

Sample Edition

**ITPEC
FUNDAMENTAL
IT Engineer Exam
2025 April**

Subject A only

**60 Real Past Questions
with
Detailed Explanations**
(Study Guide for ITPEC/FE Exam)

Recognized in ITPEC Member Countries:
Philippines, Thailand, Vietnam, Myanmar, Mongolia
Bangladesh

ITPEC Fundamentals of Information Technology Engineer Examination (FE)

– English Edition Spring 2025 Subject A Version

Author: Takashi Narita

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Based on past **FE Examination** questions published by ITPEC.

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All explanations, translations, and analyses are original work by the author, Takashi Narita.

Preface

The **Fundamental Information Technology Engineer Examination (FE)** is a core examination that demonstrates your ability to apply fundamental knowledge of information technology, programming, algorithms, and system design. Originally developed in Japan, it is now recognized internationally through the ITPEC (Information Technology Professionals Examination Council) mutual recognition framework. Member countries include the Philippines, Thailand, Vietnam, Myanmar, Mongolia, and Bangladesh. In many of these countries, the FE serves as a gateway for those aiming to work in Japan or for Japanese companies abroad. Where Japanese-owned IT firms operate, holding this certification can also provide a strong advantage in hiring and career advancement, as it reflects both technical competence and familiarity with Japanese corporate culture and IT standards.

This book is designed for learners who wish to prepare for the **FE Examination in English**. It offers clear explanations, answer analyses, and study tips to help you build genuine understanding rather than relying on rote memorization. Whether you are a student, a working professional, or someone seeking to advance your IT career, this book will support efficient, practical, and motivating study.

Important Notice

The ITPEC Fundamentals of Information Technology Engineer Examination (FE) consists of two parts: Subject A and Subject B.

Each subject has different characteristics and types of questions.

This book covers only Subject A.

- For Subject B, please purchase the separate volume.
- A combined edition (Subjects A & B) is also available.

About the Author

Takashi Narita is an IT instructor with more than 20 years of industry experience in system design, software development, programming, and database management. Now based in the Philippines, he teaches programming, system development, and system design remotely to students in Japan.

He began creating this English edition of **Fundamental Information Technology Engineer Examination (FE)** practice questions to support IT human resource development in the Philippines. Over time, he recognized that it could also serve as a valuable resource for learners across Asia seeking to succeed in Japanese-owned companies or in Japan itself.

Through this book, he aims to help readers build the skills and confidence needed to contribute meaningfully in Japanese and Japan-affiliated workplaces. He is passionate about making complex IT concepts accessible to learners of all backgrounds and believes that studying in English opens doors to international opportunities.

How to Use This Book

The fastest way to pass the **Fundamental Information Technology Engineer Examination (FE)** is to practice past questions repeatedly and understand the logic behind each answer.

This book provides past FE questions in English, along with clear explanations and answer analyses. Always review the explanations for any questions you miss, make sure you understand the reasoning, and then try again.

Recommended study flow:

1. Solve one set of questions under timed conditions, just like the actual exam.
2. Check which answers were incorrect and study the explanations carefully.
3. Reattempt the same set a few days later until you can achieve a high score with confidence.
4. Move on to the next set and repeat the process.

Study Tips

- **Do more than one set** – One set of past questions is not enough for thorough preparation. Aim for at least three sets to build both knowledge and confidence.
- **Consistency is key** – Even 10 minutes a day makes a difference. Use your phone, PC, or tablet to open this book and solve just one question. From my own experience earning multiple IT certifications, **daily habit** is the single most important factor in success. For me, solving one question before bed soon grew naturally to two or three without feeling forced. Short, consistent study sessions lead to long-term retention.
- **Set a study schedule** – Work backward from your exam date, create a plan, and track your progress.
- **Get used to English IT terms** — many are 3–4-letter abbreviations (e.g., CPU, LAN, DNS) and can feel intimidating at first, but with repeated exposure they’ll become second nature.

Exam Overview

- **Format: Two parts** — **Subject A** (formerly “Morning”) and **Subject B** (formerly “Afternoon”).
- **Exam Areas (Subject A):** 60 multiple-choice questions in 90 minutes.

Subject A consists of **60 questions** drawn from the three domains below.

1) Technology Domain

IT fundamentals, hardware, software, databases, networks, security, etc.

2) Management Domain

project management, service management, system audit, etc.

3) Strategy Domain

management strategy, business law, system strategy, corporate activities, etc.

You should aim to spend about 1.5 minutes (90 seconds) per question.

- **Exam Areas (Subject B):** 20 multiple-choice questions in 100 minutes.

Algorithms & Programming (pseudo-code); Information Security.

(**20 questions** total: 16 Algorithms & Programming, 4 Information Security)

You should aim to spend about 5 minutes per question.

- **Passing Criteria (FE):**

You must pass both Subject A and Subject B. The passing mark for each subject is 60 out of 100.

Links

The test mode (CBT or paper), schedule, application method, and venue vary by country. Details are subject to change; always check your country's official website for the latest information.

Official Information Links:

- ITPEC Official Site: <https://itpec.org/>
- Philippines (DICT): <https://dict.gov.ph/itpec/>
- Thailand (NECTEC): <https://www.nectec.or.th/itpec/>
- Vietnam (VITC): <https://www.vitc.vn/>
- Myanmar (ITPEC Myanmar):
<https://www.myanmaritpec.org/>
- Bangladesh (BCC): <https://www.bcc.gov.bd/>
- Mongolia (MITC): <https://www.mitc.gov.mn/>

Author's Note: A quick word on Subject A

Subject A assesses **fundamental IT knowledge**. The most reliable way to reach the passing mark is to **practice many questions**. In recent years, Subject A has often included **reused or closely related items** from past exams, so broad exposure to previous questions is especially effective.

If you are new to the FE, consider taking the **IT Passport** exam first. Building that foundation makes Subject A **feel much easier** for many learners, allowing you to focus your energy on **Subject B** afterward.

*ITPEC provides official Subject A materials in the downloadable past exams. For authoritative conventions—especially **logic-circuit notation and rules**—please refer to those documents.*

Exams are always a race against time. If you glance at a question and feel a strong sense of dread, move on to another one. The best strategy is to start with the questions that make you think, “I can do this!”

A-Q1

For an 8-bit binary integer, which of the following is the operation that extracts the most significant 4-bits while making the other bits zero?

- a) Bitwise AND operation with 11110000.
- b) Bitwise NAND operation with 11110000.
- c) Bitwise OR operation with 00001111.
- d) Bitwise XOR operation with 00001111.

(Source:2025S,FE,Subject-A,Q1)

Answer: a

Explanation

- The task is to extract the **most significant 4 bits (MSB)** and clear the lower 4 bits.
- A **bitwise AND** keeps only the positions where both operands have a 1.
- Masking with 11110000 means:
 - The top 4 bits remain unchanged.
 - The lower 4 bits are forced to 0.
- Example: 10110101 AND 11110000 = 10110000

Other Choices

- B: **NAND** inverts the result of AND, which does not perform extraction.
- C: **OR with 00001111** forces the lower 4 bits to 1 instead of 0.
- D: **XOR with 00001111** flips the lower 4 bits rather than clearing them.

Author's Comment

This question is a classic example of **bit masking**. In programming and computer architecture, bitwise AND is the standard technique to extract specific bits.

Tip: How to use bitwise operations (with examples)

- **AND** → Keeps only the necessary bits (others become 0).

Example:

10101100 AND 11110000 = 10100000

(Upper 4 bits remain, lower 4 bits become 0)

- **OR** → Sets specific bits to 1.

Example:

10100000 OR 00001111 = 10101111

(Lower 4 bits are forced to 1)

- **XOR** → Flips specific bits.

Example:

10101100 XOR 00001111 = 10100011

(Lower 4 bits are inverted)

- **NAND (Not AND)** → Common in logic circuits, but rarely used for masking in programming.

Example:

10101100 NAND 11110000 = 01011111

(Inverts the result of AND)

In the real world of computing, bitwise operations are used for more than just passing exams; they are essential for **IP addressing**. When a computer determines its network ID, it performs a bitwise AND between its IP address and the **Subnet Mask**. Just like the problem above, the subnet mask "masks" the host portion of the address to reveal the network portion.

A-Q2

Which of the following is the binary fraction that is the nearest equivalent to the decimal fraction 23.375?

- a) 10111.011
- b) 10111.110
- c) 11101.011
- d) 11101.110

(Source:2025S,FE,Subject-A,Q2)

Answer: a

Explanation

To convert **23.375** into binary:

Step 1. Convert the integer part (23) to binary

$$23 \div 2 = 11 \text{ remainder } 1$$

$$11 \div 2 = 5 \text{ remainder } 1$$

$$5 \div 2 = 2 \text{ remainder } 1$$

$$2 \div 2 = 1 \text{ remainder } 0$$

$$1 \div 2 = 0 \text{ remainder } 1$$

→ Integer part = **10111**

Step 2. Convert the fractional part (0.375) to binary

$$0.375 \times 2 = 0.75 \rightarrow \text{integer } 0$$

$$0.75 \times 2 = 1.5 \rightarrow \text{integer } 1$$

$$0.5 \times 2 = 1.0 \rightarrow \text{integer } 1$$

→ Fractional part = **.011**

Step 3. Combine both parts

23.375 (decimal) = 10111.011 (binary)

Author's Comment

When converting decimal fractions to binary:

- **Integer part** → repeatedly divide by 2, collect remainders from bottom up.
- **Fractional part** → repeatedly multiply by 2, collect integer parts from top down.

Tip:

$$.011 = \frac{0}{2} + \frac{1}{4} + \frac{1}{8} = 0.375$$

Always double-check by converting back to decimal.

To master binary fractions, think of them just like decimal fractions (0.1, 0.01, etc.), but with different "weights." In decimals, each place is $\frac{1}{10}$ of the previous one. In binary, each place is exactly half ($\frac{1}{2}$) of the previous one: 0.5, 0.25, 0.125, and so on. In the FE exam, most problems use combinations of these three numbers. If you remember that 0.375 is simply $0.25 + 0.125$, you can find the answer almost instantly without complex division.

A-Q3

Which of the following is the most appropriate description of machine learning in AI?

- a) It is a technology that enters specialized knowledge in a particular field into a computer, and has the computer infer by using the knowledge entered.
- b) It is a technology that gives computers the ability to learn in the same way humans naturally learn, such as finding specific patterns from memorized data.
- c) It is a technology that reproduces vital phenomena or evolutionary processes by using computers and machines.
- d) It is a technology to give computers the ability to manage learning materials and learning by using a web system or other information technology so that people can learn interactively.

(Source:2025S,FE,Subject-A,Q3)

Answer: b

Explanation

Machine learning is a subset of Artificial Intelligence (AI) that focuses on the development of algorithms that allow computers to "learn" from data. Instead of being explicitly programmed with every rule, the system analyzes large amounts of data to identify **patterns and rules** autonomously.

- Option a describes an "Expert System," which relies on pre-entered specialized knowledge.
- Option c refers to "Artificial Life" or "Biomimetics."
- Option d describes a "Learning Management System (LMS)" or "e-Learning."

Since **option b** correctly identifies the process of finding specific patterns from data, it is the most appropriate description.

Author's Comment

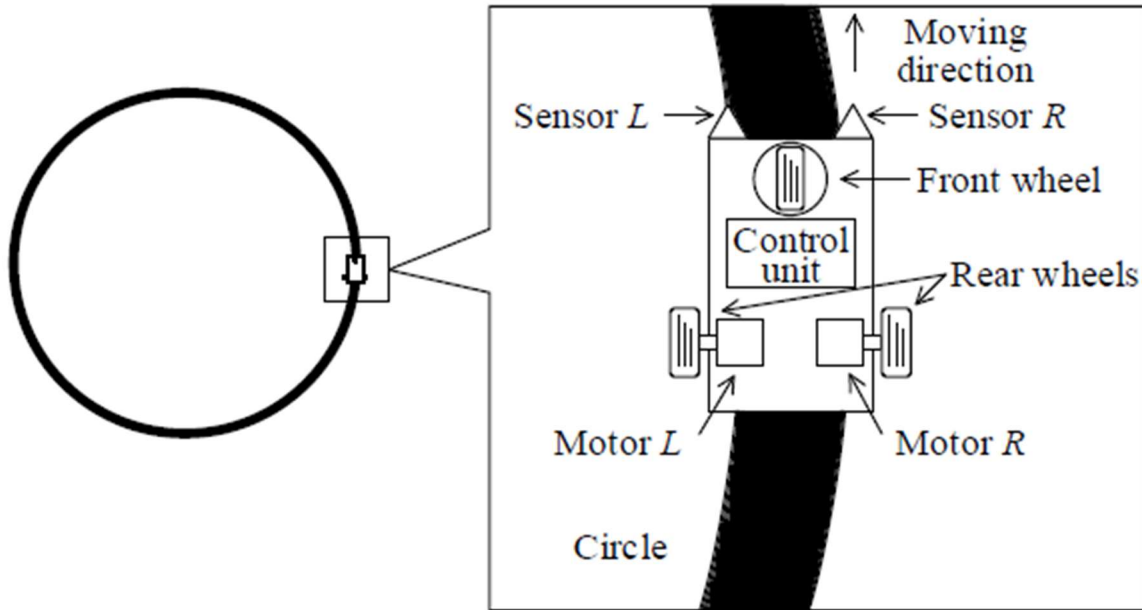
The defining characteristic of machine learning is "who creates the rules." In traditional AI, humans define every logic and rule for the computer to follow. In machine learning, however, the computer itself discovers the rules and patterns hidden within vast amounts of data. When you take the FE exam, look for keywords like "finding patterns from data" or "autonomous improvement" to identify machine learning correctly. This shift from "giving rules" to "finding rules" is the core of modern AI technology.

Column

Machine learning is already all around us. When you see "Recommended Products" on a shopping site or when your email app filters out "Spam," machine learning is working behind the scenes. It looks at your past behavior or millions of examples of junk mail to find hidden patterns. As the amount of data (Big Data) increases, these systems become even more accurate, changing how we interact with technology every day.

A-Q4

A vehicle travels along a circular path as shown in the figure below. Two sensors, L and R , whose revolution speeds are independently controlled, are attached to the left and right rear wheels. Sensors L and R are photo-reflective sensors, and their values change according to the ratio of black and white regions they pass over. If the ratio increases, the sensor value decreases, and if the ratio decreases, the sensor value increases. Which of the following is an appropriate control to ensure that the vehicle travels along the black outline of the circle? Here, if the values of the two sensors are equal, the motor revolution speeds return to the initial values.



	Sensor L value $>$ Sensor R value		Sensor L value $<$ Sensor R value	
	Motor L Revolution speed	Motor R Revolution speed	Motor L Revolution speed	Motor R Revolution speed
a)	Decrease	Increase	Decrease	Increase
b)	Decrease	Increase	Increase	Decrease
c)	Increase	Decrease	Decrease	Increase
d)	Increase	Decrease	Increase	Decrease

(Source:2025S,FE,Subject-A,Q4)

Answer: c

Explanation

The goal is to keep the vehicle traveling along the black outline. According to the problem, if the ratio of black regions increases, the sensor value decreases.

- **Sensor L (Left):** If the vehicle veers too far to the left, Sensor L will move over more of the black region, causing its value to decrease. To return to the path, the vehicle needs to turn right. To turn right, the speed of the left wheel (**L**) must be increased relative to the right wheel (**R**).
- **Sensor R (Right):** Conversely, if the vehicle veers too far to the right, Sensor R will move over more of the black region, and its value will decrease. To return to the path, the vehicle needs to turn left by increasing the speed of the right wheel (**R**).

Therefore, when a sensor value decreases, it indicates that the wheel is over the black line, and the speed of that specific wheel should be increased to steer the vehicle back. This matches the logic in option c.

Author's Comment

This is a classic line-following robot control problem. To understand it easily, think in terms of **Self-Correction** and the "**Push Harder**" rule:

- **If the left side sees more black** → Push the left wheel harder (increase speed) to turn **Right**.
- **If the right side sees more black** → Push the right wheel harder (increase speed) to turn **Left**.
- **If both sensors are equal** → Go **Straight**.

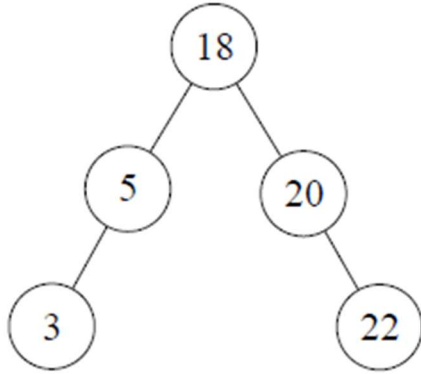
In the FE exam, always pay attention to whether a sensor value "increases" or "decreases" when it detects the target. Once you map the sensor change to the required physical movement, the correct control logic becomes clear.

Column

The logic used in this problem is the foundation of "Line Tracers," which are common in educational robotics. In industrial settings, similar Autonomous Guided Vehicles (AGVs) use various sensors to follow magnetic tape or painted lines on factory floors to transport goods. Today, this has evolved into advanced technology used by robot vacuum cleaners and self-driving cars. Even without physical lines, these systems use sensors to detect "boundaries" and constantly perform the same kind of error correction you learned in this problem.

A-Q5

Among the four tree traversal techniques—breadth-first, in-order, post-order, and preorder— which of the following is the appropriate combination to ensure that the last two nodes visited are the same in the tree shown below, when the left child is explored first?



a)	Breadth-First	Post-order
b)	Breadth-First	Pre-order
c)	In-order	Post-order
d)	In-order	Pre-order

(Source:2025S,FE,Subject-A,Q5)

Answer: d

Explanation

Tree traversal determines the order in which all nodes in a tree are visited. Let's trace each technique for the given tree, always exploring the left child first:

- **Breadth-first:** Visits nodes level by level from top to bottom, left to right. Order: $A \rightarrow B \rightarrow C \rightarrow D \rightarrow E \rightarrow F$. The last two are **E, F**.
- **Pre-order (Root-Left-Right):** Visits the root, then the left subtree, then the right subtree. Order: $A \rightarrow B \rightarrow D \rightarrow E \rightarrow C \rightarrow F$. The last two are **C, F**.
- **In-order (Left-Root-Right):** Visits the left subtree, then the root, then the right subtree. Order: $D \rightarrow B \rightarrow E \rightarrow A \rightarrow C \rightarrow F$. The last two are **C, F**.
- **Post-order (Left-Right-Root):** Visits the left subtree, then the right subtree, then the root. Order: $D \rightarrow E \rightarrow B \rightarrow F \rightarrow C \rightarrow A$. The last two are **C, A**.

Comparing the results, the last two nodes visited in **Pre-order** and **In-order** are both **C and F**. Therefore, option **d** is the correct answer.

Author's Comment

Tree traversal can be confusing, but there is a simple trick: imagine drawing a continuous line tracing the outside of the tree.

- **Pre-order:** Mark the node as you pass its **left** side.
- **In-order:** Mark the node as you pass its **bottom**.
- **Post-order:** Mark the node as you pass its **right** side. In the FE exam, drawing these marks on the provided diagram is much faster and more accurate than trying to memorize the recursive steps. For "Breadth-first," just think of it as "reading a book" from top-left to bottom-right.

Column

Tree traversal is not just an academic exercise; it is used daily in software development. For example, a **Post-order** traversal is used when you delete a directory on your computer; you must delete the files and subfolders (children) before you can delete the main folder (parent). On the other hand, **In-order** traversal is used in "Binary Search Trees" to retrieve all stored data in sorted order. Understanding these patterns allows developers to process complex data structures efficiently.

This book is sample edition.

Notes and Disclaimers

Source Note:

The questions in this book are based on the past questions from the Spring 2025 FE (Fundamentals of Engineering) Examination published on the official ITPEC website. The author translated them into English and added supplementary explanations.

Source: ITPEC – FE Examination Past Questions (<https://itpec.org/>)

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