



April 2026

Fundamental IT Engineer Examination (Subject A)

Questions must be answered in accordance with the following:

Question Nos.	Q1 – Q60
Question Selection	All questions are compulsory.
Examination Time	9:30 – 11:00 (90 minutes)

Instructions:

1. Use a pencil. If you need to change an answer, erase your previous answer completely and neatly. Wipe away any eraser debris.
2. Mark your examinee information and your answers in accordance with the instructions below. Your answer will not be graded if you do not mark properly. Do not mark nor write on the answer sheet outside of the prescribed places.

(1) **Examinee Number**

Write your examinee number in the space provided, and mark the appropriate space below each digit.

(2) **Date of Birth**

Write your date of birth (in numbers) exactly as it is printed on your examination admission card, and mark the appropriate space below each digit.

(3) **Answers**

Select one answer (a through d) for each question.

Mark your answers as shown in the following sample question.

[Sample Question]

Q1. Which of the following should be used for marking your answer on the answer sheet?

- a) Ballpoint pen b) Crayon c) Fountain pen d) Pencil

Since the correct answer is “d) Pencil”, mark the answer as below:

[Sample Answer]

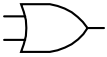
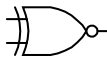
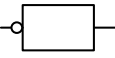
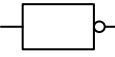
Q1	☐ a	☐ b	☐ c	☒
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**Do not open the exam booklet until instructed to do so.
Inquiries about the exam questions will not be answered.**

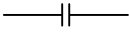
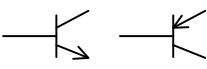
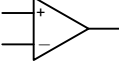
Symbols commonly used in questions

Unless otherwise noted in each question, the following notational conventions are applied as shown in the table.

I. Logic Circuit

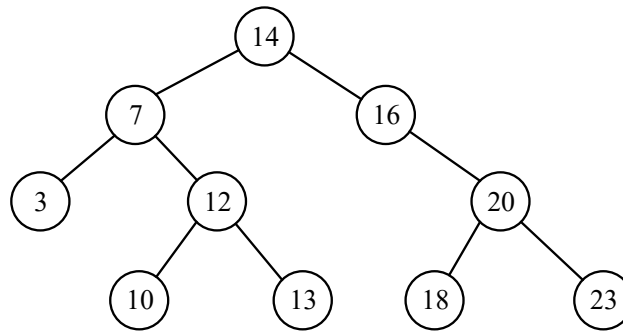
Graphic symbol	Explanation
	AND gate
	NAND gate
	OR gate
	NOR gate
	Exclusive OR (XOR) gate
	Exclusive NOR gate
	Buffer
	NOT gate
	Three-state buffer (or tri-state buffer)
 	A small circle or “bubble” on either the input or the output terminal shows inversion or negation of the logic state.

II. Circuit symbol

Graphical symbol	Explanation
	Resistor (R)
	Capacitor (C)
	Diode (D)
	Transistor (Tr)
	Earth (Ground)
	Operational amplifier

Company names or product names mentioned in the examination questions are the trademarks or registered trademarks of their respective companies or organizations. The symbol ® or ™ is not used within.

Q6. In the binary search tree below, when a new node of value 11 is inserted, where will this insertion be made?



- a) Left child of 16
- b) Left child of 23
- c) Right child of 3
- d) Right child of 10

Q7. For integers x and y ($x > y \geq 0$), a function $F(x, y)$ is defined as below:

$$F(x, y) = \begin{cases} x & (\text{when } y = 0) \\ F(y, x \bmod y) & (\text{when } y > 0) \end{cases}$$

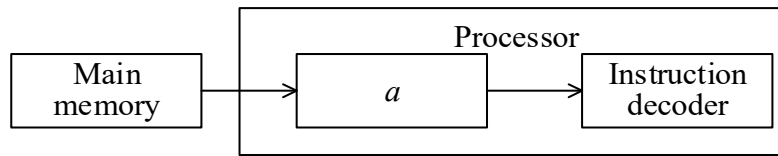
What is the value $F(231, 15)$? Here, " $x \bmod y$ " represents the remainder after division of x by y .

- a) 2
- b) 3
- c) 5
- d) 7

Q8. Which of the following is the appropriate description of constructors in Object-Oriented Programming (OOP)?

- a) Constructors are invoked only after an object has been fully instantiated.
- b) In class-based OOP, constructors do not play any role in object creation or initialization.
- c) Constructors are responsible for initializing objects in class-based OOP.
- d) Constructors are inherited by subclasses exactly like regular methods in all class-based OOP languages.

Q9. The figure shows the storage sequence of instructions fetched by a processor. Which of the following corresponds to *a*?



- a) Accumulator
- b) Data cache
- c) Instruction register
- d) Program register (program counter)

Q10. Which of the following is an appropriate CPU operation associated with cache memory?

- a) When a cache hit occurs, the CPU fetches data from ROM.
- b) When a cache hit occurs, the CPU fetches data from the main memory.
- c) When a cache miss occurs, the CPU fetches data from the cache memory.
- d) When a cache miss occurs, the CPU fetches data from the main memory.

Q11. What is the theoretical maximum data transfer rate in MB/s for the external bus of a 64-bit microprocessor that uses a 64-bit external data bus driven by a 64 MHz input clock? Here, it takes 4 input clock cycles to complete 1 bus cycle.

- a) 12.8
- b) 128
- c) 512
- d) 1280

Q12. Which of the following is the RAID level that can maximize reliability and fault tolerance for a NAS device equipped with two hard disk drives of identical capacity?

- a) RAID 0
- b) RAID 1
- c) RAID 5
- d) RAID 6

Q13. The operating status of a system is being continuously monitored. When a new task is applied to the system after several years of operation, which of the following is an appropriate sequence of work items in capacity planning?

[Work items in capacity planning]

- (i) Evaluate the proposed system configuration, assess its appropriateness, and conduct a review if necessary.
- (ii) Consider a proposal for the necessary system configuration based on system characteristics, including factors such as the number of servers and whether parallel distributed processing can be performed.
- (iii) Understand the performance information of the hardware or environment inherent to the system based on the operating status of the system.
- (iv) Conduct a meeting with users to gather information about the new task, understand requirements such as the estimated number of processes, and determine the time required by the processes.

a) (iii), (ii), (iv), (i)

b) (iii), (iv), (ii), (i)

c) (iv), (ii), (i), (iii)

d) (iv), (iii), (i), (ii)

Q14. Which of the following is the CPU utilization in percentage rounded to a decimal number when three (3) jobs with 30% average I/O (Input/Output) wait time are running on a single CPU? Here, I/O wait time refers to the percentage of time a job is waiting for its I/O operation to complete.

a) 10

b) 34

c) 90

d) 97

Q15. There are four processes, namely, P1, P2, P3, and P4, and their corresponding CPU-execution times are shown in the table below. All four (4) processes arrive at time 0, in the given order, and waiting time is the time a process waits before it gets its time slice for execution. Time slice is 5 ms. Which of the following is the average waiting time in milliseconds for the processes to be executed in Round Robin?

Process	CPU-execution time in milliseconds
P1	5
P2	13
P3	4
P4	8

- a) 7.5 b) 10 c) 11.5 d) 19

Q16. Which of the following is a program that combines the separately compiled modules of a program into a form suitable for execution in C language?

- a) Assembler b) Compiler c) Interpreter d) Linker

Q17. Which of the following is the appropriate circuit with two (2) inputs and one (1) output where the output X is 0 only when the two (2) inputs A and B are both 1?



- a) AND circuit b) NAND circuit
c) OR circuit d) XOR circuit

Q18. For a given decimal data, the check digit is calculated using the method below and appended to the original data. When the given data is 7394, what is the result? Here, the weight is 1234 and the base number is 11.

- (1) For each digit of the data, calculate the product with the digit at the same digit position of the weight and sum these products.
- (2) Calculate the remainder after dividing the total sum by the base number.
- (3) Subtract the remainder from the base number and let the last digit of the result be the check digit.

- a) 73940 b) 73941 c) 73944 d) 73947

Q19. Which of the following is an appropriate description of the mapping between a relational model and relational database in implementation?

- a) A domain is mapped to a character type or a character string type.
- b) A relation is mapped to a table.
- c) Attributes and columns are ordered from left to right.
- d) Neither tuples nor rows have duplicates.

Q20. In database normalization, which of the following is the most appropriate description of a table in the third normal form? Here, 2NF stands for the second normal form and 3NF stands for the third normal form.

- a) A table is in the 3NF if it is in the 2NF and no candidate key exists in the table.
- b) A table is in the 3NF if it is in the 2NF and no partial dependency exists in the table.
- c) A table is in the 3NF if it is in the 2NF and no repeating group exists in the table
- d) A table is in the 3NF if it is in the 2NF and no transitive dependency exists in the table.

Q21. There is a relation schema $A = (P, Q, R, S, T, Y)$ with functional dependencies below:

- $P \rightarrow Q$
- $QR \rightarrow S$
- $T \rightarrow R$
- $S \rightarrow P$

Which of the following is the candidate keys of A ?

- | | |
|--------------------|--------------------|
| a) PT, QT | b) PT, QT, ST |
| c) PTY, QTY, QRY | d) PTY, QTY, STY |

Q22. A student's ID, name, and class ID are recorded in the Student table. Which of the following is the SQL statement that returns records of all students whose names start with A ?

- a) `SELECT * FROM Student WHERE name LIKE '%A';`
- b) `SELECT * FROM Student WHERE name LIKE '%A_';`
- c) `SELECT * FROM Student WHERE name LIKE 'A_';`
- d) `SELECT * FROM Student WHERE name LIKE 'A%';`

Q23. Which of the following is an appropriate explanation of a log file in DBMS?

- a) A copy of the same data is written to another disk or the database of another site at all times to immediately recover the system even in the case of disk failure.
- b) The contents of the database are copied on a disk-by-disk basis to recover the database in case of disk failure.
- c) The data updated in the main memory is written to a disk to reduce the recovery processing time of the database when the system goes down.
- d) The values before and after the update of data are written, and used to perform database recovery.

Q24. In IPv4, which of the following is a description concerning the NAT function of a router that connects some computers to the Internet?

- a) It caches the Internet access to speed up the connections when revisiting the same websites.
- b) It converts between private and global IP addresses.
- c) It inspects the IP packets during transmission to detect possible attacks and intrusions from the Internet.
- d) It only passes the IP packets intended for specific terminals.

Q25. Which of the following is a data link layer function that enables a receiver to control the amount of data a sender transmits?

- a) Congestion control
- b) Error control
- c) Flow control
- d) Media access control

Q26. Which of the following is a role played by a DNS in a TCP/IP network?

- a) It assigns an unused IP address from the pool of addresses in response to a request from a PC or a printer.
- b) It associates domain or host names with IP addresses.
- c) It converts private IP addresses used within a company into global IP addresses and enables access to the Internet.
- d) It enables a program in a server to be called only by its name without being aware of the IP address of the server.

Q27. In telecommunication, which of the following is a standard for wireless broadband communication for mobile devices and data terminals?

- a) IEEE 802.11
- b) LTE
- c) NFC
- d) UWB

Q28. Which of the following is multi-factor authentication?

- a) Authentication by answer to a Security Question and other thing the user knows
- b) Authentication by fingerprint and other biometrics
- c) Authentication by password and one-time code generated by a smartphone application
- d) Authentication by username and password

Q29. In the context of information security defined by ISO/IEC 27000, which of the following is the property of accuracy and completeness of information assets?

- a) Authentication
- b) Availability
- c) Confidentiality
- d) Integrity

Q30. Which of the following is an appropriate description of a Trojan horse?

- a) A brute force attack software tool
- b) A malicious computer program that presents itself as legitimate
- c) A malicious user that steals private information from a system
- d) A software tool to decrypt an encrypted password

Q31. Which of the following is an example of ransomware?

- a) A range of different types of software including adware, spyware, and freeware
- b) Malicious software blocking access to a victimized computer and demanding money to unblock it
- c) Software that assigns randomized MAC addresses to PCs to ensure user privacy on the Internet
- d) Software that generates the random numbers required by computer security application software

Q32. Company *A*, a mobile game developer, is developing a new version of its game with a social media plugin that allows users to post their achievements on social media platforms. However, during beta testing, some users point out that posts from the game can bypass their privacy settings, making them visible to the public. Company *A* understands the risk and decides not to include the social media plugin in their new version of the game. Which of the following is the risk management strategy that Company *A* is choosing?

- a) Risk acceptance b) Risk avoidance c) Risk mitigation d) Risk sharing

Q33. Which of the following is an appropriate explanation of CSIRT?

- a) A generic term for an organization that is established within a company, organization, or government agency, receiving reports on information security incidents for investigation and response
- b) A generic term for people or an organization whose aim is to achieve a religious or political goal by utilizing IT
- c) An organization that creates technical documents concerning the Internet and investigates standardization issues
- d) An organization that defines the IP-address allocation policy, operating and monitoring DNS root servers and coordinating DNS management on a global scale

Q34. An SQL injection attack caused the SQL statement below to be executed. Which of the following does the SQL statement do? Here, the accounts table contains user account information in each row.

```
SELECT * FROM accounts WHERE username='1' or '1'='1'; DROP TABLE accounts;
```

- a) It creates a new user '1'.
- b) It creates a pop-up box that shows the first username in the "accounts" table.
- c) It selects all the records in the "accounts" table and deletes the "accounts" table from the database.
- d) It selects one record from the "accounts" table and drops the rest of the records in the table.

Q35. Among UML 2.x diagrams (including 2.0 and later versions), which of the following is the most appropriate diagram for providing a graphic overview of the actors involved in a system, the different functions those actors need to perform and how these different functions interact?

- a) Activity diagram
- b) Communication diagram
- c) Interaction overview diagram
- d) Use case diagram

Q36. Which of the following is a structural design pattern that allows classes with incompatible interfaces to work together?

- a) Adapter
- b) Factory
- c) Iterator
- d) Singleton

Q37. Which of the following is an appropriate explanation of encapsulation in object orientation?

- a) Abstraction and grouping of several objects that have common properties
- b) Bundling of data and procedures operating on the data as a single object and concealing their implementation inside the object
- c) Creation of a base class by extracting the properties that are common among classes
- d) Inheritance of the properties of a base class by a subclass

Q38. Which of the following is an appropriate category of system maintenance performed for the purpose of modifying the system to cope with changes in the software environment (e.g. DBMS, Operating system)?

- a) Adaptive maintenance
- b) Corrective maintenance
- c) Perfective maintenance
- d) Preventive maintenance

Q39. Which of the following is a software development model for a small, and cross-functional team to develop a new social shopping platform, including creating user profiles, following friends, sharing products, and personalizing recommendation? Here, this platform constantly evolves, so frequent user feedback on all modules is expected.

- a) Agile model
- b) Prototyping model
- c) Spiral model
- d) Waterfall model

Q40. According to the Capability Maturity Model Integration, which is the final stage and has the highest level of maturity?

- a) Defined
- b) Managed
- c) Optimizing
- d) Quantitatively managed

Q41. In project management, which of the following is the subject group with Purpose 1 and Purpose 2?

Purpose 1: To clarify the objectives, deliverables, requirements, and boundaries of the project

Purpose 2: To maximize positive impact and minimize negative impact to the project occurring as a result of the changes in project objectives and deliverables

- a) Communication
- b) Procurement
- c) Risk
- d) Scope

Q42. The functional size of a new system was estimated to be 500 function points (FPs).

Apart from development, the project requires 10 person-months in total for installation of the system and education of developers. Additionally project management requires 10% of the total person-months of development, installation, and education. How many person-months are required in total for this project? Here, the productivity in development is 10 FPs per person-month.

- a) 51
- b) 60
- c) 65
- d) 66

Q43. Which of the following is an appropriate meaning of a mission-critical system?

- a) As with an operating system, it is an indispensable system necessary for operating a business system.
- b) It is a system that has a significant impact on corporate activities and society when a failure occurs.
- c) It is a system that is first installed on a trial basis, and if successful, a full-scale installation is implemented.
- d) It is a system with operating performance close to the limit.

Q44. As for the activities in capacity management to estimate a service's capacity, capability, and performance, which of the following is trend analysis?

- a) Creating a model that accurately reflects the current performance, as the first phase of modeling
- b) Generating simulated transactions and predicting the response time and throughput of a service
- c) Understanding the chronological usage of a specific resource and predicting usage changes in the future
- d) Using mathematical techniques, such as queueing theory, and predicting the response time and throughput of a service

Q45. In an information security audit, which of the following is a check item for confirming availability?

- a) Appropriate performance of error checking for data entry
- b) Database encryption
- c) Managing and maintaining the level of SLA that defines downtime
- d) Prohibiting the removal of external storage media from the company without permission

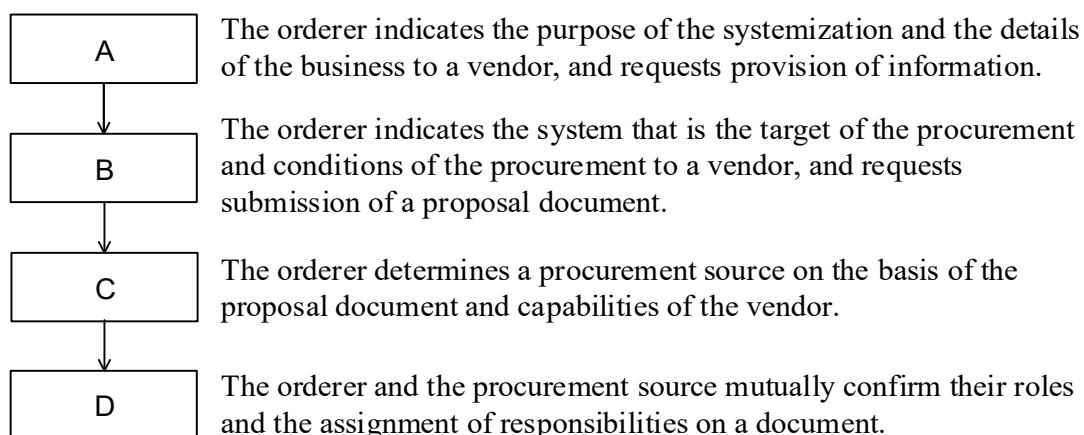
Q46. Which of the following is an appropriate description of Business Process Reengineering (BPR)?

- a) A management practice used to provide the overall governance of an organization in a business process environment to improve agility and operational performance
- b) A management strategy used to automate key business processes to help saving time and promote efficiency, ultimately reducing costs to enhance the value of an organization
- c) A management system used in marketing and business to automate sales activities, such as contact management, order taking and fulfillment, information sharing, inventory monitoring, and sales forecast analysis
- d) A management technique used to redesign and restructure value-creating processes in an organization to gain significant benefits in productivity, profitability, service, and quality through maximizing the potential of individuals and teams

Q47. Which of the following is a method of training in which trainees handle multiple simulated tasks within a set time limit, such as editing a piece of written correspondence, creating purchase orders, and completing travel expense reports?

- a) Case study
- b) Debate
- c) In-basket
- d) Role-playing

Q48. When an information system is procured through the steps shown in the figure below, which of the following is a word or phrase that should be inserted in the blank B?



- a) Concluding a contract
- b) RFI
- c) RFP
- d) Selecting a provider

Q49. Company *A* (a software company) acquires Company *B* (a data analytics company). After the acquisition, the resulting company implements the following:

- Cross-sells Company *A*'s software tools to company *B*'s customers to boost revenue.
- Integrates Company *B*'s algorithms into Company *A*'s products to enhance functionality.
- Cuts redundant office leases to save \$3 million annually.

Which of the following is the phenomenon that creates greater value than the sum of what each company could have achieved independently?

- | | |
|---------------------------|-------------------------|
| a) Horizontal integration | b) Market penetration |
| c) Synergy effect | d) Vertical integration |

Q50. A company expands into new markets by allowing independent business owners to operate under its brand name and quality standards including store management obligations. These local business owners pay royalties for using the brand name and getting business support from the company while investing in and managing their own stores. From a marketing strategy perspective, which of the following describes this arrangement?

- | | |
|------------------------|----------------|
| a) Direct distribution | b) Franchising |
| c) Licensing | d) Wholesaling |

Q51. Which of the following is an example of the strategic target and key performance indicator from the viewpoint of internal business processes in a Balanced Scorecard (BSC)?

- a) Since establishing a continuing relationship with the main customers is the target, the number of complaints is the indicator.
- b) Since improvement in manufacturing productivity of the product is the target, a reduction in the number of days in manufacturing is the indicator.
- c) Since improvement in product development capability is the target, time for classroom training on product development areas is the indicator.
- d) Since sustainable growth is the target, backlog of orders is the indicator.

Q52. When trial production is performed for components to be loaded into electrical appliances, which of the following is the least expensive development method? Here, the construction time of each process is six (6) months during the creation process, three (3) months during the modification process, and two (2) months during the evaluation process. The cost per one (1) person-month is 6,000 dollars during the creation process and 10,000 dollars for each modification and evaluation process. Costs other than the purchasing, outsourcing, and person-month are not considered.

	Development method	Purchase cost (dollars)	Outsourcing cost (dollars)	Number of persons per month (persons)		
				Creation process	Modification process	Evaluation process
a)	Purchasing samples and modifying them in-house	200,000	0	0	4	1
b)	Outsourcing in batches	0	350,000	0	0	0
c)	Modifying in-house assets	0	0	0	10	3
d)	Creating new products in-house	0	0	10	0	2

Q53. Which of the following is an explanation of a smart grid?

- a) A system that aims to utilize recyclable energy, supply stable electric power, and optimise demand adjustment through integrated control of power generation and power consumption on the basis of communication and information-processing technology
- b) A system that can provide ideal health advice to each individual by performing analysis on the basis of similar case reports such as the results of health examinations and medication use
- c) A system that can search for information on restaurants and entertainment, send and receive traffic information, and communicate the current position at the time of an emergency by using information-processing equipment installed in vehicles
- d) A system that supports varied work styles by enabling mutual communication between workers with varied working styles, such as home-based employees and senior workers

Q54. Which of the following is an appropriate example of utilizing machine learning at a production site?

- a) Causes of defect occurrence in a factory are decomposed and arranged in a tree shape for analysts to statistically investigate the cause and solution.
- b) Instead of programming the working method for the production robot in the factory, the robot itself learns, thus improving work efficiency.
- c) Production equipment in a factory is connected through high-speed communication so that the host computer can be controlled in real time.
- d) Productivity of employees in the factory improves each time the cumulative production volume doubles, and the unit cost reduces at a fixed percentage.

Q55. Which of the following is a case using deep learning in order to improve the performance of an in-car device?

- a) An accelerometer detects the vehicle colliding against a wall and causes the air bag to inflate, thus protecting the passenger from injury.
- b) By acquiring and processing numerous images, the driver assistance system can more reliably distinguish between a pedestrian and a vehicle.
- c) By installing equipment that automatically performs idling stops, the fuel efficiency improves compared to that of a vehicle operated by a very experienced driver.
- d) The navigation system updates the software via a mobile phone line and refreshes the map.

Q56. Which of the following is part of total quality management?

- a) Designing products and services that meet or exceed customers' expectations
- b) Focusing on the appointment of staff with long-term work experience in a similar environment
- c) Prioritizing central decisions rather than empowerment to ensure the quality of products and services
- d) Promoting the capability of each department to work independently in a competitive manner

Q57. Which of the following can secure employment and create employment opportunities across an entire society by shortening work hours per employee?

- a) Cafeteria plan
- b) Free-agent system
- c) Work sharing
- d) Work-life balance

Q58. A factory manager is planning the costs for the next two years. Instead of using a single estimate, the manager runs thousands of simulations where material prices, customer demand, and labor costs vary randomly within realistic ranges. This creates a probability distribution of possible costs, helping in risk planning and setting contingency budgets. Which of the following is an analytical method that the manager is using?

- a) Linear Programming
- b) Monte Carlo Analysis
- c) Scenario Analysis
- d) Sensitivity Analysis

Q59. When a company wants to earn a profit of \$42,000, which of following is the number of units that the company must sell under the conditions shown in the table below?

Unit: dollar

Selling price per unit	17
Fixed costs	
General and administrative expense	130,000
Interest expense	10,000
Variable costs per unit	
General and administrative expense	3
Selling expense	4

- a) 14,000
- b) 18,200
- c) 26,000
- d) 26,200

Q60. In developing new products that are expected to be employed by government agencies of WTO member countries, which of the following are the appropriate standards to be applied?

- a) ANSI standards
- b) BSI standards
- c) FCC standards
- d) ISO standards