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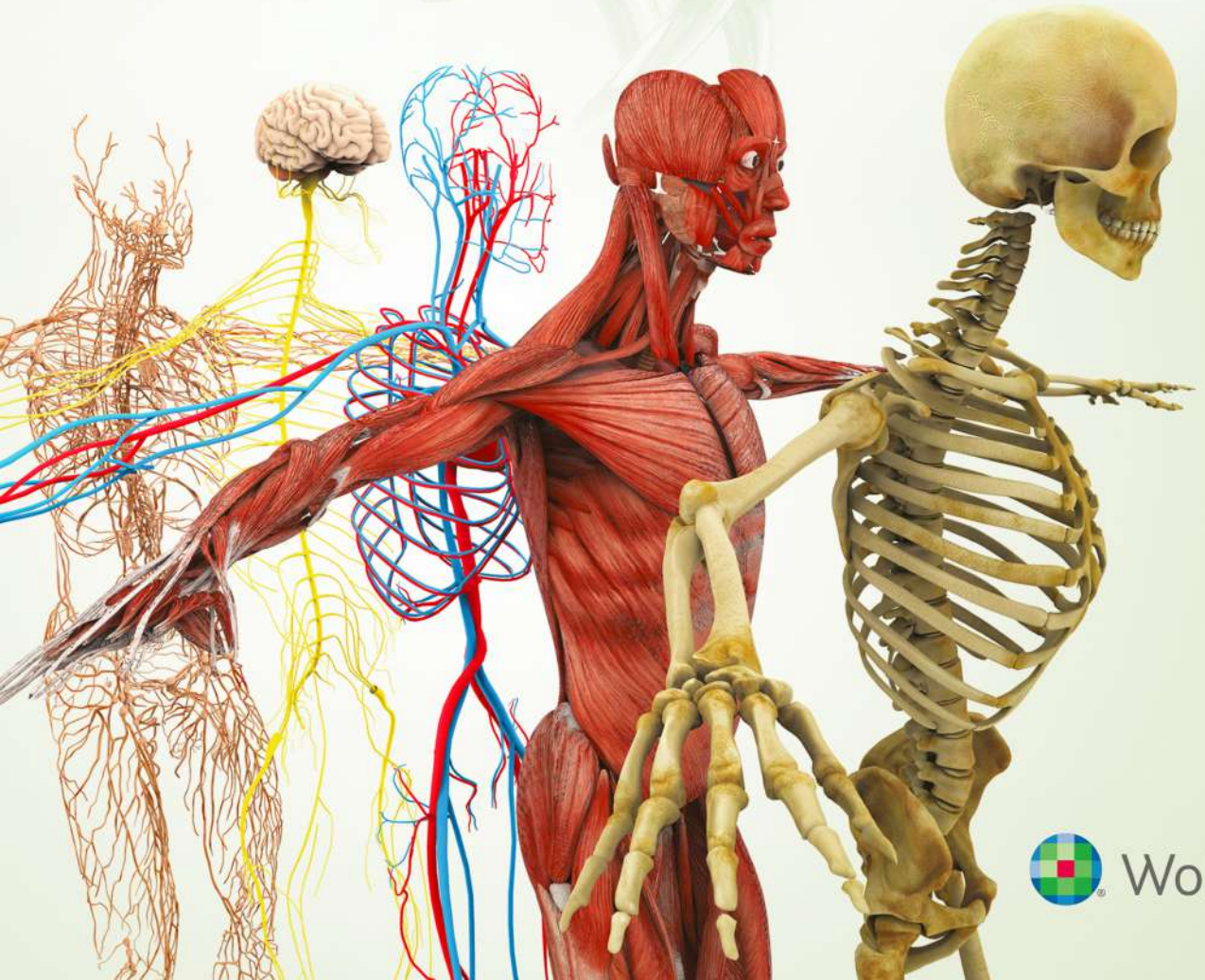
Self-Assessment Book

Joshi's Basic and Applied

Anatomy and Physiology

for Nursing and Healthcare Students, 4e

Ashalata N Nandedkar • Sadhana S Mendhurwar



Wolters Kluwer

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Contents

1 Introduction

ANATOMY

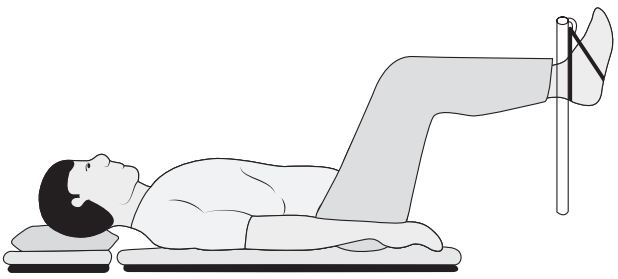
QUESTIONS

I. What is normal anatomical position? What is its significance?

II. Fill the correct word/value in the boxes below.

1. Study of bones is called _____.
2. Study of nervous system is called _____.
3. Endocrine system consists of _____.
4. Integumentary system consists of _____ and its _____.

III. Name different body positions. Describe the following position.



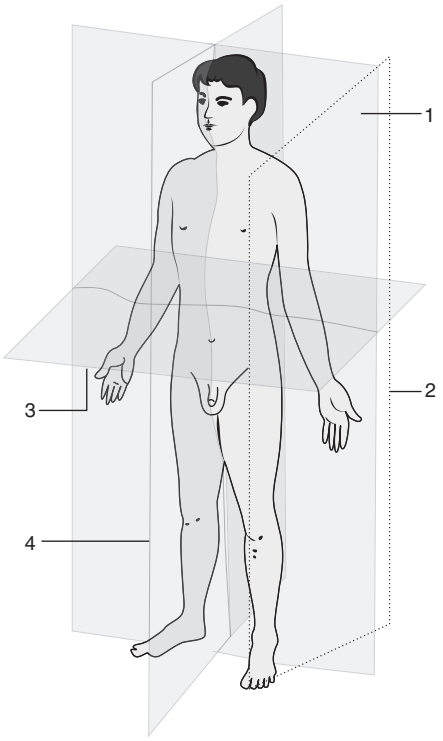
Different body positions:

1. _____.
2. _____.
3. _____.
4. _____.

Describe the following position:

_____.

IV. Label the planes in the following figure:



1. .....
2. .....
3. .....
4. .....

V. Match the following:

(a) Nearer to the front	(i) Superficial
(b) Nearer to the median plane	(ii) Adduction
(c) Nearer to the lower end	(iii) Eversion
(d) Closure to the surface	(iv) Ventral
(e) Movement towards midline of the body	(v) Medial
(f) Movement in upward direction	(vi) Caudal
(g) Movement that turns the sole of foot outwards	(vii) Opposition
(h) Movement that brings the thumb and little finger together	(viii) Elevation

VI. Tick mark the correct answer.

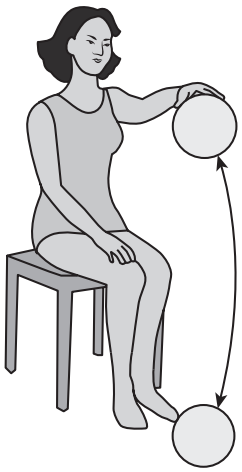
1. Fingers are proximal/distal to the wrist.
2. Vertebral column is located in the ventral/dorsal part of the body.
3. Head is cranial/caudal to the neck.
4. Mouth is medial/lateral to the ears.
5. Thumb is medial/lateral to the little finger.
6. Muscles are deep/superficial to the skin.

VII. Fill in the blanks.

1. Movement towards the midline of the body is .....
2. Folding the knee is ..... of the knee.

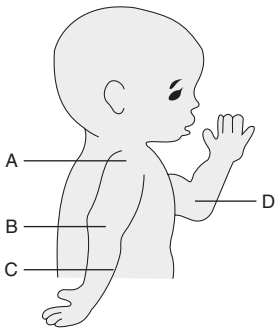
3. Moving the thumb across the palm is .....
4. Moving the limb away from the body is .....
5. Moving upper limb in a circle at shoulder joint is .....
6. While walking on the toes, feet are .....
7. Turning the sole of the foot inwards is .....
8. Bending the head towards the shoulder is .....

VIII. Study the figure and tick mark the correct option.



1. The knee joints are in flexed/extended/depressed position.
2. The neck is flexed/extended/in normal anatomical position.
3. The right forearm is in supine/prone/flexed position.
4. The left elbow is flexed/extended/elevated.
5. Thighs are adducted/abducted/extended.
6. Hip joints are flexed/extended/inverted.

IX. In the following figure, name the positions of shoulder (A), right elbow (B), forearm (C) and left elbow (D):



A. .....

B. .....

C. .....

D. .....

X. Multiple-choice questions

1. Coronal plane divides the body into
   (a) Upper and lower parts
   (b) Left and right
   (c) Front and back
   (d) Medial and lateral parts
2. A person standing in anatomical position shows all of the following, **EXCEPT**
   (a) Palms facing forwards
   (b) Eyes looking forwards
   (c) Toes facing forwards
   (d) Upper limbs away from the trunk
3. Sagittal plane is the ..... plane of the body.
   (a) Lateral
   (b) Medial
   (c) Transverse
   (d) Median

4. Splanchnology is a study of
- (a) Bones
- (b) Joints
- (c) Muscles
- (d) Organs

5. Which position is suitable for abdominal surgery?
- (a) Prone
- (b) Supine
- (c) Sitting
- (d) Lithotomy

6. Moving the limbs apart is
- (a) Abduction
- (b) Adduction
- (c) Medial rotation
- (d) Lateral rotation

7. Medial rotation of the forearm with palm facing backwards is
- (a) Adduction
- (b) Abduction
- (c) Supination
- (d) Pronation

8. Where is the heart in relation to vertebral column?
- (a) Posterior
- (b) Anterior
- (c) Medial
- (d) Lateral

ANSWERS

I. Normal anatomical position and its significance?
Body erect, with upper limbs by the side, eyes looking forward, palm and toes facing forwards.

Significance of anatomical position: It serves as an initial reference point for description regardless of body position.

II. Fill the correct word/value in the boxes below.
1. Osteology
2. Neurology
3. Endocrine (ductless) glands
4. Skin and its appendages

III. Different body positions:
1. Anatomical position
2. Supine position
3. Prone position
4. Lithotomy position, Page no. 2

IV. Label the planes in the following figure:
1. Coronal plane
2. Paramedian plane
3. Transverse plane
4. Sagittal plane

V. Match the following:

(a) Nearer to the front	(iv) Ventral
(b) Nearer to the median plane	(v) Medial
(c) Nearer to the lower end	(vi) Caudal
(d) Closure to the surface	(i) Superficial
(e) Movement towards midline of the body	(ii) Adduction
(f) Movement in upward direction	(viii) Elevation
(g) Movement that turns the sole of foot outwards	(iii) Eversion
(h) Movement that brings the thumb and little finger together	(vii) Opposition

VI. Tick mark the correct answer.
1. Distal
2. Dorsal
3. Cranial
4. Medial
5. Lateral
6. Deep

VII. Fill in the blanks.
1. Adduction
2. Flexion
3. Flexion
4. Abduction

5. Circumduction
6. Plantar flexed
7. Inversion
8. Lateral flexion

VIII. Study the figure and tick mark the correct option.

1. Flexed
2. Normal anatomical position
3. Prone
4. Flexed
5. Adducted
6. Flexed

IX. In the following figure, name the positions of shoulder (A), right elbow (B), forearm (C) and left elbow (D):

A. Adducted
B. Extended
C. Pronated
D. Flexed

X. Multiple-choice questions

1. c; **2**. d; **3**. d; **4**. d; **5**. b; **6**. a. **7**. d; **8**. b

PHYSIOLOGY

I. Fill in the blanks.

1. Two important control systems of the body are ..... and .....
2. Skin plays an important role in heat loss by carrying out .....
3. ..... carry stimuli from external and internal environment.
4. Four important structures from which waste is excreted are ....., ..., ... and .....
5. Water in the body is distributed in ..... and ..... compartments.
6. Maintaining a constant internal environment is .....
7. Main constituents of feedback mechanism are receptor, ... and effector organ.
8. Clotting of blood is an example of ..... feedback mechanism.
9. Water constitutes .....% of body weight normally in an adult.
10. Nutrients diffuse from plasma to .....
11. Waste products diffuse from interstitial fluid to .....
12. Fertilisation of ovum and sperm happens in .....
13. ..... is a basic structural and functional unit of the body.
14. CNS is made up of ..... and .....
15. CNS controls skeletal muscle activities by control on ..... nervous system.
16. Main function of ..... is exchange of gases.

II. Who am I?

1. I control all metabolic functions of body: .....
2. I am main cation of ECF: .....
3. I am main cation of ICF: .....
4. I take all deoxygenated blood and make it oxygenated: .....
5. We together control and coordinate all body functions: .....
6. We are secretions of ductless glands: .....
7. We produce antibodies to fight back against infection: .....

8. We are main transport vehicles in the body: .....
9. I am responsible to maintain normal calcium level in blood: .....
10. We produce cell-mediated immunity: .....
11. We help in excretion of water- and water-soluble waste products from the body: .....

III. Fill the correct word/value in the boxes below.

1. Receptor → ??? → Effector
2. Intracellular fluid ..... [ ] L
3. Baroreceptors → IX and X cranial nerves → ..... in medulla
4. Dilatation of arteries → ..... → Blood pressure
5. Constriction of veins → ..... and ..... → Blood pressure

IV. Match the following:

(a) Female germ cell	(i) Smell, vision
(b) Cell-mediated immunity	(ii) Regulate BP
(c) Male germ cell	(iii) Ovum
(d) Baroreceptors	(iv) T lymphocytes
(e) Special sense	(v) Sperm
(f) Antigen	(vi) 28 days
(g) Movements	(vii) Skeletal muscle
(h) Ovum release	(viii) Skin
(i) Insulin	(ix) Immunity
(j) Biggest sensory organ	(x) Blood glucose level

V. Read and mark the statements as true (T) or false (F).

1. Antigen sets in immune reaction in the body.
2. Kidneys excrete CO_2 as metabolic end-product.
3. Regulation of body temperature is required for homeostasis.
4. Interstitial fluid is present between cells.
5. Oxytocin is a uterine relaxant.
6. Vessels transmitting blood from heart are veins.
7. Plasma and interstitial fluid together make extracellular fluid.
8. Stretch on cervix during parturition leads to less release of oxytocin.
9. PTH is required for maintaining blood sugar levels.
10. Insulin is synthesised from duodenum.

11. In a reproductive life of a female, ovum is produced after every 28 days.
12. Immunology is a study of defence mechanisms of the body.
13. Regulation of body temperature is an example of positive feedback mechanism.
14. Clotting of blood is a positive feedback mechanism.
15. Transfer of various substances from interstitial fluid to plasma happens in capillaries.
16. All hormone control levels are via negative feedback mechanism mainly.

VI. Multiple-choice questions

1. Living organisms differ from nonliving organisms in
   (a) Metabolism
   (b) Movement
   (c) Growth
   (d) All of the above
2. Hormone that can affect each and every cell of the body is
   (a) Insulin
   (b) Glucagon
   (c) Growth
   (d) Oxytocin
3. 55% of the total body water is present in
   (a) ICF
   (b) ECF
   (c) Plasma
   (d) Transcellular fluid
4. Following nerves are important in baroreceptor reflex
   (a) III and IX nerves
   (b) II and X nerves
   (c) IV and VI nerves
   (d) IX and X nerves
5. Vasomotor centre is located in
   (a) Hypothalamus
   (b) Medulla
   (c) Spinal cord
   (d) All of the above

VII. Short notes

1. Definition of homeostasis; two important mechanisms that operate to maintain it via feedback mechanisms
2. Define negative feedback mechanism. How BP is controlled by negative feedback mechanism?
3. Positive feedback mechanism/parturition reflex
4. Specific and nonspecific immunity
5. Communication of body with external environment
6. Internal environment and endocrine system
7. Two examples of positive and two examples of negative feedback mechanisms
8. T and B lymphocytes

VIII. Answer the following questions:

1. Define homeostasis and its importance.
2. Draw a flow chart showing BP regulation by baroreceptors (negative feedback mechanism).
3. Draw positive feedback mechanism in childbirth.
4. Draw a diagram showing distribution of water in the human body.
5. Give examples of transcellular fluid.
6. Define receptor, centre and effector.
7. Enumerate all special senses.

8. Write meaning of the following common terms used in clinical practice:

- Fever: .....
- Acute: .....
- Chronic: .....
- Sign: .....
- Symptom: .....
- Congenital: .....
- Communicable and noncommunicable diseases: .....

IX. Long-answer question

Define homeostasis. What are the different mechanisms by which it is regulated? Explain with the help of examples.

ANSWERS

I. Fill in the blanks.

1. Endocrine and CNS
2. Evaporation
3. Receptors
4. Lungs, skin, kidney and GIT
5. Intracellular and extracellular
6. Homeostasis
7. Centre
8. Positive
9. 60%
10. Interstitial fluid
11. Plasma
12. Fallopian tube
13. Cell
14. Brain and spinal cord
15. Somatic
16. Respiratory

II. Who am I?

1. Endocrine system
2. Sodium
3. Potassium
4. Lungs
5. Endocrine and CNS
6. Hormones
7. B lymphocytes
8. Blood and lymph
9. PTH
10. T lymphocytes
11. Excretory system

III. Fill the correct word/value in the boxes below.

1. Centre
2. 28
3. Vasomotor centre
4. Peripheral resistance (exactly opposite happens with constriction of veins → increase in peripheral resistance → increase in BP)
5. Venous return and cardiac output (exactly opposite happens with vasodilatation of veins → decreased venous return and cardiac output → decrease in BP)

IV. Match the following:

(a) Female germ cell	(iii) Ovum
(b) Cell-mediated immunity	(iv) T lymphocytes
(c) Male germ cell	(v) Sperm
(d) Baroreceptors	(ii) Regulate BP
(e) Special sense	(i) Smell, vision
(f) Antigen	(ix) Immunity
(g) Movements	(vii) Skeletal muscle
(h) Ovum release	(vi) 28 days
(i) Insulin	(x) Blood glucose level
(j) Biggest sensory organ	(viii) Skin

V. Read and mark the statements as true (T) or false (F).

1. T; **2.** F (lungs excrete CO_2); **3.** T; **4.** T; **5.** F (uterine relaxant); **6.** F (arteries); **7.** T; **8.** F (more release); **9.** F (insulin); **10.** F (pancreas); **11.** T; **12.** T; **13.** F (negative feedback); **14.** T; **15.** T; **16.** T

VI. Multiple-choice questions

1. d; **2**. c; **3**. a; **4**. d; **5**. b

Chemistry of Life

2

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. ..... is concentrated source of energy.
2. Excess glucose is converted to .....
3. Glycogen is stored in ..... and .....
4. Main dietary lipids are ....., ... and .....
5. ..... are essential for oxidation of fats.
6. With acidic pH, neurons are .....
7. Normal pH of arterial blood is .....
8. pH of gastric juice is .....
9. Drastic changes in pH are quickly prevented by .....
10. Kidneys control pH by excreting ..... or ..... urine.
11. pH is ..... related to H^+ ion concentration.
12. Redox potential is .....
13. ..... are important for growth and repair of tissues.

II. Fill the correct word/value in the boxes below.

1. For clotting of blood, [ ] is required.
2. For bones and teeth, [ ] is required.
3. Bicarbonate buffer includes [ ] and [ ].
4. Millimole/litre is [ ] of mole per litre.
5. Inorganic compounds are [ ].
6. Lipids form [ ] component of plasma membrane.
7. Essential fatty acids are [ ] and [ ].

8. Proteins are digested to _____.
9. For reformation of ATP from ADP, energy derived from _____ of nutrients is used.
10. Powerhouse of cell is _____.

III. Multiple-choice questions

1. H_2O is
   (a) Compound
   (b) Molecule
   (c) Isotope
   (d) All of the above
2. Major elements of the body include all of the following, **EXCEPT**
   (a) Carbon
   (b) Nitrogen
   (c) Sulphur
   (d) Oxygen
3. Major and important electrolyte present in ECF is
   (a) K^+
   (b) Ca^+
   (c) PO_4^+
   (d) Na^+
4. Iodine is linked to _____ hormone.
   (a) Norepinephrine
   (b) Cortisol
   (c) Thyroid
   (d) Growth
5. Important buffer systems in body are
   (a) Phosphate buffer
   (b) Bicarbonate buffer
   (c) Protein buffer
   (d) All of the above
6. DNA
   (a) Is present in cytoplasm
   (b) Does not have genetic function
   (c) Controls cell division
   (d) None of the above
7. Nucleotides are compounds formed by
   (a) Purine or pyrimidine bases
   (b) Ribose or deoxyribose sugars
   (c) Phosphoric acids
   (d) All of the above
8. Main source of energy in the body is
   (a) Lipids
   (b) Vitamins
   (c) Carbohydrates
   (d) Proteins

IV. Short notes

1. Carbohydrate classification
2. Lipid classification
3. Functions of lipids
4. Important chemicals formed from protein
5. Role of carbohydrates in diet
6. Principal buffer systems of the body
7. DNA
8. RNA
9. Atomic number
10. ATP
11. Classification of proteins
12. Mechanisms that maintain pH of body fluids

V. Answer the following questions:

1. Describe the importance of elements essential to life.
2. Define isotope, element and compound.
3. What is a strong and a weak base?
4. What is a strong and a weak acid?
5. What are monosaccharides, disaccharides and trisaccharides?
6. What are simple lipids, compound lipids and derived lipids?
7. Describe the role of proteins in the body.
8. What is a nucleotide and its composition?
9. Enumerate functions of ATP.
10. Enumerate factors affecting enzymatic activity.

VI. Long-answer question

Discuss main nutrients used by the human beings and give their functions.

ANSWERS

I. Fill in the blanks.

1. Fat
2. Glycogen
3. Liver, muscles
4. Triglycerides, cholesterol, phospholipids
5. Carbohydrates
6. Depressed/inhibited
7. 7.4
8. 1.5–3.5
9. Buffers
10. Acidic, basic (alkaline)
11. Inversely
12. Ability of enzyme to catalyse oxidation or reduction
13. Proteins

II. Fill the correct word/value in the boxes below.

1. Calcium
2. Calcium and phosphate
3. $NaHCO_3$, H_2CO_3
4. 1/1000th of
5. Electrolytes
6. Structural
7. Linoleic acid, linolenic acid
8. Amino acids
9. Oxidation
10. Mitochondria

III. Multiple choice questions

1. a; **2**. c; **3**. d; **4**. c; **5**. d; **6**. c; **7**. d; **8**. c

Cells, Transport and Tissues

3

ANATOMY

QUESTIONS

I. Draw and label the structure of a typical cell showing organelle.

II. Complete the following table:

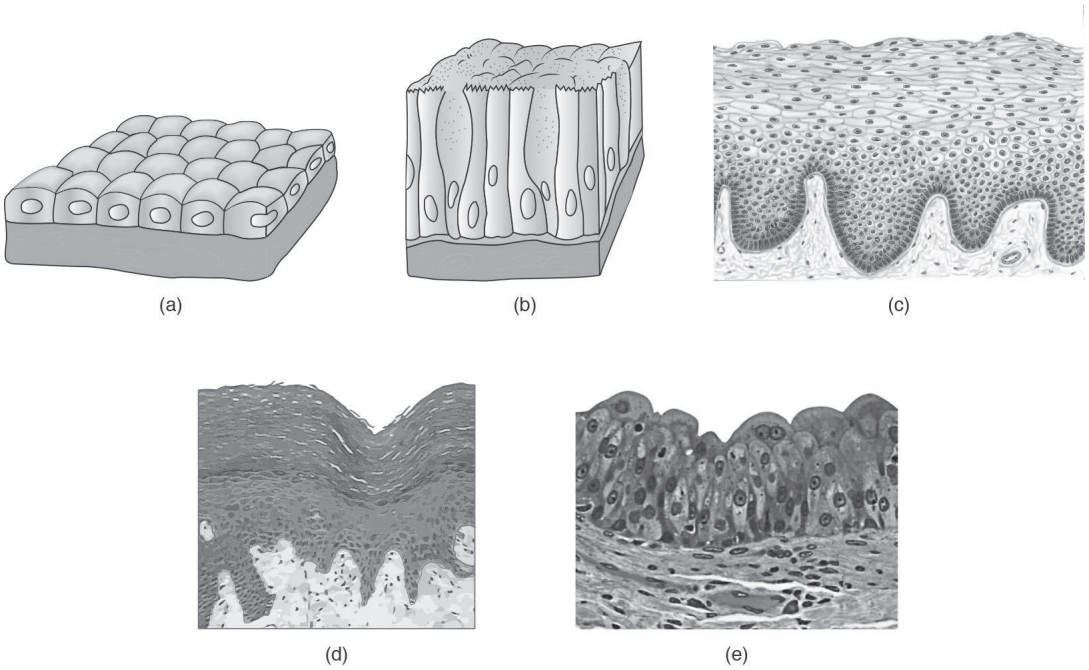
Name of the organelle	Function in brief

III. Fill in the blanks.

1. ..... is the largest organelle of the cell.
2. DNA is found in ..... and .....
3. Chromatids are visible in ..... of mitotic division.
4. ..... is a type of cell division forming gametes.
5. Gametes have ..... number of chromosomes.

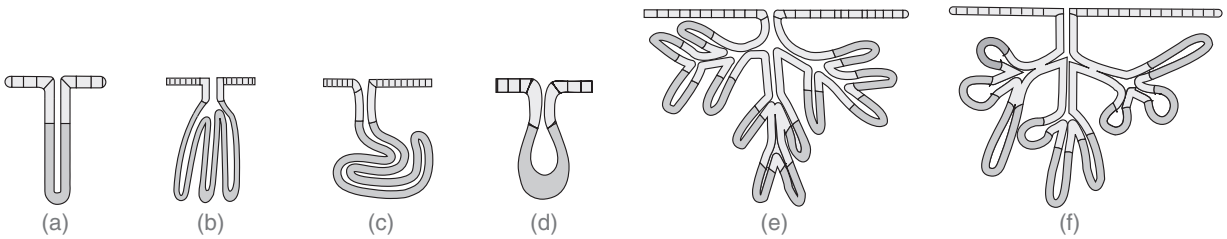
6. ..... are the end parts of chromosomes.
7. Mutation is a change in ..... or .....
8. Genotype of Turner syndrome is .....
9. Inheritance of blood group is an example of ..... inheritance.
10. Haemophilia is transmitted as ..... inheritance.

IV. Identify the following illustrations:



(a) .....
(b) .....
(c) .....
(d) .....
(e) .....

V. Identify the variety of the glands below and give example of each.



(a) .....
(b) .....
(c) .....
(d) .....
(e) .....
(f) .....

VI. Complete the following table:

Component of connective tissue	Distribution	Function
Fibroblasts		
Macrophages		
Adipocytes		
Plasma cells		
Mast cells		
Collagen fibres		
Elastic fibres		
Reticular fibres		

VII. Read and mark the statements as true (T) or false (F).

1. Secretions onto the body surfaces are characteristic of endocrine glands.
2. The combination of fibres and ground substance in connective tissue forms matrix.
3. The most abundant cells in connective tissue are fibroblasts.
4. Elastic fibres are found in bundles.
5. Cartilages are highly vascular.

VIII. Multiple-choice questions

1. In humans, each cell normally contains ..... of chromosomes.
- (a) 22 pairs
- (b) 23 pairs
- (c) 44 pairs
- (d) 46 pairs

2. The chromosomal complement of normal sperm is
- (a) 22 + X
- (b) 22 + Y
- (c) 23 + X
- (d) 23 + Y

3. A change in the gene or chromosomes is known as
- (a) Genetics
- (b) Genome
- (c) Multiplication
- (d) Mutation

4. Each of the following is a primary tissue, **EXCEPT**
- (a) Epithelial tissue
- (b) Bone
- (c) Connective tissue
- (d) Muscle tissue

5. Absorption of the food takes place in small intestine. Which variety of epithelium is lining it?
- (a) Simple columnar
- (b) Simple columnar with brush border
- (c) Ciliated columnar
- (d) Simple columnar with goblet cells

6. Which epithelium shows umbrella cells?
- (a) Pseudostratified columnar epithelium
- (b) Stratified cuboidal epithelium
- (c) Urothelium
- (d) Stratified squamous epithelium

7. Tendon is an example of
- (a) Loose areolar tissue
- (b) Dense regular connective tissue
- (c) Dense irregular connective tissue
- (d) Elastic tissue

8. The cells producing histamine responsible for inflammatory reaction are
(a) Macrophages
(b) Adipocytes
(c) Fibrocytes
(d) Mast cells

9. Epiphyseal cartilage is of ..... variety.
(a) Hyaline
(b) Articular
(c) Fibrocartilage
(d) Elastic cartilage

10. An individual who has two identical alleles for a trait is
(a) Codominant
(b) Homozygous
(c) Heterozygous
(d) Recessive

11. The ..... is the set of observable characteristics and is the sum of genetic and environmental effects.
(a) Genotype
(b) Phenotype
(c) Both genotype and phenotype
(d) Neither genotype or phenotype

IX. Case-based questions

A 15-year-old girl was brought to the clinic by her mother as the girl has not started her periods. The girl looked short for her age. On examination, she showed an extra fold of skin at neck; breasts were not developed and nipples were widely separated. Her hands looked swollen.

1. What is the likely diagnosis?
2. What investigation should be done to confirm the diagnosis?
3. What is the likely treatment for it?

X. Short-answer questions

1. Name the types of simple epithelia. Give example of each variety.
2. Name compound epithelia. Give example of each variety.
3. Name the components of connective tissue.
4. Write a short note on classification of chromosomes.
5. Draw and label the microscopic structure of articular cartilage.
6. Write the functions of connective tissue in brief.

XI. Long-answer questions

1. Draw and label the stages of meiosis.
2. Classify chromosomes. Add a note on sex chromosomes.
3. Classify simple epithelium. Describe modifications of the columnar epithelium.
4. What are the characteristics of cartilage? Describe elastic cartilage.

ANSWERS

I. Page no. 32

II. Complete the following table:

Name of the organelle	Function in brief
Endoplasmic reticulum	Rough ER—synthesis of proteins Smooth ER—synthesis of lipids
Golgi apparatus	Processing and packaging of proteins from ER
Mitochondria	Produce energy in the form of ATP required for aerobic respiration
Lysosomes	Digestion of worn-out organelles and food particles ingested by cell
Peroxisomes	Detoxify harmful substances
Nucleus	Control of cellular structures and functions by genes
Centrioles	Form mitotic spindle during cell division for equal division of chromosomes
Microfilaments	Form cytoskeleton Cause contraction in muscle
Microtubules	Support cell and maintain the shape of cell Cilia and flagellum provide mobility

III. Fill in the blanks.

1. Nucleus
2. The nucleus, mitochondria
3. Metaphase
4. Meiosis
5. 23 (or *n*)
6. Telomeres
7. The gene, chromosome
8. 45XO
9. Codominant
10. Sex-linked inheritance

IV. Identify the following illustrations:

(a) Simple squamous epithelium
(b) Simple columnar epithelium with goblet cells
(c) Stratified squamous nonkeratinised epithelium
(d) Stratified squamous keratinised epithelium
(e) Urothelium

V. Identify the variety of the glands below and give example of each.

(a) Simple tubular—glands of small intestine
(b) Simple branched tubular—fundic glands of stomach
(c) Simple coiled tubular—sweat glands
(d) Simple acinar—tarsal gland
(e) Compound tubular—duodenal glands
(f) Compound tubuloalveolar or racemose—salivary glands

VI. Complete the following table:

Component of connective tissue	Distribution	Function
Fibroblasts	Found in varieties of connective tissue and in the wound that is healing	Form fibres and secrete ground substance
Macrophages	Fixed macrophages in spleen and lung Wandering macrophages in varieties of connective tissue and at site of inflammation	Phagocytosis
Adipocytes	Adipose tissue, around organs, in mesentery	Protection, insulation and storage of food
Plasma cells	Lymph nodes, red bone marrow, in GIT	Secretion of antibodies
Mast cells	Along the blood vessels, loose areolar tissue and capsules of spleen and liver	Secrete heparin and histamine at the site of injury
Collagen fibres	Tendons, bones, ligaments, cartilages	Give strength and help in healing the wound
Elastic fibres	Elastic cartilage, tunica media of elastic arteries, ligamentum nuchae	Give elasticity
Reticular fibres	Kidney, lymph nodes, spleen, liver	Provide framework to support cells

VII. Read and mark the statements as true (T) or false (F).

1. F; **2.** T; **3.** T; **4.** F; **5.** F

VIII. Multiple-choice questions

1. b; **2**. b; **3**. d; **4**. b; **5**. b; **6**. c; **7**. b; **8**. d; **9**. a; **10**. b; **11**. b.

IX. Case-based questions

1. The likely diagnosis is Turner syndrome.

2. Karyotyping is the investigation required. A karyotype gives information about the total number of chromosomes and chromosomal anomalies of an individual. In Turner syndrome, total 45 chromosomes and only 1 X chromosome are seen (45,XO).

3. As ovaries are not developed in Turner syndrome, the patient lacks female hormones, hence treated with oestrogen.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Na^+/K^+ pump is ..... pump.

2. Integral proteins act as ..... and peripheral proteins act as .....

3. In granular ER, ... occurs in ribosomes.

4. ..... controls cellular structure and functions.

5. ..... contain code for synthesis of protein in cell.

6. Humans have ..... chromosomes.

7. ..... is used to find chromosomal anomalies.

8. ..... does not and ..... does require energy.

9. Diffusion always occurs from ..... concentration to ..... concentration.

10. Lining of alveoli shows ..... epithelium.

II. Who am I?

1. We form cytoskeleton and maintain shape of cell: .....

2. We are responsible for equal division of characters in offspring: .....

3. We are digestive system of cell: .....

4. We process and pack proteins from endoplasmic reticulum: .....

5. I am the largest organelle in the cell: .....

6. We change functions of cell: .....

7. We help to maintain size of cells: .....

8. We open and close our gates according to voltage: .....

9. We are specialist in transport of large molecules: .....

10. We require carrier proteins for transport: .....

III. Match the following:

(a) Na^+/K^+ pump	(i) Mitochondria
(b) Vmax	(ii) Central centromere
(c) Metacentric	(iii) Facilitated diffusion
(d) Powerhouse	(iv) Electrogenic

IV. Multiple-choice questions

1. Ions cannot pass through lipid bilayer because
- (a) They are large
- (b) They have charges
- (c) They are not water soluble
- (d) All of the above

2. The number of chromosomes is halved in
- (a) Mitosis
- (b) Division of neuron
- (c) Meiosis
- (d) None of the above

3. Water molecules pass through
- (a) Pores of cell membrane
- (b) Lipid bilayer
- (c) Both of the above
- (d) None of the above

4. Rate of diffusion through cell membrane is directly proportional to
- (a) Molecular weight
- (b) Concentration gradient
- (c) Thickness of membrane
- (d) Supply of energy

5. Facilitated diffusion has all of the following characteristics **EXCEPT**
- (a) Vmax
- (b) Requires energy
- (c) Specificity
- (d) Competitive inhibition

6. Water molecules pass
- (a) With competitive inhibition
- (b) Utilising energy
- (c) Through lipid bilayer
- (d) All of the above

7. Simple diffusion through lipid bilayer of cell membrane involves
- (a) Water-soluble substances
- (b) Lipid-soluble substances
- (c) Glucose
- (d) Amino acids

8. Function of endoplasmic reticulum of cell is to
- (a) Produce energy
- (b) Store granules
- (c) Synthesise proteins
- (d) None of the above

9. Total number of chromosomes in somatic cells is
- (a) 46
- (b) 48
- (c) 22
- (d) 26

10. Human mitochondria
- (a) Contain DNA
- (b) Can replicate
- (c) Store energy
- (d) All of the above

11. Glucose is transported in tissue cells by
- (a) Simple diffusion
- (b) Primary active transport
- (c) Facilitated diffusion
- (d) None of the above

12. Lysosomes
- (a) Are surrounded by plasma membrane
- (b) Contain hydrolase enzyme
- (c) Form intracellular digestive system
- (d) All of the above

V. Short notes

1. Functions of cell membrane
2. Golgi apparatus and mitochondria
3. Functions of microtubules and microfilaments
4. Functions of lysosomes and peroxisomes
5. Simple diffusion
6. Facilitated diffusion
7. Primary and secondary active transport
8. Functions of Na^+/K^+ pump
9. Pinocytosis and phagocytosis
10. Functions of adipose tissue
11. Cell division

VI. Answer the following questions:

1. Explain mitochondria, a powerhouse.
2. Define endoplasmic reticulum (ER) and enumerate its functions.
3. Compare mitosis and meiosis.
4. What is mutation? Describe the effects of mutations.
5. What are integral and peripheral proteins?
6. Draw a nucleus and state its functions.
7. Draw a diagram of cell cycle.
8. Enumerate membrane-bound organelles.
9. Enumerate different phases of mitosis.
10. Enumerate stages of meiosis and its significance.
11. Classify different transport mechanism with the help of a flow chart.
12. Enumerate factors affecting rate of diffusion.
13. Enumerate characteristics of protein channels.
14. What are Na cotransport and Na countertransport mechanisms?
15. Draw a diagram of Na^+/K^+ pump.

VII. Long-answer question

Classify and describe the various transport mechanisms in the body.

ANSWERS

I. Fill in the blanks.

1. Electrogenic
2. Carriers, enzymes
3. Protein synthesis
4. Nucleus
5. Genes
6. 46
7. Karyotype
8. Passive transport, active transport
9. Higher, lower
10. Simple squamous

II. Who am I?

1. Microfilaments
2. Centrioles
3. Lysosomes
4. Golgi apparatus
5. Nucleus
6. Mutations
7. Na^+/K^+ pump
8. Voltage-gated channels
9. Endocytosis
10. Facilitated diffusion

III. Match the following:

(a) Na^+/K^+ pump	(iv) Electrogenic
(b) Vmax	(iii) Facilitated diffusion
(c) Metacentric	(ii) Central centromere
(d) Powerhouse	(i) Mitochondria

IV. Multiple-choice questions

1. b; **2**. c; **3**. c; **4**. b; **5**. b; **6**. c; **7**. b; **8**. c; **9**. a; **10**. d; **11**. c; **12**. d

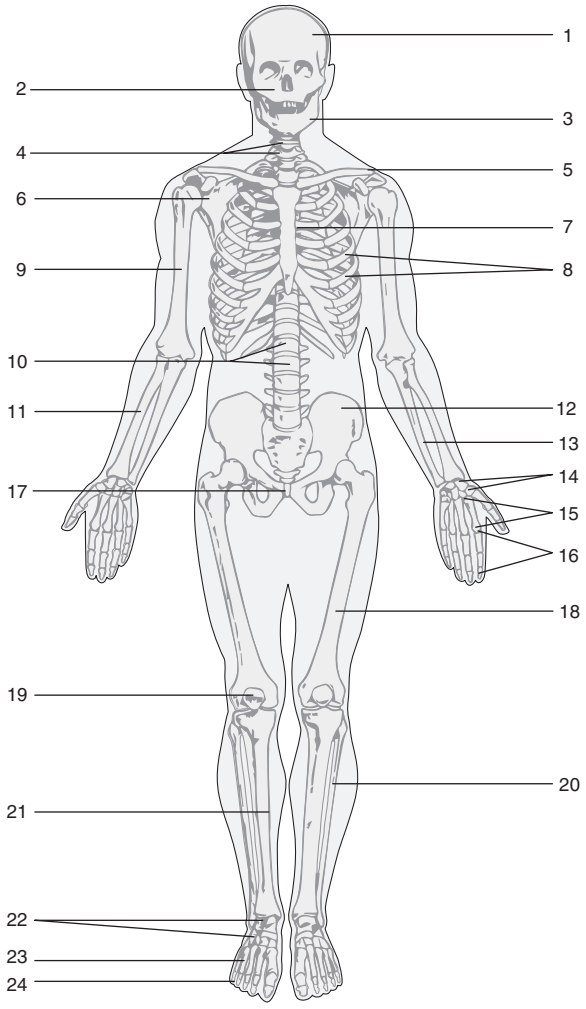
Skeletal System

4

ANATOMY

QUESTIONS

I. Refer to the figure below and label the bones.

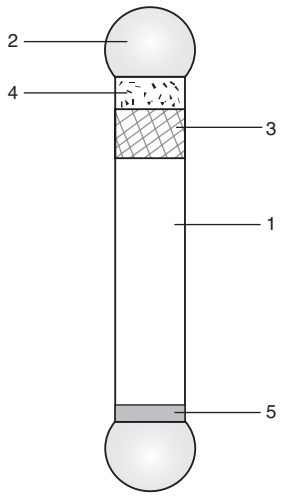


1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....
10. .....
11. .....
12. .....
13. .....
14. .....
15. .....
16. .....
17. .....
18. .....
19. .....
20. .....
21. .....
22. .....
23. .....
24. .....

II. Name the bones forming axial skeleton.

III. Name the bones forming appendicular skeleton.

IV. Name the parts numbered.



1. .....
2. .....
3. .....
4. .....
5. .....

V. Fill in the blanks.

1. Bone is a ..... tissue with ..... matrix.
2. Bones are covered by ..... which has outer ..... layer and inner ..... layer.
3. Organic matter of the bone consists of ..... and .....
4. Flat bones of the skull develop in .....
5. Long bones develop in .....
6. The paired bones of the skull are ..... and .....
7. The pneumatic bones of the skull are ....., ..., ..., ... and ..... process of ..... bone.
8. The structural and functional unit of the bone is called .....

9. ..... forms the shaft of a long bone.
10. ..... is the growing end of the humerus.

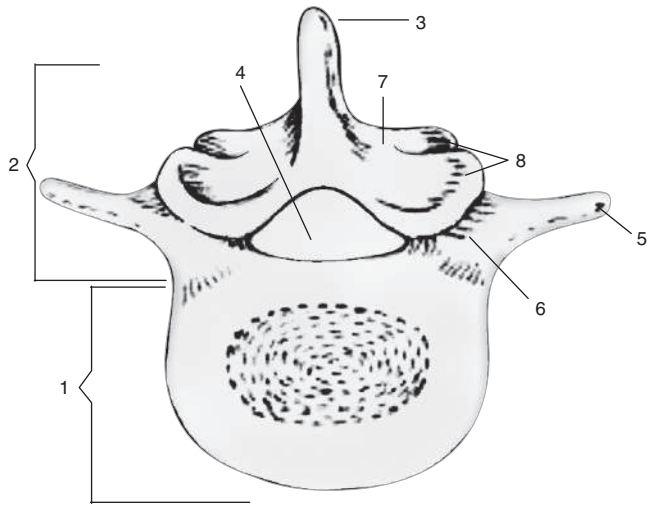
VI. Read and mark the statements as true (T) or false (F).

1. Metaphysis has a poor blood supply.
2. Clavicle develops in cartilage.
3. Anterior fontanelle is situated at bregma.
4. Sphenoid is a pneumatic bone.
5. Kyphosis is an excessive lateral curvature.
6. The eighth rib is a false rib.
7. Acromion process is atavistic epiphysis.
8. Femur is the longest bone in the body.
9. Sustentaculum tali is a part of talus.
10. Pyogenic infection of the bone is known as osteoporosis.

VII. Identify the numbers 1–4 in the following figure. Name the bones seen in the figure.

1. .....
2. .....
3. .....
4. .....

VIII. Label the parts of vertebra in the following figure:



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....

IX. Tick mark the correct answer.

1. Cells that secrete organic component of bone are osteoblasts/osteocytes.
2. Childhood disorder involving softening of the bones is osteomalacia/rickets.
3. Presence of epiphyseal line indicates fracture of the bone/end of epiphyseal growth.
4. Clavicle articulates with scapula at acromion process/coracoid process.
5. Red bone marrow forms blood cells/bone cells.
6. The pituitary gland is located in sella turcica/glenoid fossa.
7. A cleft palate is developmental anomaly of maxilla/mandible.
8. The shoulder girdle consists of scapula, clavicle and humerus/scapula and clavicle.
9. Medial epicondyle of humerus provides attachment to flexors/extensors of forearm.
10. Brachialis/brachioradialis is inserted into ulnar tuberosity.
11. Pelvis is formed by two hip bones/two hip bones and sacrum.
12. Pelvic inlet in females is oval/heart shaped.
13. Psoas major is inserted into greater trochanter/lesser trochanter.
14. Tennis elbow involves medial epicondyle/lateral epicondyle of humerus.
15. Intercondylar areas of tibia give attachment to cruciate ligaments/collateral ligaments.
16. Neck of the fibula is related to saphenous nerve/common peroneal nerve.
17. Fibula bears the weight of the body/provides lateral stability to the ankle joint.
18. Reduction in bone mass in elderly women is called osteomalacia/osteoporosis.

X. Multiple-choice questions

1. Tensile strength is imparted to the bone by
   (a) Osteocytes
   (b) Calcium
   (c) Collagen fibres
   (d) Glycosaminoglycans
2. The cells that maintain the bone are
   (a) Osteogenic cells
   (b) Osteoblasts
   (c) Osteocytes
   (d) Osteoclasts
3. The osteocytes are located in
   (a) Lacunae
   (b) Haversian canal
   (c) Canaliculi
   (d) Volkmann canal
4. A fossa is
   (a) Air cavity
   (b) Elevation
   (c) Depression
   (d) Opening
5. The bone which forms forehead is
   (a) Frontal
   (b) Parietal
   (c) Temporal
   (d) Occipital
6. The coronal suture is formed by the articulation between
   (a) Temporal and parietal
   (b) Frontal and parietals
   (c) Occipital and parietals
   (d) Occipital and temporal
7. All of the following are the unpaired bones of the cranium, **EXCEPT**
   (a) Frontal
   (b) Occipital
   (c) Sphenoid
   (d) Temporal

8. The head of the humerus is the following type of epiphysis.
(a) Pressure
(b) Atavistic
(c) Traction
(d) Aberrant

9. Which part of scapula articulates with humerus?
(a) Spine
(b) Coracoid process
(c) Glenoid cavity
(d) Acromion process

10. Pituitary fossa is a part of the following bone.
(a) Occipital bone
(b) Frontal bone
(c) Temporal bone
(d) Sphenoid bone

11. All of the following are the parts of femur, **EXCEPT**
(a) Linea aspera
(b) Lesser tuberosity
(c) Gluteal tuberosity
(d) Adductor tubercle

12. The characteristic feature of the typical thoracic vertebra is
(a) Foramen transversarium
(b) Costal facet
(c) Horizontal spine
(d) Large body

13. Greater trochanter gives attachment to all of the following muscles, **EXCEPT**
(a) Gluteus maximus
(b) Gluteus medius
(c) Gluteus minimus
(d) Piriformis

14. The medial malleolus is a process on
(a) Tibia
(b) Fibula
(c) Talus
(d) Calcaneus

15. All of the following bones are involved in weight transmission, **EXCEPT**
(a) Tibia
(b) Fibula
(c) Talus
(d) Calcaneum

XI. Case-based questions

An old lady slipped in her bathroom and could not get up. Her X-ray showed intracapsular fracture of neck of femur.

1. Where is the attachment of capsule of hip joint to the neck of femur?
2. What is the likely complication of intracapsular neck fracture?
3. What is the reason for this complication?
4. Why are old women more likely to sustain fractures from trivial trauma?

XII. Long-answer question

Classify bones giving an example of each variety. Add a note on pneumatic bones.

XIII. Write short notes on the following topics:

1. Long bone
2. Metaphysis
3. Bone cells and their functions
4. Microscopic structure of compact bone
5. Parts of typical vertebra (drawing and labelling)
6. Fontanelle of skull
7. Pelvimetry
8. Nerves in relation with humerus and their importance

ANSWERS

I. Page no. 52

II. Name the bones forming axial skeleton: Skull, hyoid bone, vertebral column, ribs and sternum

III. Name the bones forming appendicular skeleton: Pectoral girdle with bones of upper limb and pectoral girdle with bones of lower limb

IV. Name the parts numbered.

1. Diaphysis
2. Epiphysis
3. Metaphysis
4. Epiphyseal plate of cartilage
5. Epiphyseal line

V. Fill in the blanks.

1. Connective tissue, solid
2. Periosteum, fibrous, cellular
3. Collagen fibres, glycosaminoglycans
4. Membrane
5. Cartilage
6. Parietal, temporal
7. Frontal, maxilla, sphenoid, ethmoid, mastoid process of temporal bone
8. Osteon
9. Diaphysis
10. Upper end

VI. Read and mark the statements as true (T) or false (F).

1. F; **2.** F; **3.** T; **4.** T; **5.** F; **6.** T; **7.** F; **8.** T; **9.** F; **10.** F

VII. Identify the numbers 1–4 in the following figure. Name the bones seen in the figure.

1. Bregma
2. Coronal suture
3. Lambdoid suture
4. Lambda

VIII. Label the parts of vertebra in the following figure:

1. Body
2. Neural arch
3. Spinous process
4. Vertebral foramen
5. Transverse process
6. Pedicle
7. Lamina
8. Articular processes

IX. Tick mark the correct answer.

1. Osteoblasts
2. Rickets
3. End of epiphyseal growth
4. Acromion process
5. Blood cells
6. Sella turcica
7. Maxilla
8. Scapula and clavicle
9. Flexors
10. Brachialis
11. Two hip bones and sacrum
12. Oval
13. Lesser trochanter
14. Lateral epicondyle
15. Cruciate ligaments
16. Common peroneal nerve
17. Provides lateral stability to the ankle joint
18. Osteoporosis

X. Multiple-choice questions

1. c; **2**. c; **3**. a; **4**. c; **5**. a; **6**. b; **7**. d; **8**. a; **9**. c; **10**. c; **11**. b; **12**. b; **13**. a; **14**. a; **15**. b

XI. Case-based questions

1. The capsule of the hip joint is attached to intertrochanteric line anteriorly and 1 cm medial to the intertrochanteric crest posteriorly. Thus, the whole neck is intracapsular anteriorly and major part posteriorly.
2. The likely complication is avascular necrosis of head of the femur.
3. The blood vessels supplying the head of femur run along the capsule and get torn with intracapsular fracture of the neck of femur, cutting the blood supply to the head of femur. This leads to avascular necrosis of head of femur.
4. Old women are more likely to sustain fractures from trivial trauma as their bones are light and osteoporotic.

Articulations

5

ANATOMY

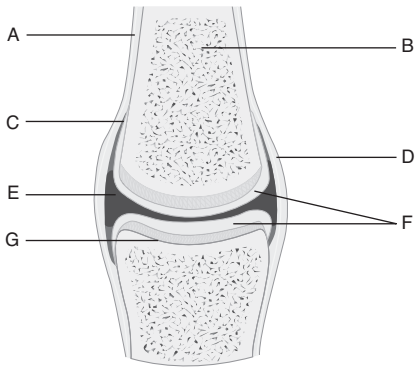
QUESTIONS

I. Give classification of joints in tabular form.

II. Fill in the blanks.

1. Sutures are classified as ..... type of joint.
2. Sutures are found in .....
3. ..... and ..... are two varieties of cartilaginous joints.
4. ..... cartilaginous joints are temporary.
5. Joints between the bodies of vertebrae are .....

III. Identify the parts labelled in the figure below.



A. .....

B. .....

C. .....

D. .....

E. .....

F. .....

G. .....

IV. Match the following:

(a) Syndesmosis	(i) Joint between epiphysis and diaphysis
(b) Pivot joint	(ii) Acromioclavicular joint
(c) Saddle joint	(iii) Glenohumeral joint
(d) Hinge joint	(iv) Metacarpophalangeal joint
(e) Condylar joint	(v) First carpometacarpal joint
(f) Ball and socket joint	(vi) Elbow joint
(g) Plane synovial joint	(vii) Radiocarpal joint
(h) Synchondrosis	(viii) Joint between two pubic bones
(i) Symphysis	(ix) Inferior tibiofibular joint
(j) Ellipsoid joint	(x) Superior radioulnar joint

V. Name the following:

1. Two joints of shoulder girdle

2. Ligament which transmits the weight of upper limb to the clavicle

3. Muscle for protraction of scapula

4. Structure deepening the glenoid cavity of scapula

5. Bursa involved in student's elbow

6. Structure which binds radius and ulna to each other

7. Strongest ligament of hip joint

8. Tendon passing through knee joint

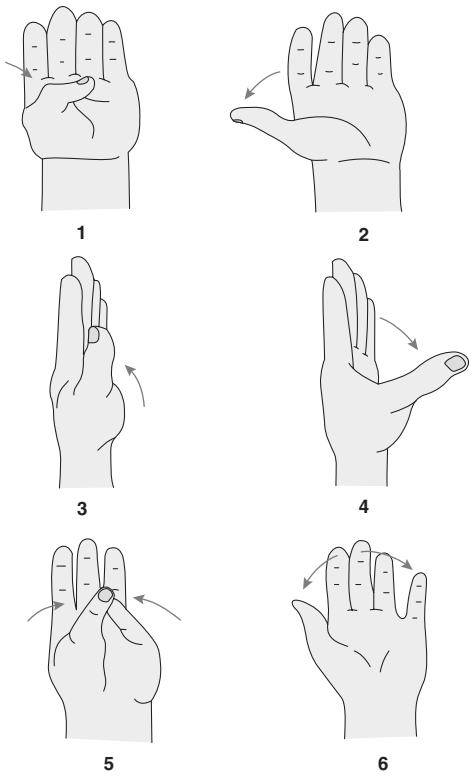
9. Intra-articular ligaments of knee joint which hold tibia and femur together

10. Ligament most often injured in ankle sprain

VI. Read and mark the statements as true (T) or false (F).

1. All joints in the human body are mobile.
2. Primary cartilaginous joints are located in the midline of the body.
3. Synovial joints are characterised by joint cavity.
4. Rotator cuff gives stability to the shoulder joint.
5. Ligamentum teres is the strongest ligament of hip joint.
6. Knee joint communicates with superior tibiofibular joint.
7. Lateral longitudinal arch of foot is for weight transmission and stability.
8. Aging of the articular cartilages of joints leads to rheumatoid arthritis.

VII. Identify the following movements of thumb. Name the muscles causing each movement.



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

VIII. Multiple-choice questions

1. All of the following are the synovial joints, **EXCEPT**
(a) Syndesmosis
(b) Pivot
(c) Saddle
(d) Plane

2. Symphyses are which variety of the joints?
(a) Fibrous
(b) Primary cartilaginous
(c) Secondary cartilaginous
(d) Synovial

3. Which of the following joints is of saddle variety?
(a) First carpometacarpal
(b) Tibiofemoral
(c) Acromioclavicular
(d) Calcaneonavicular

4. Which of the following is not a synovial joint?
(a) Acromioclavicular
(b) Glenohumeral
(c) Manubriosternal
(d) Talocalcaneal

5. Which of the following movements is circumduction?
(a) A pitcher winding up to throw the ball
(b) Bending the trunk on left
(c) Picking up the glass from table
(d) Picking up the ball from the ground

6. Pulled elbow is
(a) Dislocation of head of radius
(b) Tear of bicipital aponeurosis
(c) Tear of common extensor tendon
(d) Dislocation of elbow joint

7. A young boy slipped on a pavement on outstretched hand. After taking X-ray, the doctor told him that he has dislocated the middle carpal bone of proximal row. Which bone is dislocated?
(a) Scaphoid
(b) Lunate
(c) Triquetrum
(d) Pisiform

8. Which ligament normally supports the head of talus and is primarily responsible for holding the medial longitudinal arch of the foot?
(a) Long plantar ligament
(b) Short plantar ligament
(c) Plantar calcaneonavicular ligament
(d) Interosseous talocalcaneal ligament

9. The spring ligament connects
(a) Talus and calcaneus
(b) Talus and navicular
(c) Calcaneus and cuboid
(d) Calcaneus and navicular

10. Osteoarthritis is
(a) A degenerative disease of the joint
(b) An inflammation of bursa
(c) An inflammation of tendon sheath
(d) A bone tumour

IX. Case-based questions

A footballer, while playing, suddenly twisted his right knee and fell down. Examination showed that he had bucket handle tear of medial meniscus of his right knee.

1. What are menisci?
2. Why is medial meniscus more often injured?
3. What are the functions of menisci?

X. Short-answer questions

1. Saddle joint
2. Name of the movements of temporomandibular joint and muscles causing them
3. Enumerate movements of elbow joint and muscles causing them
4. Movements of thumb
5. Bursae around knee joint
6. Lateral longitudinal arch of foot

XI. Long-answer questions

1. Classify fibrous joints. Describe sutures in brief.
2. Describe the shoulder joint as under:
   (a) Bones forming the joint
   (b) Name of the ligaments
   (c) Movements and muscles causing them
3. Name intra-articular structures of knee joint. Describe the cruciate ligaments in brief.

ANSWERS

I. Page no. 52

II. Fill in the blanks.

1. Fibrous
2. Skull
3. Primary cartilaginous (synchondrosis), secondary cartilaginous (symphysis)
4. Primary cartilaginous
5. Symphyses (secondary cartilaginous)

III. Identify the parts labelled in the figure below.

A. Periosteum
B. Bone
C. Synovial membrane
D. Capsule
E. Fibrocartilage
F. Joint cavity
G. Articular cartilage

IV. Match the following:

(a) Syndesmosis	(ix) Inferior tibiofibular joint
(b) Pivot joint	(x) Superior radioulnar joint
(c) Saddle joint	(v) First carpometacarpal joint
(d) Hinge joint	(vi) Elbow joint
(e) Condylar joint	(iv) Metacarpophalangeal joint
(f) Ball and socket joint	(iii) Glenohumeral joint
(g) Plane synovial joint	(ii) Acromioclavicular joint
(h) Synchondrosis	(i) Joint between epiphysis and diaphysis
(i) Symphysis	(viii) Joint between two pubic bones
(j) Ellipsoid joint	(vii) Radiocarpal joint

V. Name the following:

1. Sternoclavicular, acromioclavicular
2. Coracoclavicular ligament
3. Serratus anterior
4. Glenoidal labrum
5. Olecranon bursa
6. Interosseous membrane
7. Iliofemoral ligament (ligament of Bigelow)
8. Tendon of popliteus
9. Anterior and posterior cruciate ligaments
10. Lateral ligament of ankle joint

VI. Read and mark the statements as true (T) or false (F).

1. F; **2.** F; **3.** T; **4.** T; **5.** F; **6.** F; **7.** T; **8.** F

VII. Page no. 117

VIII. Multiple-choice questions

1. a; **2**. c; **3**. a; **4**. c; **5**. a; **6**. a; **7**. b; **8**. c; **9**. d; **10**. a

IX. Case-based questions

1. Menisci are two semilunar fibrocartilages in the knee joint on the condyles of tibia, attached to the intercondylar area.
2. Medial meniscus is more often injured because of the following reasons:
   - It is less mobile than lateral meniscus.
   - It is adherent to the joint capsule.
3. Functions of menisci are the following:
   - Deepen the tibial condyles and add to the stability of the joint
   - Act as shock absorbers
   - Increase the area for weight transmission
   - Prevent the lateral displacement of bones

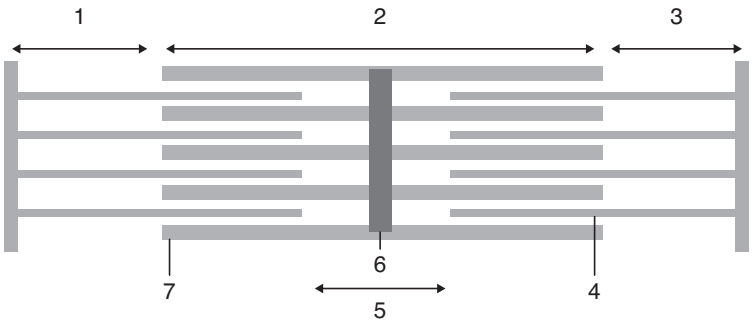
Muscular System

6

ANATOMY

QUESTIONS

I. Label the following figure:



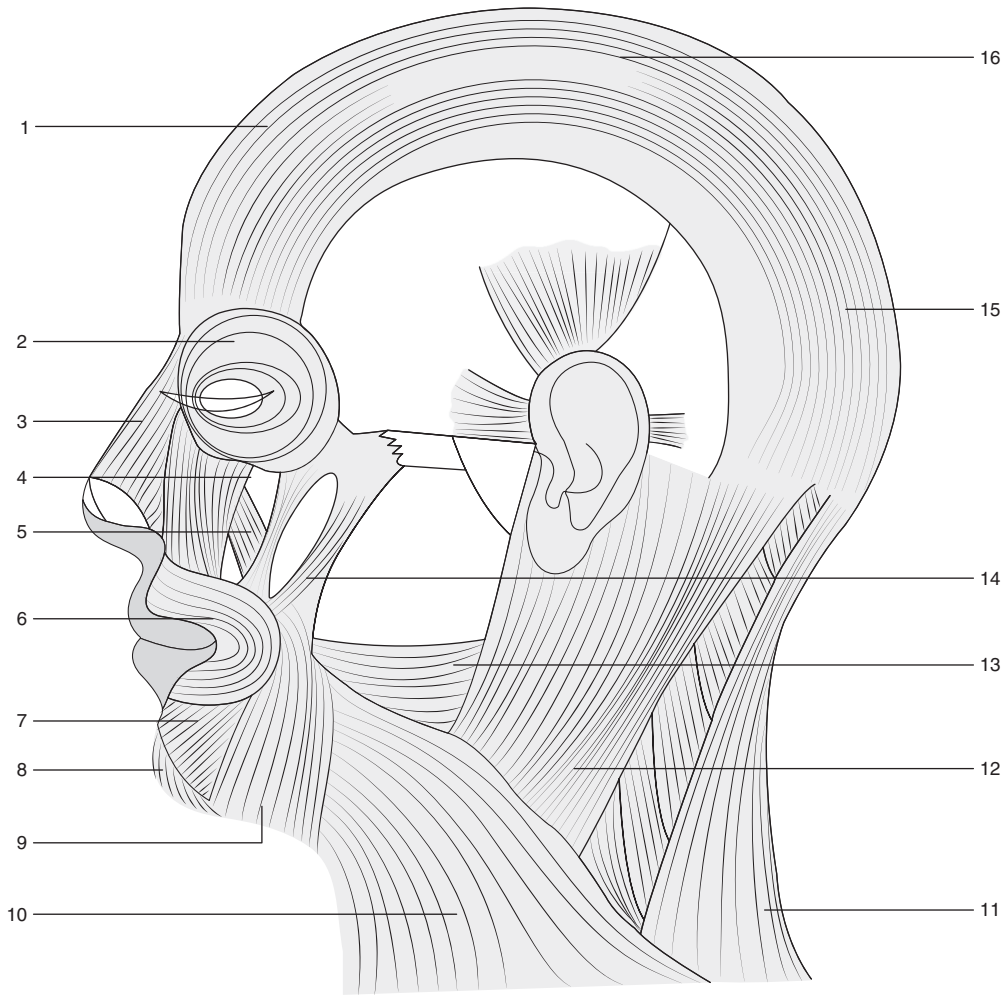
1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....

II. Name the connective tissue coverings of skeletal muscle.

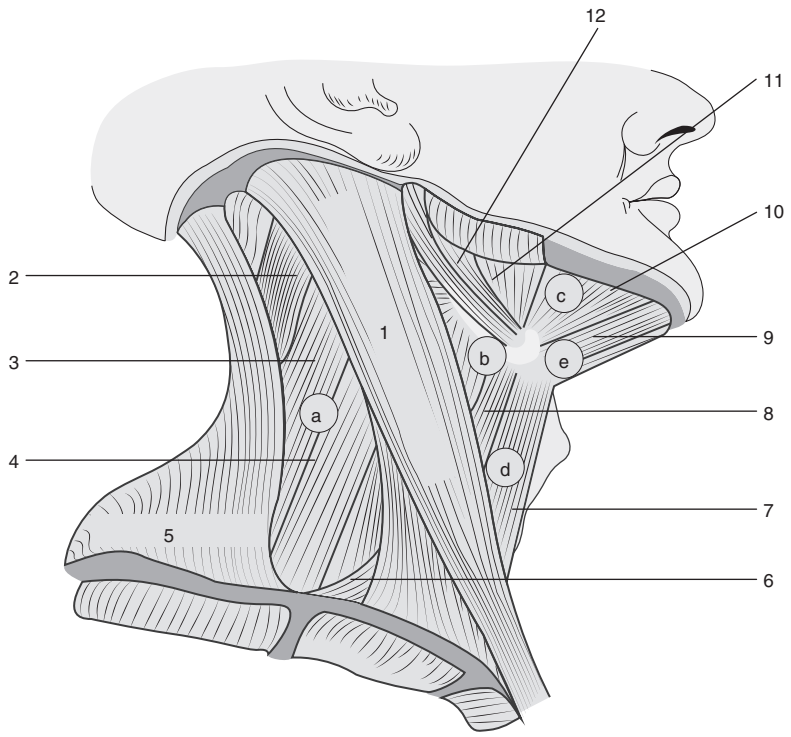
III. Match the following:

(a) Smooth muscle cell	(i) Cross-striations, multinucleated
(b) Deep fascia	(ii) Syncytium
(c) Prepatellar bursa	(iii) Weaver's bottom
(d) Cardiac muscle cell	(iv) Spindle-shaped cell
(e) Trumpeter's muscle	(v) Zygomaticus major
(f) Muscle for smile	(vi) Sartorius
(g) Skeletal muscle cell	(vii) Buccinator
(h) Ischial bursa	(viii) Clergyman's knee
(i) Strap muscle	(ix) Retinaculum
(j) Superficial infrapatellar bursa	(x) Housemaid's knee

IV. Identify the muscles in the following figures (a) and (b).

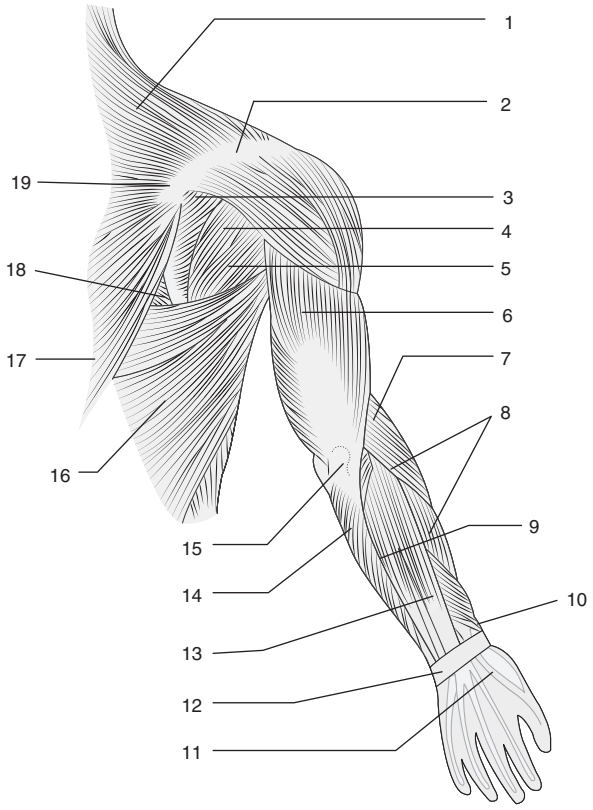


(a)

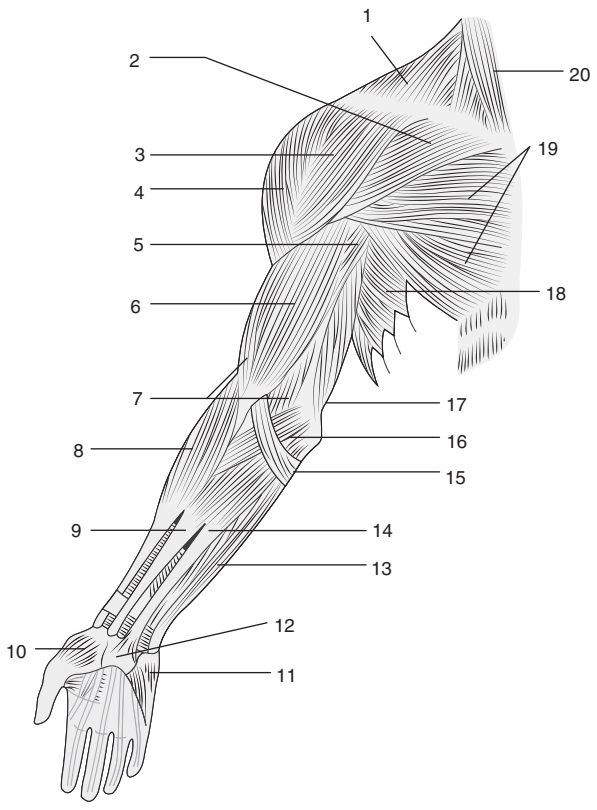


(b)

V. Identify the muscles in the following figures (a) and (b).



(a)

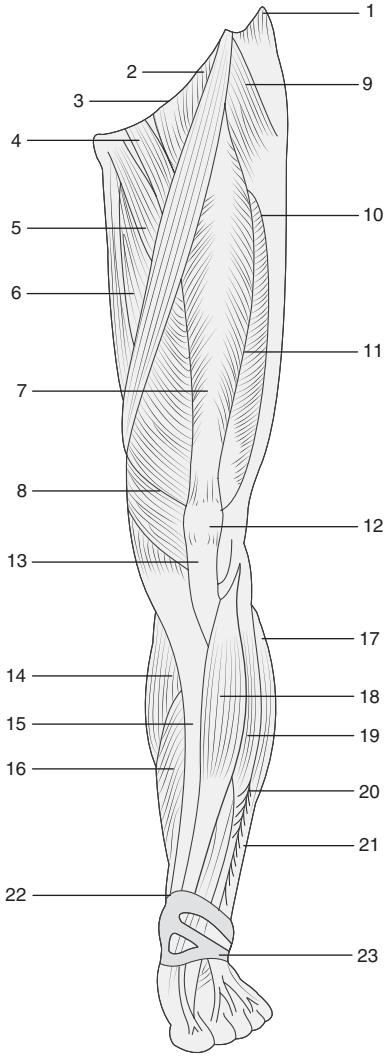


(b)

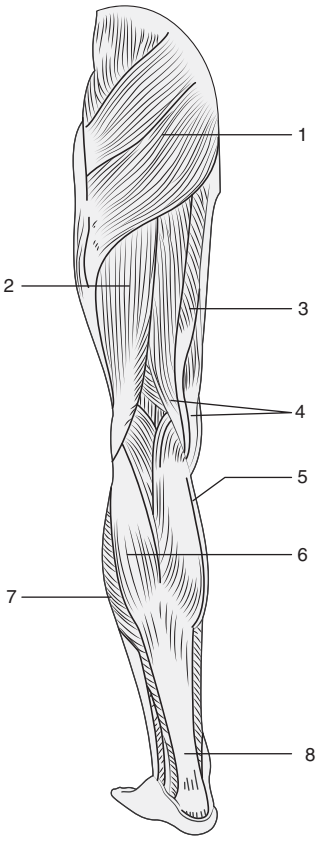
VI. Fill in the blanks.

1. Muscles of facial expression are supplied by ..... nerve.
2. The key muscle of the neck is .....
3. Spinal accessory nerve supplies ..... and .....
4. Axillary nerve supplies ..... and .....
5. Flexors of the elbow are ....., ... and .....
6. Brachialis is inserted into ....
7. Posterior compartment of the forearm contains ..... group of muscles.
8. Dorsal interossei ..... the fingers.
9. Lumbricals ..... metacarpophalangeal joint and ..... interphalangeal joints.
10. Thenar muscles include ....., ... and .....

VII. Identify the muscles in the figures (a) and (b).



(a)



(b)

VIII. Fill the correct word/value in the boxes below.

1. _____ muscle flexes both hip and knee joints.
2. Base of the femoral triangle is formed by _____.
3. Quadriceps femoris includes the following muscles: _____, _____, _____ and _____.
4. Strongest abductor of the hip joint is _____.
5. Gluteus maximus is inserted into _____ and _____.
6. Hamstring muscles include _____, _____ and _____.
7. Adductors of the thigh are supplied by _____.
8. Tendocalcaneus is a tendon of _____, _____ and _____.
9. Inverters of the foot are _____.
10. Evertors of the foot are _____.

IX. Read and mark the statements as true (T) or false (F).

1. Tendons connect muscles to bones.
2. Tibialis posterior is often called calf muscle.
3. Skeletal muscles are involuntary.
4. Supraspinatus initiates the abduction at shoulder joint.
5. Antigravity muscles maintain the posture.

X. Complete the following sentences:

1. The type of muscle found only in the heart is _____.
2. The two protein filaments found in the muscle fibres are _____ and _____.
3. The type of striated muscle that moves joints is _____.
4. The end of the muscle that can move is _____.
5. A condition in which muscle reduces in size from lack of use is _____.
6. An injury in which ligament is overstretched is _____.
7. When prime mover contracts, its antagonist _____.

XI. Multiple-choice questions

1. Which of the following statements describes correctly what happens in extension?
- (a) The angle between the bones is increased.
- (b) The angle between the bones is decreased.
- (c) The bone moves away from the body.
- (d) The bone moves towards the centre of the body.

2. Which of the following correctly identifies muscle components from largest to smallest?
- (a) Fasciculus, muscle fibre, myofibril
- (b) Muscle fibre, fasciculus, myofibril
- (c) Myofibril, muscle fibre, fasciculus
- (d) Myofibril, fasciculus, muscle fibre

3. The deep fascia forms all of the following structures **EXCEPT**
- (a) Sheath for nerves and vessels
- (b) Retinaculi
- (c) Intermuscular septa
- (d) Tendons

4. Which of the following is a strap muscle?
- (a) Semitendinosus
- (b) Semimembranosus
- (c) Sartorius
- (d) Biceps femoris

5. All of the following muscles close the jaw **EXCEPT**
- (a) Masseter
- (b) Temporalis
- (c) Medial pterygoid
- (d) Lateral pterygoid

6. The structure piercing the right crus of the diaphragm is
- (a) Inferior vena cava
- (b) Thoracic duct
- (c) Oesophagus
- (d) Azygos vein

7. Major flexor of the hip joint is
- (a) Rectus femoris
- (b) Pectineus
- (c) Sartorius
- (d) Psoas major

8. The effect of paralysis of the left sternocleidomastoid will be
- (a) The neck tilted to the left and the face turned to the left
- (b) The neck tilted to the left and the face turned to the right
- (c) The neck tilted to the right and the face turned to the left
- (d) The neck tilted to the right and the face turned to the right

9. Protraction of the scapula is done by
- (a) Serratus anterior
- (b) Latissimus dorsi
- (c) Supraspinatus
- (d) Subscapularis

10. This muscle is known as tailor's muscle.
- (a) Rectus femoris
- (b) Pectineus
- (c) Sartorius
- (d) Gracilis

11. The muscle which unlocks the knee joint is
- (a) Soleus
- (b) Gastrocnemius
- (c) Popliteus
- (d) Plantaris

12. In infants, intramuscular injections are given in
- (a) Gluteus maximus
- (b) Deltoid
- (c) Vastus medialis
- (d) Vastus lateralis

13. The striated appearance of the skeletal muscle is due to
- (a) Formation of fasciculi
- (b) Regular arrangement of sarcomeres in adjacent fibrils
- (c) Presence of myosin in A band
- (d) Attachment of actin filaments to Z line

XII. Case-based questions

A young man had a fall and broke his upper part of fibula. The fracture healed, but he was walking abnormally with high step (raising his foot higher than normal to avoid toes scraping the ground).

1. What is the man suffering from?
2. Which muscles are paralysed?
3. Which structure is injured?
4. Why is it injured?

XIII. Short-answer question

Write short notes on the following:

- Median cubital vein
- Hamstring muscles
- Lumbricals

XIV. Long-answer questions

1. Describe gluteus maximus as muscle as follows:
   (a) Origin
   (b) Insertion
   (c) Actions
   (d) Applied anatomy
2. Describe pelvic diaphragm and its applied anatomy in brief.

ANSWERS

I. Page no. 135

II. Name the connective tissue coverings of skeletal muscle.

Epimysium covers whole muscle.

Perimysium covers muscle fasciculus.

Endomysium covers muscle fibre.

III. Match the following:

(a) Smooth muscle cell	(iv) Spindle-shaped cell
(b) Deep fascia	(ix) Retinaculum
(c) Prepatellar bursa	(x) Housemaid's knee
(d) Cardiac muscle cell	(ii) Syncytium
(e) Trumpeter's muscle	(vii) Buccinator
(f) Muscle for smile	(v) Zygomaticus major
(g) Skeletal muscle cell	(i) Cross-striations, multinucleated
(h) Ischial bursa	(iii) Weaver's bottom
(i) Strap muscle	(vi) Sartorius
(j) Superficial infrapatellar bursa	(viii) Clergyman's knee

IV. Page no. 142, 144

V. Page no. 153, 152

VI. Fill in the blanks.

1. Facial
2. Sternocleidomastoid
3. Sternocleidomastoid, trapezius
4. Deltoid, teres minor
5. Biceps brachii, brachialis, brachioradialis
6. Ulnar tuberosity
7. Extensor
8. Abduct
9. Flex, extend
10. Abductor pollicis bravis, flexor pollicis bravis, opponens pollicis

VII. Page no. 161, 162

VIII. Fill the correct word/value in the boxes below.

1. Sartorius
2. Inguinal ligament
3. Vastus medialis, vastus lateralis, vastus intermedius, rectus femoris

4. Gluteus medius
5. Gluteal tuberosity and iliotibial tract
6. Semitendinosus, semimembranosus, biceps femoris
7. Obturator nerve
8. Lateral head of gastrocnemius, medial head of gastrocnemius and soleus
9. Tibialis anterior and posterior
10. Peroneus longus and bravis

IX. Read and mark the statements as true (T) or false (F).

1. T; **2.** F; **3.** F; **4.** T; **5.** T

X. Complete the following sentences:

1. Cardiac muscle
2. Actin, myosin
3. Skeletal muscle
4. Insertion
5. Atrophy
6. Sprain
7. Relaxes

XI. Multiple-choice questions

1. a; **2**. a; **3**. d; **4**. c; **5**. d; **6**. c; **7**. d; **8**. c; **9**. a; **10**. c; **11**. c; **12**. d; **13**. b

XII. Case-based questions

1. The man has foot drop.
2. The planter flexors of the foot are paralysed. They are the muscles of posterior compartment of the leg and include gastrocnemius, soleus and plantaris.
3. Common peroneal nerve is injured.
4. It is injured as it is closely related to the neck of fibula.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Sustained state of contraction is called .....
2. ..... is an autoimmune disease.
3. Neuromuscular transmitter is .....
4. Increased muscle mass is called .....
5. ..... is a genetic degenerative disease.
6. ..... is a structural and functional unit of skeletal muscle.
7. Inability to maintain muscle twitch tension is .....
8. Sarcomere is arranged between .....
9. ..... forms dark band.
10. ..... forms light band.

II. Multiple-choice questions

1. Channels present on the end-plate membrane of muscle at neuromuscular junction
- (a) Allow sodium ions to pass inwards
- (b) Allow calcium ions to pass inwards
- (c) Open by acetylcholine
- (d) All of the above

2. At neuromuscular junction
- (a) Acetylcholine is released
- (b) Acetylcholine is destroyed by cholinesterase in the matrix
- (c) Acetylcholine opens ion channels through which Na^+ and Ca^+ ions pass
- (d) All of the above

3. Muscle is in active state
- (a) As long as cross-bridges are cycling
- (b) When sarcoplasmic concentration of sarcoplasm is higher than resting
- (c) For a long time during tetanus
- (d) All of the above

4. Role of ATP in muscle contraction is
- (a) Energising myosin cross-bridge
- (b) Binding of ATP to myosin head to cause dissociation of cross-bridges bound to actin allowing cross-bridges to cycle
- (c) For pumping calcium back into sarcoplasmic reticulum for allowing muscle to relax
- (d) All of the above

5. All of the following are properties of skeletal muscle **EXCEPT**
- (a) Fatigue
- (b) Tetanus
- (c) Refractory period
- (d) Autorhythmicity

6. Tetanus occurs due to
- (a) Repeated stimulation of the muscle at a high rate
- (b) Prolonged active state of the muscle
- (c) Wave summation
- (d) All of the above

7. Neuromuscular transmitter is
- (a) Epinephrine
- (b) Acetylcholine
- (c) GABA
- (d) Serotonin

III. Short notes

1. Properties of skeletal muscle
2. Compare and contrast between skeletal, cardiac and smooth muscles
3. Sarcomere
4. Excitation–contraction coupling
5. Sarcoplasmic reticulum
6. Muscle tetanus

IV. Answer the following questions:

1. Draw flow chart of impulse transmission through neuromuscular junction.
2. Define motor unit.
3. Draw different stages of muscle contraction.
4. Draw and label structure of skeletal muscle.

V. Long-answer question

Describe structure of skeletal muscle and explain modern theory of muscle contraction.

ANSWERS

I. Fill in the blanks.

1. Tetanus
2. Myasthenia gravis
3. Acetylcholine
4. Hypertrophy
5. Muscular dystrophy
6. Sarcomere
7. Fatigue
8. Two Z lines
9. A band
10. I band

II. Multiple-choice questions

1. d; **2**. d; **3**. d; **4**. d; **5**. d; **6**. d; **7**. b

Blood

7

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Normal RBC count is in ..... mm^3 of blood.
2. Leucopenia is less than ..... mm^3 of WBC count.
3. Maximum percentage of granulocytes is .....
4. RBCS have ..... shape.
5. Normal Hb has ..... and ..... chains.
6. Immature RBC is called .....
7. ..... hormone is required for erythropoiesis.
8. ..... have kidney-shaped nucleus.
9. Factor IX is also called ..... factor.
10. Plasminogen activator converts ..... to plasmin.
11. Plasmin is ..... which breaks fibrin threads.
12. Iron absorption is better in ..... state than in ..... state.
13. Excess radiation can cause ..... of bone marrow.
14. Platelets are derived from .....
15. Clot retraction causes separation of fluid called .....
16. Sodium citrate acts as anticoagulant by ..... of calcium.
17. In leukaemia, there is ..... proliferation of WBCs.
18. Haemolytic anaemia can be ..... or .....
19. Tropical sprue is a disease of small intestine leading to .....
20. ..... commonly leads to eosinophilia.

II. Who am I?

1. I am highest as far as cell count is concerned in blood: .....
2. I am responsible to make blood thick: .....
3. My deficiency causes purpura: .....
4. I work more in allergic conditions: .....

5. I am responsible for cell-mediated immunity: .....
6. I fight back infection forming antibodies: .....
7. When I am there, pallor is seen on skin and mucous membrane: .....
8. I am the most powerful phagocyte: .....
9. I have kidney-shaped nucleus: .....
10. My absence leads to immature DNA synthesis in RBCs: .....
11. I am responsible for exerting maximum colloid osmotic pressure: .....
12. I am a clotting disorder, delaying clotting time, and affect males more: .....
13. I am the most common anaemia in our country: .....
14. I am the abnormal proliferation of leucocytes: .....

III. Match the following:

(a) Blood group AB	(i) Phagocyte
(b) Plasma protein	(ii) Carry O_2
(c) RBCs	(iii) Universal recipient
(d) Neutrophil	(iv) Deficiency causes malnutrition

IV. Multiple-choice questions

1. Sites of erythropoiesis are
   (a) In liver and spleen in early embryonic life
   (b) In bone marrow after the 20th week of intrauterine life
   (c) In axial skeleton and proximal ends of femur and humerus in adults
   (d) All of the above
2. All of the following conditions cause excess bleeding **EXCEPT**
   (a) Deficiency of vitamin D
   (b) Thrombocytopenia
   (c) Polycythaemia
   (d) Haemophilia
3. Stored blood can be used for ..... days.
   (a) 21
   (b) 5
   (c) 100
   (d) 50
4. Most antigenic Rh factor is
   (a) Small c
   (b) C
   (c) d
   (d) D
5. Erythroblastosis has which of the following features?
   (a) Anaemia
   (b) Jaundice
   (c) Kernicterus
   (d) All of the above
6. Leucocytosis is seen in all **EXCEPT**
   (a) Parturition
   (b) Typhoid fever
   (c) Newborn up to 1 year
   (d) Exposure to lower temperature
7. Physiological lymphocytosis occurs in
   (a) Autoimmune diseases
   (b) Tuberculosis
   (c) Young infants
   (d) Viral infections
8. Iron is stored in
   (a) Hepatocytes
   (b) RBCs
   (c) Lymphocytes
   (d) Reticuloendothelial cells

9. Serum albumin
- (a) Is synthesised in spleen
- (b) Level is less than globulin
- (c) Exerts most of colloid osmotic pressure
- (d) Has higher molecular weight than globulin

10. All of the following are granulocytes **EXCEPT**
- (a) Eosinophil
- (b) Monocyte
- (c) Neutrophil
- (d) Basophil

11. Erythropoiesis
- (a) Is a process of formation of RBCs
- (b) Is stimulated when a person is exposed to hypoxia
- (c) Is regulated by erythropoietin
- (d) All of the above

12. Normal percentage of neutrophils is
- (a) 25
- (b) 70
- (c) 40
- (d) 2

13. The largest cell amongst the following is
- (a) Neutrophil
- (b) Eosinophil
- (c) Basophil
- (d) Monocyte

14. Red cells in iron deficiency anaemia are
- (a) Normocytic
- (b) Hyperchromic
- (c) Microcytic
- (d) Macrocytic

15. Platelets have a lifespan of
- (a) 1–2 days
- (b) 7–10 days
- (c) 30 days
- (d) 40 days

16. In vitro coagulation is initiated by clotting factor
- (a) XII
- (b) X
- (c) VII
- (d) XI

17. Haemophilia is due to deficiency of ..... factor.
- (a) X
- (b) IV
- (c) VIII
- (d) All of the above

V. Short notes

1. Factors required for erythropoiesis
2. Stages of erythropoiesis
3. Landsteiner law
4. Functions of red blood cells (RBCs)
5. Functions of platelets
6. Fate of RBCs
7. Blood groups
8. Blood transfusion
9. Major and minor crossmatching of blood
10. Erythroblastosis fetalis
11. Functions of WBCs
12. Iron deficiency anaemia
13. Morphological classification of anaemia
14. Haemolytic anaemia
15. Blood indices
16. Intrinsic and extrinsic mechanisms of clotting

17. Thrombocytopenic purpura
18. Rh incompatibility
19. Neutrophil as a phagocyte
20. Polycythaemia
21. Bleeding and clotting time
22. RE system
23. Megaloblastic anaemia
24. Indications and precautions during blood transfusion
25. Hazards of mismatched transfusion

VI. Answer the following questions:

1. Enumerate functions of blood.
2. Enumerate functions of plasma proteins.
3. Draw a flow chart showing fate of haemoglobin.
4. State advantages of biconcave shape of RBCs.
5. Enumerate stages of erythropoiesis.
6. Draw a flow chart for regulation of erythropoiesis.
7. State Landsteiner law.
8. Draw the genesis of WBCs in a flow chart.
9. Enumerate all clotting factors.
10. Draw a flow chart for intrinsic and extrinsic blood coagulation mechanisms.
11. Describe iron deficiency and megaloblastic anaemia.
12. Mention types of leukaemia.
13. Write a note on haemophilia.
14. What is disseminated intravascular coagulation?
15. Enumerate functions of platelets.
16. Write normal values of the following:

    (a) RBC count in males and females: .....
    (b) WBC count in normal adult: .....
    (c) Platelet count in normal adult: .....
    (d) Normal bleeding time: .....
    (e) Normal clotting time: .....
    (f) Normal haematocrit in males and females: .....

VII. Long-answer questions

1. Give the composition and functions of blood.
2. Describe with the help of a diagram the physiology of clotting mechanism.
3. Classify white blood cells. State their different functions.

ANSWERS

I. Fill in the blanks.

1. Millions per
2. 4000
3. Neutrophil
4. Biconcave
5. Two alpha, two beta chains
6. Reticulocyte
7. Thyroid
8. Monocytes
9. Christmas factor
10. Plasminogen
11. Proteolytic enzyme
12. Ferrous, ferric
13. Hypoplasia of bone marrow
14. Megakaryocytes
15. Serum
16. Chelation
17. Uncontrolled
18. Congenital, acquired
19. Malabsorption
20. Worm infestation

II. Who am I?

1. RBCs
2. RBCs and plasma proteins
3. Platelets
4. Eosinophil
5. T lymphocytes
6. B lymphocytes
7. Anaemia
8. Macrophage
9. Monocyte
10. Vitamin B_{12}, folic acid
11. Albumin
12. Haemophilia
13. Iron deficiency anaemia
14. Leukaemia

III. Match the following:

(a) Blood group AB	(iii) Universal recipient
(b) Plasma protein	(iv) Deficiency causes malnutrition
(c) RBCs	(ii) Carry O_2
(d) Neutrophil	(i) Phagocyte

IV. Multiple-choice questions

1. d; **2**. c; **3**. a; **4**. d; **5**. d; **6**. b; **7**. c; **8**. d; **9**. c; **10**. b; **11**. d; **12**. b; **13**. d; **14**. c; **15**. b; **16**. a; **17**. c

Cardiovascular System

8

ANATOMY

QUESTIONS

I. **Name the divisions of circulatory system.**

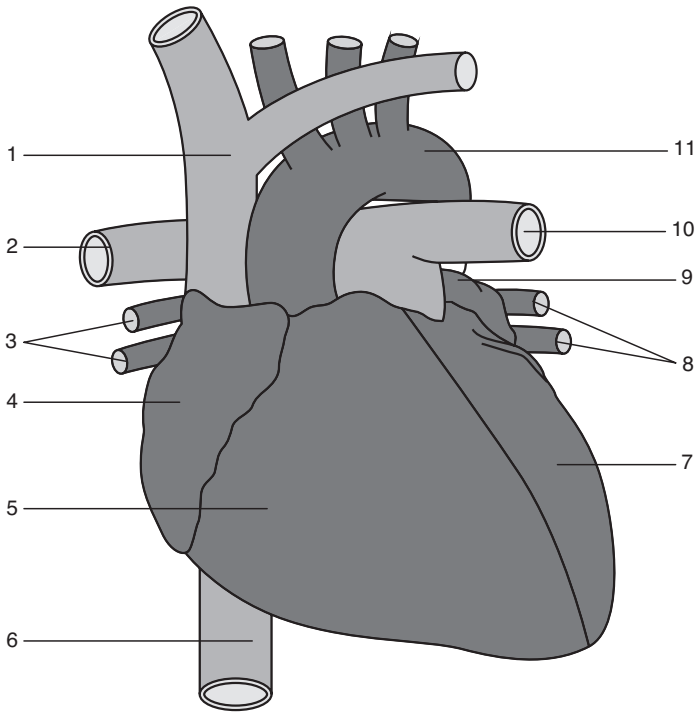
II. **Name the divisions of cardiovascular system.**

III. **Name the three layers of the vessel wall.**

IV. Fill in the blanks.

1. Lining of the blood vessels is called _____.
2. Tunica media consists of _____ and _____.
3. Aorta is an example of _____ type of artery.
4. _____ arteries are called distributing vessels and capillaries are called _____ vessels.
5. Vessels which supply the vessel wall are called _____ _____.
6. The arteries that do not anastomose with the neighbouring vessels are called _____ _____.
7. Heart lies in the _____ mediastinum.
8. Fibrous pericardium is lined by _____ of _____ _____.
9. Membrane closest to the heart muscle is _____ of _____ pericardium.
10. Collection of the fluid in the pericardial cavity is known as _____ _____.

V. Identify the structures numbered in the following figure:



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____

VI. Fill the correct word/value in the boxes below.

1. The layer of the heart that would be most susceptible to the infection by circulating bacteria is _____.
2. The semilunar valves prevent blood flowing backwards into the _____.
3. Vessel that carries deoxygenated blood away from the heart is _____.
4. The three unpaired branches of the abdominal aorta are _____, _____ and _____.
5. _____ artery supplies upper limb, while lower limbs are supplied by _____ artery.
6. _____ artery mainly supplies the pelvic organs.
7. Facial artery arises from _____.

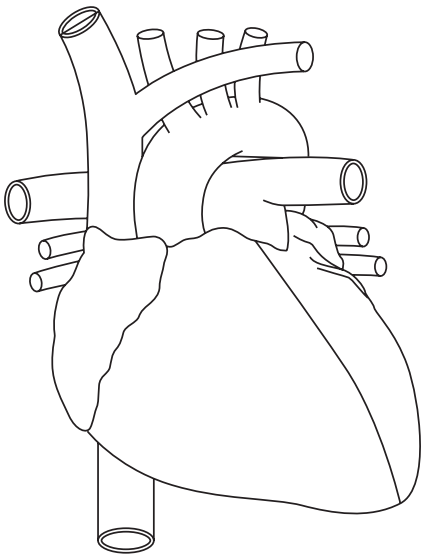
VII. Read and mark the statements as true (T) or false (F).

1. The type of blood vessels that have one-way valves preventing backflow of the blood are veins.
2. Brachiocephalic vein is formed by confluence of internal jugular vein with subclavian vein.
3. The lungs are supplied by pulmonary arteries.
4. Left testicular artery is a branch of external iliac artery.
5. Profunda femoris artery is content of the adductor canal.

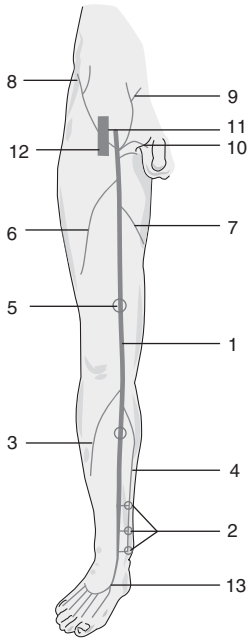
VIII. Complete the following table:

Valve	Location	Function
Tricuspid		
Mitral		
Aortic		
Pulmonary		

IX. Show the arterial blood supply in the figure given below.



X. Identify the structures in the figure given below and answer the following questions in minimum words:



1. Identify the structure labelled no. 1: .....
2. Name two special characters of no. 1: .....
3. Identify no. 2: .....
4. The function of no. 2 is: .....
5. If no. 2 fails to function, the effect is: .....
6. Name the structure labelled no. 5: .....
7. No. 5 connects to vessel: .....

XI. Multiple-choice questions

1. Which blood vessels are called resistance vessels?
   (a) Arteries
   (b) Arterioles
   (c) Capillaries
   (d) Venules
2. The right ventricle pumps the blood to the
   (a) Systemic circuit
   (b) Lungs
   (c) Left atrium
   (d) Left ventricle
3. The function of an atrium is to
   (a) Pump the blood to the systemic circuit
   (b) Pump the blood to the lungs
   (c) Pump the blood to the heart muscles
   (d) Collect the blood
4. Which of the following blood vessels returns blood to the left atrium?
   (a) SVC
   (b) IVC
   (c) Pulmonary vein
   (d) Pulmonary artery
5. The longest vein in the body is
   (a) Great saphenous vein
   (b) Inferior vena cava
   (c) Femoral vein
   (d) Cephalic vein
6. The blood from the brain returns to the heart via a vein called
   (a) Vertebral vein
   (b) Internal jugular vein
   (c) External jugular vein
   (d) Anterior jugular vein
7. The pacemaker cells in the heart are located in
   (a) SA node
   (b) AV node
   (c) Moderator band
   (d) Tricuspid valve

8. Which arteries of the following are the end arteries?
- (a) Hepatic arteries
- (b) Pulmonary arteries
- (c) Renal arteries
- (d) Coronary arteries

9. Posterior interventricular artery is a branch of
- (a) Left coronary
- (b) Right coronary
- (c) Ascending aorta
- (d) Marginal artery

10. Deposit of plaque on the walls of a coronary artery is called
- (a) Hypertension
- (b) Atherosclerosis
- (c) Stroke
- (d) Myocardial infarction

11. Which is the path of circulatory system through which RBC in right cephalic vein will travel?
- (a) SVC → right atrium → right ventricle → lungs → left atrium → left ventricle → aorta
- (b) SVC → right atrium → left atrium → right ventricle → lungs → left ventricle → aorta
- (c) SVC → left atrium → left ventricle → lungs → right atrium → right ventricle → aorta
- (d) SVC → left atrium → right atrium → lungs → left ventricle → right ventricle → aorta

XII. Case-based questions

In a patient of burn-only head, neck and face area is available for examination and IV infusion.

1. Where will you take pulse? Name the sites.

2. Which vein/veins can be used for infusion?

XIII. Short-answer questions

1. Conducting system of the heart

2. Atrioventricular valves

3. Write short notes on the following:
- (a) Circle of Willis
- (b) Brachial artery
- (c) Portal vein
- (d) Fallot's tetralogy

XIV. Long-answer questions

1. Describe the interior of the right atrium of the heart.

2. Describe pericardium in brief. Add a note on its applied anatomy.

3. Name cranial venous sinuses. Describe the cavernous sinus in brief.

4. Name parts of aorta. Describe arch of aorta in brief.

ANSWERS

I. Name the divisions of circulatory system.

1. Heart and blood vessels
2. Lymphatic system

II. Name the divisions of cardiovascular system.

1. Systemic system
2. Pulmonary system
3. Hepatic portal system

III. Name the three layers of vessel wall: From inside out—tunica intima, tunica media, tunica adventitia

IV. Fill in the blanks.

1. Endothelium
2. Smooth muscle, elastic laminae
3. Elastic
4. Muscular, exchange
5. Vasa vasora
6. End arteries
7. Middle
8. Parietal, serous pericardium
9. Visceral layer, serous
10. Pericardial effusion

V. Page no. 211

VI. Fill the correct word/value in the boxes below.

1. Endocardium
2. Ventricles
3. Pulmonary trunk
4. Coeliac trunk, superior mesenteric artery, inferior mesenteric artery
5. Subclavian, external iliac
6. Internal iliac
7. External carotid

VII. Read and mark the statements as true (T) or false (F).

1. T; **2.** T; **3.** F; **4.** F; **5.** F

VIII. Complete the following table:

Valve	Location	Function
Tricuspid	Between right atrium and right ventricle	Prevents backflow of the blood into the right atrium during ventricular systole
Mitral	Between left atrium and left ventricle	Prevents backflow of the blood into the left atrium during ventricular systole
Aortic	At the origin of aorta	Prevents backflow of the blood into the left ventricle during ventricular diastole
Pulmonary	At the origin of pulmonary trunk	Prevents backflow of the blood into the right ventricle during ventricular diastole

IX. Page no. 215

X. Page no. 240

1. Great saphenous vein
2. Longest vein of the body, superficial throughout
3. Perforators
4. Drain blood from superficial veins to deep veins
5. Development of varicose veins
6. Hunter's perforator
7. Great saphenous vein to profunda femoris

XI. Multiple-choice questions

1. b; **2**. b; **3**. d; **4**. c; **5**. a; **6**. b; **7**. a; **8**. d; **9**. b; **10**. b; **11**. a

XII. Case-based questions

1. The following arteries can be palpated to examine the pulse:
   (a) Common carotid artery on the neck below the jaw, lateral to the larynx
   (b) Facial artery at anteroinferior angle of masseter against lower border of mandible
   (c) Superficial temporal artery on the temple in front of the ear
2. Internal jugular vein in the neck or subclavian vein behind clavicle can be used for IV infusion.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Abnormal heart sounds are .....
2. Occlusion of coronary artery or its branch leads to .....
3. Normal PR interval is ..... seconds.
4. Last phase of ventricular diastole corresponds with .....
5. Closure of AV valves causes .....
6. Pressure diuresis is getting rid of excess of .....
7. Pressure natriuresis is getting rid of excess of .....
8. ..... is wave complex for ventricular depolarisation.
9. Amount of venous blood returning to heart per minute is .....
10. With inspiration, venous returns .....
11. Closure of semilunar valves causes .....
12. Normal atrial diastole is ..... second.
13. Amount of pressure required to obliterate the pulse is ..... of pulse.
14. Amount of blood ejected with each ventricle with each beat is .....
15. Distance between ..... is the rhythm of pulse.

II. Who am I?

1. I am thin walled amongst all the blood vessels: .....
2. I store a large amount of blood: .....
3. I work without fatigue: .....
4. I supply blood to heart: .....
5. Doctor checks me with three fingers: .....
6. I am responsible for the production of the first heart sound: .....
7. I am responsible for narrowing of blood vessel: .....
8. I decide rate at which heart beats: .....
9. I am a wave of atrial depolarisation: .....
10. We three suffer a lot with untreated hypertension: .....
11. When BP falls below 50 mmHg, I am activated: .....
12. I help body get rid of sodium and water from the body: .....
13. I offer maximum resistance to flow of blood: .....
14. We do not require any stimulus to get excited: .....
15. I am common in obese people and people who smoke: .....
16. I am must when you want to diagnose heart attack: .....
17. I beat fast when you have fever or when you exercise: .....
18. I work 24 × 7 and do not get tired: .....
19. If I am obstructed, you get ascites: .....

20. I am a common occupational hazard seen in bus conductors/traffic policemen: .....
21. We are not audible with stethoscope normally: .....
22. I am an only vein that carries oxygenated blood: .....
23. I am an only artery that carries deoxygenated blood: .....
24. I do not innervate any blood vessels: .....
25. My duration is smallest in cardiac cycle: .....

III. Fill the correct word/value in the boxes below.

1. Cardiac output = stroke volume × [ ].
2. Mean arterial blood pressure is [ ] mmHg.
3. Last attempt of body survival when BP falls too low is [ ].
4. Common risk factors for hypertension are [ ] and [ ].
5. Amount of pressure applied to feel the pulse best is [ ].
6. Time duration for isovolumic contraction phase is [ ].
7. Mean arterial pressure is [ ] of pressure.
8. Slow filling phase is [ ].
9. BP is measured with the help of [ ].
10. As we walk, skeletal muscle pump increases [ ].

IV. Match the following:

(a) Last ditch response	(i) PR interval
(b) 0.14 second	(ii) CNS ischaemic response
(c) QRS complex	(iii) Reduced renal blood flow
(d) 0.12 second	(iv) Ventricular depolarisation
(e) Renin secretion	(v) First heart sound

V. Multiple-choice questions

1. Vasomotor centre is located in
- (a) Medulla
- (b) Hypothalamus
- (c) Cortex
- (d) Spinal cord

2. Shock with high fever is ..... shock.
- (a) Anaphylactic
- (b) Septic
- (c) Neurogenic
- (d) Obstructive

3. Aortic valve closes before
- (a) Atrial systole
- (b) First rapid passive filling phase
- (c) Isovolumic relaxation
- (d) Isovolumic contraction

4. At the end of isovolumic relaxation, there is
- (a) A closure of semilunar valves
- (b) A closure of AV valves
- (c) An opening of AV valves
- (d) None of the above

5. In cardiac cycle
- (a) Atrial systole is 0.5 second
- (b) Isovolumic contraction phase is 0.05 second
- (c) Last phase of ventricular diastole corresponds with atrial systole
- (d) All of the above

6. Sympathetic stimulation causes all of the following, **EXCEPT**
- (a) Increase in heart rate
- (b) Increase in force of contraction
- (c) Decrease in stroke volume
- (d) Increase in venous return

7. Wave of ventricular repolarisation is ..... wave.
- (a) P
- (b) T
- (c) QRS
- (d) QT

8. Pacemaker of heart is
- (a) Purkinje fibres
- (b) AV node
- (c) SA node
- (d) Bundle of His

9. Chemoreceptor reflex gets activated approximately at ..... pressure (mmHg).
- (a) 100
- (b) 120
- (c) 80
- (d) 40

10. Normal stroke volume is ..... mL.
- (a) 100
- (b) 70
- (c) 50
- (d) 120

11. AV nodal delay is about ..... second.
- (a) 0.01
- (b) 0.13
- (c) 0.2
- (d) 0.3

12. Mean arterial blood pressure is ..... mmHg.
- (a) 120
- (b) 80
- (c) 100
- (d) 150

13. Cardiac output is regulated by
- (a) Venous return
- (b) Muscle pump
- (c) Peripheral resistance
- (d) All of the above

14. All of the following are signs of shock, **EXCEPT**
- (a) Decreased blood pressure
- (b) Tachycardia
- (c) Increased urinary output
- (d) Pale and cold skin

15. P wave in the ECG is due to
- (a) Ventricular repolarisation
- (b) Atrial repolarisation
- (c) Ventricular depolarisation
- (d) Atrial depolarisation

16. Duration of cardiac cycle in human beings is
- (a) 0.4 second
- (b) 0.8 second
- (c) 1 second
- (d) 1.2 seconds

17. Windkessel effect in blood vessels is seen in
- (a) Large veins
- (b) Small veins
- (c) Capillaries
- (d) Aorta and large arteries

VI. Case-based questions

A 22-year-old female came with complaints of fatigue and shortness of breath. On examination, pallor was present. Hb was 7 mg/dL. Mean corpuscular volume and mean corpuscular haemoglobin were decreased.

1. What is anaemia?
2. What are the blood indices in iron deficiency anaemia?
3. What is the daily requirement of iron?

VII. Short notes

1. ANS supply to heart and blood vessels
2. Factors affecting heart rate
3. Cardiac output
4. Short-term regulation of BP
5. Renin–angiotensin system
6. Role of kidneys in BP regulation
7. Events in cardiac cycle
8. Waves and intervals in ECG
9. Hazards of hypertension
10. Essential hypertension
11. Factors affecting cardiac output
12. Circulatory changes at birth
13. First and second heart sounds
14. Control of coronary blood flow
15. Ischaemic heart disease
16. Myocardial infraction
17. Effects of rheumatic heart disease on heart
18. Subacute bacterial endocarditis
19. Postural hypotension
20. AV node delay

VIII. Answer the following questions:

1. Enumerate functions of circulatory system.
2. Create a flow chart describing local regulatory mechanisms for control of blood flow.
3. Draw a flow chart and show effect of parasympathetic stimulation on heart.
4. Create a flow chart and show effect of sympathetic stimulation on heart.
5. Draw a well-labelled diagram of ECG with waves and intervals.
6. Describe conduction pathway of heart.
7. Compare and contrast between four heart sounds.
8. Create a flow chart explaining work of baroreceptors in BP regulation.
9. Enumerate stages of shock and signs and symptoms of shock.
10. Define myocardial infarction. Enumerate its complications.
11. Enumerate causes of acute and chronic heart failure.

IX. Long-answer questions

1. Define cardiac cycle and describe various events of cardiac cycle.
2. Define blood pressure and how it is regulated.

ANSWERS

I. Fill in the blanks.

1. Murmur
2. Myocardial infarction
3. 0.12–2
4. Atrial systole
5. First heart sound
6. Water
7. Salt
8. QRS complex
9. Venous return
10. Increases
11. Second heart sound
12. 0.7
13. Force
14. Stroke volume
15. Two consecutive beats

II. Who am I?

1. Capillary
2. Vein
3. Heart
4. Coronaries
5. Pulse
6. Closure of AV valves
7. Atherosclerosis
8. SA node
9. P wave
10. Heart, brain, kidney
11. CNS ischaemic response
12. Kidney
13. Arteriole
14. Autorhythmic structures of heart (SA node, AV node, Purkinje fibres)
15. Hypertension
16. ECG
17. Heart
18. Heart
19. Portal vein
20. Varicose vein
21. Third and fourth heart sounds
22. Pulmonary vein
23. Pulmonary artery
24. Parasympathetic nerve
25. Protodiastole

III. Fill the correct word/value in the boxes below.

1. Heart rate
2. 100
3. CNS ischaemic response
4. Atherosclerosis, obesity
5. Tension of the pulse
6. 0.06 second
7. Average
8. Diastasis
9. Sphygmomanometer
10. Venous return

IV. Match the following:

(a) Last ditch response	(ii) CNS ischaemic response
(b) 0.14 second	(v) First heart sound
(c) QRS complex	(iv) Ventricular depolarisation
(d) 0.12 second	(i) PR interval
(e) Renin secretion	(iii) Reduced renal blood flow

V. Multiple-choice questions

1. a; **2**. b; **3**. c; **4**. c; **5**. d; **6**. c; **7**. b; **8**. c; **9**. c; **10**. b; **11**. b; **12**. c; **13**. d; **14**. c; **15**. d; **16**. b; **17**. d

VI. Case-based questions

1. Anaemia is defined as decreased oxygen-carrying capacity of blood.
2. Blood indices in iron deficiency anaemia show decreased mean corpuscular volume and mean corpuscular haemoglobin, indicating microcytic hypochromic anaemia.
3. The daily requirement of iron is as follows:
   (a) 5–10 mg/day in males
   (b) 20 mg/day in females

Lymphatic System

9

ANATOMY

QUESTIONS

I. Fill in the blanks.

1. The lining of the lymphatic vessels is composed of .....
2. The lymph from the right lymphatic duct enters the systemic circulation at the junction of ..... and .....
3. Peyer's patches are found in .....
4. ..... vessels enter the periphery of the lymph node and ..... vessels exit through the hilus lymph nodes.
5. Thymus is located posterior to the .....

II. Read and mark the statements as true (T) or false (F).

1. Medulla of the lymph node contains T lymphocytes.
2. Spleen filters blood and lymph node filters lymph.
3. Tonsil is a primary lymphatic tissue.
4. Thymus is active throughout life.
5. B lymphocytes produce antibodies.

III. Multiple-choice questions

1. Malpighian corpuscles are found in
   (a) Spleen
   (b) Thymus
   (c) Lymph node
   (d) Tonsil
2. Which of the following is a part of MALT?
   (a) Spleen
   (b) Thymus
   (c) Lymph node
   (d) Lingual tonsil
3. The lymphoid tissue's structural framework is composed of
   (a) Collagen fibres
   (b) Fat cells
   (c) Reticular connective tissue
   (d) Loose connective tissue

4. Which of the following is not a lymphatic organ?
- (a) Inguinal lymph nodes
- (b) Pharyngeal tonsil
- (c) Thymus
- (d) Thyroid

5. Which of the following cells produce antibodies?
- (a) Reticular cells
- (b) B lymphocytes
- (c) T lymphocytes
- (d) Macrophages

6. Lymphatic tissue is a specialised form of
- (a) Liquid connective tissue
- (b) Loose areolar tissue
- (c) Dense connective tissue
- (d) Reticular tissue

7. Lymph rejoins the circulatory system in
- (a) External jugular vein
- (b) Subclavian veins
- (c) Right atrium
- (d) Pulmonary veins

8. Mature T lymphocytes will collect at which of the following organs for their immune response?
- (a) Thymus
- (b) Lymph nodes
- (c) Spleen
- (d) Bone marrow

9. Which lymphatic structure absorbs lipids in the small intestine?
- (a) Columnar cells
- (b) Blood vessels
- (c) Intestinal glands
- (d) Lacteals

10. Lymphangitis presents itself as
- (a) Enlarged tonsils
- (b) Enlarged lymph nodes
- (c) Painful lymph nodes
- (d) Red lines under skin

IV. Case-based questions

A female patient complained of small swellings in the neck. On examination, swellings were diagnosed as enlarged tubercular lymph nodes.

1. Which group of lymph nodes are they?
2. Which are the body parts drained by these nodes?
3. Where do these nodes drain?

V. Short-answer questions

1. Name the functions of the spleen.
2. Write a short note on inguinal lymph nodes.
3. Write a short note on thoracic duct.

VI. Long-answer questions

1. Describe gross anatomy of the thymus. Add a note on its functions.
2. Name the lymphatic organs. Draw and label the diagram of lymph node. Add a note on its functions.

ANSWERS

I. Fill in the blanks.

1. Endothelium
2. Right internal jugular vein, right subclavian vein
3. Ileum
4. Afferent lymphatics, efferent lymphatics
5. Sternum

II. Read and mark the statements as true (T) or false (F).

1. T; **2.** T; **3.** F; **4.** F; **5.** T

III. Multiple-choice questions

1. a; **2**. d; **3**. c; **4**. d; **5**. b; **6**. a; **7**. b; **8**. b; **9**. d; **10**. d

IV. Case-based questions

1. These are deep cervical nodes.
2. They drain the deeper parts of neck such as larynx, pharynx and thyroid gland. They also receive lymph from superficial nodes of head and neck which drain head, neck and face.
3. The deep inguinal nodes form jugular lymphatic trunk on each side. The left jugular trunk joins thoracic duct and the right jugular trunk joins right lymphatic duct.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Lymphatic system is ..... of circulatory system.
2. At arterial end plasma is ..... and at venous end plasma is .....
3. Lymph is like plasma with less amount of .....
4. Protein content of lymph in liver is ..... g/100 mL.
5. Lymphatics are absent in ..... and .....
6. More the functional activity of tissue, ... is lymph flow.
7. In foetal life ..... marrow is more than ..... marrow.
8. Spleen stores about ..... mL of blood.
9. Mucosa-associated lymphoid tissue is found in ..... and .....
10. More the interstitial fluid pressure, ... is lymph flow.

II. Who am I?

1. We allow unidirectional flow of lymph: .....
2. We perform the function of filtration of lymph: .....
3. I contain haemopoietic stem cells: .....
4. I am replaced completely in treatment of cancer: .....
5. I destroy old RBCs: .....

III. Multiple-choice questions

1. If interstitial fluid pressure increases, then lymph flow
- (a) Decreases
- (b) Remains same
- (c) Increases
- (d) First decreases and then increases

2. Lymphatic system contains
- (a) Lymphocytes
- (b) Macrophage
- (c) Plasma cells
- (d) All of the above

3. RBCs are destroyed in
- (a) Bone marrow
- (b) Spleen
- (c) Liver
- (d) All of the above

4. Maturation of lymphocytes occurs in
- (a) Spleen
- (b) Yellow bone marrow
- (c) Thymus
- (d) Liver

5. MALT is associated with ..... system.
- (a) Excretory
- (b) Cardiovascular
- (c) Alimentary
- (d) Endocrine

6. Which of the following factors affects the lymph flow?
- (a) Interstitial fluid pressure
- (b) Lymphatic pump
- (c) Surface area of lymph capillaries
- (d) All of the above

7. Normal rate of lymph flow is ..... mL/hour.
- (a) 80
- (b) 120
- (c) 180
- (d) 200

IV. Case-based questions

A 55-year-old woman came to the clinic with complaints of weakness and repeated upper respiratory tract infection for a couple of months. On examination, there were palpable enlarged lymph nodes in the neck. She was advised to undergo biopsy of lymph nodes.

1. What are the different types of malignant tumours of lymphoid tissue?

2. Why does the patient suffer from repeated infections?

3. If left untreated, what is the lifespan of the patient?

V. Short notes

1. Composition of lymph

2. Functions of lymph node

3. Functions of spleen

VI. Answer the following questions:

1. Enumerate functions of lymph nodes.

2. Enumerate functions of spleen.

3. List down the functions of MALT.

4. Draw a flow chart showing components of lymphatic system.

VII. Long-answer question

Describe the composition and functions of lymph.

ANSWERS

I. Fill in the blanks.

1. Accessory component
2. Filtered, absorbed
3. Protein
4. 6 g/100 mL
5. CNS, cornea of the eye
6. More
7. Red, yellow
8. 350 mL
9. GIT, respiratory system
10. More

II. Who am I?

1. Lymphatic valves
2. Lymph nodes
3. Red bone marrow
4. Bone marrow
5. Spleen

III. Multiple choice questions

1. c; **2**. d; **3**. b; **4**. c; **5**. c; **6**. d; **7**. b

IV. Case-based questions

1. Malignant tumours of lymphoid tissues are classified as Hodgkin lymphoma and non-Hodgkin lymphoma.
2. The patient suffers from repeated infections due to depressed immunity.
3. If left untreated, the patient's average life is about 2 years.

Nervous System

10

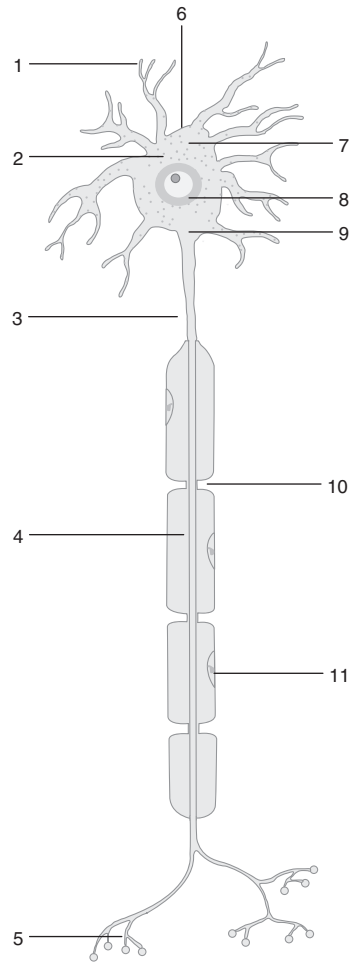
ANATOMY

QUESTIONS

I. **Name the divisions of nervous system in a tabular form.**

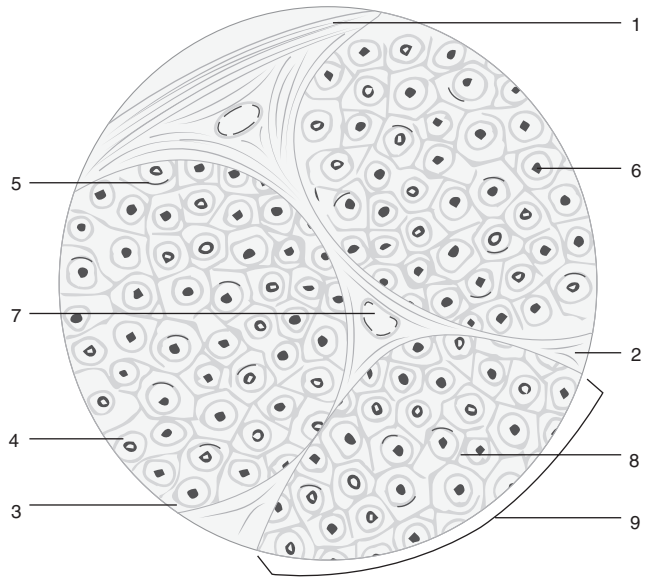
II. **Name the components of the nervous system.**

III. Identify the structures in the figure below.



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....
10. .....
11. .....

IV. Identify the structures in the figure below.



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....

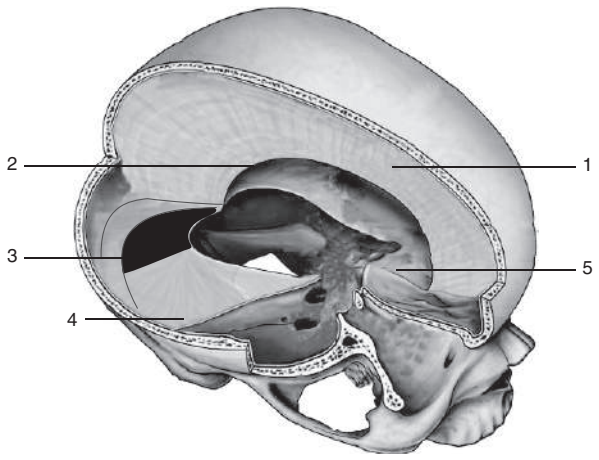
V. Tick mark the correct answer.

1. The most superior part of the brain includes cerebral hemispheres/brain stem.
2. Deep grooves in the cerebral hemispheres are known as sulci/gyri.
3. The outer cortex of the cerebrum contains grey/white matter.
4. The division of the nervous system responsible for the increased heart rate during exercise is somatic/autonomic.
5. The part of the neuron that sends electrical signals to the target cells is dendrites/axon.
6. Death of dopaminergic neurons results in upper motor neuron paralysis/Parkinson disease.
7. Unconscious proprioception is carried by posterior spinocerebellar/lateral spinothalamic tract.
8. Corticospinal fibres cross in the internal capsule/medulla oblongata.
9. Major vital autonomic centres are located in the cerebellum/medulla oblongata.
10. Sensory supply of the face is by facial/trigeminal nerve.

VI. Fill the correct word/value in the boxes below.

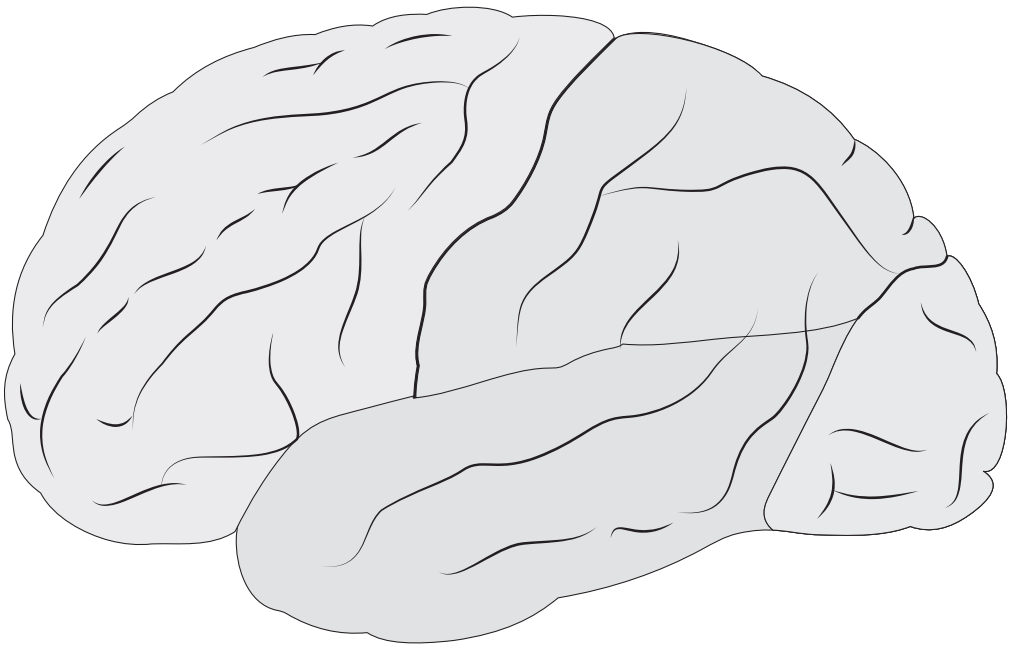
1. Receptors for the pain are _____.
2. Cranial dura mater has two layers: _____ and _____.
3. Falx cerebri separates two _____.
4. Length of the spinal cord is _____.
5. Tapering end of the spinal cord is called _____.
6. The sensations carried by the anterior spinothalamic tract are _____ and _____.
7. Prefrontal cortex is a part of _____ system.
8. Brain stem includes _____, _____ and _____.
9. The only muscle supplied by glossopharyngeal nerve is _____.
10. Sciatic nerve divides into _____ and _____.

VII. Identify the parts/folds of dura mater.

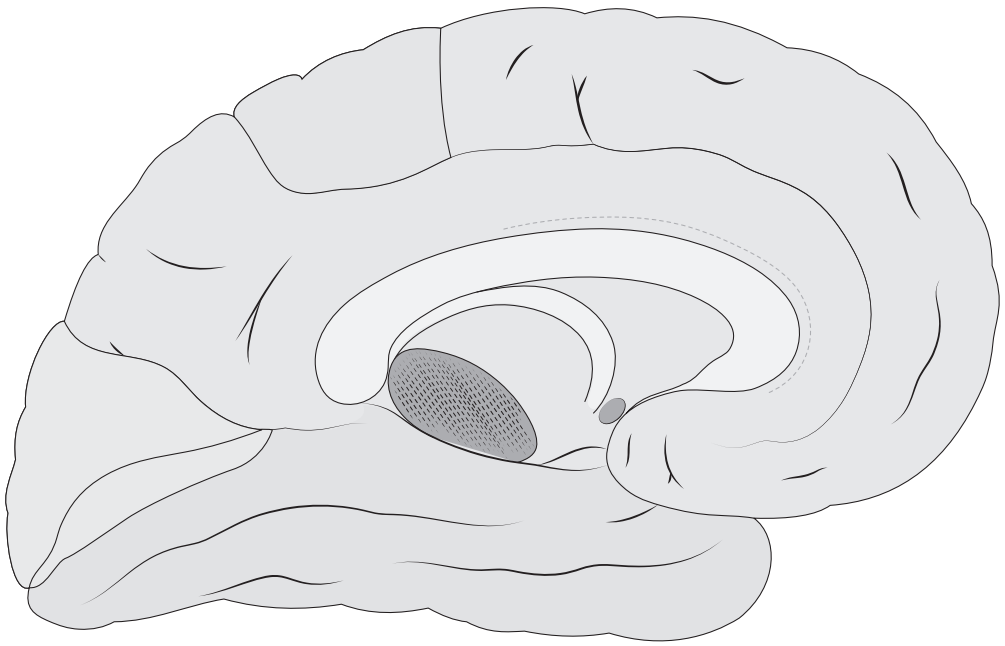


1. _____
2. _____
3. _____
4. _____
5. _____

VIII. Label major sulci and gyri in the following figures (a) and (b).

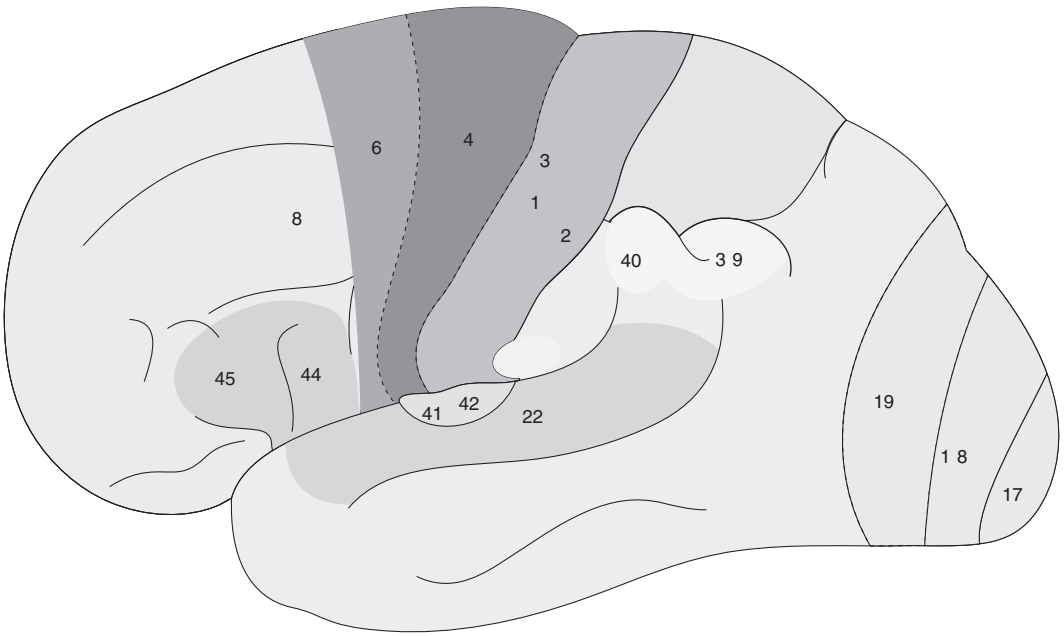


(a)

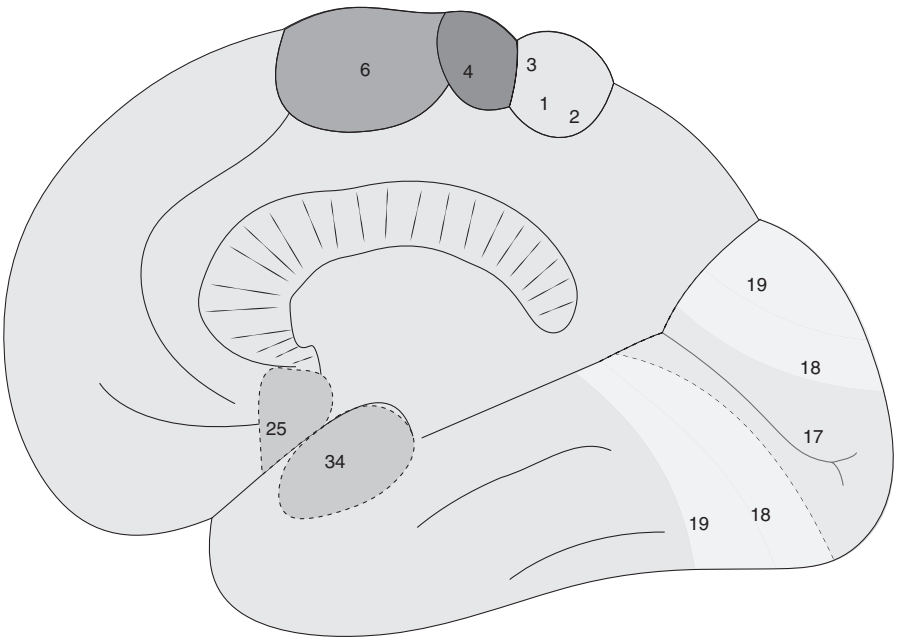


(b)

IX. Label the functional cortical areas in the following figures (a) and (b).

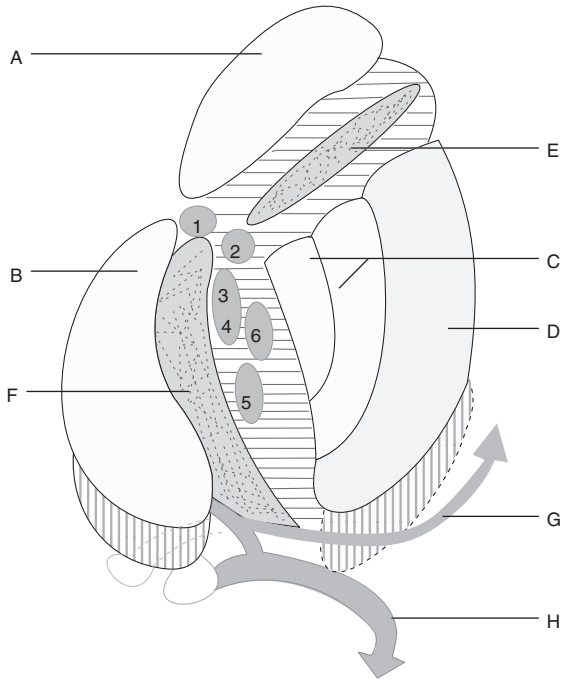


(a)



(b)

X. Identify the parts labelled in the figure below.



A. .....

B. .....

C. .....

D. .....

E. .....

F. .....

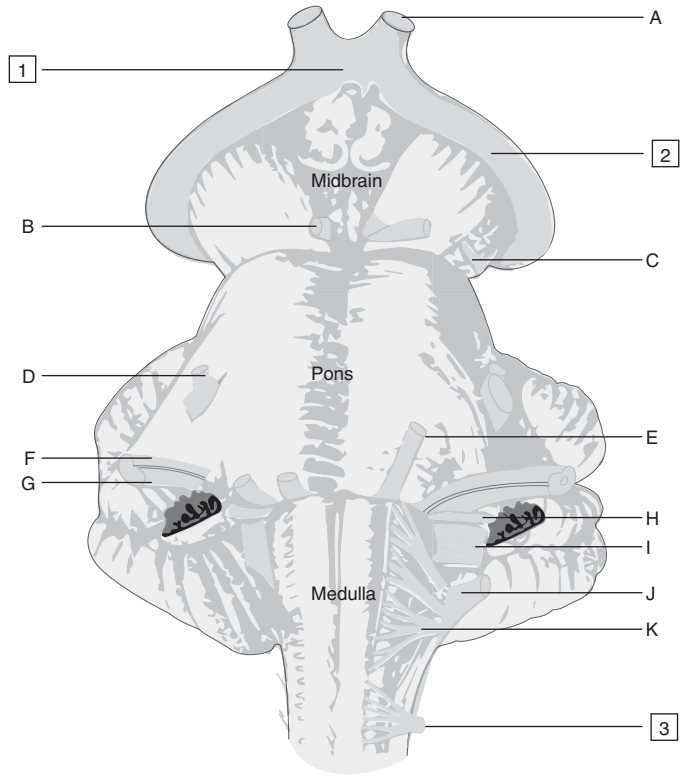
G. .....

H. .....

XI. Fill in the blanks.

1. The outer grey matter of cerebrum contains ..... and .....
2. The cortical areas 44 and 45 are functionally .....
3. Primary auditory cortex is located in the ..... lobe of cerebrum.
4. Major part of the superolateral surface of cerebrum is supplied by ..... artery.
5. Metathalamus consists of ..... and .....
6. Basal nuclei constitute an important part of ..... system.
7. Primary function of vestibulocerebellum is .....
8. Third and fourth ventricles communicate through .....
9. Erb's paralysis is a lesion of ..... of .....
10. Pain of the hip joint is referred to the knee joint as both are supplied by ..... nerve.

XII. Identify cranial nerves and other structures in the following figure.



1. .....
2. .....
3. .....

A. .....
B. .....
C. .....
D. .....
E. .....
F. .....
G. .....
H. .....
I. .....
J. .....
K. .....

XIII. Read and mark the statements as true (T) or false (F).

1. Subarachnoid space contains CSF.

2. Circle of Willis is formed at the base of the brain.

3. Thalamus is the highest centre of ANS.

4. Lesion of basal nuclei is characterised by the presence of unwanted movements.

5. Voluntary movements are initiated by cerebellum.

6. Dorsal roots of spinal nerves are motor.

XIV. Multiple-choice questions

1. The basic functional unit of the nervous system is
- (a) Nerve
- (b) Neuron
- (c) Neuroglia
- (d) Tract

2. Which term describes bundle of axons in PNS?
- (a) Nerve
- (b) Ganglion
- (c) Tract
- (d) Nucleus

3. The cell responsible for myelination in CNS is
- (a) Astrocyte
- (b) Oligodendrocyte
- (c) Satellite cell
- (d) Schwann cell

4. Pacinian corpuscles are the receptors for
(a) Crude touch
(b) Tactile discrimination
(c) Pressure
(d) Pain

5. Spinal cord ends at which of the following vertebral levels in a child?
(a) Upper border of L1
(b) Lower border of L1
(c) Upper border of L3
(d) Lower border of L3

6. Lateral grey horn of spinal cord gives origin to which fibres?
(a) Preganglionic sympathetic
(b) Preganglionic parasympathetic
(c) Postganglionic sympathetic
(d) Postganglionic parasympathetic

7. Superior and inferior colliculi are a part of
(a) Thalamus
(b) Hypothalamus
(c) Midbrain
(d) Pons

8. Broca's area is located in which gyrus?
(a) Precentral
(b) Postcentral
(c) Superior frontal
(d) Inferior frontal

9. You plucked the rose, saw its red colour and felt its soft petals. Which lobe of cerebrum processed all this information?
(a) Frontal
(b) Parietal
(c) Temporal
(d) Occipital

10. Which variety of fibres forms internal capsule?
(a) Association
(b) Commissural
(c) Projection
(d) Arcuate

11. Which of the following functions will be lost with injury to the cerebellum?
(a) Pain sensation
(b) Coordination of movements
(c) Thermoregulation
(d) Taste sensation

12. CSF is secreted mainly by choroid plexus in
(a) Lateral ventricle and third ventricle
(b) Lateral ventricle and cerebral aqueduct
(c) Third ventricle and cerebral aqueduct
(d) Fourth ventricle and cerebral aqueduct

13. Which nerve injury results in ptosis?
(a) Oculomotor
(b) Trochlear
(c) Supraorbital
(d) Facial

14. Which cranial nerve supplies muscles of mastication?
(a) Trigeminal
(b) Glossopharyngeal
(c) Vagus
(d) Hypoglossal

15. Which nerve is affected in Bell's palsy?
(a) Trigeminal
(b) Facial
(c) Glossopharyngeal
(d) Hypoglossal

16. Paralysis of which nerve produces ape hand deformity?
(a) Axillary
(b) Radial
(c) Ulnar
(d) Median

XV. Case-based questions

A 60-year-old person approached his physician with the complaint of constant shaking of his left hand and tendency to fall while walking. On examination, he showed tremors of his left hand and muscular rigidity. His condition was diagnosed as Parkinson disease.

1. Which neurons die in Parkinson disease?
2. Where are these neurons located?
3. What do they secrete?
4. Why does patient get tremors?

XVI. Short-answer questions

1. Classify neuroglia and give function of each variety.
2. Name the ventricles of the brain and their locations. What is their function?
3. Name the tracts in the posterior column of spinal cord. Which sensations are carried by them?
4. Write short notes on the following topics:
   (a) Microscopic structure of peripheral nerve
   (b) Cortical speech areas
   (c) Reflex arc
5. Draw and label TS of the spinal cord showing different tracts

XVII. Long-answer questions

1. Describe the tract carrying pain sensation. What are the effects of its lesion?
2. What are commissural fibres? Describe corpus callosum.
3. Describe the oculomotor nerve as under:
   (a) Origin
   (b) Course
   (c) Branches
   (d) Applied anatomy
4. Draw and label formation and branches of the brachial plexus. Add a note on its applied anatomy.
5. Describe the origin, course and branches of axillary nerve. What are the effects of its lesion?

ANSWERS

I. Page no. 271

II. Page no. 271

III. Page no. 271

IV. Identify the structures in the figure below.

Peripheral nerve TS:

1. Epineurium
2. Perineurium
3. Endoneurium
4. Myelin sheath
5. Schwann cell
6. Axon
7. Blood vessel
8. Nerve fibre
9. Nerve fasciculus

V. Tick mark the correct answer.

1. Cerebral hemisphere
2. Sulci
3. Grey matter
4. Autonomic

5. Axon
6. Parkinson disease
7. Posterior spinocerebellar tract
8. Medulla oblongata
9. Medulla oblongata
10. Trigeminal nerve

VI. Fill the correct word/value in the boxes below.

1. Free nerve endings
2. Endosteal, meningeal
3. Cerebral hemispheres
4. 45 cm
5. Conus medullaris
6. Pressure, crude touch
7. Limbic
8. Midbrain, pons, medulla oblongata
9. Stylopharyngeus
10. Tibial, common peroneal nerve

VII. Identify the parts/folds of dura mater.

1. Falx cerebri
2. Free margin of falx cerebri
3. Falx cerebelli
4. Tentorium cerebelli
5. Endosteal dura mater

VIII. Page no. 292

IX. Page no. 293

X. Page no. 298

XI. Fill in the blanks.

1. Neuronal cell bodies, neuroglia
2. Motor speech area
3. Temporal
4. Middle cerebral
5. Medial, lateral geniculate body
6. Extrapyramidal
7. Maintenance of equilibrium
8. Cerebral aqueduct
9. Upper trunk of brachial plexus
10. Obturator

XII. Page no. 301

XIII. Read and mark the statements as true (T) or false (F).

1. T; **2.** T; **3.** F; **4.** T; **5.** F; **6.** F

XIV. Multiple-choice questions

1. b; **2**. a; **3**. b; **4**. c; **5**. c; **6**. a; **7**. c; **8**. d; **9**. b; **10**. c; **11**. b; **12**. a; **13**. a; **14**. a; **15**. b; **16**. d

XV. Case-based questions

1. The dopaminergic neurons die in Parkinson disease.
2. They are located in substantia nigra in midbrain.
3. They produce dopamine.
4. The dopamine secreted by neurons of substantia nigra is carried to basal nuclei. Because of less dopamine, basal nuclei are affected producing tremors.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. ..... carry information from receptors to CNS.
2. ..... carry information from CNS to muscles/glands.
3. Somatic nervous system supplies .....
4. ..... support neurons and also contribute to blood–brain barrier.
5. ..... perform myelination of fibres in CNS.

6. Maximum conduction velocity is of .....
7. RMP of nerve fibre is ..... mV.
8. In myelinated nerve fibre, the impulse jumps from first node of ..... to next.
9. ..... is a functional junction between two neurons.
10. ..... is released at synaptic cleft.
11. Receptors located in joints, muscle and tendons are called .....
12. Ischaemic heart pain is felt in left arm; this is called ..... pain.
13. Enkephalin causes presynaptic inhibition by blocking ..... channels in membrane of nerve.
14. Basic postural reflex is .....
15. Muscle tone is due to continuous ..... motor neuron discharge.
16. Decrease in muscle tone is ..... and increase in muscle tone is .....
17. Hypertonia occurs when ..... is abnormally active.
18. Spinal cord extends from upper boarder of atlas to ..... vertebra.
19. Spinal cord contains ..... inside and ..... outside.
20. In spinal cord, dorsal root is ..... and ventral root is .....
21. Function of anterior and posterior spinocerebellar tract is to conduct ..... to cerebellum.
22. Upper motor neuron extends form ..... to .....
23. Area 4 is .....
24. Premotor area is .....
25. Motor areas are located ..... of central sulcus.
26. Area 8 is .....
27. Motor speech area is also called .....
28. Primary sensory area is area .....
29. Areas 41 and 42 are .....
30. CSF can be collected by performing .....

II. Who am I?

1. We lie parallel to extrafusal muscle fibres: .....
2. We carry pain and have low conduction velocity: .....
3. I am the main inhibitory neurotransmitter in CNS: .....

4. I am the receptor for pressure and vibration sense: .....
5. We respond to chemical changes around us: .....
6. We are the receptors which lack on of the properties of receptors that is adaptation .....
7. I am the only receptor having afferent and efferent supplies: .....
8. I monitor muscle length: .....
9. I monitor muscle tension: .....
10. My lesion causes astereognosis: .....
11. My lesion leads to intention tremors: .....
12. Timing and scaling of movements is my important function: .....
13. I control all precise voluntary movements: .....
14. I have the main function of planning rapid skillful activities, timing and predictive function: .....
15. I am the commonest type of dementia: .....

III. Fill the correct word/value in the boxes below.

1. Thoracolumbar outflow is present in [ ].
2. Craniosacral outflow is present in [ ].
3. Types of synapse are [ ], [ ], [ ].
4. Synaptic knob contains [ ] and [ ].
5. Important neurotransmitters in analgesic system are [ ] and [ ].
6. Stretch reflex is [ ].
7. Inflammation of meninges is known as [ ].
8. Pain and temperature are carried by [ ].
9. Fine touch and proprioception are carried by [ ].
10. Connection between two cerebral hemispheres is [ ].
11. Functional and morphological changes in distal part of nerve after injury are known as [ ].
12. CSF is formed by [ ] of lateral and third ventricle of brain.
13. In a right-handed person, dominant hemisphere is [ ].
14. Main cerebellar nuclei are [ ].
15. Haemorrhage below arachnoid mater is called [ ].

IV. Match the following:

(a) Vestibulocerebellum	(i) Hypotonia
(b) Feeding centre	(ii) Sensory relay station
(c) Thalamus	(iii) Maintains equilibrium
(d) Cerebellum lesion	(iv) Hypothalamus
(e) Emotions	(v) Sensory area
(f) 3, 1, 2	(vi) Occipital lobe
(g) Visual cortex	(vii) Limbic cortex

V. Multiple-choice questions

1. Fast pain
- (a) Is carried by A delta fibres
- (b) Is well-localised
- (c) Elicits withdrawal reflex
- (d) All of the above

2. Receptors for withdrawal reflex are
- (a) Merkel's disc
- (b) Pain receptors
- (c) Tactile receptors
- (d) Pacinian corpuscles

3. Basic postural reflex is ..... reflex.
- (a) Golgi tendon
- (b) Withdrawal
- (c) Inverse stretch
- (d) Stretch

4. Satiety centre is located in
- (a) Cerebellum
- (b) Hypothalamus
- (c) Cortex
- (d) Reticular formation

5. Cells responsible for myelination of nerves in CNS are
- (a) Schwan cells
- (b) Astrocytes
- (c) Ependymal cells
- (d) Oligodendrocytes

6. Which of the following is a symptom and sign of parkinsonism?
- (a) Rigidity
- (b) Mask-like face
- (c) Involuntary tremors
- (d) All of the above

7. Parkinson disease is due to damage to
- (a) Putamen
- (b) Dopaminergic neurons in substantia nigra
- (c) Globus pallidus
- (d) All of the above

8. Swallowing centre is situated in
- (a) Pons
- (b) Medulla
- (c) Midbrain
- (d) Cortex

9. Spinothalamic tract carries all of the following, **EXCEPT**
- (a) Pain
- (b) Temperature
- (c) Proprioception
- (d) Crude touch

10. First relay station of pain is
- (a) Medulla
- (b) Spinal cord
- (c) Thalamus
- (d) Midbrain

11. Synapse
- (a) Is a functional junction
- (b) Can be axosomatic between two neurons
- (c) Can be axodendritic
- (d) All of the above

12. Receptors responsible for sense of vibration are
- (a) Free nerve endings
- (b) Pacinian corpuscle
- (c) Ruffini's end organs
- (d) Merkel disc

13. Primary visual area is
- (a) 42
- (b) 6
- (c) 17
- (d) 8

14. The grey matter of spinal cord
- (a) Is arranged in the form of H
- (b) Has two anterior and two posterior horn cells
- (c) Has central canal lined by ependymal cells
- (d) All of the above

15. All of the following are the sensations carried by dorsal column pathway, **EXCEPT**
- (a) Temperature
- (b) Fine touch
- (c) Tactile localisation
- (d) Vibration sense

16. Major relay station for all sensory impulses is
- (a) Cortex
- (b) Hypothalamus
- (c) Thalamus
- (d) Spinal cord

17. Feeding and satiety centre is situated in
- (a) Medulla
- (b) Hypothalamus
- (c) Cortex
- (d) Pons

VI. Short notes

1. Organisation of nervous system
2. Structure of neuron
3. Classification of nerve fibres
4. Functions of neuroglial cells
5. Conduction of impulse in myelinated and unmyelinated nerve fibres
6. Saltatory conduction
7. Impulse transmission across synapse
8. Classification of sensory receptors
9. Differentiation between fast and slow pain
10. Analgesic system of pain
11. Functions of stretch reflex
12. Functions of hypothalamus
13. Functions of cerebellum
14. Functions of basal ganglia
15. Cranial nerves
16. Classification of receptors
17. Definition of reflex arc and name of its components
18. Stretch reflex pathway
19. Cerebral dominance
20. Differences between dorsal column and lateral spinothalamic pathway

VII. Answer the following questions:

1. Draw and label structure of synapse.
2. Define stretch reflex (dynamic and static).
3. Compare and contrast between fast and slow pain.
4. Draw and label muscle spindle.
5. Enumerate sensation carried by dorsal column pathway and anterolateral pathway.
6. Describe the corticospinal pathway/pyramidal tract.
7. Enumerate functions of CSF.
8. Enumerate functions of hypothalamus.
9. Enumerate functions of basal ganglia.
10. Enumerate features of Parkinson disease.

VIII. Long-answer questions

1. Give composition, formation, absorption and functions of cerebrospinal fluid.
2. Describe the functions of hypothalamus in detail.
3. Give the structure and functions of cerebellum.
4. Give the functions of cerebellum. Describe the effects of cerebellar lesion.

ANSWERS

I. Fill in the blanks.

1. Afferent nerves
2. Efferent nerves
3. Skeletal muscle
4. Astrocytes
5. Oligodendrocytes
6. A-alpha fibres
7. –90
8. Ranvier
9. Synapse
10. Neurotransmitter
11. Proprioceptors
12. Referred pain
13. Calcium
14. Stretch reflex
15. Gamma motor neurons
16. Hypotonia, hypertonia
17. Stretch reflex
18. L1
19. Grey matter and white matter
20. Sensory, motor
21. Proprioception impulses
22. Cortex, spinal cord (horn cells)
23. Primary motor area
24. Area 6
25. In front of
26. Frontal eye field
27. Broca's area
28. 3, 1, 2
29. Primary auditory area
30. Lumbar puncture (LP)

II. Who am I?

1. Intrafusal fibres
2. C fibres
3. GABA
4. Pacinian corpuscle
5. Chemoreceptors
6. Pain receptors
7. Muscle spindle
8. Muscle spindle
9. Golgi tendon organ
10. Parietal association cortex
11. Cerebellum
12. Basal ganglia

13. Corticospinal pathway (pyramidal tract)
14. Cerebellum
15. Alzheimer disease

III. Fill the correct word/value in the boxes below.

1. Sympathetic nervous system
2. Parasympathetic nervous system
3. Axodendritic, axosomatic, axoaxonic
4. Mitochondria, synaptic vesicles
5. Encephalin, serotonin
6. Spinal
7. Meningitis
8. Anterolateral pathway
9. Dorsal column pathway
10. Corpus callosum
11. Wallerian degeneration
12. Choroid plexus
13. Left cerebral hemisphere
14. Fastigial, globose, emboliform and dentate
15. Subarachnoid haemorrhage

IV. Match the following:

(a) Vestibulocerebellum	(iii) Maintains equilibrium
(b) Feeding centre	(iv) Hypothalamus
(c) Thalamus	(ii) Sensory relay station
(d) Cerebellum lesion	(i) Hypotonia
(e) Emotions	(vii) Limbic cortex
(f) 3, 1, 2	(v) Sensory area
(g) Visual cortex	(vi) Occipital lobe

V. Multiple-choice questions

1. d; **2**. b; **3**. d; **4**. b; **5**. d; **6**. d; **7**. b; **8**. b; **9**. c; **10**. b; **11**. d; **12**. b; **13**. c; **14**. d; **15**. a; **16**. c; **17**. b

Special Senses

11

ANATOMY

QUESTIONS

I. Name the special senses and the organs required for them.

II. Name extraocular muscles and their nerve supply.

III. Fill in the blanks.

1. Apex of the orbit is formed by .....
2. Lacrimal gland lies in ..... on the ..... of the orbit.
3. III, IV and VI cranial nerves enter the orbit through .....
4. Recti of the eyeball originate from .....
5. Oblique muscles of the eye are inserted ..... the equator of the eyeball.

6. Recti of the eye are inserted ..... of the equator of the eyeball.
7. ....., ... and ..... are the intrinsic muscles of the eye.
8. Nasolacrimal duct opens into .....
9. Aqueous humor is secreted by ..... processes and it drains into .....
10. Optic disc is ..... of the eye.

IV. Tick mark the correct answer.

1. The jelly-like substance behind the eye lens is aqueous humor/vitreous humor.
2. The purpose of auricles is to dampen/increase the intensity of the sound.
3. Stapes sends its vibrations to oval window/round window.
4. Perilymph flows into scala vestibuli and scala tympani/scala vestibuli and scala media.
5. The receptors for dynamic equilibrium are located in utricle and saccule/semicircular canals.
6. A patient with a facial nerve paralysis suffers from inability to dampen loud noises (hyperacusis) due to denervation of stapedius/tensor tympani muscle.
7. Suspensory ligament is attached to the eye lens/iris.
8. The organ of Corti is placed on vestibular membrane/basilar membrane.

V. Read and mark the statements as true (T) or false (F).

1. Intraocular muscles are supplied by optic nerve.
2. Muller's muscle attached to superior tarsal plate is supplied by sympathetic fibres.
3. The gap between the open eyelids is called palpebral fissure.
4. In retinal detachment, retina separates from choroid.
5. Facial nerve lies in the middle ear.

VI. Multiple-choice questions

1. Muscles turning the eyeball downwards are
   (a) Superior oblique and superior rectus
   (b) Inferior oblique and inferior rectus
   (c) Superior oblique and inferior rectus
   (d) Inferior oblique and superior rectus
2. Lesion of which nerve leads to ptosis?
   (a) Oculomotor
   (b) Trochlear
   (c) Abducent
   (d) Supraorbital
3. The muscle responsible for the change of the shape of the lens is the
   (a) Orbicularis oculi
   (b) Superior rectus
   (c) Muller's muscle
   (d) Ciliaris
4. The layer that contains photoreceptor is
   (a) Iris
   (b) Sclera
   (c) Retina
   (d) Choroid
5. Which of the following cells transmit impulses to the rest of the central nervous system via axons in the optic nerve?
   (a) Rods
   (b) Cones
   (c) Bipolar cells
   (d) Ganglion cells
6. The point of the sharpest retinal vision is called
   (a) Optic disc
   (b) Fovea centralis
   (c) Macula lutea
   (d) Sclerocorneal junction

7. A tumour of pituitary pressing on optic chiasma will produce
- (a) Bilateral blindness
- (b) Bitemporal hemianopia
- (c) Homonymous hemianopia
- (d) Ipsilateral blindness

8. Which of the following does not belong with others?
- (a) Pinna
- (b) External auditory meatus
- (c) Ceruminous glands
- (d) Malleus

9. The order in which sound travels through the auditory system is
- (a) External acoustic meatus, tympanic membrane, ossicles, oval window, scala vestibuli, scala tympani, round window
- (b) External acoustic meatus, tympanic membrane, ossicles, round window, scala vestibuli, scala tympani, oval window
- (c) External acoustic meatus, ossicles, tympanic membrane, oval window, scala vestibuli, scala tympani, round window
- (d) External acoustic meatus, ossicles, tympanic membrane, round window, scala vestibuli, scala tympani, oval window

10. Receptors for the dynamic equilibrium are located in
- (a) Utricle
- (b) Saccule
- (c) Semicircular canals
- (d) Cochlear duct

11. Auditory pathway ends in which lobe of cerebrum?
- (a) Frontal
- (b) Parietal
- (c) Temporal
- (d) Occipital

12. Vestibular system is not involved in
- (a) Balance
- (b) Hearing
- (c) Postural reflexes
- (d) Eye movements

13. Gustatory cortex is located in ..... lobe.
- (a) Frontal
- (b) Parietal
- (c) Temporal
- (d) Occipital

VII. Case-based questions

A middle-aged person approached an ophthalmologist for foggy vision and headache. Examination revealed raised intraocular pressure.

1. What is the condition of raised intraocular pressure called?
2. Where is the aqueous humor found in the eye?
3. Which structures produce it?
4. Where is it drained?

VIII. Write short notes on the following:

1. Superior oblique muscle of the eye
2. Name of the parts of lacrimal apparatus. Describe lacrimal gland in brief
3. Eye lens
4. Name of the intrinsic muscles of the eyeball and their functions
5. Eustachian tube and its applied anatomy

IX. Long-answer questions

1. Draw and label a diagram showing layers of the eyeball.
2. Describe in brief the auditory pathways and the effect of its lesion.
3. Name the contents of the middle ear. Describe middle ear ossicles in brief.
4. Name the parts of the internal ear. Describe in brief the cochlear duct.

ANSWERS

I. Name the special senses and the organs required for them: Vision, eyes; hearing, ears; equilibrium, vestibular apparatus; taste, tongue; and mucous membrane of mouth, pharynx

II. Name extraocular muscles and their nerve supply: Superior, inferior, medial and lateral rectus; superior and inferior oblique muscle of the eye; and levator palpebrae superioris

All these muscles are supplied by oculomotor nerve except lateral rectus supplied by abducent nerve, superior oblique muscle by trochlear nerve and deep part of the levator palpebrae superioris supplied by sympathetic fibres.

III. Fill in the blanks.

1. Optic canal
2. Lacrimal fossa, roof
3. Superior orbital fissure
4. Common tendinous ring
5. Behind
6. In front
7. Ciliaris, sphincter pupillae and dilator pupillae
8. Inferior meatus of nose
9. Ciliary processes, canal of Schlemm
10. Blind spot

IV. Tick mark the correct answer.

1. Vitreous humour
2. Increase the intensity
3. Oval window
4. Scala vestibuli
5. Semicircular canals
6. Stapedius
7. The eye lens
8. Basilar membrane

V. Read and mark the statements as true (T) or false (F)

1. F; **2.** T; **3.** T; **4.** F; **5.** F

VI. Multiple-choice questions

1. c; **2**. a; **3**. d; **4**. c; **5**. d; **6**. b; **7**. b; **8**. d; **9**. a; **10**. c; **11**. c; **12**. b; **13**. b

VII. Case-based questions

1. The condition in which intraocular pressure is raised is called glaucoma.
2. Aqueous humour is found in anterior (between the cornea and the iris) and posterior (between the iris and the lens) chambers of the eye.
3. It is produced by the ciliary processes.
4. It drains into scleral venous sinus (canal of Schlemm), a vein situated at sclerocorneal junction.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Superior oblique is supplied by .....
2. Lateral rectus is supplied by .....
3. Lacrimal secretion contains ..... to kill bacteria.
4. ..... occurs every 3–7 seconds.
5. ..... lines eyelids and covers sclera.
6. The farthest distance from eye at which objects are seen clearly is ..... m.
7. The nearest distance at which objects are seen clearly is ..... cm.
8. ..... does not contain rods and cones.

9. Constriction of pupil ..... amount of light entering the eye.
10. Minimum refractive power of lens is ..... D.
11. Normal intraocular pressure is ..... mmHg.
12. Myopia is corrected using ..... lens.
13. Cylindrical lens is put in defective plane to correct .....
14. Cones are responsible for ..... vision.
15. ..... is filled with perilymph.
16. Human ear is capable of hearing sound frequencies from ..... to ..... cps.
17. Pitch and intensity of sound is judged by .....
18. Utricle and saccule contain a sense organ called .....
19. Sense of equilibrium is maintained by .....
20. In centre of macula, there is .....

II. Who am I?

1. I keep conjunctiva clean and moist: .....
2. I am a thin, transparent and circular membrane that allows passage of light: .....
3. We have photosensitive pigments to absorb light: .....
4. Our axons form optic nerve: .....
5. I am situated in calcarine area of occipital lobe: .....
6. I constrict when eye is accommodated for near vision: .....
7. I vibrate inwards and outwards with sound and transmit sound to inner ear: .....
8. I am a bony-coiled, tube-like snail's shell: .....
9. We contract and protect ear from higher-intensity sound: .....
10. I sit on basilar membrane and have hair cells: .....
11. We get stimulated and initiate nerve impulse in auditory nerve: .....
12. We help maintaining equilibrium in dynamic state: .....
13. Loss of smell sensation: .....
14. We are in roof of nose: .....
15. I am concerned with hearing: .....

III. Multiple-choice questions

1. Cataract
- (a) Is an opaque area in eye lens
- (b) Occurs due to coagulation of proteins of lens
- (c) Treated by surgical removal of lens
- (d) All of the above

2. Emmetropia
- (a) Is a condition in which near point is nearer to the eye
- (b) Is corrected by convex lens
- (c) Is normal eye
- (d) Is corrected by cylindrical lens

3. When eye is accommodated for far vision
- (a) Eye lens has refractive power of +15D
- (b) Ciliary muscles are relaxed
- (c) Image of object is focused on retina
- (d) All of the above

4. When eye is accommodated for near vision
- (a) Ciliary muscles relax
- (b) Pupils dilate
- (c) There is convergence of eyes
- (d) Image of object is focused in front of retina

5. Lateral geniculate body is concerned with
- (a) Vision
- (b) Hearing
- (c) Taste
- (d) Smell

6. All of the following are errors of refraction, **EXCEPT**
- (a) Myopia
- (b) Emmetropia
- (c) Hypermetropia
- (d) Astigmatism

7. Most of the refraction occurs in the eye at
- (a) Anterior surface of cornea
- (b) Anterior surface of lens
- (c) Posterior surface of cornea
- (d) Posterior surface of lens

8. Middle ear contains
- (a) Two muscles—stapedius
- (b) Three ossicles—malleus, incus, stapes
- (c) Both (a) and (b)
- (d) Organ of Corti

9. Impedance matching is a function of
- (a) Middle ear
- (b) External ear
- (c) Cochlea
- (d) Organ of Corti

10. Peak spectral sensitivity
- (a) For blue cones, it is 500 nm
- (b) For red cones, it is 575 nm
- (c) For green cones, it is 600 nm
- (d) For rods, it is 350 nm

11. Medial geniculate body is concerned with
- (a) Vision
- (b) Hearing
- (c) Smell
- (d) Taste

12. The part of the tongue that contains taste buds that sense bitter taste is
- (a) Anterior one-third part
- (b) Sides of the tongue
- (c) Posterior one-third part
- (d) All over the tongue

IV. Short notes

1. Layers of retina
2. Myopia and its correction
3. Hypermetropia and its correction
4. Astigmatism and its correction
5. Light and dark adaptation
6. Visual pathway flowchart
7. Otitis media
8. Structure of cochlea
9. Auditory pathway flowchart
10. Nervous pathway for taste sensation

V. Answer the following questions:

1. Enumerate special senses and special sense organs.
2. Draw a flow chart for nervous pathway of light reflex.
3. Draw a flow chart for nervous pathway for accommodation reflex.
4. Argyll Robertson pupil.

5. Describe mechanism of hearing.
6. Draw a flow chart for types of glaucoma.
7. Draw a flow chart for nervous pathway for smell sensation.
8. Define cataract and write its treatment.
9. Define conduction and nerve deafness.
10. Describe mechanism of stimulation of taste buds.
11. Enumerate changes in eyes with accommodation for far and near vision.

VI. Long-answer questions

1. Define accommodation. Give the mechanism of accommodation.
2. Draw a well-labelled diagram of visual pathway.
3. Describe the structure of the eye. Mention various components of the eye.
4. Describe briefly the mechanism of hearing.
5. Describe the structure of ear and mention its functions.
6. Describe the structure and function of vestibular apparatus.

ANSWERS

I. Fill in the blanks.

1. Trochlear nerve
2. Abducent nerve
3. Lysozyme
4. Blinking of eyes
5. Conjunctiva
6. 6
7. 25
8. Blind spot
9. Reduces
10. +15
11. 10–20
12. Concave
13. Astigmatism
14. Colour
15. Scala tympani
16. 20, 20,000
17. Frequency and amplitude of vibration of basilar membrane
18. Macula
19. Vestibular apparatus
20. Fovea centralis

II. Who am I?

1. Lacrimal secretion
2. Cornea
3. Rods and cones
4. Ganglion cells
5. Primary visual cortex
6. Pupil
7. Footplate of stapes
8. Cochlea
9. Tensor tympani and stapedius
10. Organ of Corti
11. Hair cells
12. Semicircular canals
13. Anosmia
14. Olfactory sensory cells
15. Medial geniculate body

III. Multiple-choice questions

1. d; **2**. c; **3**. d; **4**. c; **5**. a; **6**. b; **7**. a; **8**. c; **9**. a; **10**. b; **11**. b; **12**. c

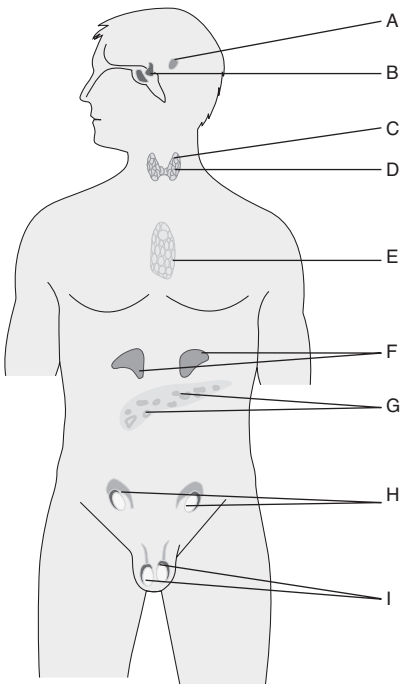
Endocrine System

12

ANATOMY

QUESTIONS

I. Name the glands and their secretions in the table below.



Gland	Secretions

II. Name the following:

1. Parts of the pituitary gland
2. Arteries supplying the pituitary gland
3. Lobes of thyroid gland
4. Zones of the adrenal cortex
5. Cells in adrenal medulla
6. Cells in islets of Langerhans

III. Complete the following columns with appropriate choice from the lists given below:

A—location	B—gland/cells	C—function/secretion
1. In front of trachea		
2. In hypophyseal fossa		
3. On roof of III ventricle		
4. In front of heart		
5. In pancreas		
6. In thyroid		
7. In testis		
8. In abdomen		

B—gland/cells	C—function/secretion
Thymus	Controls BMR
Pineal gland	Androgens
Pituitary	Insulin
Thyroid	Lower blood calcium
C cells	Growth hormone
Cells of Leydig	Epinephrine
Islets of Langerhans	Melatonin
Suprarenal	Cellular immunity

IV. Multiple-choice questions

1. Which of the following has no endocrine part?
- (a) Pancreas
- (b) Stomach
- (c) Ovary
- (d) Fallopian tube

2. Where is the pituitary gland situated?
- (a) Above hypothalamus
- (b) Below hypothalamus
- (c) Above thalamus
- (d) Below thalamus

3. Posterior pituitary contains
- (a) Nervous tissue
- (b) Epithelium
- (c) Connective tissue
- (d) Muscle tissue

4. The maximum number of islets of Langerhans is located in which part of pancreas?
- (a) Head
- (b) Neck
- (c) Body
- (d) Tail

5. All of the following structures are related to the thyroid gland, **EXCEPT**
- (a) Superior constrictor of the pharynx
- (b) Oesophagus
- (c) Recurrent laryngeal nerve
- (d) Trachea

V. Short-answer questions

1. Microscopic structure of thyroid gland

2. Islets of Langerhans

VI. Long-answer questions

1. Name the parts of pituitary. Describe the blood supply of pituitary gland.

2. Describe the gross and applied anatomy of suprarenal glands in brief.

ANSWERS

I. A, pineal gland; B, pituitary gland; C, thyroid gland; D, parathyroid glands; E, thymus; F, adrenal glands; G, islets of Langerhans; H, ovaries (in females); I, testes (in males)

II. Name the following:

1. Page no. 365

2. Page no. 365

3. Left, right and occasional pyramidal lobe which may be single or double

4. Page no. 371

5. Page no. 371

6. Page no. 373

III. Complete the following columns with appropriate choice from the lists given below:

A—location	B—gland/cells	C—function/ secretion
1. In front of trachea	Thyroid	Controls BMR
2. In hypophyseal fossa	Pituitary	Growth hormone
3. On roof of III ventricle	Pineal gland	Melatonin
4. In front of heart	Thymus	Cellular immunity
5. In pancreas	Islets of Langerhans	Insulin
6. In thyroid	C cells	Lower blood calcium
7. In testis	Cells of Leydig	Androgens
8. In abdomen	Suprarenal	Epinephrine

IV. Multiple-choice questions

1. d; **2**. b; **3**. a; **4**. d; **5**. a.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. GH is a .....
2. GH promotes ..... of cells.
3. ..... controls secretion of glucocorticoid hormone.
4. ..... spares use of carbohydrates and favours fat utilisation.
5. LH stimulates secretion of ..... from testes.
6. In females, FSH stimulates ..... and .....
7. Osmoreceptors respond to changes in ..... around them.
8. Oxytocin is synthesised from .....
9. ADH increases permeability of water of .....
10. TRH → ..... of anterior pituitary → thyroid hormone released from thyroid gland.
11. Oxytocin causes contraction of ..... of breast.
12. Stretch on cervix causes release of more .....
13. ..... is released from parafollicular cells of thyroid gland.
14. Iodide is oxidised to iodine with the help of ..... enzyme.
15. Main mineralocorticoid is .....
16. Immediate reaction to stress is called .....
17. Glucagon is secreted by ..... cells of islets of Langerhans.
18. Normal fasting blood glucose level is ..... mg/100 mL of blood.
19. Pineal gland secretes .....
20. Decreased secretion of growth hormone before adolescence causes .....
21. Loss of weight despite increased appetite is a feature of .....

II. Who am I?

1. I stimulate protein synthesis and growth: .....
2. I stimulate breast to secrete milk: .....
3. Till puberty I increase length of bone and then its thickness: .....
4. I stimulate spermatogenesis in males: .....
5. My secretion rises after ovulation: .....
6. We are specialised afferent nerve endings in supraoptic nuclei of hypothalamus: .....
7. We two are secreted from hypothalamus: .....
8. I am required not only for physical growth but also for mental growth: .....
9. I am essential for thyroid synthesis: .....
10. I am an only endocrine gland that stores its secretion: .....
11. I am required for absorption of calcium from bone: .....
12. We decrease protein synthesis and increase their breakdown: .....

13. As growth hormone, we do not favour use of carbohydrates: .....
14. We are released during chronic stress: .....
15. Main stimulus for my release is increased potassium level and decreased sodium level: .....
16. If cortisol is important in chronic stress, we are important in acute stress: .....
17. I am secreted from beta cells of islet of Langerhans: .....
18. I get glucose in as I am secreted: .....
19. All of my actions are opposite to those of glucagon: .....
20. I can cause mental retardation in children: .....

III. Fill the correct word/value in the boxes below.

1. One monoiodotyrosine + 1 diiodotyrosine give [ ].
2. Two diiodotyrosines bind to give [ ].
3. Normal serum calcium is [ ] mg/100 mL of blood.
4. Three zones of adrenal cortex are [ ], [ ] and [ ].
5. Synthesis of carbohydrates from noncarbohydrates is called [ ].
6. [ ] has a strong anti-inflammatory effect.
7. Delta cells of islets of Langerhans secrete [ ].
8. [ ] is inhibited when glucose levels fall.
9. [ ] helps increase blood glucose level.
10. Oversecretion of growth hormone before adolescence is called [ ].
11. Decreased secretion of all anterior pituitary hormones is called [ ].
12. Low BMR is a feature of [ ].

IV. Multiple-choice questions

1. Hormones
   (a) Have low concentration in plasma
   (b) Are circulated in plasma by binding with protein
   (c) Have receptors on target organs
   (d) All of the above
2. Correct statements about endocrine glands are
   (a) Regulate metabolic functions
   (b) Secrete hormones directly in blood
   (c) Hormones chemically are steroids, proteins or amino acids
   (d) All of the above
3. Growth hormone
   (a) Affects almost all tissues of the body
   (b) Is a steroid hormone
   (c) Has a protein catabolic effect
   (d) All of the above
4. Supraoptic and paraventricular nuclei of hypothalamus
   (a) Are important for temperature regulation
   (b) Synthesise thyroid hormone
   (c) Are connected to posterior pituitary gland
   (d) Are connected to anterior pituitary gland
5. Hypothyroidism causes
   (a) Muscle sluggishness
   (b) Less sleep
   (c) Intolerance to heat
   (d) More appetite
6. Aldosterone is
   (a) A mineralocorticoid
   (b) A steroid hormone
   (c) Synthesised from cholesterol
   (d) All of the above

7. Cushing syndrome
- (a) Causes hypoglycaemia
- (b) Causes hypotension
- (c) Is caused due to excess secretion of cortisol
- (d) All of the above

8. Beta cells of pancreas secrete
- (a) Insulin
- (b) Glucagon
- (c) Calcitonin
- (d) Somatostatin

9. BMR is decreased in
- (a) Fever
- (b) Myxoedema
- (c) Graves disease
- (d) Cushing syndrome

10. All of the following about cortisol are correct, **EXCEPT**
- (a) Increases free fatty acid level
- (b) Has anti-inflammatory effect
- (c) Decreases blood sugar level
- (d) Causes Cushing syndrome with more secretion

11. All of the following are hormones of anterior pituitary gland, **EXCEPT**
- (a) Growth hormone
- (b) Antidiuretic hormone (ADH)
- (c) Thyroid hormone
- (d) Adrenocorticotropic hormone

12. Statements true for gigantism are
- (a) It is caused due to excess secretion of growth hormone
- (b) Person is very tall
- (c) Liver and spleen are enlarged
- (d) All of the above

13. Normal blood sugar level is ..... mg/100 mL of blood.
- (a) 60–80
- (b) 120–150
- (c) 80–120
- (d) 150–200

14. Hormone that plays an important role in chronic stress is
- (a) Thyroid hormone
- (b) Insulin
- (c) Parathyroid hormone
- (d) Cortisol

15. All of the following are features of hyperthyroidism, **EXCEPT**
- (a) Tachycardia
- (b) Weight gain
- (c) Increased appetite
- (d) Muscle weakness

16. Feature of diabetes mellitus is
- (a) Polyuria
- (b) Polyphagia
- (c) Lack of energy
- (d) All of the above

17. Hormone responsible for maintaining normal basal metabolic rate is
- (a) Thyroid
- (b) Aldosterone
- (c) Growth
- (d) ADH

V. Short notes

1. Principal endocrine glands
2. Hypothalamohypophyseal portal system
3. Hypothalamohypophyseal nervous tract
4. Hormones of anterior pituitary gland
5. Hypothalamic-releasing hormones for pituitary hormones
6. Thyroid regulation by negative feedback
7. ACTH
8. Actions of thyroid-stimulating hormone
9. Flow chart for oxytocin release during childbirth

10. Flow chart for body's response to dehydration with respect to ADH release
11. Synthesis of thyroid hormones
12. Iodide pump
13. Actions/functions of thyroid hormone
14. Functions of parathyroid gland
15. Flow chart showing how serum calcium regulates PTH levels
16. Stress response by the body
17. Graves disease
18. Hypothyroidism
19. Diabetes insipidus
20. Addison disease

VI. Answer the following questions:

1. Enumerate features of Cushing syndrome.
2. Enumerate features of hypothyroidism and hyperthyroidism.
3. What are the features of diabetes mellitus?
4. Compare and contrast between gigantism and acromegaly.
5. Draw a flow chart showing regulation of glucocorticoids with ACTH.
6. What is Addisonian crisis?
7. What are primary and secondary hyperaldosteronism?
8. Enumerate hormones of anterior pituitary and posterior pituitary gland.
9. What is the effect of excess secretion of PTH?
10. Enumerate actions of glucocorticoids.

VII. Long-answer questions

1. Describe the structure and function of thyroid gland.
2. Describe the structure, function and regulation of growth hormone.
3. Describe the actions of posterior pituitary hormones.
4. Describe the actions of glucocorticoids and mineralocorticoids.

ANSWERS

I. Fill in the blanks.

1. Polypeptide
2. Mitosis
3. ACTH
4. Growth hormone
5. Testosterone
6. Growth of Graafian follicle, ovum
7. Osmolality
8. Paraventricular nuclei of hypothalamus
9. Distal convoluted tubules and collecting ducts
10. TSH
11. Myoepithelial cells
12. Oxytocin
13. Calcitonin
14. Peroxidase
15. Aldosterone
16. Fight-and-flight reaction
17. Alpha cells
18. 80–120
19. Melatonin
20. Dwarfism
21. Hyperthyroidism

II. Who am I?

1. Growth hormone
2. Prolactin
3. Growth hormone
4. FSH
5. Progesterone
6. Osmoreceptors
7. Oxytocin and ADH
8. Thyroid hormone
9. Iodide
10. Thyroid gland
11. PTH
12. Glucocorticoids
13. Glucocorticoids
14. Glucocorticoids
15. Aldosterone
16. Adrenomedullary hormones
17. Insulin
18. Insulin
19. Insulin
20. Cretinism

III. Fill the correct word/value in the boxes below.

1. Triiodothyronine (T3)
2. Thyroxine (T4)
3. 9–11
4. Zona glomerulosa, zona fasciculata, zona reticularis
5. Gluconeogenesis
6. Glucocorticoids
7. Somatostatin
8. Insulin
9. Glucagon
10. Gigantism
11. Panhypopituitarism
12. Myxoedema

IV. Multiple-choice questions

1. d; **2**. d; **3**. a; **4**. c; **5**. a; **6**. d; **7**. c; **8**. a; **9**. b; **10**. c; **11**. b; **12**. d; **13**. c; **14**. d; **15**. b; **16**. d; **17**. a

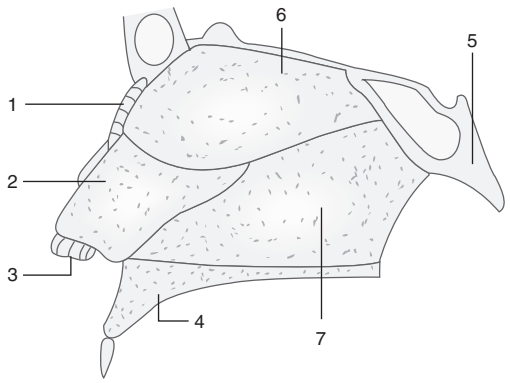
Respiratory System

13

ANATOMY

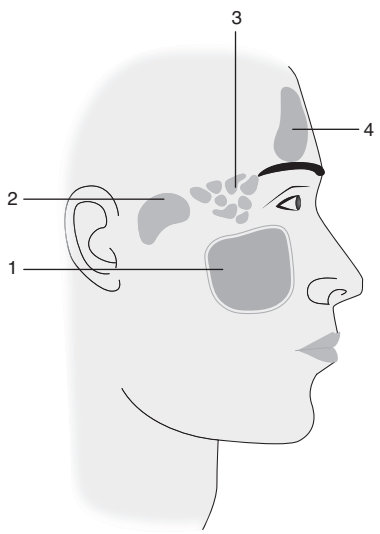
QUESTIONS

I. Identify the parts of nasal septum.



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....

II. Identify the air sinuses.



1. .....
2. .....
3. .....
4. .....

III. Match the following:

(a) Little's area	(i) Rima glottis
(b) Middle concha	(ii) Nasolacrimal duct
(c) Vocal folds	(iii) Superior concha
(d) Olfactory mucosa	(iv) Nasal septum
(e) Inferior meatus	(v) Ethmoid

IV. Fill in the blanks.

1. ..... concha is an independent bone.
2. Sphenoidal air sinus opens into .....
3. Unpaired cartilages of the larynx are ....., ... and .....
4. ..... are false vocal folds.
5. ..... is the abductor of the vocal cords.
6. The longer vocal cords produce ..... pitch sound.
7. All intrinsic muscles of the larynx are supplied by ..... nerve except cricothyroid that is supplied by ..... nerve.
8. Lungs have ..... colour in a newborn and ..... in an adult.
9. Lingular lobe is a part of ..... lobe of the ..... lung.
10. ..... is the collection of pus in the pleural cavity.

V. Read and mark the statements as true (T) or false (F).

1. The sound is produced by vibrations of vestibular folds.
2. Azygos vein arches over the root of right lung.
3. Lung tissue is supplied by pulmonary arteries.
4. Respiratory diaphragm descends with contraction.
5. In pleural effusion, fluid first accumulates in costodiaphragmatic recess.

VI. Multiple-choice questions

1. Which of the following structures is *not* a part of the upper respiratory tract?
   (a) Nose
   (b) Larynx
   (c) Pharynx
   (d) Epiglottis
2. Which of the following does not drain into the middle meatus of nose?
   (a) Sphenoidal sinus
   (b) Maxillary sinus
   (c) Frontal sinus
   (d) Ethmoidal sinus
3. Which sinuses are not paranasal?
   (a) Maxillary
   (b) Mastoid
   (c) Sphenoid
   (d) Frontal
4. Trachea is lined by which epithelium?
   (a) Stratified squamous
   (b) Stratified ciliated columnar
   (c) Columnar with goblet cells
   (d) Pseudostratified ciliated columnar

5. The lowermost cartilage of larynx is
   (a) Thyroid
   (b) Cricoid
   (c) Arytenoid
   (d) Corniculate

6. The trachea
   (a) Lies anterior to oesophagus
   (b) Lies posterior to oesophagus
   (c) Has complete rings of cartilage
   (d) Divides at thoracic inlet

7. Surface tension of the alveolar fluid is reduced by
   (a) Mucus
   (b) Sebum
   (c) Surfactant
   (d) Water

8. The area between the lungs is known as
   (a) Pleural cavity
   (b) Pericardial cavity
   (c) Mediastinum
   (d) Thoracic cavity

9. The gaseous exchange takes place in
   (a) Trachea
   (b) Bronchi
   (c) Bronchioli
   (d) Alveoli

10. All of the following are the features of the bronchopulmonary segments, **EXCEPT**
   (a) Wedge-shaped mass of lung
   (b) Supplied by segmental artery
   (c) Drained by segmental vein
   (d) Supplied by tertiary bronchus

VII. Case-based questions

A middle-aged man with a history of hypertension was brought to the clinic for bleeding through the nose. Examination showed the blooding was from septum.

1. What is the term used for bleeding from nose?
2. Which area of the nasal septum usually bleeds?
3. Which arteries supply that area?

VIII. Short-answer questions

1. Name of air sinuses, and describe frontal air sinus
2. Functions of air sinuses
3. Name of cartilages of larynx and their functions
4. Posterior cricoarytenoid muscle
5. Pleural recesses
6. Divisions of mediastinum

IX. Long-answer questions

1. Describe the gross anatomy of lateral wall on nose in brief. Add a note on its applied anatomy.
2. Draw and label the parts of cavity of larynx. Name the movements of vocal cords and muscles causing them.
3. Describe the pleura as under:
   (a) Name the parts
   (b) Nerve supply
   (c) Applied anatomy
4. Describe relations of mediastinal surface of left lung. Name the structures at the hilus of left lung.

ANSWERS

I. Page no. 383

II. Page no. 385

III. Match the following:

(a) Little's area	(iv) Nasal septum
(b) Middle concha	(v) Ethmoid
(c) Vocal folds	(i) Rima glottis
(d) Olfactory mucosa	(iii) Superior concha
(e) Inferior meatus	(ii) Nasolacrimal duct

IV. Fill in the blanks.

1. Inferior
2. Sphenoethmoidal recess
3. Epiglottis, thyroid, cricoid
4. Vestibular folds
5. Posterior cricoarytenoid
6. Lower
7. Recurrent laryngeal, external laryngeal
8. Pink, grey
9. Upper, left
10. Empyema

V. Read and mark the statements as true (T) or false (F).

1. F; **2**. T; **3**. F; **4**. T; **5**. T

VI. Multiple-choice questions

1, c; **2**, a; **3**, b; **4**, d; **5**, b; **6**, a; **7**, c; **8**, c; **9**, d; **10**, c

VII. Case-based questions

1. Bleeding from the nose is called epistaxis.
2. Little's area, which is on the anteroinferior part of the septum, usually bleeds.
3. The septal branch of superior labial branch of facial artery, anastomosing with sphenopalatine artery, supply that area.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Part of respiratory tract that conducts air is .....
2. Part of lung performing respiratory function is .....
3. Main muscle of inspiration is .....
4. Complete closure of ..... causes increased intra-abdominal pressure.
5. Collection of fluid in pleural cavity leads to .....
6. For inspiration, pressure in lungs is ..... than atmospheric pressure.
7. For expiration, pressure in lungs is ..... than atmospheric pressure.
8. Respiratory minute volume is ..... × respiratory rate.
9. Breathing reserve is ..... L.
10. Anatomical dead space is ..... mL.
11. Volume of air remaining in lungs after normal tidal expiration is .....
12. Normal vital capacity is ..... mL.
13. Capillary endothelium of lungs secretes .....
14. Inspiratory capacity = ... + tidal volume.

15. Total diffusing surface area of lung is ..... m^2.
16. Increase in thickness of respiratory membrane ..... rate of diffusion.
17. Normal alveolar ventilation is ..... mL.
18. One gram of Hb carries ..... mL of O_2.
19. Amount of O_2 dissolved in plasma is .....%.
20. PCO_2 of alveolar air is ..... mmHg.
21. Respiratory gases are ..... soluble.
22. O_2 + Hb → .....
23. Hb – O_2 is .....
24. Plateau of O_2 dissociation curve is from PO_2 of ..... to ..... mmHg.
25. Curve of O_2 dissociation curve is steep between ..... and ..... mmHg.
26. Normal tissue PO_2 is ..... mmHg.
27. Increase in PCO_2 shifts O_2 dissociation curve to .....
28. Decrease in PCO_2 shifts O_2 dissociation curve to .....
29. When tissues are damaged/poisoned and not able to take O_2, the condition is called .....
30. Congestive cardiac failure causes ..... hypoxia.
31. Bleeding from nose is called .....
32. Difficulty in breathing is called .....
33. Hypersensitivity to pollen leads to .....
34. In bronchial asthma, there is difficulty in .....
35. Prolonged attack of asthma is called .....
36. ..... centres affect ventilation during speech and singing

II. Who am I?

1. I vibrate to produce sound: .....
2. When I get damaged, you get hoarseness of voice: .....
3. I cover lungs: .....
4. I measure lung volume and capacities of lung: .....
5. I do not take part in gaseous exchange: .....
6. I am S shaped: .....
7. Value of PO_2 in alveoli is: .....
8. I am activated when tidal volume is more than 1500 mL: .....
9. We are situated in aortic body: .....
10. We carry maximum proportion of CO_2 in blood: .....
11. We are situated in carotid body: .....
12. We are afferents from chemoreceptor to medulla: .....
13. We three centres control respiration: ....., ..., ...
14. I favour inspiration and decrease rate of respiration: .....
15. I inhibit inspiration and increase rate of respiration: .....
16. I am triggered by allergens and affect young adults: .....
17. I affect premature baby's lungs: .....
18. I am always present in lungs: .....
19. Rate of diffusion of substance/gas depends on .....

III. Fill the correct word/value in the boxes below.

1. Increased temperature of blood shifts O_2 dissociation curve to ____.
2. Increased H^+ ions shift O_2 dissociation curve to ____.
3. Total lung capacity (TLC) = ____ + tidal volume + ____ + residual volume.
4. Carbon monoxide poisoning causes ____ hypoxia.
5. Inflammation of mucous membrane of bronchial tree is called ____.
6. Hay fever is characterised by release of ____ from mast cells.
7. IgE antibodies are produced by ____.
8. Four sinuses are ____, ____, ____ and ____.
9. Lobar pneumonia causes ____, ____ and ____.
10. Common cause of lobar pneumonia is ____.
11. Bronchopneumonia is ____ + pneumonia.
12. When tuberculosis spreads to other areas, it is called ____.
13. In tuberculosis, many tubercles join together and secrete cheesy material. This is known as ____.
14. Low-grade fever, loss of appetite and cough are the main symptoms of ____.
15. Exposure to a high level of O_2 causes ____.

IV. Match the following:

(a) Reduced Hb carries more O_2	(i) Alveolar ventilation
(b) 500 mL	(ii) Haldane's effect
(c) 4200 mL	(iii) O_2 dissociation curve
(d) S shaped	(iv) Tidal volume
(e) Respiratory centre	(v) Chemoreceptors
(f) Aortic body	(vi) O_2
(g) 3% dissolved form	(vii) Medulla

V. Multiple-choice questions

1. Total lung capacity is
- (a) 1500 mL
- (b) Vital capacity + tidal volume
- (c) Vital capacity + residual volume
- (d) 4000 mL

2. Spirometry is not useful in measuring
- (a) Residual volume
- (b) Functional residual capacity
- (c) Total lung capacity
- (d) All of the above

3. Breathing reserve
- (a) Is equal to maximum ventilatory volume—respiratory minute volume
- (b) Is more in athletes
- (c) Decreases in restrictive lung diseases
- (d) All of the above

4. Respiratory membrane includes
- (a) Lining of alveolar ducts
- (b) Alveolar epithelium
- (c) Lining of respiratory bronchiole
- (d) All of the above

5. O_2 dissociation curve is sigmoid shaped because
(a) Hb is present in RBCs
(b) O_2 combines with Hb reversibly
(c) O_2 is attached to iron part of Hb
(d) O_2 is attached to haem part of Hb

6. O_2 dissociation curve shifts to right
(a) When blood reaches tissues
(b) When PCO_2 of blood falls
(c) When pH of blood rises
(d) when PO_2 level is low

7. Stimulation of pneumotaxic centre results in
(a) Increased tidal volume
(b) Increased respiratory rate
(c) Stimulation of vagus
(d) None of the above

8. Amount of CO_2 expired per minute by a normal person is ..... mL.
(a) 100
(b) 250
(c) 200
(d) 150

9. During exercise, peripheral resistance is decreased in
(a) Muscles
(b) Kidneys
(c) Liver
(d) GIT

10. Most potent respiratory stimulus is
(a) Increased H^+ ions in blood
(b) Decreased HCO_3^- ions in blood
(c) Decreased PO_2 of blood
(d) Increased PCO_2 of blood

11. Tidal volume is ..... mL.
(a) 100
(b) 350
(c) 500
(d) 200

12. A factor affecting diffusion of gases is
(a) Surface area
(b) Pressure gradient
(c) Thickness of respiratory membrane
(d) All of the above

13. Normal alveolar ventilation is ..... L.
(a) 5
(b) 3.5
(c) 4.2
(d) 6

14. Normal functional residual capacity (FRC) in a young adult is ..... L.
(a) 2.3
(b) 1.2
(c) 4
(d) 0.5

15. Alveolar air PO_2 is ..... mmHg.
(a) 110
(b) 149
(c) 159
(d) 104

16. Total lung capacity is
(a) 1500 mL
(b) Equal to vital capacity + tidal volume
(c) Equal to vital capacity + residual volume
(d) 4000 mL

17. PO_2 of arterial blood is ..... mmHg.
(a) 95
(b) 104
(c) 40
(d) 40–100

VI. Short notes

1. Lung capacities
2. Lung volumes
3. Anatomical dead space
4. Physiological dead space
5. Types of hypoxia
6. O_2 dissociation curve
7. Bohr's effect and Haldane's effect
8. Respiratory centres in medulla
9. Mechanism of breathing
10. Central and peripheral chemoreceptors
11. Hering–Breuer reflex
12. Acute and chronic bronchitis
13. Primary and secondary tuberculosis
14. Predisposing factors for pneumonia
15. Types of control of respiration
16. Respiratory centres
17. Dyspnoea
18. Functions of respiratory system
19. Dead space air
20. Differences between extrinsic and extrinsic asthma

VII. Answer the following questions:

1. Enumerate factors causing right shift of O_2 dissociation curve.
2. Enumerate respiratory centres and their main function.
3. Enumerate factors causing left shift of O_2 dissociation curve.
4. Define the following and give their normal values:
   (a) Residual volume
   (b) Tidal volume
   (c) Functional residual capacity
   (d) Total lung capacity
   (e) Vital capacity
5. Compare and contrast between inspired air, alveolar air and expired air.

VIII. Long-answer questions

1. Describe the mechanism of breathing.
2. Describe the different lung volumes and capacities.
3. Describe the transport of O_2.
4. Describe the transport of CO_2.
5. Describe the chemical control of respiration in humans.
6. Describe the nervous control of respiration in humans.

ANSWERS

I. Fill in the blanks.

1. Nose to terminal bronchiole
2. Beyond terminal bronchiole
3. Diaphragm
4. Glottis
5. Pleural effusion
6. Less
7. More/greater
8. Tidal volume
9. 94
10. 150
11. Functional residual capacity (FRC)
12. 4600
13. Angiotensin-converting enzyme
14. Inspiratory reserve volume (IRV)
15. 70
16. Decreases
17. 4200
18. 1.34
19. 3
20. 40
21. Lipid
22. Oxyhaemoglobin
23. Reduced Hb
24. 60, 300
25. 20, 40
26. 40
27. Right
28. Left
29. Histotoxic hypoxia
30. Stagnant hypoxia
31. Epistaxis
32. Dyspnoea
33. Hay fever
34. Expiration
35. Status asthmaticus
36. Higher (cortical)

II. Who am I?

1. Vocal cord
2. Recurrent laryngeal nerve
3. Pleura
4. Spirometry
5. Anatomical dead space
6. O_2 dissociation curve
7. 104
8. Hering–Breuer reflex
9. Aortic chemoreceptors
10. Bicarbonates
11. Carotid chemoreceptors
12. IX and X cranial nerves
13. Medullary, apneustic, pneumotaxic
14. Apneustic centre
15. Pneumotaxic centre
16. Extrinsic/allergic asthma
17. Respiratory distress syndrome
18. Residual volume
19. Pressure gradient

III. Fill the correct word/value in the boxes below.

1. Right
2. Right
3. IRV, ERV
4. Anaemic
5. Acute bronchitis
6. Histamine
7. B lymphocytes
8. Maxillary, sphenoidal, ethmoidal, frontal
9. Fever, tachycardia, cough
10. Pneumococcus
11. Bronchitis
12. Miliary tuberculosis
13. Caseation
14. Tuberculosis
15. O_2 toxicity

IV. Match the following:

(a) Reduced Hb carries more O_2	(ii) Haldane's effect
(b) 500 mL	(iv) Tidal volume
(c) 4200 mL	(i) Alveolar ventilation
(d) S shaped	(iii) O_2 dissociation curve
(e) Respiratory centre	(vii) Medulla
(f) Aortic body	(v) Chemoreceptors
(g) 3% dissolved form	(vi) O_2

V. Multiple-choice questions

1. c; **2**. d; **3**. d; **4**. d; **5**. a; **6**. a; **7**. b; **8**. c; **9**. a; **10**. d; **11**. c; **12**. d; **13**. c; **14**. a; **15**. d; **16**. c; **17**. a

Nutrition

14

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Amount of heat produced per hour per square metre of body surface area is .....
2. Calorie value of fat, protein and carbohydrate is ....., ... and ....., respectively.
3. ..... gives taste to food.
4. We get essential amino acids from .....
5. Vitamin C is also called .....
6. Deficiency in ..... metabolism causes phenylketonuria.
7. ..... % of protein must be from animal source.
8. Carrots, mango and fish are rich in .....
9. Protein of ..... origin is superior.
10. All ..... fruits are rich source of vitamin C.

II. Who am I?

1. My deficiency causes haemorrhagic disease in newborn: .....
2. My deficiency causes rickets: .....
3. Our absence increases size of RBCs: .....
4. My deficiency is the commonest cause of anaemia in our country: .....
5. If you have me less in your diet, you frequently end up in constipation: .....
6. We are organic compounds (required in minute amount) but not synthesised in body: .....
7. I am very important for your eyes and skin: .....
8. Our deficiency in diet can cause kwashiorkor: .....

III. Fill the correct word/value in the boxes below.

1. Excess calorie intake often causes [ ].
2. Protein–energy malnutrition leads to [ ] and [ ].
3. [ ] become weak and atrophic in malnutrition.

4. High phenylalanine level often cause development abnormality of _____.
5. The opposite of obesity × _____.
6. Demyelination of large nerve fibres occurs due to _____.
7. Fat-soluble vitamins are _____.
8. More intake of saturated fat can cause _____.
9. Daily protein intake is _____ mg/kg body weight.
10. Dietary fibre facilitates _____.
11. Human body derives energy from _____ of food.

IV. Match the following:

(a) Atherosclerosis	(i) Thiamin
(b) Methionine	(ii) Vitamin A deficiency
(c) Xerophthalmia	(iii) Saturated fat
(d) Beriberi	(iv) Rickets
(e) Vitamin D	(v) Essential amino acid

V. Multiple-choice questions

1. Vitamin A deficiency causes
   (a) Bleeding gums
   (b) Megaloblastic anaemia
   (c) Night blindness
   (d) Stomatitis
2. Pulses are a rich source of
   (a) Fats
   (b) Carbohydrates
   (c) Minerals
   (d) Proteins
3. Which of the following is a symptom of kwashiorkor?
   (a) Growth failure
   (b) Loss of appetite
   (c) Angular stomatitis
   (d) All of the above
4. Which of the following is required for synthesis of clotting factors?
   (a) Vitamin C
   (b) Vitamin K
   (c) Vitamin D
   (d) Vitamin B_{12}
5. Excess use of ..... often leads to hypertension
   (a) Iron
   (b) Copper
   (c) Sodium
   (d) Protein
6. All of the following are essential amino acids, **EXCEPT**
   (a) Isoleucine
   (b) Threonine
   (c) Calcium
   (d) Valine
7. Fibre in the diet helps in
   (a) Preventing absorption of various foodstuffs
   (b) Reducing blood glucose levels
   (c) Preventing atherosclerosis
   (d) All of the above

VI. Case-based questions

A 1.5-year-old child came with complaints of oedema in lower limbs, loss of appetite and diarrhoea. There were reduced plasma protein levels.

1. What is kwashiorkor?
2. Why are plasma protein levels low?

VII. Short notes

1. Important sources of carbohydrates, proteins and fats
2. Balanced diet
3. Vitamin A deficiency
4. Vitamin D deficiency
5. Water-soluble vitamins
6. Scurvy
7. Marasmus
8. Phenylketonuria
9. Sources of foodstuffs
10. Fat-soluble vitamins
11. Effects of deficiency of vitamin C
12. Kwashiorkor

VIII. Answer the following questions:

1. Enumerate essential amino acids.
2. Write down calculation for calorie requirement.
3. How will diet plan differ for a 12-year-old boy, 80-year-old person and 25-year-old lactating mother and why?
4. State the significance of dietary fibre.
5. Mention the rich sources of carbohydrates, proteins and fat (give two to three sources for each).
6. State the significance of vitamins in diet.

IX. Long-answer questions

1. What is a balanced diet?
2. Calculate the balanced diet for a male person weighing 50 kg doing light work. Describe the various sources of various foodstuffs.

ANSWERS

I. Fill in the blanks.

1. BMR
2. 9, 4, 4
3. Fat
4. Diet
5. Ascorbic acid
6. Phenylalanine
7. 25
8. Vitamin A
9. Animal
10. Citrus

II. Who am I?

1. Vitamin K
2. Vitamin D
3. Folic acid and vitamin B_{12}
4. Iron
5. Dietary fibre
6. Vitamins
7. Vitamin A
8. Proteins

III. Fill the correct word/value in the boxes below.

1. Obesity
2. Marasmus and kwashiorkor
3. Muscles
4. CNS
5. Inanition
6. Vitamin B_{12} deficiency
7. A, D, E and K
8. Atherosclerosis
9. 1
10. Intestinal movements
11. Oxidation

IV. Match the following:

(a) Atherosclerosis	(iii) Saturated fat
(b) Methionine	(v) Essential amino acid
(c) Xerophthalmia	(ii) Vitamin A deficiency
(d) Beriberi	(i) Thiamin
(e) Vitamin D	(iv) Rickets

V. Multiple-choice questions

1. c; **2**. d; **3**. d; **4**. b; **5**. c; **6**. c; **7**. d

VI. Case-based questions

1. Kwashiorkor is a condition of protein–energy malnutrition (PEM).
2. As there is quantitative and qualitative deficiency of proteins in the diet, plasma protein levels are low.

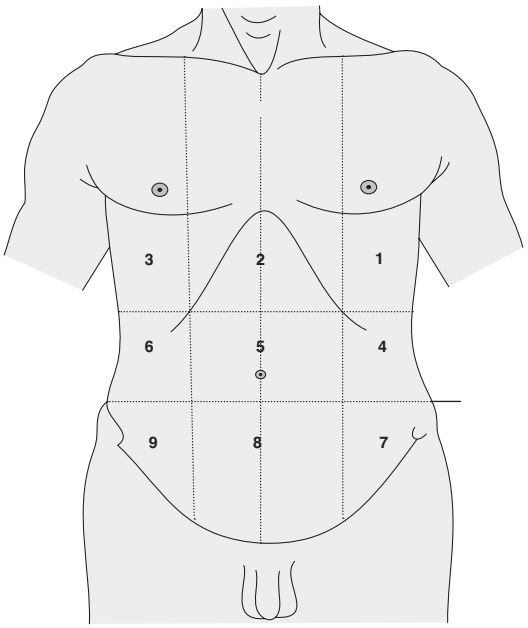
Digestive System

15

ANATOMY

QUESTIONS

I. Identify the different quadrants of anterior abdominal wall in the figure below. Where will you palpate the following organs during per abdominal examination?



(a) Small intestine
(b) Stomach
(c) Vermiform appendix
(d) Left kidney
(e) Liver
(f) Spleen

II. Tick mark the correct answer.

1. A midline incision below umbilicus will pass through linea alba/rectus abdominis.
2. Spleen lies between 6 and 9 ribs/9 and 11 ribs on left side.
3. Blood from the intestines travels to the liver via portal vein/inferior vena cava.
4. The structure that controls passage of the food from the stomach to the duodenum is pyloric antrum/pyloric sphincter.
5. Bile duct opens into the first/second part of duodenum.
6. Lesser omentum is attached to the stomach/spleen.

7. Loss of taste sensation from posterior one-third of the tongue occurs in the lesion of chorda tympani nerve/glossopharyngeal nerve.
8. The herringbone pattern of the duct system is seen in liver/pancreas.
9. Appendices epiploicae are absent in sigmoid colon/rectum.
10. The commonest type of appendix is retrocaecal/subcaecal.

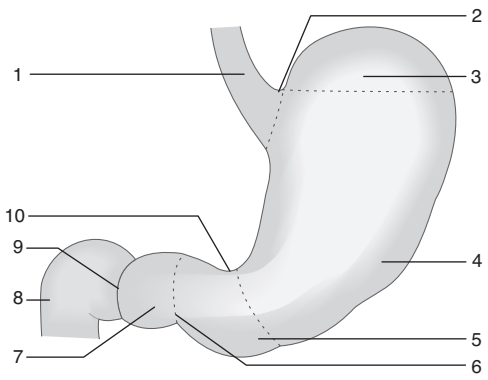
III. Fill in the blanks.

1. Lips contain the muscle .....
2. Palatopharyngeal sphincter closes ..... pharynx from .....
3. ..... papillae are located in front of sulcus terminalis.
4. The muscle for protrusion of the tongue is .....
5. ..... is called wisdom tooth.
6. In pharynx, outer circular muscle layer is formed by .....
7. Stomach bed is formed by ....., ... and .....
8. Neck of pancreas is closely related to ..... posteriorly.
9. The liver is supplied by .....
10. Gallstones often collect in .....

IV. Read and mark the statements as true (T) or false (F).

1. Intrinsic muscles of the tongue are involuntary.
2. The submandibular duct opens on the floor of the mouth.
3. Difficulty in swallowing is called dysphagia.
4. Major part of duodenum is intraperitoneal.
5. Ileum is thicker than jejunum.

V. Identify the structures labelled in the figure below.



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....
10. .....

VI. Multiple-choice questions

1. All of the following are the accessory glands of digestive system, **EXCEPT**
- (a) Liver
- (b) Salivary glands
- (c) Spleen
- (d) Pancreas

2. The hardest part of the tooth without blood supply and nerve supply is
- (a) Enamel
- (b) Dentin
- (c) Cementum
- (d) Pulp cavity

3. Which lymphatic tissue is the commonest site of inflammation?
- (a) Lingual tonsil
- (b) Palatine tonsil
- (c) Peyer's patches
- (d) Tubal tonsil

4. Which intestinal layer accounts for peristaltic waves?
- (a) Mucosa
- (b) Muscularis mucosae
- (c) Muscularis externa
- (d) Serosa

5. The muscle which constricts to prevent the air entry in oesophagus is
- (a) Superior constrictor
- (b) Middle constrictor
- (c) Inferior constrictor
- (d) Circular muscle of oesophagus

6. Which of the following cells secrete hormones?
- (a) Parietal cells
- (b) Mucous neck cells
- (c) Chief cells
- (d) Enteroendocrine cells

7. Which is the primary function of villi?
- (a) Ingestion
- (b) Secretion
- (c) Absorption
- (d) Digestion

8. Bile is secreted by
- (a) Liver
- (b) Gallbladder
- (c) Pancreas
- (d) Duodenum

9. Dermatome at the level of umbilicus is
- (a) T9
- (b) T10
- (c) L1
- (d) L2

10. Villi are present in all of the following parts, **EXCEPT**
- (a) Duodenum
- (b) Jejunum
- (c) Ileum
- (d) Appendix

VII. Case-based questions

A small child was brought to the clinic for fever of and on. The child had open mouth and was breathing through mouth. He had pinched nostrils. The mother was told that the child has adenoids.

1. What are adenoids?

2. What is the reason for pinched nostrils?

3. What is ring of Waldeyer? Name its components.

VIII. Short-answer questions

1. Describe ring of Waldeyer in brief.

2. List the accessory organs of digestive system and their functions.

3. Name the mesenteries and their functions.

4. Name the peritoneal pouches and their importance.

5. Name the characteristics of large intestine.
6. Describe microscopic structure of the stomach with suitable diagram.
7. Describe in brief the microscopic structure of gall bladder.

IX. Long-answer questions

1. Describe gross and applied anatomy of palatine tonsil in brief.
2. Describe the tongue in terms of the following:
   (a) Parts
   (b) Blood supply
   (c) Nerve supply
3. Describe the pancreas in terms of the following:
   (a) Parts
   (b) Blood supply
   (c) Microscopic structure
   (d) Applied anatomy
4. Describe the gross anatomy of the anal canal in brief. Add a note on its applied anatomy.

ANSWERS

I. Page no. 434

(a) Umbilical region
(b) Epigastric, left hypochondriac and umbilical
(c) Right iliac fossa
(d) Left lumbar
(e) Right hypochondriac and epigastric
(f) Spleen present in left hypochondriac region, but covered by ribs; palpable only when enlarged beyond costal margin

II. Tick mark the correct answer.

1. Linea alba
2. 9 and 11 ribs
3. Portal vein
4. Pyloric sphincter
5. Second
6. Stomach
7. Glossopharyngeal nerve
8. Pancreas
9. Rectum
10. Retrocaecal

III. Fill in the blanks.

1. Orbicularis oris
2. Naso, oropharynx
3. Circumvallate
4. Genioglossus
5. Third molar
6. Constrictors
7. Pancreas, left kidney, left suprarenal
8. Portal vein
9. Hepatic artery
10. Hartmann's pouch

IV. Read and mark the statements as true (T) or false (F).

1. F; **2.** T; **3.** T; **4.** F; **5.** F

V. Page no. 436

VI. Multiple-choice questions

1. c; **2**. a; **3**. b; **4**. c; **5**. c; **6**. d; **7**. c; **8**. a; **9**. b; **10**. d

VII. Case-based questions

1. An enlarged pharyngeal tonsil is called an adenoid.
2. As adenoids block the nasopharynx, the child constantly breathes through nose. Therefore, nostrils do not develop and look pinched.
3. The ring of Waldeyer is a collection of lymphatic tissue in relation to oropharynx. Its components are lingual tonsil, palatine tonsils, tubal tonsils and pharyngeal tonsil.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Small intestine consists of duodenum, ... and .....
2. Three pairs of salivary glands are ....., ... and .....
3. Daily salivary secretion is ..... mL.
4. Salivary centre is situated in .....
5. ..... glands secrete thick and viscous saliva.
6. Sympathetic stimulation causes secretion of ..... saliva.
7. Parasympathetic stimulation causes secretion of ..... saliva.
8. ..... acts on boiled starch in mouth.
9. Adenoid facies seen in children is due to enlarged .....
10. ..... glands secrete mucus.
11. Surgical removal of stomach is called .....
12. Fats release ..... hormone from jejunum.
13. Capacity of adult stomach is .....
14. More the fluidity of chyme, ... is gastric emptying.
15. Cephalic phase of gastric secretion is controlled by ..... nerve.
16. Two important hormones releases from small intestine are .....
17. Distension of duodenum ..... gastric secretion.
18. Brush border helps increase ..... of small intestine.
19. Normal gastric juice secretion is ..... mL.
20. Small intestinal juice is called .....
21. Major portion of small intestinal juice is .....
22. Secretin causes ..... juice secretion from pancreas.
23. Alpha cells of islets of Langerhans secrete .....
24. Beta cells of islets of Langerhans secrete .....
25. Wave of relaxation which is followed by contraction is .....
26. Typhoid is caused by .....
27. Watery diarrhoea is a characteristic of ..... infection.
28. Bile contains ..... and .....
29. Bile salts cause ..... of fat.
30. Most common hernia is .....
31. ..... hernia is common in females.
32. ..... hernia is seen in females during foetal development.
33. Gastro-oesophageal junction and portion of stomach protrude in chest to cause ..... hernia.
34. Normal bilirubin level is ..... mg/100 mL.

II. Who am I?

1. We make you appreciate taste: .....
2. I am the largest salivary gland: .....
3. My secretion starts when you see food: .....
4. I supply muscles of tongue: .....
5. I secrete thin watery saliva: .....
6. I am a common path for food and air: .....
7. We secrete HCl and intrinsic factor: .....
8. We secrete pepsin: .....
9. I maintain acidic pH and help to kill bacteria: .....
10. I sweep all contents of small intestine into the colon: .....
11. I help in digestion and absorption of fat: .....
12. I have exocrine and endocrine functions: .....
13. I open in second part of duodenum: .....
14. We two control pancreatic juice secretion: .....
15. Glucose formed from noncarbohydrate source is: .....
16. I store bile: .....
17. We are end products of Hb breakdown: .....
18. I guard opening of common bile duct in duodenum: .....
19. My failure to relax leads to achalasia cardia: .....
20. I am responsible for amoebic dysentery: .....

III. Fill the correct word/value in the boxes below.

1. [ ] acts on carbohydrates in stomach.
2. [ ] acts on fats in stomach.
3. More the volume of food, [ ] is stomach emptying.
4. $CO_2 + H_2O \xrightarrow[\text{[ ]}]{?} H_2CO_3$
5. Commonest area of duodenal ulcer is [ ] part of duodenum.
6. Trypsinogen $\xrightarrow[\text{[ ]}]{}$ Trypsin.
7. Gastrin is released from [ ] cells of stomach.
8. Secretin is released from [ ].
9. We three make portal pyramid [ ], [ ], [ ].
10. Glycogen is converted to glucose by [ ].

IV. Multiple-choice questions

1. Defaecation reflex
- (a) Is intrinsic nerve plexus
- (b) Is reinforced by spinal reflex
- (c) Is initiated by distention of rectum
- (d) All of the above

2. Large intestinal mucosa
- (a) Secretes mucus
- (b) Secretes bicarbonates
- (c) Absorbs electrolytes
- (d) All of the above

3. Brunner's glands are located in
- (a) Mucosa of ileum
- (b) Mucosa of duodenum
- (c) Mucosa of jejunum
- (d) All of the above

4. Enterogastric reflex is initiated by
- (a) Distention of small intestine
- (b) Protein breakdown products in small intestine
- (c) Acid in small intestine
- (d) All of the above

5. Process of digestion
- (a) Is a process of hydrolysis
- (b) Converts food into absorbable form
- (c) Converts large molecules into simple molecules
- (d) All of the above

6. Incisors
- (a) Help in grinding of food
- (b) Help in cutting of food
- (c) Are four in number
- (d) Are two in number

7. Cardiac glands of stomach mainly secrete
- (a) Mucus
- (b) Acid
- (c) Pepsin
- (d) Mucus and acid

8. Main constituents of gastric juice are
- (a) Amylase, trypsin, chymotrypsin
- (b) HCl, pepsin, gastric lipase, amylase
- (c) Bicarbonates, lipase
- (d) None of the above

9. Main gastric glands are present in
- (a) Fundus of stomach
- (b) Body and fundus of stomach
- (c) Pylorus of stomach
- (d) Incisura angularis

10. Which of the following is absorbed in colon?
- (a) Protein
- (b) Alcohol
- (c) Iron
- (d) Electrolytes

11. Sympathetic stimulation of salivary gland causes
- (a) Secretion of watery saliva
- (b) Secretion of saliva rich in water and enzymes
- (c) Viscous saliva
- (d) All of the above

12. HCl is secreted in stomach by
- (a) Mucous cells
- (b) Oxyntic cells
- (c) Chief cells
- (d) S cells

13. Absorption of salt and water occurs in
- (a) Small intestine
- (b) Liver
- (c) Large intestine
- (d) Gallbladder

14. Total length of gastrointestinal tract is
- (a) 15 m
- (b) 15 feet
- (c) 4 feet
- (d) 30 m

15. Quantity of gastric juice secreted daily is
- (a) 2000–3000 mL
- (b) 500–1000 mL
- (c) 100–200 mL
- (d) 5–7 L

V. Short notes

1. Salivary glands
2. Functions of saliva
3. Composition of saliva
4. Stomach emptying
5. Motor functions of stomach
6. Functions of gastric juice
7. Phases of gastric secretion
8. Phases of pancreatic secretion
9. Functions of small intestine
10. Functions of liver
11. Defaecation reflexes
12. Functions of large intestine
13. Gastritis
14. Peptic ulcer
15. Risk factors for peptic ulcer
16. Reflux oesophagitis
17. Pancreatitis
18. Gallstones
19. Succus entericus
20. Composition of gastric juice
21. Composition of pancreatic juice
22. Gastric emptying
23. Functions of pancreatic juice
24. Functions of HCl
25. Defaecation

VI. Answer the following questions:

1. Enumerate functions of liver.
2. Enumerate functions of saliva.
3. Write mechanism of secretion of HCl.
4. Enumerate functions of small intestine.
5. Write a note on pancreatic juice.
6. Enumerate movements of small intestine.

VII. Long-answer questions

1. Describe the structure of stomach and mention its functions.
2. State the composition and functions of gastric juice.
3. State the composition and functions of pancreatic juice.

ANSWERS

I. Fill in the blanks.

1. Jejunum, ileum
2. Parotid, submandibular, sublingual
3. 800–1500
4. Medulla
5. Submandibular and sublingual
6. Viscous
7. Watery
8. Salivary amylase
9. Adenoids
10. Cardiac and pyloric
11. Gastrectomy
12. Cholecystokinin (CCK)
13. 1–1.5 L
14. Easier
15. Vagus
16. Enterogastrone/secretin and CCK
17. Inhibits
18. Surface area
19. 500–1000
20. Succus entericus
21. Water
22. Watery and alkaline
23. Glucagon
24. Insulin
25. Propulsion movement
26. *Salmonella typhi*
27. *Vibrio cholerae*
28. Bile pigments, bile salts
29. Emulsification
30. Inguinal
31. Femoral
32. Physiological
33. Hiatus hernia
34. 0.3–1

II. Who am I?

1. Taste receptors in taste bud
2. Parotid
3. Cephalic phase
4. Hypoglossal nerve
5. Parotid gland
6. Pharynx
7. Oxyntic cells
8. Chief cells
9. HCl
10. Peristaltic rush
11. Bile
12. Pancreas
13. Common bile duct
14. Secretin and CCK
15. Gluconeogenesis
16. Gallbladder
17. Bilirubin and biliverdin
18. Sphincter of Oddi
19. Cardiac sphincters in lower end of oesophagus
20. *Entamoeba histolytica*

III. Fill the correct word/value in the boxes below.

1. Gastric amylase
2. Gastric lipase
3. Faster
4. Carbonic anhydrase
5. First
6. Enterokinase
7. G cells
8. S cells
9. Branch of portal vein, branch of hepatic artery, interlobular bile duct
10. Glycogenolysis

IV. Multiple-choice questions

1. d; **2**. d; **3**. b; **4**. d; **5**. d; **6**. b; **7**. a; **8**. b; **9**. b; **10** d; **11**. c; **12**. b; **13**. c; **14**. b; **15**. b

Urinary System

16

ANATOMY

QUESTIONS

I. Name the parts of urinary system.

II. Match the following:

(a) Ureter	(i) Muscular sac that serves as a temporary reservoir of urine
(b) Incontinence	(ii) Inner part of kidney
(c) Nephron	(iii) Loss of voluntary control over urination
(d) Medulla	(iv) Muscular tubes that carry urine from the kidney to the bladder
(e) Bladder	(v) Functional unit of kidney

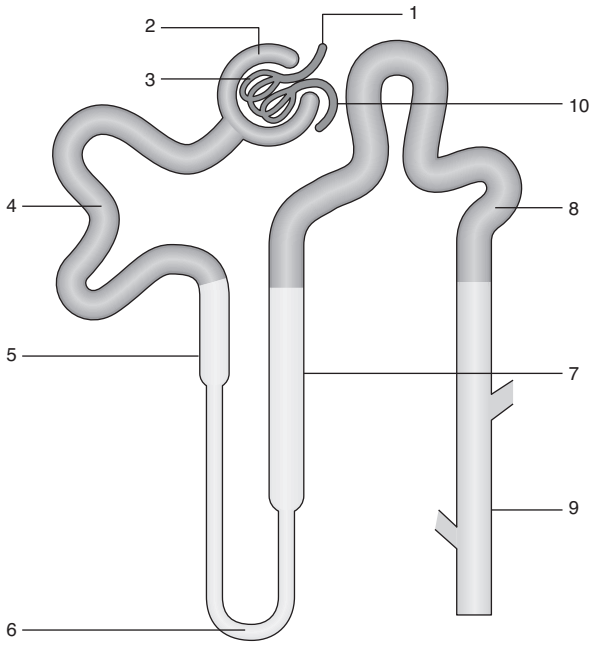
III. Fill in the blanks.

1. The structures at the hilus of the kidney from anterior to posterior .....
2. The renal corpuscle consists of ....., ...
3. The apex of the pyramid is called .....
4. The lowest and the most fixed part of the bladder is .....
5. In the male, base of the bladder is related to .....
6. The length of the ureter is .....
7. Ureteric stones commonly get impacted at .....
8. The passage of ureteric calculus produces pain that radiates from .....

IV. Tick mark the correct answer.

1. Ureters are intraperitoneal/retroperitoneal.
2. Trigone of the urinary bladder has smooth mucosa/mucosa with folds.
3. Muscle coat of the urinary bladder is known as dartos/detrusor.
4. Internal vesical sphincter is voluntary/involuntary.
5. Urinary bladder in a child is pelvic/abdominal.

V. Identify the structures in the figure below.



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....
10. .....

VI. Multiple-choice questions

1. Which of the following is not a component of urinary system?
   (a) Kidney
   (b) Urethra
   (c) Urinary bladder
   (d) Prostate
2. Which of the following is the correct sequence in which urine flows through the kidney towards the urinary bladder?
   (a) Renal pelvis, major calyx, minor calyx, papillary duct, ureter
   (b) Papillary duct, minor calyx, major calyx, renal pelvis, ureter
   (c) Minor calyx, major calyx, papillary duct, renal pelvis, ureter
   (d) Papillary duct, major calyx, minor calyx, ureter, renal pelvis
3. Where are most microvilli found?
   (a) Proximal convoluted tubule
   (b) Loop of Henle
   (c) Distal convoluted tubule
   (d) Collecting duct
4. Pyramids in renal medulla contain
   (a) Proximal convoluted tubule
   (b) Loop of Henle
   (c) Distal convoluted tubule
   (d) Ducts of Bellini
5. Mucosa of the urinary bladder has ..... epithelium.
   (a) Stratified squamous nonkeratinised
   (b) Stratified columnar
   (c) Transitional
   (d) Simple columnar

VII. Case-based questions

A middle-aged man complained of pain in the back. On examination, the pain was located on the right side below the twelfth rib. Further investigations showed that he had tumour of the kidney and was to be operated.

1. Name the site where pain from the kidney is felt at maximum.
2. Describe renal angle.
3. Why kidneys are often operated from the back?

VIII. Short-answer questions

1. Name of the organs of urinary system and a description of the general function of each organ
2. Trigone of the urinary bladder
3. Nephron

IX. Long-answer questions

1. Describe the gross anatomy of the urinary bladder in brief.
2. Describe the ureters in terms of
   (a) Blood supply
   (b) Function
   (c) Microscopic structure

ANSWERS

I. Name the parts of urinary system: Two kidneys, two ureters, urinary bladder and urethra

II. Match the following:

(a) Ureter	(iv) Muscular tubes that carry urine from the kidney to the bladder
(b) Incontinence	(iii) Loss of voluntary control over urination
(c) Nephron	(v) Functional unit of kidney
(d) Medulla	(ii) Inner part of kidney
(e) Bladder	(i) Muscular sac that serves as a temporary reservoir of urine

III. Fill in the blanks.

1. Renal vein, renal artery, ureter
2. Glomerulus, Bowman's capsule
3. Renal papilla
4. Neck
5. Vas deference and seminal vesicle of both sides
6. 25–30 cm
7. At constrictions
8. Loin to groin

IV. Tick mark the correct answer.

1. Retroperitoneal
2. Smooth mucosa
3. Detrusor
4. Involuntary
5. Abdominal

V. Page no. 469

VI. Multiple-choice questions

1. d; **2**. b; **3**. a; **4**. d; **5**. c.

VII. Case-based questions

1. The pain from the kidney is felt maximum at the renal angle.
2. The renal angle is an angle between lateral border of erector spinae and lower border of the twelfth rib.
3. Kidneys are retroperitoneal. Therefore, operating from the back avoids opening peritoneal cavity.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Presence of ..... in urine is haematuria.
2. Two types of dialysis are ..... and .....
3. External urinary sphincter is under ..... control.
4. Plasma clearance is .....
5. ADH acts on .....
6. Normal amount of urine excreted per day is ..... L.
7. Normal urine has ..... pH.
8. Water reabsorption form PCT is called .....
9. Renal calculi (stones) are common in .....
10. Amount of fluid filtered through glomeruli of both kidneys in a day is .....
11. Micturition reflex is ..... reflex.
12. Increased frequency of micturition at night is called .....
13. Zero urinary output is called .....
14. Loss of protein in urine is called .....
15. ..... is common in young children.
16. Main stimulus for renin secretion is reduced .....
17. Renal cell carcinoma is ..... tumour.
18. Types of nephrons are ..... and .....
19. Aldosterone is secreted by .....

II. Who am I?

1. I am secreted by kidney and regulate RBC production: .....
2. I control BP and sodium balance and am synthesised from kidney: .....
3. I am a functional unit of kidney: .....
4. I favour filtration at glomerulus and my pressure is 60 mmHg: .....
5. I am required for absorption of calcium from distal nephron of kidney: .....
6. We two together can cause gross damage to kidneys: .....

7. I am responsible for severe renal colic: .....
8. I run in families and I cause formation of cysts in kidneys: .....
9. My composition is the same as that of plasma except plasma proteins: .....
10. My cells have many mitochondria and brush border: .....
11. I dip from cortex to medulla of kidney: .....
12. If you count us, we are in minority of nephrons but functionally important: .....
13. I give yellow colour to urine: .....

III. Fill the correct word/value in the boxes below.

1. Three basic processes in [ ] of urine formation are filtration, [ ], secretion.
2. Normal GFR is [ ] mL/minute.
3. Normally, [ ] % of proteins are excreted from urine.
4. Transport maximum for glucose is [ ] mg/minute.
5. Energy is required for reabsorption of [ ], [ ].
6. Loss of voluntary control on external sphincter of bladder leads to [ ].

IV. Read and mark the statements as true (T) or false (F).

1. ADH secretion helps decrease water reabsorption.
2. Majority of Na^+ is reabsorbed in PCT.
3. Angiotensin II is a vasodilator substance.
4. ADH has an important role in calcium absorption.
5. PTH helps in Na^+ reabsorption.
6. Aldosterone acts on PCT for sodium reabsorption.
7. Papilloma is a tumour of transitional epithelium.

V. Match the following:

(a) ADH	(i) GFR
(b) PCT	(ii) Glucose
(c) Inulin	(iii) Na ions
(d) Transport maximum	(iv) Renal disease
(e) Anaemia	(v) Osmoreceptors

VI. Multiple-choice questions

1. Normal serum creatinine level is
(a) 2–3 mg/100 mL
(b) 0.6–1.2 mg/100 mL
(c) 5–7 mg/100 mL
(d) 7–10 mg/100 mL

2. Each kidney contains ..... nephrons.
(a) 2000
(b) 2 million
(c) 70 lac
(d) 1 million

3. Chronic renal failure causes
(a) Anaemia
(b) Deficient secretion of erythropoietin
(c) Electrolyte imbalance
(d) All of the above

4. Which of the following has most permeable capillaries?
(a) Liver
(b) Kidney
(c) Brain
(d) Small intestine

5. In severe vomiting and diarrhoea, ADH secretion
(a) Increases
(b) Decreases
(c) Remains same
(d) None of the above

6. Normal blood supply to kidneys is ..... mL/minute.
(a) 250
(b) 1200
(c) 500
(d) 700

7. Main process involved in the formation of urine by kidneys is
(a) Filtration
(b) Absorption
(c) Secretion
(d) All of the above

8. Out of total percentage of nephrons, cortical nephrons are ..... %.
(a) 85
(b) 25
(c) 95
(d) 65

9. Most of the Na is absorbed in
(a) Loop of Henle
(b) Collecting ducts
(c) Proximal convoluted tubule
(d) Collecting tubules

10. Antidiuretic hormone mainly acts on
(a) Descending limb of loop of Henle
(b) Proximal convoluted tubule
(c) Distal tubules
(d) Ascending limb of loop of Henle

11. Normal glomerular filtration rate is ..... mL/minute.
(a) 100
(b) 180
(c) 60
(d) 125

12. Proximal convoluted tubule absorbs .....% of water.
(a) 10
(b) 65
(c) 20
(d) Water according to needs of the body

VII. Short notes

1. Functions of kidney
2. Factors favouring and opposing glomerular filtration
3. Composition of urine
4. Nephrotic syndrome
5. Renal failure

6. Micturition
7. Glomerulonephritis
8. Nerve supply of bladder
9. Role of kidneys in BP regulation
10. Role of ADH in water balance
11. Tubular load and renal threshold
12. Loop of Henle
13. Three processes of urine formation
14. Aldosterone action on kidney
15. Stress incontinence
16. Urine formation by kidneys
17. Glomerular filtration rate
18. Glomerular membrane

VIII. Answer the following questions:

1. Draw a flow chart showing role of kidney in BP regulation.
2. Draw a flow chart for water balance by ADH.

IX. Long-answer questions

1. Give an account of the formation of urine by kidneys.
2. Describe briefly the reabsorption and secretion of various substances in renal tubules.
3. Describe the role of kidneys in regulation of water balance.
4. Describe the nerve supply of urinary bladder and the mechanism of voluntary micturition.

ANSWERS

I. Fill in the blanks.

1. RBCs
2. Peritoneal dialysis, haemodialysis
3. Voluntary
4. Amount of substance that is completely cleared of the plasma per minute
5. Distal nephron
6. 1–1.5L
7. Acidic
8. Obligatory water reabsorption
9. Hyperparathyroidism
10. 180 L/day
11. Spinal
12. Nocturia
13. Anuria
14. Proteinuria
15. Nocturnal enuresis (bed wetting)
16. Renal blood flow
17. Malignant
18. Juxtamedullary, cortical
19. Adrenal cortex

II. Who am I?

1. Erythropoietin
2. Renin
3. Nephron
4. Hydrostatic pressure in glomerular capillaries
5. Parathyroid hormone
6. Diabetes mellitus and hypertension
7. Renal stone

8. Polycystic kidney disease
9. Glomerular filtrate
10. Proximal convoluted tubule
11. Loop of Henle
12. Juxtamedullary nephrons
13. Urobilin (bile pigment)

III. Fill the correct word/value in the boxes below.

1. Reabsorption
2. 125
3. NO
4. 320
5. Glucose, amino acids
6. Urine incontinence

IV. Read and mark the statements as true (T) or false (F).

1. F (it increases water reabsorption); **2.** T;
3. F (vasoconstrictor);
4. F (parathyroid hormone); **5.** F (aldosterone);
6. F (acts on distal nephron); **7.** T

V. Match the following:

(a) ADH	(v) Osmoreceptors
(b) PCT	(iii) Na ions
(c) Inulin	(i) GFR
(d) Transport maximum	(ii) Glucose
(e) Anaemia	(iv) Renal disease

VI. Multiple-choice questions

1. b; **2**. d; **3**. d; **4**. b; **5**. a; **6**. b; **7** d; **8**. a; **9**. c; **10**. c; **11**. d; **12**. b

Skin

17

ANATOMY

QUESTIONS

I. Read and mark the statements as true (T) or false (F).

1. The structures responsible for fingerprints are sweat pores.
2. Keratinocytes produce tough fibrous protein that gives epidermis most of its protective qualities.
3. All sweat glands start functioning at puberty.
4. Nails are formed of cells containing hard keratin.

II. Multiple-choice questions

1. The layer of the epidermis that contains Langerhans cells is
   (a) Stratum basale
   (b) Stratum granulosum
   (c) Stratum spinosum
   (d) Stratum lucidum
2. Which layer of the dermis has finger-like pegs?
   (a) Reticular
   (b) Granular
   (c) Basal
   (d) Papillary
3. Sebaceous glands are found everywhere in the body, **EXCEPT**
   (a) Head
   (b) Neck
   (c) Back
   (d) Palm and sole
4. When the injection is given through the skin, which will be the first layer the needle will pass through?
   (a) Epidermis
   (b) Dermis
   (c) Hypodermis
   (d) Superficial fascia

III. Case-based questions

A young, teenaged girl approached the doctor for painful pimples all over the face. The doctor told her that it is acne—infection of oil glands in the skin.

1. What are these oil secreting glands known as?
2. Where are they located in the skin?
3. What do they secrete? What is the function of secretion?
4. Classify these glands.

IV. Short-answer questions

1. Write a short note on dermis of the skin.
2. Name the layers of epidermis and varieties of cells in it.
3. Why is skin called the sensory organ? Give reasons.

V. Long-answer question

Name the appendages of skin. Describe the sweat glands.

ANSWERS

I. Read and mark the statements as true (T) or false (F).

1. F; **2.** T; **3.** F; **4.** T

II. Multiple-choice questions

1. a; **2**. d; **3**. d; **4**. a

III. Case-based questions

1. Oil-secreting glands are known as sebaceous glands.
2. They are located with the hair follicles.
3. They secrete sebum. Sebum coats hair and prevents it from drying. It also prevents excessive evaporation of water from the skin.
4. Sebaceous glands are classified as simple acinar glands.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Decrease in body temperature is called ..... .
2. Normal set point of hypothalamus is ..... °C.
3. Rule applicable in burns is ..... .
4. Skin is biggest ..... organ.
5. ..... of skin contains sensory receptors.
6. Heat loss mechanisms are ....., ..., ... and ..... .
7. Heat is gained by ..... and ..... .
8. All enzyme reactions in body require ..... .
9. Ringworm infection is ..... in nature.
10. Skin lesions seen in herpes zoster are ..... .
11. Granulation tissue is replaced by ..... in healing process.
12. With more tissue damage, healing is ..... type.
13. In order to prevent heat loss, we wear ..... clothes.
14. Inadequate exposure to sun leads to ..... .
15. Blood vessels respond by ..... or ..... to temperature.

II. Who am I?

1. We are common in bedridden patients: .....
2. I affect posterior root ganglion of spinal nerve: .....
3. We are very common in diabetics: .....
4. Young boys and girls get upset if I appear: .....
5. I regulate body temperature: .....
6. I contract in cold and preserve body heat: .....
7. I am a major source of heat production in infants: .....
8. Our overuse can cause dermatitis: .....

III. Match the following:

(a) Temperature	(i) Insulation
(b) Heat loss	(ii) Neuralgia
(c) Body fat	(iii) Hypothalamus
(d) Herpes zoster	(iv) Infants
(e) Brown fat	(v) Evaporation

IV. Multiple-choice questions

1. Integration of temperature information happens in
   (a) Cerebellum
   (b) Hypothalamus
   (c) Amygdala
   (d) Basal ganglia
2. Rectal temperature is higher than oral temperature by ..... °C.
   (a) 2
   (b) 5
   (c) 0.5–1
   (d) 3–4
3. Normal insensible water loss via skin per day in millilitres is
   (a) 500–600
   (b) 2000– 3000
   (c) 100–200
   (d) 1000–1200
4. All of the following are heat loss mechanisms, **EXCEPT**
   (a) Evaporation
   (b) Shivering
   (c) Conduction
   (d) Radiation
5. All of the following are heat gain mechanism, **EXCEPT**
   (a) Shivering
   (b) Curling up in bed
   (c) Exercise
   (d) Conduction
6. Site of recording core temperature is
   (a) Axilla
   (b) Mouth
   (c) Rectum
   (d) All of the above
7. Human being is
   (a) Homeothermic
   (b) Poikilothermic
   (c) Cool blooded
   (d) None of the above

8. During infection, fever is caused by
- (a) Serotonin
- (b) Substance P
- (c) Interleukin I
- (d) Endorphins

9. Pyrogens increase the body temperature because
- (a) They increase heat production
- (b) They decrease heat loss
- (c) They act on hypothalamic thermostat
- (d) All of the above

10. Which mechanism causes heat loss when the surrounding temperature is higher than the body temperature?
- (a) Evaporation
- (b) Conduction
- (c) Radiation
- (d) Convection

V. Short Notes

1. Burns and its complications
2. Temperature receptor in skin
3. Types of sweat glands
4. Heat loss by sweating
5. Stages of repair in primary wound healing
6. Bedsores and their prevention
7. Stages of repair in secondary wound healing
8. Definition of fever and its advantage
9. Hypothermia
10. Role of hypothalamus in regulation of temperature
11. Malignant hyperthermia
12. Functions of skin
13. Herpes zoster
14. Differences between primary and secondary wound healing

VI. Answer the following questions:

1. Enumerate heat loss and heat gain mechanisms.
2. What is a homeothermic animal?
3. What is hypothalamic set point? How does it maintain body temperature?

VII. Long-answer questions

Discuss the various functions of skin.

ANSWERS

I. Fill in the blanks.

1. Hypothermia
2. 37
3. Rule of nine
4. Sense
5. Dermis
6. Radiation, conduction, convection, evaporation
7. Shivering, exercise
8. Specific temperature range
9. Fungal
10. Vesicles
11. Scar
12. Secondary type
13. Woollen clothes
14. Vitamin D deficiency
15. Vasodilatation, vasoconstriction

II. Who am I?

1. Bedsores
2. Herpes zoster
3. Boils
4. Acne
5. Hypothalamus
6. Arrector pili
7. Brown fat
8. Hair dye and cosmetics

III. Match the following:

(a) Temperature	(iii) Hypothalamus
(b) Heat loss	(v) Evaporation
(c) Body fat	(i) Insulation
(d) Herpes zoster	(ii) Neuralgia
(e) Brown fat	(iv) Infants

IV. Multiple-choice questions

1. b; **2**. c; **3**. d; **4**. b; **5**. d; **6**. c; **7**. a; **8**. c; **9**. c; **10**. a

Immunity

18

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. B lymphocytes produce .....
2. ..... is powerful phagocyte than neutrophil.
3. At the site of inflammation, blood flow .....
4. ..... produced by T lymphocytes prevent replication of virus inside the cell.
5. ..... and ..... released from inflammatory tissue cause increase in permeability of capillary membrane.
6. Excess collection of interstitial fluid is .....
7. Important immunoglobulins are ....., ..., ..., ... and .....
8. ..... inhibit function of B lymphocytes and cytotoxic T lymphocytes.
9. Dropping of upper eyelid is called .....
10. Swelling and redness of skin is called .....
11. Transfer of immunity from mother to foetus is .....
12. When a toxin/microorganism invades the body, ... immunity is developed.

II. Who am I?

1. We are capable of producing immunoglobulins: .....
2. We increase in number in parasitic infection: .....
3. I am RNA retrovirus: .....
4. We reduce in number due to suppression of immunity in AIDS: .....
5. If I am not functioning properly, you may contract disease: .....
6. We initiate any immune response: .....
7. I affect joints causing development of antibodies against protein in synovial membrane of joint: .....

III. Read and mark the statements as true (T) or false (F).

1. Temperature at the site of inflammation falls.
2. B lymphocytes are responsible for cell-mediated immunity.
3. Protecting the body by specific substances after their recognition is called nonspecific immunity.
4. Inflammation is accompanied by oedema.
5. Helper T cells help in the formation of antibodies by B lymphocytes.
6. Vaccination gives natural immunity.
7. Infusion of antibodies to a person gives permanent immunity.

IV. Match the following:

(a) Hashimoto thyroiditis	(i) Chemotaxis
(b) Myasthenia gravis	(ii) Hypothyroidism
(c) Neutrophils	(iii) Muscle fatigue
(d) Lysozyme	(iv) Physical barrier
(e) Skin	(v) Salivary secretion

V. Multiple-choice questions

1. In an immediate hypersensitivity reaction, mainly there are raised levels of
   (a) IgG
   (b) IgE
   (c) IgM
   (d) IgA
2. All of the following are vasodilator substances, **EXCEPT**
   (a) Histamine
   (b) Bradykinin
   (c) Angiotensin
   (d) Adenosine
3. Which of the following cells is a main phagocyte?
   (a) Eosinophil
   (b) Basophil
   (c) T lymphocyte
   (d) Neutrophil
4. All of the following are the steps in inflammation, **EXCEPT**
   (a) Vasodilatation
   (b) Increased temperature
   (c) Decreased permeability of capillary membrane
   (d) Exit of neutrophils out of capillaries
5. AIDS
   (a) Affects both cellular and humoral immunities
   (b) Is caused by virus
   (c) Is associated with a decreased number of helper T cells
   (d) All of the above
6. Types of T cells are
   (a) Cytotoxic
   (b) Helper
   (c) Memory
   (d) All of the above
7. Antibodies are formed by
   (a) B lymphocytes
   (b) Memory T cells
   (c) Helper T cells
   (d) Cytotoxic T cells

VI. Case-based questions

A 25-year-old female came with complaints of weight gain, fatigue and loss of appetite. On examination, all findings were normal. Haemogram was normal. Except low levels of T3 and T4, thyroid-stimulating hormone (TSH) levels were highly raised.

1. What are the common symptoms of hypothyroidism?
2. Why is TSH raised in this case? Why are T3 and T4 below normal levels?
3. What is Hashimoto disease?

VII. Short notes

1. Inflammation
2. Inflammation stages
3. Cell-mediated response
4. AIDS
5. Classification of immunity
6. Nonspecific defence mechanism
7. Good and bad effects of inflammation
8. Lymphocytes
9. Types of T lymphocytes
10. Anaphylaxis
11. AIDS transmission
12. Pus formation
13. Passive immunity
14. Myasthenia gravis
15. Immunoglobulins
16. Primary and secondary responses

VIII. Answer the following questions:

1. Define cell-mediated immunity.
2. Explain type I hypersensitivity reaction.
3. Draw phases of phagocytosis.

IX. Long-answer question

Define immunity. How is the body protected against invading organisms?

ANSWERS

I. Fill in the blanks.

1. Antibodies
2. Macrophage
3. Increases
4. Interferons
5. Histamine, prostaglandins
6. Oedema
7. IgG, IgM, IgA, IgD, IgE
8. Suppressor T cells
9. Ptosis
10. Urticaria
11. Passive immunity
12. Active/acquired

II. Who am I?

1. B lymphocytes
2. Eosinophils
3. HIV
4. Helper T lymphocytes
5. Immunity
6. Antigens
7. Rheumatoid arthritis

III. Read and mark the statements as true (T) or false (F).

1. F (it rises); **2.** F (antibody-mediated immunity); **3.** F (specific immunity); **4.** T; **5.** T; **6.** F (acquired immunity); **7.** F (temporary immunity)

IV. Match the following:

(a) Hashimoto thyroiditis	(ii) Hypothyroidism
(b) Myasthenia gravis	(iii) Muscle fatigue
(c) Neutrophils	(i) Chemotaxis
(d) Lysozyme	(v) Salivary secretion
(e) Skin	(iv) Physical barrier

V. Multiple-choice questions

1. b; **2**. c; **3**. d; **4**. c; **5**. d; **6**. d; **7**. a

VI. Case-based questions

1. Common symptoms of hypothyroidism are lethargy, fatigue, weight gain, etc.
2. Due to less production of thyroid gland, the T3 and T4 levels are reduced. Because of negative feedback mechanism of regulation of thyroid hormone through thyrotropin-releasing hormone (TRH) and TSH, the TSH levels are raised.
3. Hashimoto disease is an autoimmune disease in which antibodies are formed against thyroglobulin of thyroid gland.

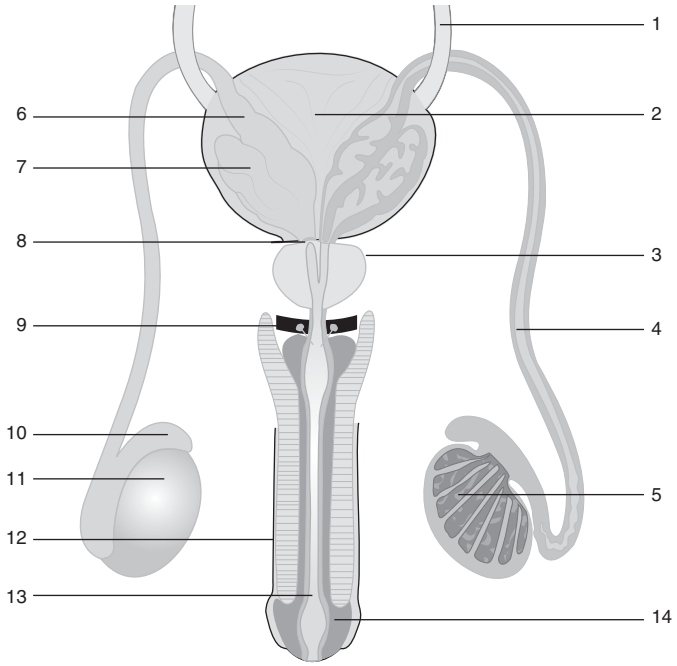
Reproductive System

19

ANATOMY

QUESTIONS

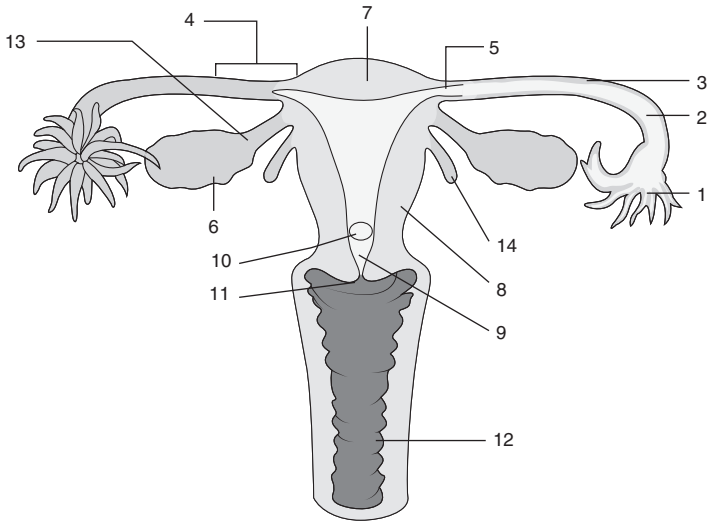
I. Identify the structures in the figure below.



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....
10. .....
11. .....
12. .....
13. .....
14. .....

II. Name the accessory glands of male reproductive system.

III. Identify the parts in the figure below.



1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....
8. .....
9. .....
10. .....
11. .....
12. .....
13. .....
14. .....

IV. Fill in the blanks.

1. The immediate covering of the testis is formed by .....
2. Vas deferens starts from .....
3. Absence of testis in scrotum at birth is called .....
4. Spermatogenesis starts at .....
5. Three masses of erectile tissue forming body of the penis are ....., ... and .....
6. The tubal pole of the ovary is attached to the lateral pelvic wall by .....
7. Ampulla of the fallopian tube is the site of .....
8. The part of the uterus above the openings of the uterine tubes is called .....
9. The openings of urethra and vagina are located in .....
10. A fibromuscular node between vagina anteriorly and anus posteriorly is called .....

V. Tick mark the correct answer.

1. The sperm production begins in the seminiferous tubules/epididymis.
2. Developing sperms are supported by cells of Leydig/cells of Sertoli.
3. Prostate lies in pelvis/perineum.
4. The cell produced by fertilisation is gamete/zygote.
5. The layer of the uterine wall shed during menstruation is endometrium/myometrium.
6. The first 14 days of menstrual cycle is follicular/secretory phase.
7. The ovum released from ovary is primary/secondary oocyte.
8. Chromosomal sex of the baby is determined at fertilisation/implantation.
9. Alveoli of the mammary gland develop at puberty/in pregnancy.
10. The breast lies over pectoralis major/deltoid.

VI. Read and mark the statements as true (T) or false (F).

1. Scrotal temperature is more than intra-abdominal temperature.
2. Membranous urethra is the least dilatable part of male urethra.
3. The total time of sperm formation (spermatogenesis) is about 24 hours.
4. After ovulation, Graafian follicle becomes corpus luteum.
5. The commonest position of the uterus is anteverted, retroflexed.
6. The most important support of the uterus is pelvic diaphragm.
7. The uterine glands are found in stratum spongiosum.
8. The mammary glands lie deep to the superficial fascia.
9. The maternal blood flows in intervillous spaces of placenta.
10. The first 8 weeks of pregnancy is called embryonic period.

VII. Multiple-choice questions

1. Secretion of which gland provides nourishment to the sperms?
(a) Testis
(b) Prostate
(c) Seminal vesicles
(d) Bulbourethral glands

2. Spermiogenesis is conversion of
(a) Spermatogonium to primary spermatocyte
(b) Primary spermatocyte to secondary spermatocyte
(c) Secondary spermatocyte to spermatid
(d) Spermatid to sperm

3. Left testicular vein drains into
(a) IVC
(b) Left renal vein
(c) Inferior mesenteric vein
(d) Left common iliac vein

4. During vasectomy, the vas deferens is ligated in the upper part of the scrotum. Two months after vasectomy, subsequent ejaculate will contain
(a) Sperms and seminal fluid
(b) Seminal fluid and prostatic fluid
(c) Sperms and prostatic fluid
(d) Sperms, seminal fluid and prostatic fluid

5. Which part of the sperm has mitochondria?
(a) Head (c) Middle piece
(b) Neck (d) Tail

6. Sperm maturation occurs in
(a) Testis (c) Ejaculatory duct
(b) Epididymis (d) Urethra

7. What is the term for external and internal reproductive organs in a female?
(a) Vulva (c) Gonads
(b) Vagina (d) Genitalia

8. Which of the following is a primary sex organ of a female?
(a) Ovary (c) Fallopian tube
(b) Uterus (d) Vagina

9. Beginning of the menstrual cycle is called
(a) Oogenesis (c) Menarche
(b) Ovulation (d) Menopause

10. A female is found to have tubal pregnancy. In order to remove embryo, you reach peritoneal cavity by passing an instrument in vagina through
(a) Cervix
(b) Anterior vaginal fornix
(c) Posterior fornix
(d) Vesicouterine pouch

11. In an operation, the surgeon needs ligating both ovarian and uterine arteries. Where are these both vessels found?
(a) Suspensory ligament of ovary
(b) Ligament of ovary
(c) Round ligament
(d) Broad ligament

VIII. Case-based questions

An elderly male patient presented with dysuria and urgency. You suspected benign prostatic enlargement.

1. Which lobe of the prostate is involved in benign hypertrophy?
2. Where is the involved lobe located in prostate?
3. What is dysuria? Explain its anatomical basis.
4. Which glands of the prostate are involved in benign hypertrophy of the gland?

IX. Short-answer questions

1. Seminal vesicle.
2. Describe the stages of spermatogenesis in tabular form.
3. Graafian follicle.
4. Name the phases of menstrual cycle and describe the endometrial changes occurring in the proliferative phase.
5. Draw and label the structure of the mammary gland.
6. Draw and label the structure of sperm.
7. Ectopic gestation.

X. Long-answer questions

1. Describe the gross anatomy of male urethra in brief. Add a note on its applied anatomy.
2. Describe the gross anatomy of fallopian tube in brief. Add a note on its applied anatomy.

ANSWERS

I. Page no. 502

II. Accessory glands of male reproductive system: Prostate, seminal vesicles (two) and bulbourethral gland (two)

III. Page no. 510

IV. Fill in the blanks.

1. Visceral layer of tunica vaginalis
2. Tail of epididymis
3. Cryptorchism
4. Puberty
5. Two corpora cavernosa and corpus spongiosum
6. Suspensory (or infundibulopelvic) ligament of ovary
7. Fertilisation
8. Fundus
9. Vestibule
10. Perineal body

V. Tick mark the correct answer.

1. Seminiferous tubules
2. Cells of Sertoli
3. Pelvis
4. Zygote
5. Endometrium
6. Follicular
7. Secondary oocyte
8. Fertilisation
9. In pregnancy
10. Pectoralis major

VI. Read and mark the statements as true (T) or false (F).

1. F; **2.** T; **3.** F; **4.** T; **5.** F; **6.** T; **7.** T; **8.** F; **9.** T; **10.** T

VII. Multiple-choice questions

1, c; **2**, d; **3**, b; **4**, b; **5**, c; **6**, b; **7**, d; **8**, a; **9**, c; **10**, c; **11**, d

VIII. Case-based questions:

1. Median (or middle) lobe of the prostate is involved.
2. The middle lobe lies between the urethra and two ejaculatory ducts.
3. Dysuria is difficulty in micturition. The enlarged middle lobe obstructs the internal urethral opening. This causes dysuria, especially starting the micturition.
4. The glands of inner and intermediate zone are involved in benign hypertrophy.

PHYSIOLOGY

QUESTIONS

I. Fill in the blanks.

1. Primordial follicle is .....
2. Mature follicle after ovulation becomes .....
3. ..... in fallopian tube is one of the common causes of female infertility.
4. ..... and ..... are permanent methods of contraception in males and females.
5. ..... phase is before ovulation phase in ovarian cycle.
6. Secretion of ..... is important before ovulation.
7. Secretion of ..... hormone rises with corpus luteum.
8. Total time for spermatogenesis is ..... days.
9. ..... gives motility to sperm.
10. Maturation of sperms occurs in .....
11. Body of the sperm provides ..... for activity of sperm.
12. Endometrium is ..... by menstruation.

II. Who am I?

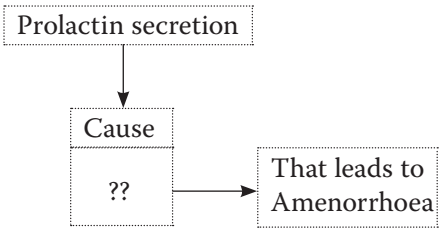
1. I am the key test when diagnosis of ca cervix is asked: .....
2. I am the most commonly used contraceptive in females: .....
3. My secretion is stimulated only during pregnancy and lactation: .....
4. I degenerate completely if there is no fertilisation: .....
5. I am a foreign body implanted in uterus and prevent contraception: .....
6. My presence in uterus is a common cause of excessive bleeding: .....
7. I undergo second meiotic division only if fertilisation occurs: .....
8. I am an important link between mother and foetus: .....
9. I am a commonly used physical barrier by males for contraception: .....
10. I am responsible for cracking of voice and increasing bone thickness in boys at puberty: .....

11. I appear in urine of a would-be mother: .....
12. My secretion rises at puberty in boys and girls: .....

III. Fill the correct word/value in the boxes below.

1. Primary spermatocyte → [ ] Chromosomes

2. During lactation period



3. Most common benign tumour of breast is [ ]

4. In ovarian cycle — Endometrial cycle

Preovulatory phase and ovulation	Corresponds to →	..... phase
..... phase	Corresponds to →	Secretory phase

5. Painful menses → ??

IV. Read and mark the statements as true (T) or false (F).

1. Sperm remains viable in female tract for about 5 days.
2. Proliferative phase of menstrual cycle is dominated by progesterone.
3. Maximum thickening of endometrium is seen in secretory phase.
4. Secretory phase of menstrual cycle is dominated by progesterone.
5. Prostaglandins secreted during menstruation stimulate uterine wall.
6. There is a drop in basal body temperature just before ovulation.
7. At puberty, spermatogonia start dividing under effect of testosterone to form primary spermatocytes.
8. Secondary spermatocytes divide mitotically to form spermatids.
9. Fertilisation happens in isthmus part of fallopian tube.
10. Oogenesis is suspended at the stage of prophase of primary oocyte till puberty.
11. LH is secreted from posterior pituitary.
12. Ovulation occurs 14 days before the next cycle.
13. Amenorrhoea refers to abnormal and excess bleeding.
14. Mammary glands are modified sebaceous glands.
15. Placenta helps to carry nutrients from mother to growing foetus.

V. Match the following:

(a) Ovulation	(i) OC pills
(b) Menarche	(ii) 28 days
(c) Menopause	(iii) Oestrogen dominated
(d) Menstrual cycle	(iv) 45–50 years
(e) Proliferative phase	(v) Progesterone dominated
(f) Secretory phase	(vi) 14 years
(g) Fertilisation	(vii) Fallopian tubes
(h) Contraceptives	(viii) 14th day

VI. Multiple-choice questions

1. Sertoli cells
- (a) Control spermatogenesis
- (b) Are nongerminal cells
- (c) Supply energy for spermatogenesis
- (d) All of the above

2. Sperm
- (a) Moves in straight line
- (b) Moves due to movement of tail
- (c) Moves at velocity of 1–4 mm/minute
- (d) All of the above

3. Seminal vesicles
- (a) Add to bulk of ejaculated semen
- (b) Secrete prostaglandin
- (c) Secrete fructose
- (d) All of the above

4. Normal sperm count is ..... million/mL of semen.
- (a) 12
- (b) 5
- (c) 120
- (d) 20

5. Preovulatory phase
- (a) Occurs due to FSH release
- (b) Lasts for 8–9 days
- (c) Causes growth of follicles
- (d) All of the above

6. Fertile period of female sexual cycle is
- (a) First 10 days after menstrual phase
- (b) Five days before initiation of menstrual phase
- (c) One day prior to and one day after ovulation
- (d) All of the above

7. Basis of immunological test of pregnancy is
- (a) Excretion of oestrogen in urine
- (b) Excretion of progesterone in urine
- (c) Excretion of FSH in urine
- (d) Excretion of human chorionic gonadotropin (hCG) in urine

8. Normal quantity of amniotic fluid is ..... L.
- (a) 5
- (b) 0.5–1
- (c) 10
- (d) 8

9. Milk ejection occurs due to
- (a) Action of prolactin
- (b) Action of oxytocin on myoepithelial cells
- (c) Action of progesterone
- (d) Action of FSH

10. Maximum production of hCG occurs
- (a) During first trimester of pregnancy
- (b) During ninth month of pregnancy
- (c) Just before delivery
- (d) During second trimester of delivery

11. Corpus luteum is maintained by
- (a) Progesterone
- (b) Human chorionic gonadotropin (hCG)
- (c) Follicle-stimulating hormone
- (d) Oestrogen

12. Period of spermatogenesis is ..... days.
- (a) 2
- (b) 74
- (c) 50
- (d) 9

13. Function of luteinising hormone is
- (a) Maintenance of placenta
- (b) Secretion of oestrogen
- (c) Growth of follicle
- (d) Ovulation

VII. Short notes

1. Functions of Sertoli cells
2. Epididymis functions
3. Primary and secondary spermatocytes
4. Structure of sperm
5. Composition of semen
6. Polycystic ovarian disease
7. Functions of fallopian tubes
8. Ovulation
9. LH surge
10. Proliferative phase of menstrual cycle
11. Secretory phase of menstrual cycle
12. Menstrual phase of menstrual cycle
13. Corpus luteum
14. Fertile and safe periods of menstrual cycle
15. Functions of placenta
16. Maternal changes during pregnancy
17. Milk ejection
18. Premenstrual syndrome
19. Definitions of amenorrhoea, dysmenorrhoea, menorrhagia and metrorrhagia
20. Phases of menstrual cycle
21. Stages of oogenesis
22. Spermatogenesis

VIII. Answer the following questions:

1. Draw a flow chart showing stages of oogenesis.
2. Draw safe and fertile periods in menstrual cycle of a female.
3. Describe proliferative phase of menstrual cycle.
4. Describe secretory phase of menstrual cycle.
5. Enumerate changes in puberty.
6. Define puberty and precocious puberty.
7. What is contraception? Enumerate different methods of contraception.

8. What are the permanent methods of contraception in males and females?
9. What are OC pills? What are their disadvantages?
10. Enumerate maternal changes during pregnancy.
11. Enumerate functions of placenta.

IX. Long-answer questions

1. Describe the structure of human testis and give its functions.
2. Define menstrual cycle and describe the various changes taking place in various stages.

ANSWERS

I. Fill in the blanks.

1. Primary oocyte surrounded by single layer of cuboidal follicular cells
2. Corpus luteum
3. Block
4. Vasectomy, tubectomy
5. Preovulatory/follicular
6. LH
7. Progesterone
8. 64
9. Tail
10. Epididymis
11. ATP
12. Desquamated

II. Who am I?

1. Pap smear
2. OC pill
3. Prolactin
4. Corpus luteum
5. IUCD
6. Fibroid
7. Secondary oocyte
8. Placenta
9. Condom
10. Testosterone
11. hCG
12. GnRH

III. Fill correct word/value in the boxes below.

1. 46
2. Inhibition of GnRH from hypothalamus
3. Fibroadenoma
4. Proliferative phase, postovulatory phase
5. Dysmenorrhea

IV. Read and mark the statements as true (T) or false (F).

1. F (viable for **2**–**3** days); **2.** F (oestrogen); **3.** T; **4.** T; **5.** T; **6.** F (rise in temperature); **7.** T; **8.** T; **9.** F (ampulla); **10.** T; **11.** F (anterior pituitary); **12.** T; **13.** F (amenorrhoea—absent menstruation); **14.** T; **15.** T

V. Match the following:

(a) Ovulation	(viii) 14th day
(b) Menarche	(vi) 14 years
(c) Menopause	(iv) 45–50 years
(d) Menstrual cycle	(ii) 28 days
(e) Proliferative phase	(iii) Oestrogen dominated
(f) Secretory phase	(v) Progesterone dominated
(g) Fertilisation	(vii) Fallopian tubes
(h) Contraceptives	(i) OC pills

VI. Multiple-choice questions

1. d; **2**. d; **3**. d; **4**. c; **5**. d; **6**. c; **7**. d; **8**. b; **9**. b; **10**. a; **11**. b; **12**. b; **13**. d

Anatomy and Physiology of Aging

20

QUESTIONS

I. Fill in the blanks.

1. Onset and progression of aging _____ from person to person.
2. _____ is a prime factor in aging.
3. Excess accumulation of _____ damages the body.
4. Ability of cells to _____ and _____ is reduced with age.
5. _____ is a common eye condition with old age.
6. Chances of _____ with light fall increase with age.
7. _____ is progressive reduction of muscle mass.
8. Heart valves become _____ and _____ with age.
9. With age, the amount of _____ in CNS decreases.
10. _____ is a common disorder of old age that affects your memory.

II. Who am I?

1. I become weak as age advances: _____
2. I loose elasticity with age: _____
3. I loose elasticity and become opaque and affect your vision: _____
4. I become delicate and you can get easy bruising: _____
5. My absence indicates end of reproduction capacity in females: _____

III. Fill the correct word/value in the boxes below.

1. Atherosclerosis of blood vessels can cause _____.
2. _____ deafness is common with aging than conduction deafness.
3. Excess consumption of calories causes accumulation of _____.
4. _____ is required in your diet to reduce free radicles.
5. Most important factor that can delay aging is _____.

IV. Multiple-choice questions

1. With respect to sleep and aging, which of the following statements is correct?
- (a) It decreases with age.
- (b) NREM sleep does not change.
- (c) Other associated health conditions can disturb sleep.
- (d) All of the above.

2. One can delay aging by all of the following, **EXCEPT**
- (a) Physical activity
- (b) Having high calorie intake
- (c) Good amount of sleep
- (d) Good mental health

3. Structural changes that occur in muscle with aging are
- (a) Increase in fibrous tissue and fat
- (b) Increase in muscle fibres
- (c) Increase in number of motor units
- (d) All of the above

4. Connective tissues with aging
- (a) Become stiff
- (b) Cause rigidity in airways
- (c) Decrease the muscle mass
- (d) All of the above

5. All of the following statements regarding aging are true, **EXCEPT**
- (a) It is a universal, progressive and dynamic process.
- (b) Primary aging is dependent on hereditary factors.
- (c) Secondary aging is not an effect of your health habits.
- (d) Health is multifactorial.

V. Short notes

1. Various effects on CNS that happen with aging
2. Effects of aging on eyes and ears
3. Free radicles and their effect
4. Gross, microscopic and functional changes in kidney with age
5. Skin changes with age

VI. Answer the following questions:

1. Enumerate effect of aging on respiratory system and GI tract.
2. State good lifestyle factors that can delay the aging process.

ANSWERS

I. Fill in the blanks.
1. Differs
2. Lifestyle
3. Free radicles
4. Divide, multiply
5. Cataract
6. Fracture bones
7. Sarcopenia
8. Thick, stiff
9. Neurotransmitters
10. Alzheimer disease

II. Who am I?
1. Bone
2. Artery
3. Lens
4. Capillary
5. Menstrual cycle

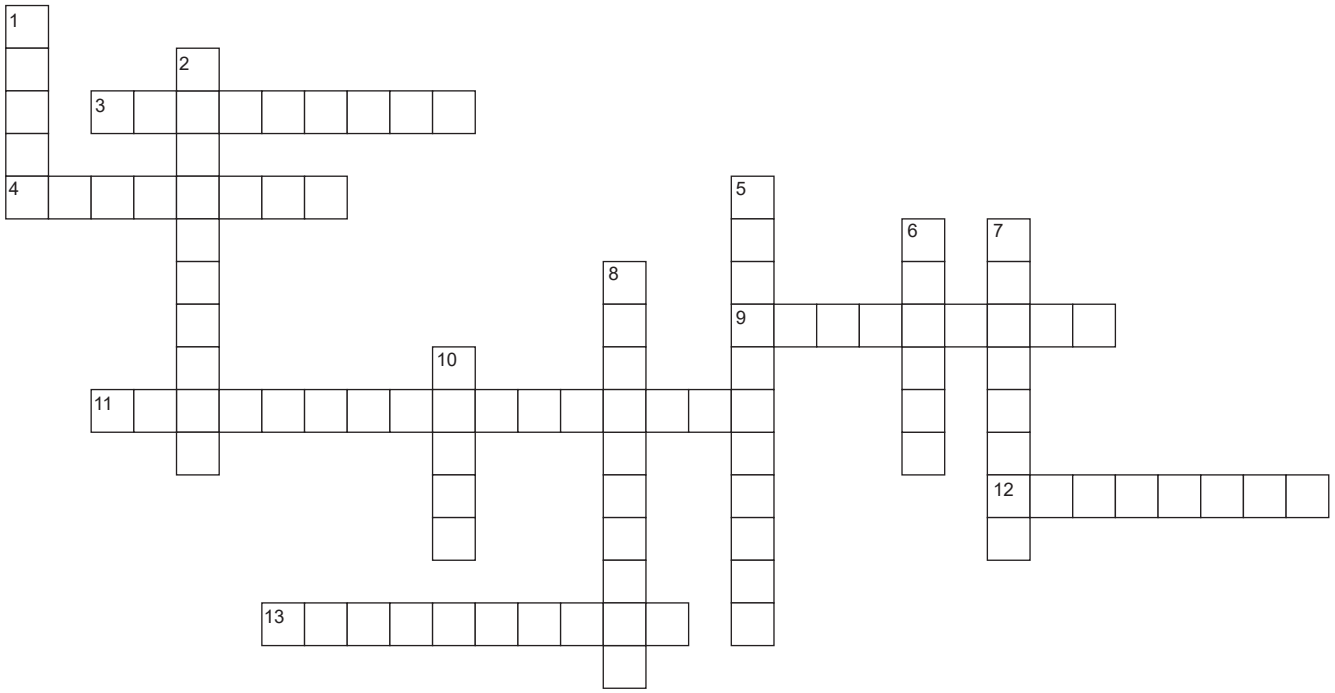
III. Fill the correct word/value in the boxes below.
1. Hypertension
2. Nerve
3. Free radicles
4. Antioxidants
5. Your lifestyle

IV. Multiple-choice questions

1. d; **2**. b; **3**. a; **4**. d; **5**. c

Puzzles

CRISS-CROSS PUZZLE: CRANIAL NERVES



I. Use the clues to fill in the words above.

Instructions:

- Words can go across or down.
- Letters are shared when the words intersect.

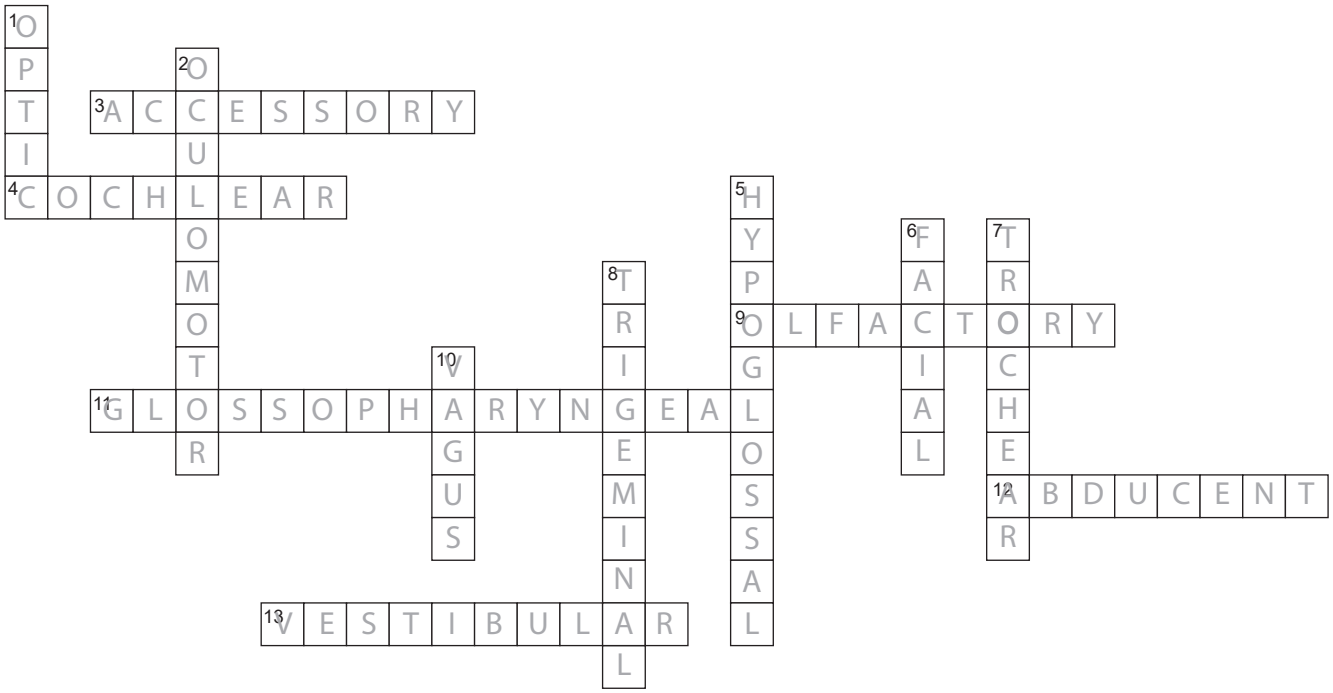
ACROSS

3. Use it to shrug your shoulders.
4. Helps you enjoy the music.
9. You need it for smell.
11. Taste your food with its help.
12. Its lesion causes medial strabismus.
13. Helps you to maintain the equilibrium.

DOWN

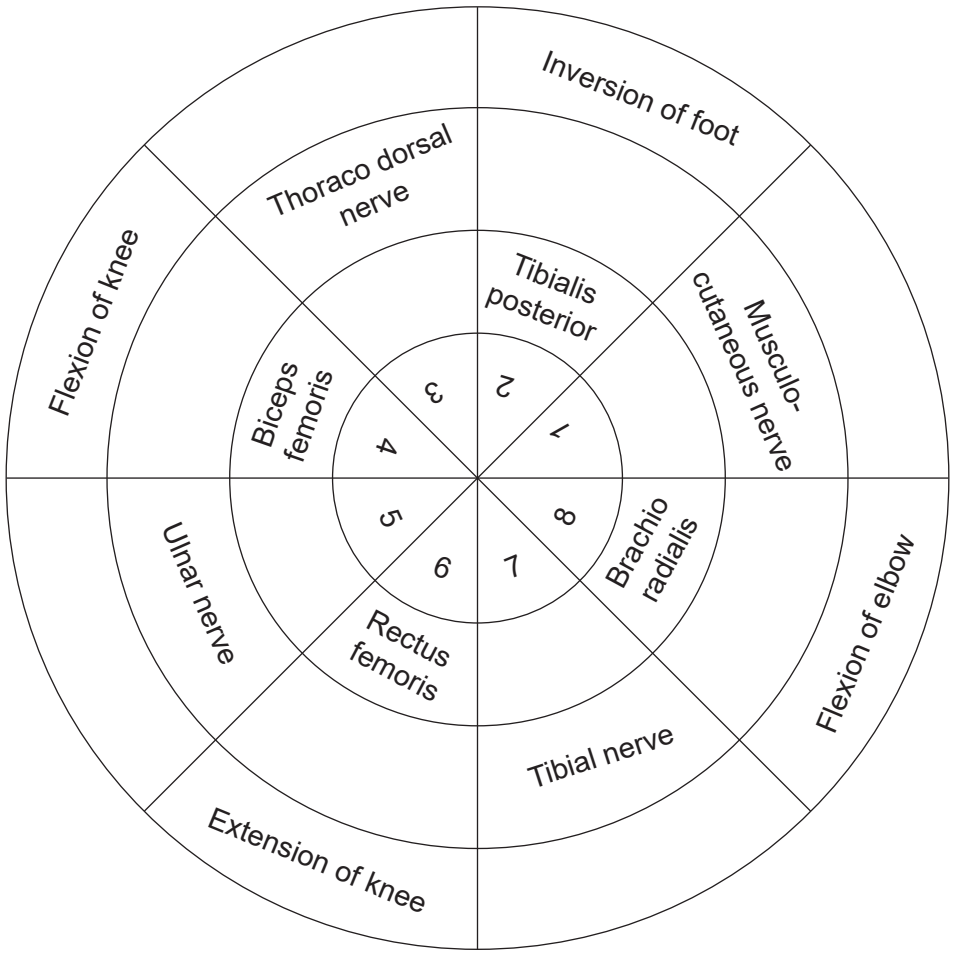
1. You are blind without it.
2. Its lesion causes ptosis.
5. Located on hyoglossus muscle.
6. Nerve involved in Bell's palsy.
7. Attached to the dorsal aspect of the brain.
8. Carries sensations from the face.
10. It wanders from neck to abdomen.

ANSWER


1 OPTIC
2 OCULOMOTOR
3 ACCESSORY
4 COCHLEAR
5 HYPOGLOSSAL
6 FACIAL
7 TROCHLEAR
8 TRIGEMINAL
9 OLFACTORY
10 VAGUS
11 GLOSSOPHARYNGEAL
12 ABDUCENT
13 VESTIBULAR

PUZZLE CIRCLE

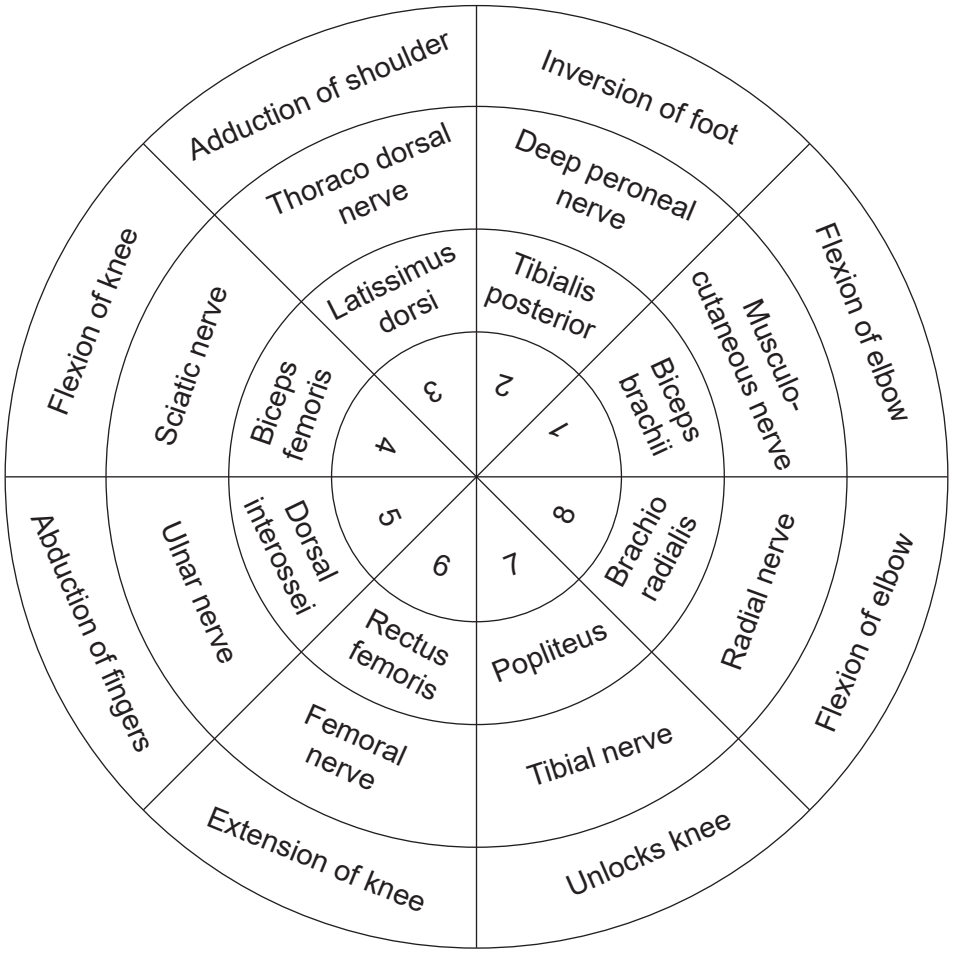
I. Fill in the gaps in the circle from the table given below.



	Inner circle	Middle circle	Outer circle
1	Brachioradialis	Thoraco dorsal nerve	Adduction of shoulder
2	Rectus femoris	Tibial nerve	Flexion of knee
3	Biceps brachii	Radial nerve	Abduction of fingers
4	Popliteus	Deep peroneal nerve	Extension of knee
5	Dorsal interossei	Musculoctaneous nerve	Flexion of elbow
6	Tibialis posterior	Femoral nerve	Unlocks knee
7	Latissimus dorsi	Ulnar nerve	Flexion of elbow
8	Biceps femoris	Sciatic nerve	Inversion of foot

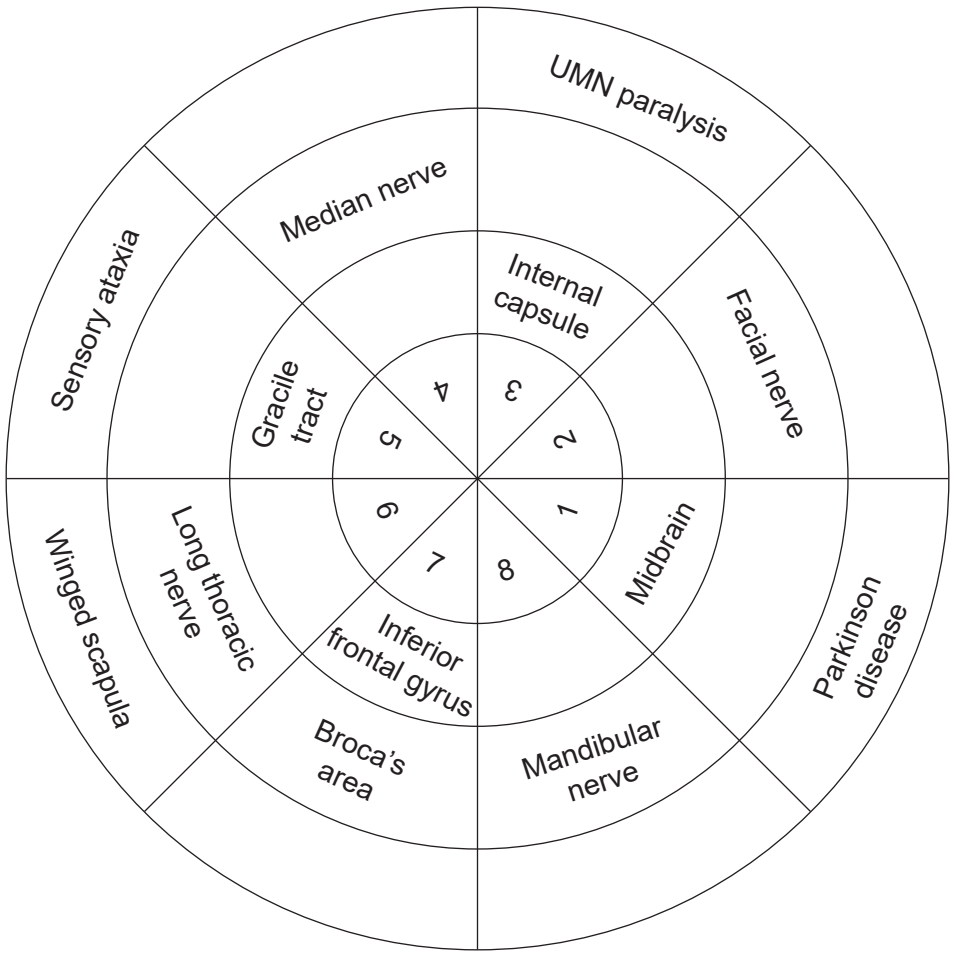
Note: Arrange the terms in order in the table and place accordingly in the circle.

ANSWER



	Inner circle	Middle circle	Outer circle
1	Biceps brachii	Musculo cutaneous nerve	Flexion of elbow
2	Tibialis posterior	Deep peroneal nerve	Inversion of foot
3	Latissimus dorsi	Thoraco dorsal nerve	Adduction of shoulder
4	Biceps femoris	Sciatic nerve	Flexion of knee
5	Dorsal interossei	Ulnar nerve	Abduction of fingers
6	Rectus femoris	Femoral nerve	Extension of knee
7	Popliteus	Tibial nerve	Unlocks knee joint
8	Brachioradialis	Radial nerve	Flexion of elbow

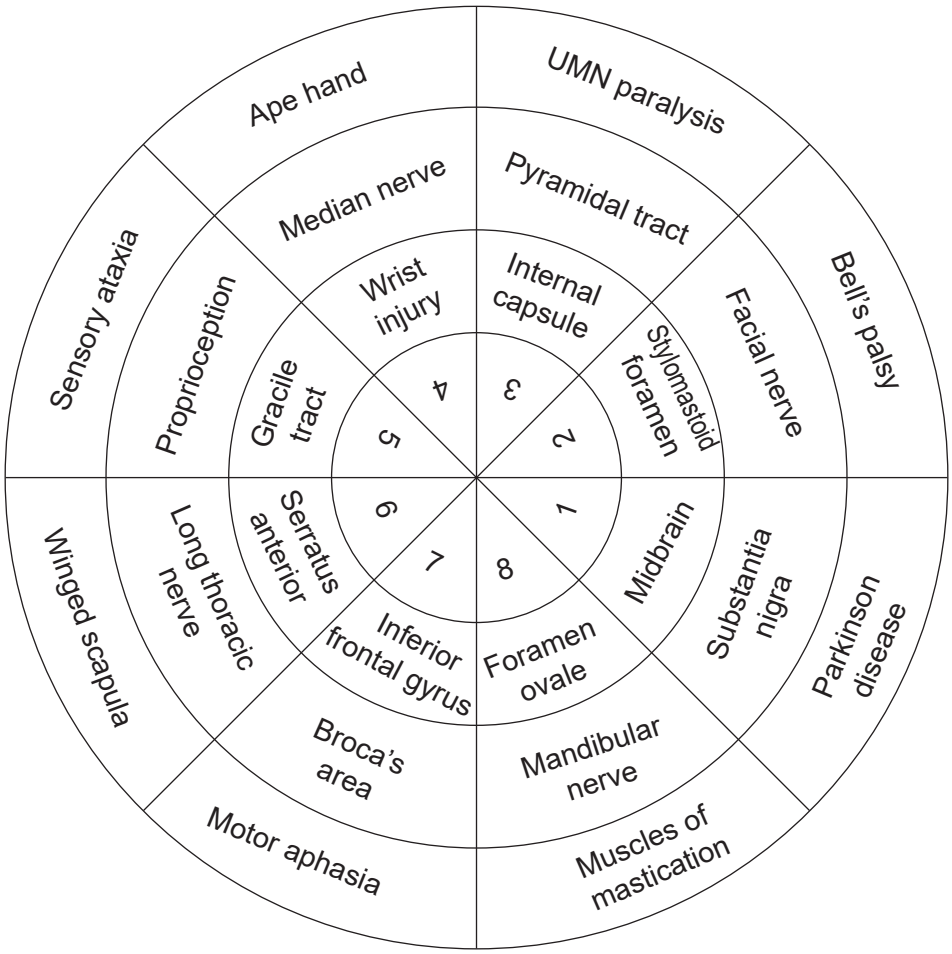
II. Fill in the gaps in the circle from the table given below.



	Inner circle	Middle circle	Outer circle
1	Internal capsule	Substantia nigra	Sensory ataxia
2	Wrist injury	Facial nerve	Winged scapula
3	Serratus anterior	Median nerve	Motor aphasia
4	Foramen ovale	Long thoracic nerve	Ape hand
5	Stylomastoid foramen	Mandibular nerve	Bell's palsy
6	Gracile tract	Pyramidal tract	Parkinson disease
7	Midbrain	Broca's area	UMN paralysis
8	Inferior frontal gyrus	Proprioception	Muscles of mastication

Note: Arrange the terms in order in the table and place accordingly in the circle.

ANSWER



	Inner circle	Middle circle	Outer circle
1	Midbrain	Substantia nigra	Parkinson disease
2	Stylomastoid foramen	Facial nerve	Bell's palsy
3	Internal capsule	Pyramidal tract	UMN paralysis
4	Wrist injury	Median nerve	Ape hand
5	Gracile tract	Proprioception	Sensory ataxia
6	Serratus anterior	Long thoracic nerve	Winged scapula
7	Inferior frontal gyrus	Broca's area	Motor aphasia
8	Foramen ovale	Mandibular nerve	Muscles of mastication

UNIT III

University Exam Questions

SAMPLE QUESTIONS - 1

ANATOMY

I. Elaborate on: (1 × 12 = 12)

1. Name the different parts and functions of digestive system. Describe in detail about stomach.

II. Write notes on: (3 × 5 = 15)

1. Bronchopulmonary segments
2. Blood supply of heart
3. Types of muscles

III. Short answers on: (5 × 2 = 10)

1. Name the arteries forming circle of Willis.
2. Name the veins for intravenous injection.
3. Name the cranial nerves emerging from medulla oblongata.
4. Name the varieties of synovial joints.
5. Name the coverings of testis.

PHYSIOLOGY

I. Elaborate on: (1 × 13 = 13)

1. Explain the composition, circulation and functions of CSF.

II. Write notes on: (3 × 5 = 15)

1. Bone healing and stages.
2. Functions of skin.
3. Coagulation of blood.

III. Short answers on: (5 × 2 = 10)

1. Two functions of liver.
2. Renal failure.
3. Myasthenia gravis.
4. Name any four female sex hormones.
5. Glands.

SAMPLE QUESTIONS - 2

ANATOMY

I. Elaborate on: (1 × 12 = 12)

1. Name the organs of male reproductive system. Describe in detail about testis.

II. Write notes on: (3 × 5 = 15)

1. Name the parts of extra-hepatic biliary apparatus. Write about gall bladder.
2. Describe in detail the supports of uterus.
3. Right atrium of the heart.

III. Short answers on: (5 × 2 = 10)

1. Median cubital vein – position and clinical importance.
2. Write about the parts of the uterus.
3. Mention any four functional areas of cerebrum.
4. Name the bones forming the vertebral column.
5. Name the fissures and lobes of right lung.

PHYSIOLOGY

I. Elaborate on: (1 × 13 = 13)

1. Define Landsteiner's law. Explain ABO blood grouping system. Add a note on erythroblastosis foetalis.

II. Write notes on: (3 × 5 = 15)

1. Define cardiac output. Write a short note on factors regulating cardiac output.
2. Intrinsic pathway of coagulation.
3. Functions of cerebellum.

III. Short answers on: (5 × 2 = 10)

1. Pancreatic secretions.
2. Hormones of anterior pituitary gland.
3. Any two non-excretory functions of kidney.
4. Cretinism.
5. Functions of testosterone.

SAMPLE QUESTIONS - 3

ANATOMY

I. Elaborate on: (1 × 12 = 12)

1. Enumerate the organs of digestion. Describe in detail about stomach.

II. Write notes on: (3 × 5 = 15)

1. Urinary bladder.
2. Blood supply of brain.
3. Right atrium of the heart.

III. Short answers on: (5 × 2 = 10)

1. Name the branches of arch of aorta.
2. Name applied anatomy of pleura.
3. Coverings of eyeball.
4. Varicose vein.
5. Mention the types of muscle.

PHYSIOLOGY

I. Elaborate on: (1 × 13 = 13)

1. Define blood pressure. Explain the factors regulating blood pressure in detail. Add a note on hypertension.

II. Write notes on: (3 × 5 = 15)

1. Properties of skeletal muscle.
2. Hypoxia and its types.
3. Functions of Hypothalamus.

III. Short answers on: (5 × 2 = 10)

1. Functions of stomach.
2. Secretion of posterior pituitary gland and its functions.
3. Dead space.
4. Active transport.
5. Different types of taste.

SAMPLE QUESTIONS - 4

ANATOMY

I. Elaborate on: (1 × 12 = 12)

1. Name the different endocrine glands present in the human body. Describe in detail the anatomy of the thyroid gland.

II. Write notes on: (3 × 5 = 15)

1. Classification of bones with examples.
2. Anterior and posterior relations of both the kidneys.
3. Pharynx.

III. Short answers on: (5 × 2 = 10)

1. Name the arteries supplying the stomach.
2. Draw a neat labelled diagram of the section of eyeball.
3. Name the different organs of male reproductive system.
4. Name the structures passing through the hilum of right lung.
5. Name the muscles for intramuscular injection.

PHYSIOLOGY

I. Elaborate on: (1 × 13 = 13)

1. Write in detail the mechanism of urine formation.

II. Write notes on: (3 × 5 = 15)

1. Blood grouping.
2. Functions of female sex hormones.
3. Refractive errors of eye.

III. Short answers on: (5 × 2 = 10)

1. Mention two uses of ECG.
2. Name the two enzymes that help in the digestion of proteins.
3. Two functions of cerebellum.
4. Muscle tone.
5. Name the muscles for inspiration and expiration.

SAMPLE QUESTIONS - 5

ANATOMY

I. Elaborate on: (1 × 12 = 12)

1. Enumerate the parts of respiratory system and write in detail about the lung.

II. Write notes on: (3 × 5 = 15)

1. Stomach.
2. Types of joints with examples.
3. Testes.

III. Short answers on: (5 × 2 = 10)

1. Types of cartilage.
2. Name any two contents of cubital fossa.
3. Parts of fallopian tube.
4. Name the major openings in the diaphragm.
5. Name the endocrine glands.

PHYSIOLOGY

I. Elaborate on: (1 × 13 = 13)

1. Define the cardiac cycle. What are the events in a cardiac cycle? Describe the ventricular events in detail. Add a note on heart sounds.

II. Write notes on: (3 × 5 = 15)

1. Spermatogenesis.
2. Enumerate the functions of saliva.
3. Functions of cerebellum.

III. Short answers on: (5 × 2 = 10)

1. Any two important functions of platelets.
2. What is residual volume? Give the normal value.
3. Define sarcomere.
4. Types of nephron and its functions.
5. Color blindness.

SAMPLE QUESTIONS - 6

ANATOMY

I. Elaborate on: (1 × 12 = 12)

1. Name the lymphatic organs. Describe the anatomy of the spleen in detail.

II. Write notes on: (3 × 5 = 15)

1. Blood supply to heart.
2. Cerebellum.
3. Support of uterus.

III. Short answers on: (5 × 2 = 10)

1. Name the muscles of tongue.
2. Median cubital vein.
3. Ear ossicles.
4. Name the covering of the brain.
5. Name the parts of pancreas.

PHYSIOLOGY

I. Elaborate on: (1 × 13 = 13)

1. What is calcium homeostasis? Explain the role of parathyroid hormone in calcium homeostasis? Add a note on tetany.

II. Write notes on: (3 × 5 = 15)

1. Briefly explain the conductive system of the heart.
2. Lung volumes.
3. Composition and functions of cerebrospinal fluid.

III. Short answers on: (5 × 2 = 10)

1. Mention any two functions of blood.
2. List out any four functions of liver.
3. Rigor mortis.
4. Mention any two functions of skin.
5. Mention any two functions of testosterone.

SAMPLE QUESTIONS - 7

ANATOMY

I. Elaborate on: (1 × 12 = 12)

1. Enumerate the different special sensory organs of the human body. Describe in detail about eye.

II. Write notes on: (3 × 5 = 15)

1. Urinary bladder – parts, surfaces, ligaments.
2. Arterial supply of heart.
3. Blood supply and applied anatomy of stomach.

III. Short answers on: (5 × 2 = 10)

1. Name the major openings of diaphragm.
2. Name the different organs of female reproductive system.
3. Name the lobes of cerebrum.
4. Name the different organs of respiratory systems.
5. Name the different lymphatic organs of the body.

PHYSIOLOGY

I. Elaborate on: (1 × 13 = 13)

1. Define erythropoiesis. Describe in detail about the stages of erythropoiesis. Add a note on maturation factors.

II. Write notes on: (3 × 5 = 15)

1. Conducting system of heart.
2. Functions of skin.
3. Composition and function of saliva.

III. Short answers on: (5 × 2 = 10)

1. Synapse.
2. Define osmosis.
3. Define respiratory unit.
4. Functions of Sertoli cells.
5. What is myopia? Name the corrective lens used for myopia.

SAMPLE QUESTIONS - 8

ANATOMY

I. Elaborate on: (1 × 12 = 12)

1. Enumerate the parts of female reproductive system with a neat diagram. Describe about the uterus in detail.

II. Write notes on: (3 × 5 = 15)

1. Tongue.
2. Circle of Willis.
3. Deltoid muscle.

III. Short answers on: (5 × 2 = 10)

1. Name the arteries supplying the heart and give their origin.
2. Write any two characteristic features of skeletal muscle.
3. Name the organs involved in respiratory system.
4. Name the ventricles present in the brain.
5. Name the salivary glands present in the body.

PHYSIOLOGY

I. Elaborate on: (1 × 13 = 13)

1. Enumerate the factors involved in blood coagulation and describe the mechanism of blood coagulation. Add a note on anticoagulants.

II. Write notes on: (3 × 5 = 15)

1. Neuromuscular junction.
2. Transport of oxygen in blood.
3. Hormonal regulation of menstrual cycle.

III. Short answers on: (5 × 2 = 10)

1. Name the layers and secretions of adrenal cortex.
2. Any four functions of calcium.
3. Functions of leucocytes.
4. Name the hormones that act on nephron.
5. Name the three compartments of cochlea.