# Advanced Level – Information and Communication Technology
# 2021 MCQ Past Paper

**1.** Which of the following pairs contains types of software that are **different** with respect to *ownership / licensing*?

(1) Application software and open-source software
(2) Application software and utility software
(3) Proprietary software and open-source software
(4) Proprietary software and systems software
(5) Systems software and utility software

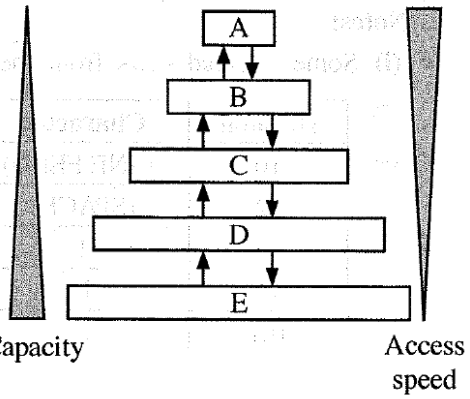
| | |
|---|---|
| Application Software | A type of computer program that performs a specific personal, educational, and business function. |
| Utility Software | Includes all systems and programs on a computer system that maintain its functionality |
| Open-source software | A software that is distributed with its source code, making it available for use, modification, and distribution with its original rights |
| Proprietary Software | Owned by an organization or an individual |
| System Software | A program designed to run a computer's hardware and applications and manage its resource, such as its memory, processors and devices |

**2.** Which of the following is a good example for *batch processing*?

(1) an air traffic control system
(2) driving system in a driver-less (autonomous) car
(3) Intensive Care Unit (ICU) patient monitoring and care system
(4) payroll system
(5) nuclear plant control system

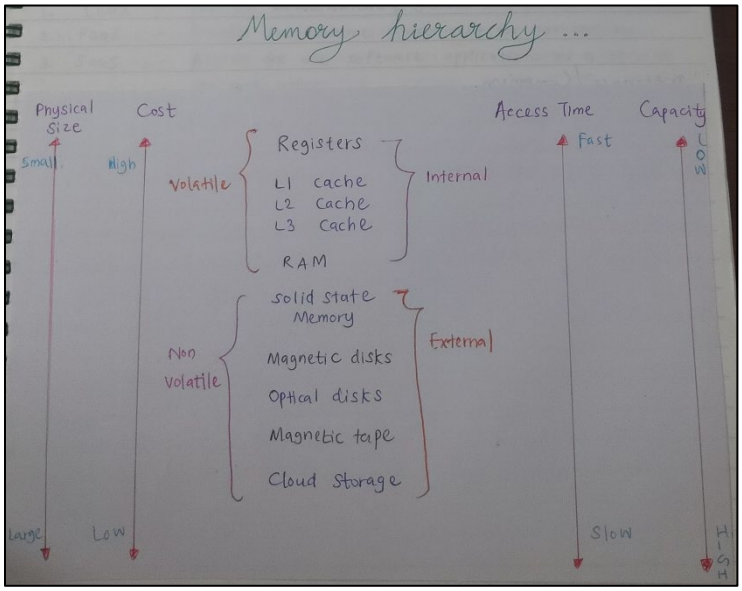
| | |
|---|---|
| Batch processing | The method computers use to periodically complete high-volume, repetitive data jobs |

**3.** There are different storage components which vary in capacity and access speed.
Consider that the shown diagram portrays capacity and access speed variation of the storage components *L1 cache*, *L2 cache*, *main memory*, *registers* and the *hard disk*. The capacity increases and access speed decreases from top to bottom, as shown.




Which is correct with respect to the A, B, C, D and E above?

(1) A – hard disk, B – registers, C – L2 cache, D – L1 cache, E – main memory
(2) A – L1 cache, B – L2 cache, C – registers, D – hard disk, E – main memory
(3) A – main memory, B – registers, C – hard disk, D – L1 cache, E – L2 cache
(4) A – registers, B – L1 cache, C – L2 cache, D – main memory, E – hard disk
(5) A – registers, B – main memory, C – L2 cache, D – L1 cache, E – hard disk




**4.** Consider the following paragraph:

To run a program, the program code is copied from .....A..... into .....B..... The Central Processing Unit's (CPU's) *program counter* register is set to the memory location where the first instruction of the program has been saved and execution of the program starts. The .....C..... implements the fetch – decode – execute cycle.

Which of the following is the correct combination for A, B and C?

(1) A – CPU, B – primary memory, C – secondary storage
(2) A – CPU, B – secondary storage, C – primary memory
(3) A – primary memory, B – secondary storage, C – CPU
(4) A – secondary storage, B – CPU, C – primary memory
(5) A – secondary storage, B – primary memory, C – CPU

**5.** What is the correct result of bit-wise XOR operation between the two binary numbers $01011100_2$ and $11111001_2$?

(1) 00000010 (2) 01011000 (3) 01011010 (4) 10100101 (5) 11111101

```
  01011100
XOR 11111001
  ----------
  10100101
```

**6.** What is the correct 2's complement binary representation of decimal $-32_{10}$ using 8-bits?

(1) 00100000 (2) 10100000 (3) 11011111 (4) 11100000 (5) 11100001

Step 1: Convert positive 32 to binary → 0010 0000

Step 2: Invert all bits and add 1 to the least significant bit

0010 0000 → 1101 1111 + 1 → 1110 0000

**7.** What is the correct decimal equivalent of hexadecimal $88.8_{16}$?

(1) $88.5_{10}$ (2) $88.8_{10}$ (3) $129.5_{10}$ (4) $136.5_{10}$ (5) $136.8_{10}$

| Power in Hexa | $16^1$ | $16^0$ | $16^{-1}$ |
|---|---|---|---|
| Equivalent | 16 | 1 | 0.0625 |
| Hexa Number | 8 | 8 | 8 |
| Decimal value | 16*8<br>128 | 1*8<br>8 | 0.0625*8<br>0.5 |
| | 128+8<br>136 | | 0.5 |

**8.** A particular command can be used to output the values of every byte in a file in decimal format. Assume a file contains the following text:

```
Love trees!
```

Referring the two **Notes (i)** and **(ii)** given below, select the correct output that will result when the said command is run on that file.

(1) 76 111 118 101 32 116 114 101 101 115 10

(2) 76 111 118 101 116 114 101 101 115 33 10

(3) 76 111 118 101 32 116 114 101 101 115 33 10

(4) 108 111 118 101 116 114 101 101 115 33 10

(5) 108 111 118 101 32 116 114 101 101 115 33 10

**Notes:**

**(i)** Some selected rows from the ASCII table are given below:

| Decimal | Character |
|---|---|
| 10 | (LINE FEED) |
| 32 | (SPACE) |
| 33 | ! |
| 76 | L |
| 101 | e |

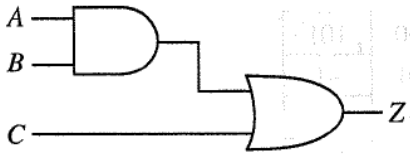
| Decimal | Character |
|---|---|
| 108 | l |
| 111 | o |
| 114 | r |
| 115 | s |
| 116 | t |
| 118 | v |

**(ii)** The file ends with a LINEFEED character.

**9.** Consider the following Karnaugh map and the logic circuit implemented based on it where A, B and C are the inputs and Z is the output:

| C \ AB | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 0 | 0 | e | f | 0 |
| 1 | 1 | g | h | 1 |

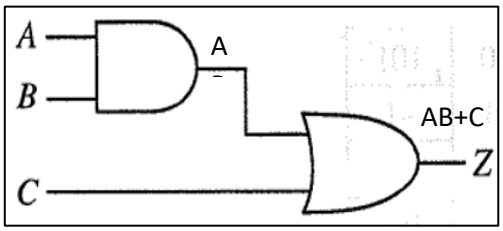
(*a*) Karnaugh map




(*b*) Logic circuit based on Karnaugh map

For the logic circuit to correctly implement the logic function represented in the Karnaugh map, what should be the values of **e**, **f**, **g**, **h**?

(1) e=0, f=0, g=1, h=1
(2) e=0, f=1, g=1, h=1
(3) e=1, f=0, g=1, h=1
(4) e=1, f=1, g=0, h=0
(5) e=1, f=1, g=0, h=1

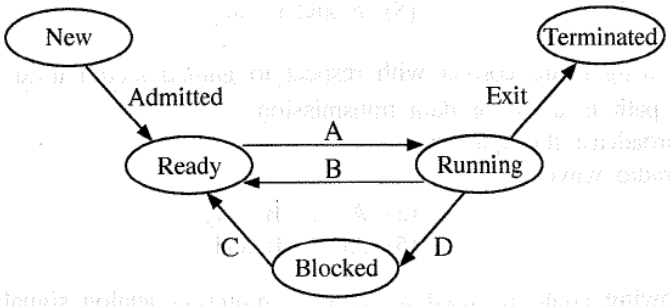



| A | B | C | AB | AB+C | SOP |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | |
| 0 | 0 | 1 | 0 | 1 | A'B'C |
| 0 | 1 | 0 | 0 | 0 | |
| 0 | 1 | 1 | 0 | 1 | A'BC |
| 1 | 0 | 0 | 0 | 0 | |
| 1 | 0 | 1 | 0 | 1 | AB'C |
| 1 | 1 | 0 | 1 | 1 | ABC' |
| 1 | 1 | 1 | 1 | 1 | ABC |

| C \ AB | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 0 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 1 | 1 |

e=0
f=1
g=1
h=1

**10.** Amara logs into a single-processor computer and starts a program to work on his presentation. He opens up a web browser too to get some information as well.
Consider the following process state transition diagram with respect to the process corresponding to Amara's **presentation program.**

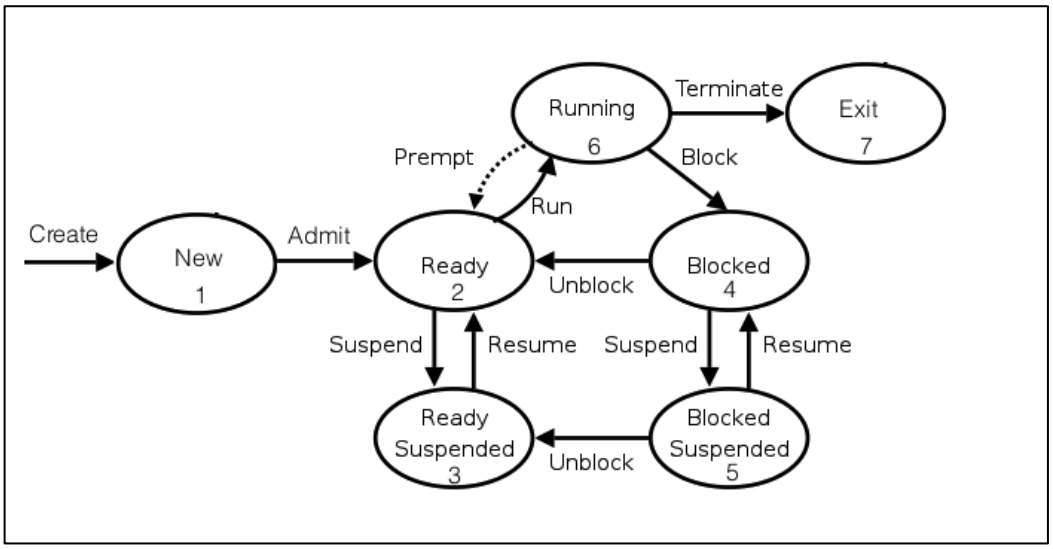



Consider some reasons for above state transitions:

| Reason | Description |
|---|---|
| 1 | Amara saving his presentation on the hard disk |
| 2 | Operating system scheduling the presentation process to run on the processor |
| 3 | Operating system suspending the presentation process to let the web browser process to run on the processor |
| 4 | The finishing of saving the presentation on the hard disk |

Which of the following gives a correct combination of reasons for transitions A to D?

(1) A – 1, B – 2, C – 3, D – 4
(2) A – 2, B – 3, C – 4, D – 1
(3) A – 3, B – 4, C – 1, D – 2
(4) A – 4, B – 1, C – 2, D – 3
(5) A – 4, B – 1, C – 3, D – 2



**11.** A *page table* is

(1) a computer hardware unit through which all memory references pass.
(2) a data structure that keeps information about the pages that are in processor caches.
(3) a hardware component in memory that facilitates page movement.
(4) an operating system data structure that keeps virtual to physical address mapping of a process' pages.
(5) a piece of processor hardware that keeps a count of the number of pages of a process that are in virtual memory.

**Paging**

- Divide logical address space (virtual) and physical address space (RAM) into same size smaller blocks
- Is a memory management scheme that eliminates the need for contiguous allocation of physical memory

★ Page table is stored in RAM

**12.** The *block size* of a disk is 4KB. A portion of its **File Allocation Table (FAT)** at a particular time is shown below. The portion shown gives the blocks of the *myprog.py* file as well.

**FAT**

| | |
|---|---|
| 100 | 101 |
| 101 | –1 |
| 102 | |
| 103 | 100 |
| 104 | |

**Notes: 1.** The last block of a file is indicated by –1.

**2.** The *directory entry* of a file contains the block number of the first block of the file.

Which of the following gives the *directory entry* for the *myprog.py* file **and** the disk space allocated for the *myprog.py* file respectively?

(1) 100, 12KB (2) 101, 12KB (3) 101, 16KB (4) 103, 12KB (5) 103, 16KB

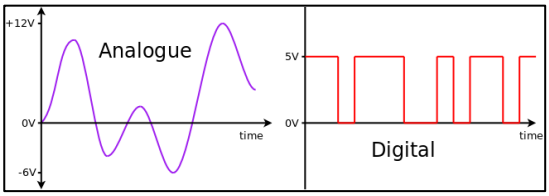
- The directory entry is 103 because the lowest value is in that block.
- As each block is 4KB and there are 3 blocks including the last block, the disk space allocated for the file will be (4*3) 12KB.

**13.** Which of the following is/are correct with respect to a *digital signal*?

A – denoted by a square wave
B – contains a continuous range of values
C – uses discrete values to represent information

(1) A only (2) B only (3) C only
(4) A and B only (5) A and C only

Digital signal is noncontinuous, discrete time signal




**14.** Which of the following is/are correct with respect to *guided media* used for data transmission?

A – a physical path is used for data transmission
B – signal is broadcast through air
C – Example: radio waves

(1) A only (2) A and B only (3) A and C only
(4) B and C only (5) All A, B and C

| Guided Media | Unguided Media |
|---|---|
| A medium that sends signals through a solid physical path | A medium that sends signals through free space |
| Comparatively more reliable | Comparatively less reliable |
| Comparatively faster | Comparatively slower |
| • Twisted pair<br>• Coaxial cables<br>• Fiber-optic cable | • Radio waves<br>• Microwave<br>• Satellite |

**15.** Which of the following could be used to digitally represent analog signals?

(1) attenuation (2) decoding (3) distortion
(4) pulse code modulation (5) synchronization

| | |
|---|---|
| (1) Attenuation | Signal strength (height of the signal) reduces when it travels through the media |
| (2) Decoding | The process by which data transmitted over computer networks is coverted from binary code into its original, often text-based format |
| (3) Distortion | Generally unwanted change in signal |
| (4) Pulse code modulation | A method of digitally representing analog signals by discretizing the amplitude of the signal at regular intervals and quantizing the values to obtain a series of coded pulses. |
| (5) Synchronization | The coordination of events or timing between different components or processes to ensure they operate in a harmonized and orderly manner. |

**16.** Read the following sentence:

When devices send and receive data over a network, a protocol is used uniquely identify the sender interface and the correct delivery of the data to the receiver's interface.

What is the protocol that the writer in above sentence is referring to?

(1) FTP (2) HTTP (3) MAC (4) TCP (5) UDP

| | |
|---|---|
| (1) FTP | A way to download, upload and transfer files from one location to another on the Internet and between computer systems |
| (2) HTTP | An application layer protocol designed to transfer information between networked devices and runs on top of other layers of the network protocol stack |
| (3) MAC | Is a unique identifier assigned to a network interface controller (NIC) for use as a network address in communications within a network segment |
| (4) TCP | A communications standard that enables application programs and computing devices to exchange messages over a network |
| (5) UDP | A communication protocol for time-sensitive applications like gaming, playing videos or Domain Name System (DNS) lookups |

**17.** Given below are some characteristics of *Transmission Control Protocol (TCP)* and *User Datagram Protocol (UDP)*:

A – best suited for applications that need high reliability and where the transmission time is less critical
B – faster and requires fewer resources
C – guarantees that no packets are missing
D – packets may not arrive in order
E – used for voice communications over internet

Which of the above are the characteristics of **UDP**?

(1) A, B and C only (2) A, C and E only (3) A, D and E only
(4) B, C and D only (5) B, D and E only

| Transport layer protocols | |
|---|---|
| **TCP** | **UDP** |
| 3 way handshake<br>1. SYN 2. SYN-ACK 3.ACK | Request → Response |
| Connection-oriented<br>(Establish→Maintain→Close) | Connectionless |
| Guarantee delivery of data packets if possible | Do not guarantee |
| Retransmission of lost data packets is possible | Not possible |
| Reliable | Unreliable |
| Data packets arrive in order | Application layer manage order if needed to be ordered |
| Comparatively slower | Much faster, simpler, efficient |
| Checks the readiness of the receiver | Do not check |
| Extensive error checking (parity) | Basic error checking mechanisms |
| Does not support broadcasting | Does support broadcasting |
| E.g.<br>Email, Web pages (HTTP); FTP | E.g.<br>Live video streaming<br>DNS, DHCP |

**18.** Which of the following is/are examples for the use of the *Client-Server* model?

A – A user printing a document using a printer connected to her computer
B – A bank customer accessing online banking services with a web browser
C – A cashier of a shop that accepts payments by credit cards

(1) A only (2) B only (3) C only
(4) A and C only (5) B and C only

**19.** Sender A wants to send the message HELLO to receiver B. Before sending the message, it is converted to IFMMP. Which of the following is correct with respect to this scenario?

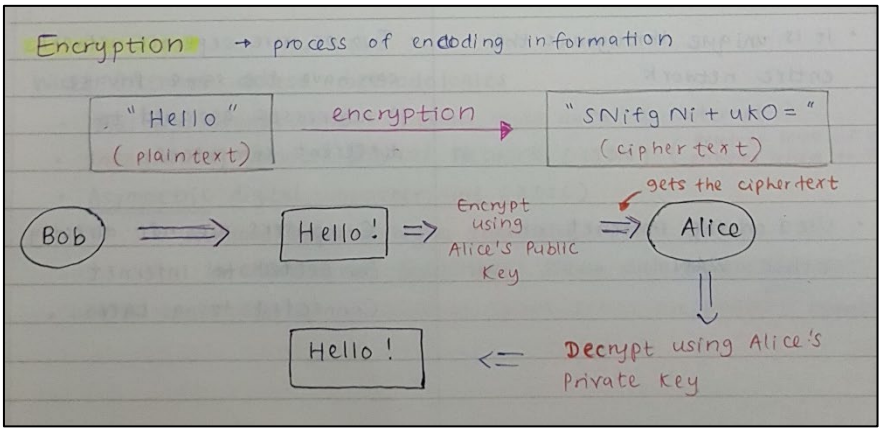
A – HELLO is the *plaintext* while IFMMP is the *ciphertext*.

B – IFMMP is the result of applying the ASCII code to HELLO.

C – +1 is the *encryption key* while –1 is the *decryption key*.

(1) A only (2) A and B only (3) A and C only

(4) B and C only (5) All A, B and C




**20.** Consider the following paragraph with three blanks labelled A, B and C:

When there are multiple computers in an office, each computer can be given a private IP address. The router in the office gets a .....A..... IP address, and each of the computers connected to that router through guided/unguided media gets a private IP address from the .....B..... via the .....C..... protocol.

Which of the following is the correct combination for the blanks A, B and C?

(1) A – private, B – file server, C – HTTP

(2) A – private, B – Internet, C – DHCP

(3) A – private, B – router, C – FTP

(4) A – public, B – file server, C – FTP

(5) A – public, B – router, C – DHCP

In a network, the router which connects to the internet obtains a public IP address. Each device which connects to the router gets private IP addresses. Each address is unique in a particular network.

| | |
|---|---|
| HTTP protocol | An application layer protocol designed to transfer information between networked devices and runs on top of other layers of the network protocol stack |
| DHCP protocol | A client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway |
| FTP protocol | A way to download, upload and transfer files from one location to another on the Internet and between computer systems |

**21.** Consider the information system types in **List A** and some examples in **List B**:

| List A | List B |
|---|---|
| **A1** – Enterprise Resource Planning System | **B1** – A customer account system in a bank |
| **A2** – Expert system | **B2** – A system that facilitates manufacturing, marketing and sales of a garment business |
| **A3** – Transaction processing system | **B3** – A system that prescribes ayurvedic medicines using a knowledge base |

A good matching between lists **A** and **B** is:

(1) A1-B1, A2-B2, A3-B3
(2) A1-B2, A2-B3, A3-B1
(3) A1-B3, A2-B1, A3-B2
(4) A1-B2, A2-B1, A3-B3
(5) A1-B3, A2-B2, A3-B1

| | |
|---|---|
| Enterprise Resource Planning System | A software system that helps to run the entire business, supporting automation and processes in finance, human resources, manufacturing, supply chain, services, procurement and more |
| Expert System | A computer program that uses artificial intelligence (AI) technologies to simulate the judgement and behavior of a human or an organization that has expertise and experience in a particular field |
| Transaction processing system | An information processing system for business transactions involving the collection, modification and retrieval of all transaction data |

**22.** Which of the following is **incorrect** about the *Agile Method*?

(1) It cannot be used when the project has a fixed set of requirements.
(2) It recommends a time sliced schedule for task completion.
(3) It delivers gradual builds of the working product in an iterative manner.
(4) It facilitates stakeholders (e.g., buyer, user) to review progress and provide feedback at every phase.
(5) The product of each build is tested independently.

Waterfall model
- First process model to be introduced which is simple to understand and use
- Requirements have to be well-known, clear and fixed
- Project is short

Spiral model
- Has four phases → Planning, Risk analysis, Engineering and Evaluation
- Complex and unsure, unfixed user requirements (Change according to the user time to time)
- Long term projects

RAD model (Rapid Application Development)
- For systems which are needed in in a short span of time
- User will be involved all through the life cycle
- Requirements are known but might change

Agile model
- Prioritizes features, continuously gathers customer feedback and adjusts and remains flexible throughout the process

**23.** Which of the following statements is/are correct with respect to *Object Oriented Programming*?

A – System output is determined by the object behaviour and their interactions.
B – System is modelled as a collection of objects.
C – Writing a program in this method is different from writing one according to the *structured programming* method.

(1) A only (2) B only (3) C only
(4) A and C only (5) All A, B and C

| |
|---|
| **Structured software development methods** are process-oriented, focusing primarily on modeling the processes, or actions that capture, store, manipulate, and distribute data as the data flow through a system. These methods *separate* data from processes. |
| **Object oriented software development** is a programming paradigm that uses objects, which are instances of classes, for organizing code. |

**24.** Which of the following lists the activities of Structured System Analysis and Design Methodology (SSADM) in the correct order?

(1) Feasibility study, Physical design, Requirement analysis, Requirement specification, System development
(2) Feasibility study, Requirements analysis, Requirement specification, Logical system specification, Physical design
(3) Feasibility study, Requirement specification, Requirements analysis, Logical system specification, Physical design
(4) Requirements analysis, Logical system specification, Feasibility study, Requirement specification, Physical Design
(5) Requirements analysis, Requirement specification, Feasibility study, Physical design, System development

**Software Development Life Cycle**

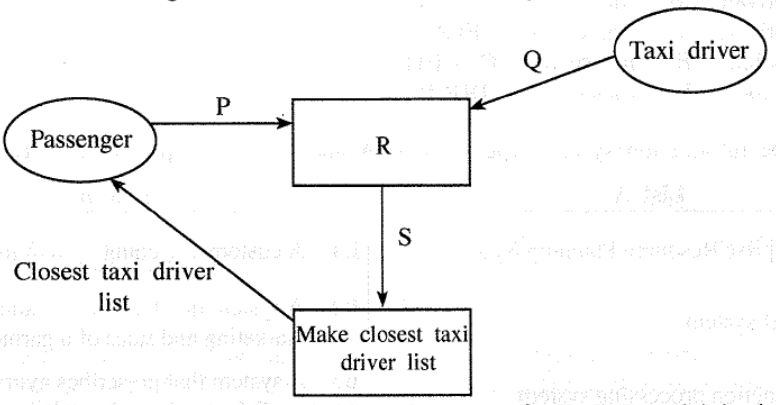
1. System Investigation
- Preliminary Analysis
- Feasibility Study

2. System Analysis
- Functional requirements
- Non-functional requirements

3. System Design
4. System Implementation/ Coding
5. Testing
6. Deployment of the developed system
7. Maintenance phase

- A system that gives the list of closest taxi drivers to a passenger is to be developed. Answer questions **25** and **26** with respect to it.

**25.** Assume that the following is the *Level 1 DFD* for this system:




Which of the following contains the suitable replacements for P, Q, R and S in the above diagram?

(1) P – Location, Q – Driver code, R – Get passenger and driver locations, S – Passenger and driver locations

(2) P – Location, Q – Driver code and location, R – Get passenger and driver details, S – Passenger and driver details

(3) P – NIC number, Q – NIC number, R – Get passenger and driver NIC numbers, S – Passenger and driver NIC numbers

(4) P – Passenger code, Q – Driver code, R – Get passenger and driver codes, S – Passenger and driver codes

(5) P – Passenger code, Q – Location, R – Get passenger and driver locations, S – Passenger and driver locations

**26.** Above Level-1 DFD was later improved so that a data store (D1) was connected to the process labelled R. What could be this data store?

(1) NIC data (2) Passenger details (3) Taxi driver details

(4) Travel cost details (5) Weather records

**27.** Which of the following gives a suitable order of activities to follow when developing a system that involves a database?

(1) Design the database, Draw the DFD, Draw the ER diagrams, Do the coding, Write the pseudo-code
(2) Design the database, Write the pseudo-code, Draw the ER diagrams, Draw the DFD, Do the coding
(3) Do the coding, Write the pseudo-code, Design the database, Draw the ER diagrams, Draw the DFD
(4) Draw the DFD, Draw the ER diagrams, Design the database, Write the pseudo-code, Do the coding
(5) Draw the ER diagrams, Do the coding, Write the pseudo-code, Design the database, Draw the DFD

**28.** Which of the following statements is/are correct about *acceptance testing*?

A – Acceptance testing is done when the user requirements of the software are analysed.
B – An essential activity in acceptance testing is checking through the conditional statements and loops in the code.
C – Users may refuse to accept the software after the Acceptance Test.

(1) A only
(2) B only
(3) C only
(4) A and C only
(5) All A, B and C

**Software Testing Types**

1. Unit Testing (Individual units are tested)

- Using white or black box testing
- Before integration testing
- Done by the developers

2. Integrated Testing

- Individual units are combined and tested as a group
- Using white or black testing
- Done by a specific tester or test team

3. System Testing

- Using black box testing
- Done by a team that is independent of the development team in order to measure the quality of the system unbiased

4. Acceptance Testing

- Performed by the end user or the client to verify/ accept the system

**29.** Which of the following statements is correct about software deployment?

(1) *Direct deployment* has the highest risk of complete failure but may be the only suitable method for some cases.

(2) *Direct deployment* is the most expensive and offers slowest learning to the users.

(3) *Parallel deployment* is the least expensive deployment option.

(4) *Phased deployment* does not provide the freedom for the relevant organization to make any needed adjustments to the system.

(5) *Pilot deployment* always rolls out the new system to a test user group larger than 50% of the users.

| | |
|---|---|
| Direct | Old system is discontinued and the new system will be used from that point onwards |
| Phase | Parts of the new system are implemented one by one over the time |
| Parallel | Old and new systems are used at the same time |
| Pilot | Entire system is used in one location |

**30.** Which of the following statements is/are correct?

A – *Business Process Re-engineering* helps to modify the existing business practices to fit with Commercial-Off-The-Shelf (COTS) software.

B – Users may have to pay for certain features of COTS even if those are not needed.

C – A well developed *custom software* can bring a competitive advantage to an organization

(1) A only
(2) B only
(3) A and B only
(4) B and C only
(5) All A, B and C

| Commercial-Off-The-Shelf (COTS) software | Custom software |
|---|---|
| Ready-made softwares | Made specifically for a individual or company |
| Initial cost of the software is comparatively lesser | Cost is higher |
| Easy to install and use | As this a brand new software, it won't be easy to solve issues |
| All the features may not be relevant | |
| Availability of supporting documentations | |
| Availability of updates | |

**31.** Which of the following is a (are) good practice(s) to follow in database development?

A – the use of meaningful names for tables and fields
B – letting different tables repeat the same information (other than the primary keys)
C – avoiding a field and and its table having the same name (in order to avoid confusion while writing queries)

(1) A only
(2) B only
(3) C only
(4) A and B only
(5) A and C only

- Consider the following **Results** and **Subjects** tables to answer questions from **32** to **35**:

**Results**

| StudentNo | NIC | FirstName | SubjectID | Grade |
|---|---|---|---|---|
| S1234 | 986888457V | Nilam | ENG | B |
| S1447 | 992562321V | Praveena | PHY | C |
| S1234 | 986888457V | Nilam | ACC | A |
| S1323 | 900251452V | Thilan | ENG | S |
| S1323 | 900251452V | Thilan | ACC | B |

**Subjects**

| SubjectID | SubjectName |
|---|---|
| ENG | English |
| PHY | Physics |
| ECO | Economics |
| ACC | Accountancy |

**32.** Which of the following is most suited to be selected as the *primary key* of the **Results** table with respect to the given details?

(1) NIC
(2) SubjectID
(3) StudentNo
(4) StudentNo and NIC
(5) StudentNo and SubjectID

As one student can learn more than one subject, each record can uniquely identify if both StudentNo and SubjectID are the composite primary key.

**33.** What is the correct SQL statement to retrieve the values of attributes **StudentNo**, **SubjectName** and **Grade**?

(1) SELECT Results.StudentNo, Subjects.SubjectName, Results.Grade FROM Results INNER JOIN ON Results.SubjectID = Subjects.SubjectID;

(2) SELECT Results.StudentNo, Subjects.SubjectName, Results.Grade FROM Results INNER JOIN Results.SubjectID = Subjects.SubjectID;

(3) SELECT Results.StudentNo, Subjects.SubjectName, Results.Grade FROM Results INNER JOIN Subjects IN Results.SubjectID = Subjects.SubjectID;

(4) SELECT Results.StudentNo, Subjects.SubjectName, Results.Grade FROM Results INNER JOIN Subjects ON Results.SubjectID = Subjects.SubjectID;

(5) SELECT Results.StudentNo, Subjects.SubjectName, Results.Grade INNER JOIN Results AND Subjects Results.SubjectID = Subjects.SubjectID;

**34.** Which of the following is the correct statement about the **Results** table?

(1) All the non-key attributes are fully functionally dependent on the primary key.

(2) It has one candidate key.

(3) It is in the *First Normal Form* (1NF).

(4) It is in the *Second Normal form* (2NF).

(5) The cardinality of the table is four.

| | |
|---|---|
| Zero Normal Form | Not yet normalized. Have repeating attributes (such as author1, author2, author3) |
| First Normal Form | Primary key is repeated but there is a composite primary key ➔ partial dependency |
| Second Normal Form | Np partial dependencies. Has transitive dependencies ➔ non-prime attribute/ column doesn't depend on the primary key but depends on another non-prime attribute |
| Third Normal Form | Fully functional dependencies |

**35.** Which dependency is removed when converting the **Results** table to next normal form?

(1) foreign key dependency

(2) fully functional dependency of non-key attributes on the primary key

(3) multivalued dependency

(4) partial dependencies of non-key attributes on the primary key

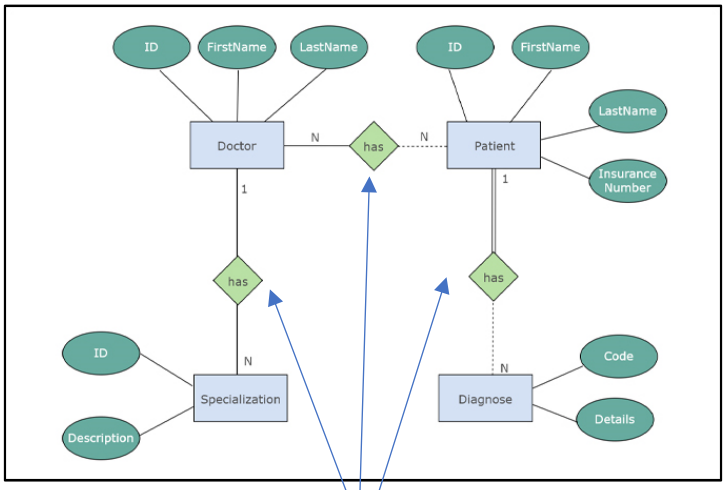
(5) transitive dependency of non-key attributes

**36.** Following are the steps involved in creating an *Entity Relationship* (ER) *Diagram*:

I. Determine the .....**A**..... in your diagram.
II. Add ....**B**.... to each ....**C**....
III. Include the ....**D**.... between the ....**A**....
IV. Add ....**E**.... to every relationship

Which of the following gives suitable choices for the **A**, **B**, **C**, **D** and **E** blanks in the above steps?

(1) A – attributes, B – entities, C – attribute, D – cardinality, E - entities
(2) A – attributes, B – cardinality, C – attribute, D – entities, E- entity
(3) A- entities, B – attributes, C – entity, D – relationships, E – cardinality
(4) A- entities, B – relationship, C – entity, D – attributes, E – cardinality
(5) A – relationships, B – cardinality, C – relationship, D – attributes, E – entities




Represent the relationship

Each rectangle box represent an entity.

The ovals connected to each entity represent the attributes of each entity.

1 and N represent the cardinality

**37.** Which of the following can be modelled with an *Extended Entity Relationship* diagram?

A – subclasses of an entity
B – inheritance of attributes
C – specialization of entities

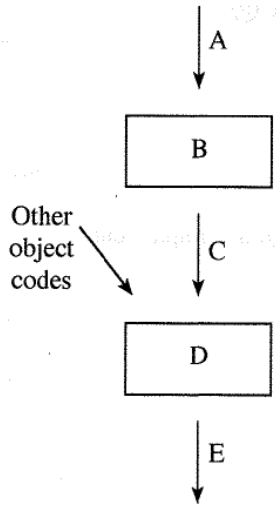
(1) A only
(2) B only
(3) C only
(4) A and C only
(5) All A, B and C

EER → Expansive version of ER diagrams

An EER diagram provides you *with all the elements of an ER diagram* while adding:

- Attribute or relationship inheritances
- Category or union types
- Specialization and generalization
- Subclasses and superclasses

**38.** A teacher of a programming class draws the following diagram and asks the students to identify the components indicated by A, B, C, D and E:



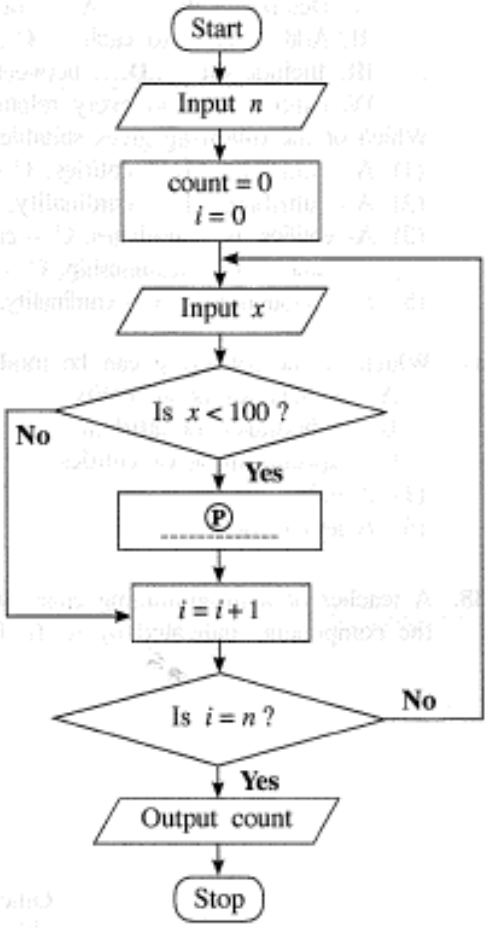

Which of the following gives the correct choices for A, B, C, D and E?

(1) A – compiler, B – executable code, C – source code, D – linker, E – object code
(2) A – compiler, B – source code, C – executable code, D – object code, E – linker
(3) A – linker, B – source code, C – object code, D – executable code, E – compiler
(4) A – source code, B – object code, C – linker, D – compiler, E – executable code
(5) A – source code, B – compiler, C – object code, D – linker, E – executable code

| | |
|---|---|
| source code | The programs we (programmers) write which is not yet been compiled into an executable file |
| compiler | Converts the whole source code in one session and reports all the errors afterwards |
| object code | Compiled code that can be run on any computer with the same CPU architecture |
| linker | A program in a system which helps to link object modules of a program into a single object file |
| executable code | Machine code which can be executed by the computer |

● Consider the algorithm expressed by the flowchart and answer questions **39** and **40**.

This algorithm takes as input first an integer $n$ ($\geq 1$) followed by a sequence of $n$ integers one by one. The algorithm is expected to output the count of integers that are less than 100 among the sequence of $n$ inputs.




**39.** For the algorithm to function correctly as expected, what should be inserted at the blank Ⓟ ?

(1) count = count + 1
(2) count = count + i
(3) count = count + x
(4) n = n - 1
(5) n = n + 1

**40.** Which of the following Python programs implement the algorithm in the flowchart?

I
```
n = int(input())
count = 0
for i in range(n):
        x = int(input())
        if (x < 100):
                count = count + i
print(count)
```

II
```
n = int(input())
count = 0
for i in range(n):
        x = int(input())
        if (x < 100):
                count += 1
print(count)
```

III
```
n = int(input())
count = i = 0
while (i < n):
        x = int(input())
        if (x < 100):
                count = count + 1
print(count)
```

(1) Only I
(2) Only II
(3) Only I and II
(4) Only II and III
(5) All I, II and III

39. As the count have to increase after each relevant iteration, 'P' will be count = count + 1

40.

The first code is incorrect as the count statement is incorrect. As it is count = count + i, the count will be counted incorrectly

The second code is correct

The third code is incorrect because the while statement is incorrect

**41.** What would be the output after executing the following Python code?

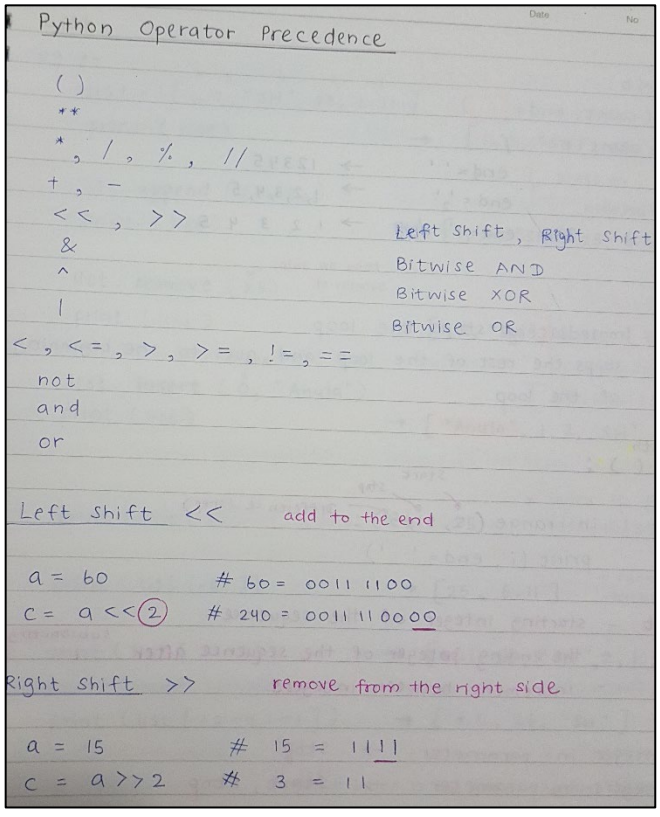
```
n = 117
m = (n & 127) // (2 ** 3)
print(m)
```

(1) 1 (2) 14 (3) 14.625 (4) 15 (5) 19

( 117 & 127 ) // ( 2 * * 3 )

117 // 8

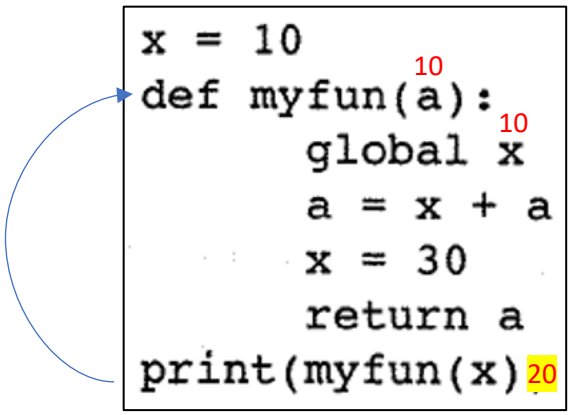
14



**42.** What will be the result when the following Python code is executed?

```
x = 10
def myfun(a):
      global x
      a = x + a
      x = 30
      return a
print(myfun(x))
```

(1) 10 (2) 20 (3) 30 (4) 40 (5) an error




a = 10 + 10 → a = 20

**43.** What will be the output of the following Python code segment?

```
S = ["covid", "pandemic", "vaccine", "booster", "virus"]
V = "aeiou"
count = 0
for i in range(len(S)):
      for j in range(len(S[i])):
            if (S[i][j] in V):
                  count = count + 1
print(count)
```

(1) 0 (2) 5 (3) 12 (4) 13 (5) 32

**44.** What will be the output when the following Python code is executed?

```
s = 1
for  i  in  range(1,10):

        if (i < 5):
                s = s * i
        elif (i < 8):
                s = s - i
        else:
                s = s + i
                break
print(s)
```

(1) 6 (2) 14 (3) 23 (4) 33 (5) 121

| s | i in range (1,10) | if (i<5) | s = s * i | elif (i<8) | s = s - i | else s = s + i | break | print (s) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 < 5 (Yes) | 1 = 1 * 1 | | | | | |
| | 2 | 2< 5 (Yes) | 2 = 1 * 2 | | | | | |
| | 3 | 3 < 5 (Yes) | 6 = 2 * 3 | | | | | |
| | 4 | 4 < 5 (Yes) | 24 = 6 * 4 | | | | | |
| | 5 | 5 < 5 (No) | - | 5 < 8 (Yes) | 19 = 24 - 5 | | | |
| | 6 | 6 < 5 (No) | - | 6 < 8 (Yes) | 13 = 19 - 6 | | | |
| | 7 | 7 < 5 (No) | - | 7 < 8 (Yes) | 6 = 13 - 7 | | | |
| | 8 | 8 < 5 (No) | - | 8 < 8 (No) | - | 14 = 6 + 8 | break | 14 |
| | 9 | | | | | | | |

**45.** Read the following sentence about *website development*:

To make an effective website, it is important to identify its objectives and the target .....A..... and then design the most useful information layout for the website accordingly.

Which of the following is the correct choice for the blank **A** above?

(1) audio (2) images (3) text (4) users (5) video

**46.** Which of the following is the correct example for CSS group selector?

(1) h1{text-align:left ; color:blue;}
(2) h1,h2{text-align:left , color:blue;}
(3) h1.h2{text-align:left; color:blue;}
(4) h1:h2{text-align:left; color:blue;}
(5) h1,h2{text-align:left; color:blue;}

## Example

In this example we have grouped the selectors

```
h1, h2, p {
  text-align: center;
  color: red;
}
```

**47.** Consider the following HTML code:

```
<!DOCTYPE  html>
<html>
<head>
<style>
body  {
    background-image:  url('srilanka.jpg');
}
</style>
</head>

<body>
<h2>Sri  Lanka</h2>
<p>Sri  Lanka,  the  island  of  serendipity,  is  really  a  <i>pearl  in  the
orient</i>.</p>
</body>
</html>
```

Which of the following statements is/are correct about the observations when the above code is viewed through a web browser?

A – The srilanka.jpg image (if existing) will be displayed as the background to the web page.
B – The **Sri Lanka** word which is enclosed within <h2> and </h2> tags will appear in italics.
C – The **pearl in the orient** phrase enclosed within  and  tags will appear in italics.

(1) A only (2) B only (3) C only
(4) A and B only (5) A and C only

**48.** Which of the following statements is correct about the following code line when it is rendered through a web browser?

```
<input type="radio" name="vaccinate" value="Yes">
```

(1) It shows a radio button with a label named vaccinate at left side.
(2) It shows a radio button with a label named vaccinate at right side.
(3) It shows a radio button with a label named Yes at left side.
(4) It shows a radio button with a label named Yes at right side.
(5) The word Yes is not shown to user.

# Input Type Radio

`<input type="radio">` defines a **radio button**.

Radio buttons let a user select ONLY ONE of a limited number of choices:

## Example

```
<p>Choose your favorite Web language:</p>

<form>
  <input type="radio" id="html" name="fav_language" value="HTML">
  <label for="html">HTML</label><br>
  <input type="radio" id="css" name="fav_language" value="CSS">
  <label for="css">CSS</label><br>
  <input type="radio" id="javascript" name="fav_language" value="JavaScript">
  <label for="javascript">JavaScript</label>
</form>
```

Try it Yourself »

This is how the HTML code above will be displayed in a browser:

- ○ HTML
- ○ CSS
- ○ JavaScript

**49.** Consider the following PHP code line which is used to create a MySQL database connectivity:

```
$conn = new mysqli($var1, $var2, $var3, $var4);
```

Which of the following is the correct representation for the above variables?

(1) $var1 = database, $var2 = server name, $var3 = user name, $var4 = password
(2) $var1 = database, $var2 = user name, $var3 = password, $var4 = server name
(3) $var1 = server name, $var2 = database, $var3 = user name, $var4 = password
(4) $var1 = server name, $var2 = user name, $var3 = password, $var4 = database
(5) $var1 = user name, $var2 = password, $var3 = server name, $var4 = database

To create a MySQL database connectivity, we have to access the server first. Therefore, the server name is mentioned. Then, we have to enter the user name and password of the account. Afterwards, we can access the database.

**50.** What would be the output when the following PHP code is executed?

```
<html>
<body>
<?php
      $class = array ("12-A", "12-B", "13-A");
      echo "IT classes are " . $class[1] . " and " . $class[2] ;
?>
</body>
</html>
```

(1) IT classes are 12-A and 12-B
(2) IT classes are "12-A" and "12-B"
(3) IT classes are 12-B and 13-A
(4) IT classes are .12-A. and .12-B
(5) IT classes are .12-B. and .13-B

$class[0] = 12-A

$class[1] = 12-B

$class[2] = 13-A