

5. Consider the two binary numbers $P = 10110001$ and $Q = 01001110$. If $X = P \text{ OR } Q$ and $Y = P \text{ AND } Q$, what will be the values of X and Y respectively?
- (1) 01001110, 10110001
 - (2) 10110001, 00000000
 - (3) 10110001, 11111111
 - (4) 11111111, 00000000
 - (5) 11111111, 10110001
6. What is the 2's complement of decimal -12 ?
- (1) 00001100
 - (2) 00110011
 - (3) 11110011
 - (4) 11110100
 - (5) 11111011
7. Which of the following is true about 2's complement?
- (1) An extra bit is used to represent the sign.
 - (2) Makes it possible to build low-cost, high-speed hardware to perform arithmetic operations.
 - (3) Addition and subtraction are used as two different operations.
 - (4) Usually represented in hexadecimal number system.
 - (5) Used in first generation computers to perform logic operations.
8. Consider the character representations in Table 1 and Table 2 given below:

Table 1:

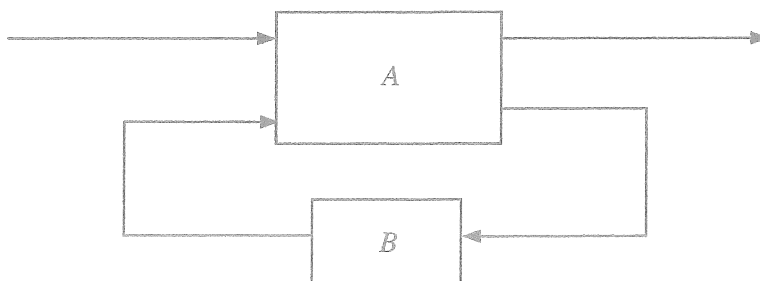
| අ | ආ | ඇ | ඈ |
|------|------|------|------|
| 0D85 | 0D86 | 0D87 | 0D88 |

Table 2:

| ඉ | ඊ | උ | ඌ |
|------|------|------|------|
| 0B85 | 0B86 | 0B87 | 0B88 |

In which of the character encoding systems given below, the above characters in Table 1 and Table 2 are represented?

- (1) Both Tables 1 and 2 : in ASCII
 - (2) Both Tables 1 and 2 : in UNICODE
 - (3) Table 1: in ASCII, Table 2: in UNICODE
 - (4) Table 1: in EBCDIC, Table 2: in ASCII
 - (5) Table 1: in UNICODE, Table 2: in ASCII
9. Which of the following is the most simplified expression equivalent to $A\bar{B}\bar{C} + B\bar{C} + \bar{A}BC + BC$?
- (1) $A\bar{B}\bar{C} + \bar{A}BC + B$
 - (2) $\bar{B}(A\bar{C} + \bar{A}C) + B$
 - (3) $\bar{C}(A\bar{B} + B) + C(\bar{A}\bar{B} + B)$
 - (4) $A\bar{C} + \bar{A}C + B$
 - (5) $\bar{A}\bar{C} + B$
10. A block diagram of a sequential logic circuit is shown below, with one block labelled as "A" and the other labelled as "B".



Which of the following statements about the above block diagram are correct?

- I - The block A is a combinational logic circuit.
 - II - The block B is a memory element.
 - III - Only the block A can be implemented using logic gates.
- (1) Only I
 - (2) Only II
 - (3) Only I and II
 - (4) Only I and III
 - (5) All I, II and III

24. The following details are given about a software project:
- A – requirements are fixed (not allowed to change throughout the complete project)
 - B – must deliver the complete software product at once
 - C – detailed descriptions and specifications must be prepared for each activity within the project
- What is the most suitable software process model for this project?
- (1) Agile
 - (2) Prototype
 - (3) Rapid Application Development
 - (4) Spiral
 - (5) Waterfall
25. Which of the following statements on Data Flow Diagrams (DFD) is **incorrect**?
- (1) Context diagram is a DFD with the highest level of abstraction.
 - (2) All data stores in a system must be represented in the context diagram.
 - (3) Data flows are used to link the other components in DFDs.
 - (4) Elementary processes are not decomposed further.
 - (5) External entities in DFDs act as sources or recipients of data.
26. What is the correct SQL statement to delete a database called 'ALdb'?
- (1) delete ALdb;
 - (2) delete database ALdb;
 - (3) drop ALdb;
 - (4) drop database ALdb;
 - (5) remove database ALdb;
27. Which of the following statement/s about a relation in the Second Normal Form (2NF) are true?
- A – It can have a composite key.
 - B – It should be in the First Normal Form (1NF) as well.
 - C – All non-key attributes are fully functionally dependent on the primary key.
- (1) B only
 - (2) C only
 - (3) A and B only
 - (4) B and C only
 - (5) All A, B and C
28. Which of the following statement/s regarding the *logical database schema* are true?
- A – It is a blueprint for a database.
 - B – It contains data and information.
 - C – It formulates all the constraints that are to be applied on the data.
- (1) A only
 - (2) A and B only
 - (3) A and C only
 - (4) B and C only
 - (5) All A, B and C
29. Consider the following SQL statement:
- ```
Alter table subject add primary key (Subject_Id);
```
- Which of the following is **incorrect** about the above SQL statement?
- (1) It adds a primary key constraint to the table named *subject*.
  - (2) The table named *subject* should already exist.
  - (3) The field *Subject\_Id* should not be null.
  - (4) A table named *subject* is created with a primary key named *Subject\_Id*.
  - (5) The values of the field *Subject\_Id* should not be repeated in *subject* table.

008585

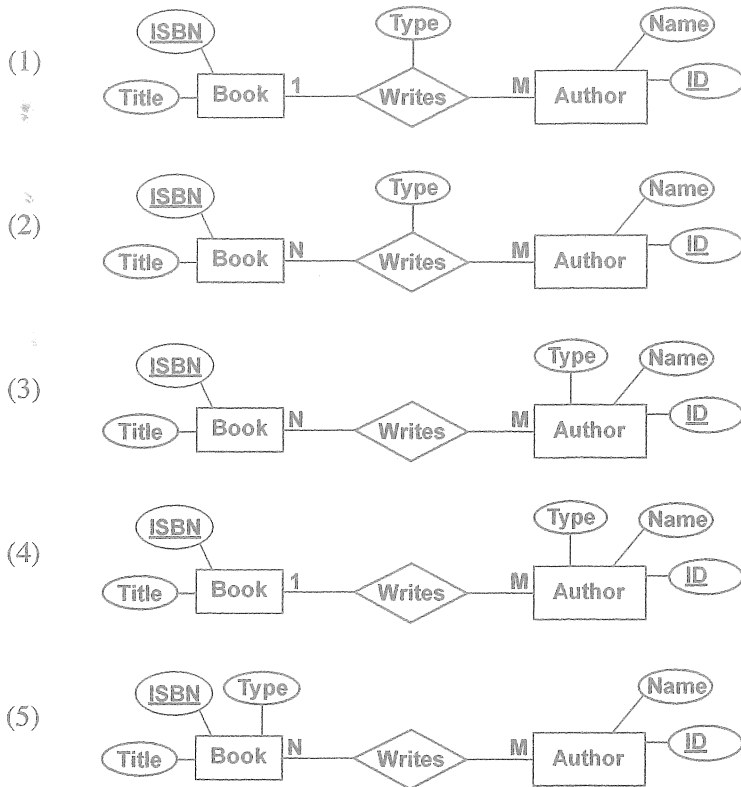
01030000380113585



- Consider the following scenario about 'authors' and 'books' to answer the questions 30 and 31.

"An author can write books. A book has a title and a code called ISBN which is unique. A book can be written by either one or several authors. An author has a name and a unique ID. An author can have a type as either chief author or a co-author for a particular book."

30. Which of the following is the most suitable Entity Relationship (ER) representation for the above scenario?



31. How many tables can be derived initially, when mapping the entity relationships in the above scenario to a relational schema?

- (1) 1                      (2) 2                      (3) 3                      (4) 4                      (5) 5

- The questions 32 – 34 are based on the algorithm expressed by the flowchart below. The algorithm takes a list L of items and an item K as inputs and is expected to output the number of items in L that are equal to K. List indices start at 0. Note that two entries, labelled as P and Q, in the flowchart are blank (unspecified).

32. For the algorithm to function correctly, what should be inserted at the blank P?

- (1)  $n = n - 1$
- (2)  $n = n + 1$
- (3)  $\text{count} = \text{count} + 1$
- (4)  $\text{count} = \text{count} + i$
- (5)  $\text{count} = \text{count} + n$

33. For the algorithm to function correctly, what should be inserted at the blank Q?

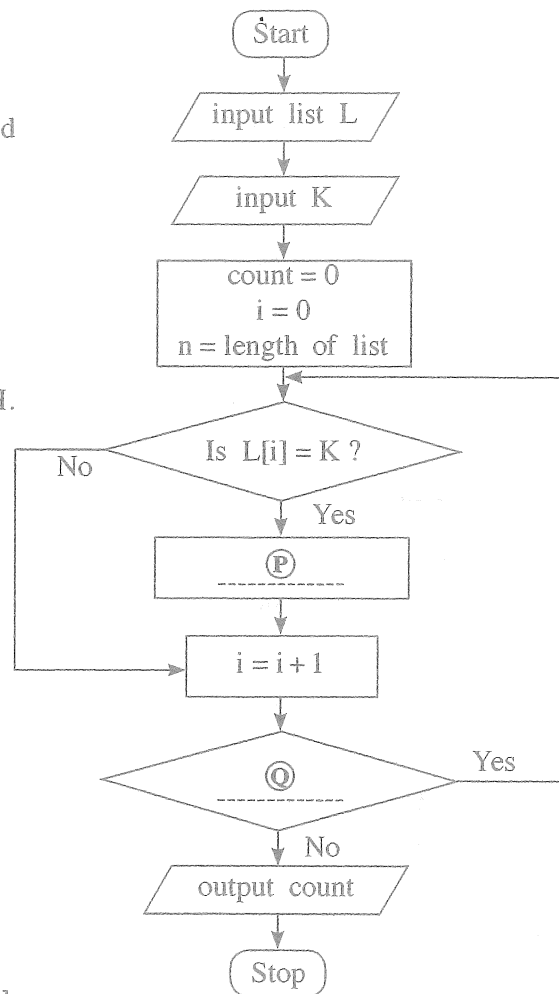
- (1) Is  $i < n$ ?
- (2) Is  $i = n$ ?
- (3) Is  $\text{count} < n$ ?
- (4) Is  $\text{count} < K$ ?
- (5) Is  $n > 0$ ?

34. Consider the following python programs I, II and III.

```
I L = [int(x) for x in input().split()]
K = int(input())
count = 0
for i in range(len(L)):
 if (L[i]== K):
 count = count + 1
print(count)
```

```
II L = input().split()
K = input()
count = 0
n = len(L)
for i in range(n):
 if (L[i]== K):
 count = count + i
print(count)
```

```
III L = [int(x) for x in input().split()]
K = int(input())
count = i = 0
while (i < len(L)):
 if (L[i]== K):
 count = count + 1
print(count)
```



Which of the above python programs implement the given algorithm?

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





40. What would be the output of the following Python code?

```
x = 1
y = 100
while (x < 100):
 y = y - x
 x = x + 1
 if (x + y) < 90:
 break

print(y)
```

- (1) 100                      (2) 85                      (3) 79                      (4) 72                      (5) 7

41. Consider the following Python program:

```
f1 = open("inFile.txt", "r")
f2 = open("outFile.txt", "w")
checkString = "No"
for line in f1:
 if (checkString not in line):
 f2.write(line)
f1.close()
f2.close()
```

Which of the following statements are correct about the above program?

A - The content of the input file (inFile.txt) is checked in a loop, one line at a time.

B - The total content of one file is written onto another file.

C - If either of the two files does not exist, the program will stop and exit while executing the first two lines of the code.

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

42. Which of the following HTML tags are used to define a *definition* list?

- (1) <dl>, <dd>, <li>                      (2) <dl>, <dt>, <dd>                      (3) <dl>, <td>, <dd>  
(4) <dl>, <th>, <dd>                      (5) <dl>, <th>, <td>

43. Which HTML tag is used to include a caption for a *fieldset* grouping in a form?

- (1) <caption>                      (2) <head>                      (3) <label>                      (4) <legend>                      (5) <title>

44. What is the expected output of the following PHP code block?

```
<?php
 $one = "Welcome";
 $two = "2020";
 echo $one.$two ;
?>
```

- (1) Welcome.2020                      (2) Welcome2020                      (3) Welcome 2020  
(4) Welcome;2020;                      (5) Welcome.2020;

45. Which of the following affects **least** to the downloading speed of a web page?

- (1) capability of the web browser  
(2) number of hyperlinks in the web page  
(3) number and size of images in the web page  
(4) processing power of the server computer that stores the web page  
(5) the bandwidth of the internet connection which is used to access the web page

46. Which of the following statements is true about the code given below?

```
<style>
 .title {
 text-align: center;
 color: blue;
 }
</style>
```

- (1) This defines internal styles and uses the CSS 'class' concept.
- (2) This defines internal styles and uses the CSS 'group' concept.
- (3) This defines inline styles and uses the CSS 'group' concept.
- (4) The styles defined inside the code can be used only for one type of element.
- (5) This is an example of the CSS 'Id' concept and the name of the Id is 'title'.

47. Consider the following HTML code line:

```
 Go to Part A
```

Which of the rows in the following table describes the outcome of the above code line?

|     | Displayed as a hyperlink | To which the hyperlink connects to                 |
|-----|--------------------------|----------------------------------------------------|
| (1) | #PartA                   | new web page named "Go to Part A"                  |
| (2) | #PartA                   | part of the same page named with Id "Go to Part A" |
| (3) | Go to Part A             | new web page named "#PartA"                        |
| (4) | Go to Part A             | part of the same web page named with Id "#PartA"   |
| (5) | Go to Part A             | part of the same web page named with Id "PartA"    |

48. Which of the following statements related to *e-commerce* are true?

- A – A particular product may be available at different prices at different e-commerce sites.
- B – Payment option at the receipt of goods allows customers to verify the quality of their purchases made through the e-commerce site.
- C – Additional charges can be included as delivery and service fees over and above the stated price.

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

49. Consider the following:

- A – Cloud formation in the sky
- B – The evolution of living species
- C – How neurons function in the human brain

Which of the above could be used in *bio-inspired computing*?

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

50. Which of the following statements about *quantum computing* are correct?

- A – In quantum computing, principles of quantum physics are applied.
- B – Quantum bits (qubits) are used in quantum computing as the information unit.
- C – Quantum computers emit radiation fatal to human users.

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

\*\*\*