I.  Topographic Anatomy of the Abdomen
A.  Surface landmarks
   1.  Xiphoid process
   2.  Costal margin
   3.  Iliac crest
   4.  ASIS
   5.  Pubic symphysis
   6.  Inguinal groove
B.  Anterior abdominal wall
   1.  Structures
      a.  Skin
      b.  Muscles
      c.  Peritoneum
         1)  Greater omentum
         2)  Lesser omentum
         3)  Mesentery
   2.  Quadrants (4)
      a.  RUQ
      b.  LUQ
      c.  RLQ
      d.  LLQ
   3.  Regions (9)
      a.  Rt. Hypochondriac
      b.  Epigastric
      c.  Lt. Hypochondriac
      d.  Rt. Lumbar
      e.  Umbilical
      f.  Lt. lumbar
      g.  Rt. Iliac
      h.  Hypogastric
      i.  Lt. Iliac
   4.  Planes
      a.  Xiphisternal
      b.  Midcostal
      c.  Transpyloric
      d.  Subcostal
      e.  Interiliac
      f.  Transtubercular

II.  Diaphragm
A.  Anatomy
   1.  Higher on right side
   2.  Higher anteriorly
B.  Attachments
   1.  Arises from xiphoid
   2.  Anteriorly
   3.  Posteriorly
C.  Major Diaphragmatic Openings (Hiatus)
DIGESTIVE SYSTEM AND BODY METABOLISM

I. Anatomy of the Digestive System
   A. Alimentary canal organs
   B. Accessory digestive organs

II. Overview of Gastrointestinal Processes and Controls
   A. Processes
      1. Ingestion
         a. Mastication
      2. Propulsion
         a. Deglutition
         b. Peristalsis
      3. Digestion
         a. Mechanical
         b. Chemical
      4. Absorption
      5. Defecation

III. Organs and Functions of the Alimentary Canal (GI Tract)
   A. Mouth (oral cavity)
      1. Lips
      2. Cheeks
      3. Hard palate
      4. Soft palate
      5. Tonsils
      6. Tongue
      7. Teeth
      8. Both mechanical and chemical digestion; saliva
   B. Pharynx
      1. Common passageway for food and air
      2. Divisions
         a. Nasal pharynx
         b. Oral pharynx
         c. Laryngeal pharynx
C. Esophagus
1. Conducts food by peristalsis

D. Stomach - lies vertically and obliquely in LUQ
1. Parts
   a. Fundus
   b. Body
   c. Pylorus
2. Openings
   a. Cardiac orifice
   b. Pyloric orifice
3. Rugae
4. Borders
   a. Greater curvature
   b. Lesser curvature
      1) Angular notch
5. Functions
   a. Storage tank
   b. Site for food breakdown
6. Gastric glands produce
   a. Hydrochloric acid
   b. Pepsin
   c. Renin
   d. Mucus
   e. Gastrin
   f. Intrinsic factor
7. Contents
   a. Chyme
8. Activities of the Stomach
   a. No absorption of nutrients
      b. Food Propulsion
         1) Peristaltic waves
         2) Mixing action
         3) Pylorus pumps chyme

E. Stomach in Relation to Body Type
1. Sthenic
2. Hypersthenic
3. Hyposthenic
4. Asthenic

F. Small Intestine
1. Boundaries
2. Subdivisions
   a. Duodenum
      1) Duodenal bulb or cap
      2) Ligament of Treitz
   b. Jejunum
   c. Ileum
3. Features
   a. Circular folds
   b. Villi
4. Activities and Functions
   a. Chemical digestion
   b. Nutrient absorption
   c. Water, indigestible food residue, and bacteria

G. Large intestine
1. Boundaries
2. Subdivisions
   a. Cecum
   b. Appendix
   c. Ascending colon
   d. Transverse colon
   e. Descending colon
   f. Sigmoid colon
   g. Rectum
   h. Anus
3. Flexures
   a. Hepatic (right colic) flexure
   b. Splenic (left colic) flexure
4. Structures
   a. Goblet cells
   b. Haustra
   c. Teniae coli
5. Activities and Functions
   a. Receives indigestible food residue
   b. Absorbs water
   c. Propulsion
   d. Defecates residues

IV. Accessory Digestive Organs
A. Teeth
1. Sets of teeth
   a. Deciduous (20)
   b. Permanent (32)

B. Salivary Glands
1. Three pairs of glands
   a. Parotid
   b. Submandibular (submaxillary)
   c. Sublingual
2. Secretion

C. Pancreas
1. Retroperitoneal
2. Exocrine (digestive) function
3. Endocrine (hormonal) function; Islets of Langerhans
   a. Insulin
   b. Glucagon

D. Liver and Gallbladder
1. Liver structure
2. Digestive function of liver
3. Digestive function of gallbladder
4. Bile flow

V. Nutrition and Metabolism
A. Nutrition
   1. Nutrient
   2. Dietary Sources of the Major Nutrients
      a. Carbohydrates
      b. Lipids
      c. Proteins
      d. Vitamins
      e. Minerals
B. Metabolism
   1. Metabolism

VI. Pathology
A. Common congenital defects
   1. Cleft palate/cleft lip
   2. Tracheoesophageal fistula
B. Common inborn errors of metabolism
   1. Cystic fibrosis
C. Common GI problems throughout life
   1. Appendicitis
   2. Ulcer
   3. Gallbladder problems
   4. Diverticulum
   5. Polyp
   6. Intussusception
   7. Volvulus
ANATOMY II STUDY QUESTIONS - Gastrointestinal System

1. The _______ groove is a crease that separates the lower abdominal cavity from the upper thigh.

2. The _______ is the naval, often used as a superficial landmark for L-4.

3. The _______ is the membranous lining of the abdomen and pelvic cavity.

4. The _______ omentum if the fold of the peritoneum in the anterior abdomen that drapes like an apron from the stomach to below the transverse colon.

5. The _______ omentum is a fold of the peritoneum between the stomach and the liver.

6. The _______ is a double fold of the peritoneum that supports the small intestine.

7. Tell which level of the vertebrae the following landmarks locate:
   Xiphoid process _______ Transpyloric plane _______
   Subcostal plane _______ Interiliac plane _______
   Transtubercular plane _______ Iliac crest _______

8. The diaphragm is higher on the _______ side due to the attachment of the liver. The dome of the right hemidiaphragm is at the level of _______ and the left hemidiaphragm is at the level of _______.

9. An opening in the diaphragm is called a _______. Name the 3 major diaphragmatic openings and describe their location.

10. The diaphragm is _______ when supine than in the erect position. The average range of movement of the diaphragm is _______ inches during normal breathing.

11. A _______ is a rupture allowing the protrusion of an organ through a wall. _______ _______ _______ is weakening of the diaphragm, but organs do not through as they do in a hernia.

12. _______ and _______ chest films would demonstrate diaphragm paralysis and /or excursion.

13. Name 3 conditions that would require studies to include the diaphragm.
   a. ____________________________
   b. ____________________________
   c. ____________________________

14. What are the 5 gastrointestinal processes? ____________, ____________, ____________, ____________, and ____________.
15. Name the 3 pairs of salivary glands, their location, and primary duct(s):

<table>
<thead>
<tr>
<th>GLAND</th>
<th>LOCATION</th>
<th>DUCT</th>
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<tbody>
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<td>a.</td>
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16. Which salivary gland is the largest? _____________________________

17. The act of chewing food is called ______________. The act of swallowing is called ____________ ________________.

18. What is the common passageway for food and air? ________________

19. Name the 3 sections of the pharynx.
   a. ______________________
   b. ______________________
   c. ______________________

20. The ________________ is the cartilaginous flap that covers the airway during deglutition.

21. The ________________ conveys food from the pharynx to the stomach.

22. Food passes through the GI tract in wave-like contractions called ________________.

23. During digestion the solid foods are converted to a semi-liquid called ___________.
   The chemical breakdown of food is called ________________.
   The conversion of food into energy is called ________________.

24. The stomach lies in the ____________ ____________ quadrant. The two regions the stomach lie in are the left ____________ and the ________________.

25. The upper air-filled portion of the stomach is called the ________________.
   The junction between the esophagus and the stomach is called the ____________ ____________.
   The mucosal folds within the stomach are called ________________.

26. Name the 4 body types and describe the position of the stomach in each.

<table>
<thead>
<tr>
<th>BODY TYPE</th>
<th>POSITION</th>
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<tbody>
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<td>a.</td>
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27. The first section of the small intestine is called the ________________. It is a C-shaped
loop, approximately _______ inches long, and extends from the ______________ to the ___________. The duodenum ends at the Ligament of _______________.

28. The second section of the small intestine is the ___________. The third and longest section is the ________________.

29. The small intestine is ____________ than the large intestine. The primary function of the small intestine is ____________ of nutrients. The wall of the small intestine contains finger-like structures called ____________ through which nutrients are absorbed into the bloodstream. It extends from the pyloric sphincter to the ____________ valve at the colon.

30. The large intestine, or colon, contains sac-like pouches called _____________. It extends from the ileocecal valve to the _____________. _____________ is the primary function of the large intestine.

31. A stalked tumor on the mucosal lining of the GI tract is called a _____________.

32. An ____________ is a mucosal erosion of the lining of the GI tract.

33. Telescoping of the bowel is called _____________.

34. A _____________ is an outpouching of the lining of the GI tract wall or lining.

35. When part of the stomach herniates above the diaphragm this condition is called a ____________ hernia.

36. The pancreas has both endocrine (hormonal) and exocrine (digestive) functions. Its exocrine function is the secretion of ____________ ____________ which helps to break down proteins. Its endocrine functions are the secretion of ____________ which metabolizes (lowers) blood sugar and ____________ which raises blood sugar.

37. The liver, the largest solid organ in the body, secretes ____________ which helps in the emulsification (breakdown) of _____________. The ____________ stores and concentrates bile.

38. The right and left ____________ ducts from the liver join together to form the ________________ duct. The ____________ duct from the gallbladder and the common hepatic duct join together to form the ________________ ________________ duct. The common bile duct joins together with the ____________ duct from the pancreas to form the ________________ which empties into the duodenum through the Sphincter of _________________.
Fig. 22-41. Salivary glands and ducts.

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