AL/2019/20/E-I (NEW)

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NEW

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2019 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2019 ஓகஸ்ற்
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තොරතුරු හා සන්නිවේදන තාක්ෂණය I
தகவல், தொடர்பாடல் தொழினுட்பவியல் I
Information & Communication Technology I

20 E I

පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Instructions:

* *Answer* ***all*** *the questions.*
* *Write your* ***Index Number*** *in the space provided in the answer sheet.*
* *Instructions are also given on the back of the answer sheet. Follow them carefully.*
* *In each of the questions* **1** *to* **50**, *pick one of the alternatives from* (1), (2), (3), (4), (5) *which is* ***correct or most appropriate*** *and* ***mark your response on the answer sheet with a cross*** (×) ***in accordance with the instructions given on the back of the answer sheet.***
* *Use of calculators is* ***not allowed***.

1. Which of the following is a hardware device that maps *virtual addresses* to *physical* addresses?

(1) bus (2) cache memory (3) control unit
(4) memory management unit (5) register

2. Which of the following represents the bitwise AND operation of the two binary numbers 01010101 and 10101010?

(1) 00000000 (2) 00001111 (3) 11001100 (4) 11110000 (5) 11111111

3. Use of public key and private key in *encryption* and *decryption* processes is called

(1) asymmetric encryption. (2) digital encryption. (3) hybrid encryption.
(4) private key encryption. (5) symmetric encryption.

4. In a particular network, each node is connected directly to a central network device. This topology is referred to as a

(1) bus. (2) hybrid. (3) mesh. (4) ring. (5) star.

5. Consider the following activities related to e-commerce:

A – online purchase of a pair of shoes
B – online purchase of an e-book of your favourite novel
C – online booking of a taxi to the airport from your home

Which of the above activities represent/s the *pure-click* type business model?

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

6. Which of the following shows the correct order of *software testing*?

(1) acceptance testing ⟶ system testing ⟶ integration testing ⟶ unit testing
(2) unit testing ⟶ acceptance testing ⟶ system testing ⟶ integration testing
(3) unit testing ⟶ integration testing ⟶ acceptance testing ⟶ system testing
(4) unit testing ⟶ integration testing ⟶ system testing ⟶ acceptance testing
(5) white-box testing ⟶ black-box testing ⟶ system testing ⟶ unit testing

[*See page two*

7. A software development company identifies that their new system development project has complex requirements and has a *medium* to *high* risk level. Further, an evaluation is needed to clear the requirements and significant changes are expected during system development.

What is the most suitable software development process model for this project?

(1) agile
(2) prototyping
(3) rapid application development
(4) spiral
(5) waterfall

8. Which of the following made a significant contribution to the growth of Information and Communication Technology (ICT) usage?

A - exponential progress of the semiconductor technology paving the way for low cost hardware
B - introduction of user-friendly software and interfaces to computers
C - merge of computer and communication technologies to produce smart and mobile devices

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

9. Which of the following is the correct statement to connect to "login.php" from an HTML form?

(1) <form action ="GET" method ="/login.php">
(2) <form action ="/login.php" method ="GET">
(3) <form submit ="GET" method="/login.php">
(4) <form submit="/login.php" method="GET">
(5) <form target"=/login.php" method="GET">

10. Which of the following HTML code lines is correct to create a hyperlink to the words "Department of Examinations" using the URL: http://www.doe.index.html?

(1) http://www.doe.index.html
(2) Department of Examinations
(3)
(4) http://www.doe.index.html
(5) Department of Examinations

11. On his single processor computer, a user starts a spreadsheet application and creates a new spreadsheet. To get some information required for the spreadsheet he opens a **large** database using his Database Management System (DBMS). After completing his spreadsheet he saves it.
Which of the following operating system features has/have being used by the above user?

A - context switching
B - file management
C - virtual memory

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

12. A smart environment can be created by having an interconnected network of hardware devices, sensors, connectivity and required software, which is often referred to as the *Internet of Things* (*IoT*). Which of the following statements is correct about IoT?

(1) Every IoT device or item must be connected using UTP cables.
(2) If any item of the IoT setup fails to operate the entire IoT setup will be shutdown.
(3) IoT environments cannot be monitored and controlled remotely.
(4) Modern smart mobile phones cannot be connected to an IoT setup.
(5) The Internet connectivity is not essential for an IoT setup to function.

13. Which of the following indicates a *non-functional* requirement?

A – A user shall be allowed to upload an image to the system to be used as his/her profile picture.

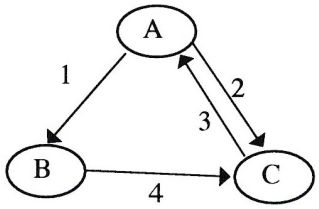
B – The correct invoice value should be calculated including applicable tax rates at the check-out.

C – The system must satisfy 99.9% availability of service.

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

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

14. Consider the process transition diagram in the figure:



If the transitions shown are as follows:

1 – Process blocks for input/output

2 – Scheduler picks another process

3 – Scheduler picks this process

4 – Input/output is completed

then what are the states indicated by the labels A, B and C respectively?

(1) A: Blocked B: New C: Ready

(2) A: New B: Ready C: Running

(3) A: Ready B: Running C: Blocked

(4) A: Running B: Blocked C: Ready

(5) A: Running B: New C: Blocked

- Consider the following database table to answer the questions **15** to **17**.

Student_Sport

Student_Id	Event_Id	Event_Name
10012	S-02	Carrom
10022	S-01	Basketball
10018	S-02	Carrom
10012	S-03	Volleyball
10025	S-04	Chess
10018	S-01	Basketball

15. In which normal form does the above table exist?

(1) BCNF (2) First normal form (3) Second normal form

(4) Third normal form (5) Zero normal form

16. Consider the following statements regarding the above table:

A - It has a composite primary key.

B - *Event_Name* attribute is fully dependent on the primary key of *Student_Sport* table.

C - *Event_Id* is a candidate key.

Which of the above statements is/are correct?

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

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

17. It is required to add a new field called ***Age*** to the *Student_Sport* table and the values of the new field must be greater than 10.

Which one is the correct SQL statement to implement the above requirement?

(1) Alter table *Student_Sport add check* (*Age*> 10);

(2) Alter table *Student_Sport add where* (*Age*> 10);

(3) Alter table *Student_Sport set check* (*Age*> 10);

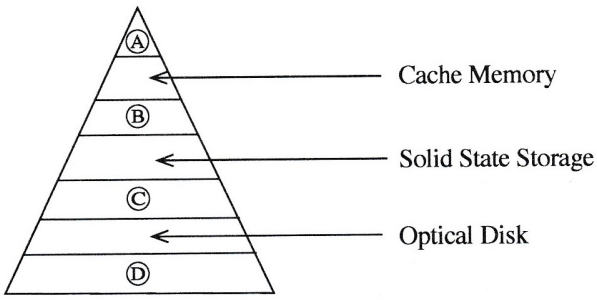
(4) Update table *Student_Sport add check* (*Age*> 10);

(5) Update table *Student_Sport add where* (*Age*> 10);

[See page four

18. Which of the following SQL commands is **not** available in the Data Manipulation Language (DML)?
(1) CREATE (2) DELETE (3) INSERT (4) SELECT (5) UPDATE

19. In the memory hierarchy diagram given, which of the following represents Ⓐ, Ⓑ, Ⓒ and Ⓓ respectively?



(1) Magnetic Tape, Magnetic (Hard) Disk, Random Access Memory (RAM), Processor Registers
(2) Processor Registers, Magnetic (Hard) Disk, Random Access Memory (RAM), Magnetic Tape
(3) Processor Registers, Random Access Memory (RAM), Magnetic (Hard) Disk, Magnetic Tape
(4) Processor Registers, Random Access Memory (RAM), Magnetic Tape, Magnetic (Hard) Disk
(5) Random Access Memory (RAM), Processor Registers, Magnetic (Hard) Disk, Magnetic Tape

20. Which of the following represents the result of the binary arithmetic operation of 11001100 - 01010101?
(1) 00110011 (2) 01100110 (3) 01110111 (4) 10011001 (5) 10101010

21. Which of the following statements is/are correct about *two's complement*?
A - Subtraction is carried out as addition.
B - Calculations are more efficient.
C - It is possible to represent negative numbers within the two's complement.
(1) A only (2) B only (3) A and B only
(4) B and C only (5) All A, B and C

22. Which of the following statements correctly describe/describes *hackers*?
A - They are bored and lonely anti-social teenagers who attack computer systems as a challenge and sometimes for profit.
B - They are IT skilled people who attack computer systems of individuals and businesses as a form of competition.
C - They are organized crime groups that deploy highly automated and sometimes highly targeted attacks against computer systems of individuals and businesses for certain benefits.
(1) A only (2) B only (3) A and C only
(4) B and C only (5) All A, B and C

23. Which is the most suitable HTML form element input type in which the user can enter his credit card secret number?
(1) textarea (2) type="checkbox" (3) type="hidden"
(4) type="password" (5) type="text"

24. Consider the following statements regarding the Extended Entity Relationship (EER) model.
A - EER model includes all the concepts of the original ER model.
B - EER model has additional concepts of specialization/generalization.
C - EER model includes a new concept to model the weak entities.
Which of the above statement/s is/are correct?
(1) A only (2) B only (3) A and B only
(4) A and C only (5) All A, B and C

[See page five

25. Which of the following are the properties of a signal?
(1) Amplitude, Clock time, Frequency and Wavelength
(2) Amplitude, Frequency, Phase and Time
(3) Amplitude, Frequency, Phase and Wavelength
(4) Amplitude, Frequency, Time and Wavelength
(5) Amplitude, Impulse, Phase and Wavelength

26. Which of the following options contains only *guided media*?
(1) Coaxial, Fiber optics and Infrared
(2) Coaxial, Fiber optics and Microwave
(3) Coaxial, Fiber optics and Twisted pair
(4) Coaxial, Infrared and Twisted pair
(5) Fiber optics, Satellite communication and Twisted pair

27. The *frequency modulation* technique is used to change only
(1) the amplitude and frequency.
(2) the amplitude, frequency and phase.
(3) the amplitude and phase.
(4) the frequency.
(5) the frequency and phase.

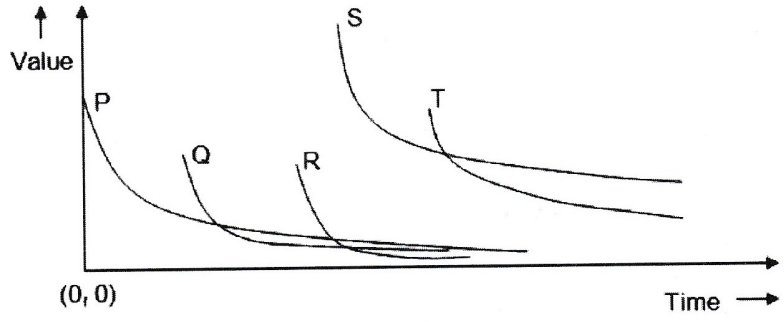
28. Which of the following is a valid example for a PHP variable name?
(1) *@class_name* (2) *&class_name* (3) *$class name*
(4) *$class_name* (5) *_class_name*

29. What is the binary equivalent to decimal 54.25 ?
(1) 00011111.11 (2) 00101010.01 (3) 00110110.01
(4) 00111011.1 (5) 00111110.1

30. Which of the following is a valid example for CSS **class** selectors?
(1) .myclass{color:blue;font-family:serif;}
(2) #myclass{color:blue;font-family:serif;}
(3) myclass{color:blue;font-family:serif;}
(4) myclass:{color:blue;font-family:serif;}
(5) myclass;{color:blue;font-family:serif;}

31. Which one of the following is **false** regarding the HTML form methods GET and POST?
(1) Both methods are used to transfer data from client side to the server.
(2) GET method is more efficient than the POST method.
(3) GET method is more suitable to send sensitive data.
(4) POST method does not have a limit on size of data.
(5) POST requests cannot be bookmarked.

32. The diagram shows the variation of value of information with time for five events of a single mission in the chronological order. Information about the entire mission especially about the occurrences of each event is made available on-line real time.



Consider the following statements related to the above mission:

A - Only the events P, Q and R comply with the Golden Rule of Information.

B - Event S has the highest demand and needs to be facilitated with the highest technical resources.

C - The value of an event can be determined reasonably using the demand for the information about the particular event.

Which of the above statements related to this mission is/are valid?

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

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

33. Consider the following statements related to *nature inspired computing*:

A – In *nature inspired computing* natural phenomena/scenario are observed and used to design and develop computing models to solve complex problems.

B – Artificial Intelligence can use *nature inspired computing* for improving its ability to understand and solve computationally challenging problems.

C – Computing models and algorithms developed under *nature inspired computing* can only be used in natural environments such as rain forests, oceans and wild-life sanctuaries.

Which of the above statements is/are **incorrect**?

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

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

34. What is the correct statement related to system deployment?

(1) Direct deployment is the most complex and the slowest form of deployment.

(2) In pilot deployment, all the users have the ability to use the system at the beginning.

(3) In parallel deployment old and new systems are used at the same time.

(4) Phased deployment do not allow users to develop skills required for new system gradually.

(5) Phased deployment means the entire system is used in one location.

35. Consider the following statements:

A – A *hub* connects only the networked computers but a *switch* connects multiple devices.

B – A *switch* manages the ports and the VLAN security settings.

C – In data transmission, a *hub* uses bits while a *switch* uses frames and packets.

D – The data transmission speed in a *hub* is higher than that in a *switch*.

Which of the above statements are correct?

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

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

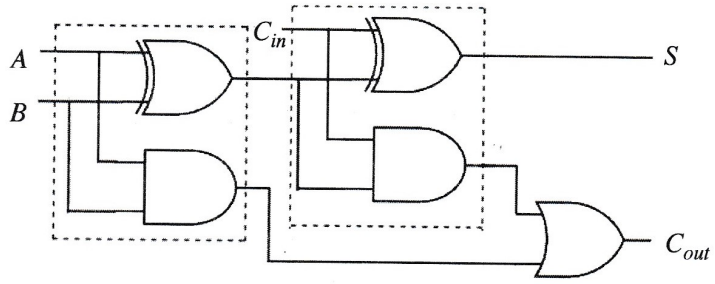
36. Consider the following statements about the *proxy server*:

A – It helps to hide the true IP address.
B – It is used to restrict the access of the website in the network.
C – It uses the cached data for the quick loading of regularly accessed websites.
D – It helps to detect the locations of the visitors and load web pages as per their needs.

Which of the above statements are correct?

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

- Consider the following logic circuit diagram to answer the questions **37** and **38**:



37. Which of the following statements is/are correct about the above circuit?

I - It implements a full adder.
II - The logic function of S can be stated as $S = A \oplus B \oplus C_{in}$.
III - The logic function of C_{out} can be stated as $C_{out} = AB + BC_{in} + AC_{in}$.

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

38. Which of the following statements is/are correct about the part of the circuit within the area surrounded by the dotted line?

I - It implements a half adder.
II - It can be implemented using only AND and OR gates.
III - It can be implemented using only NAND gates.

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

39. Consider the Karnaugh map shown below:

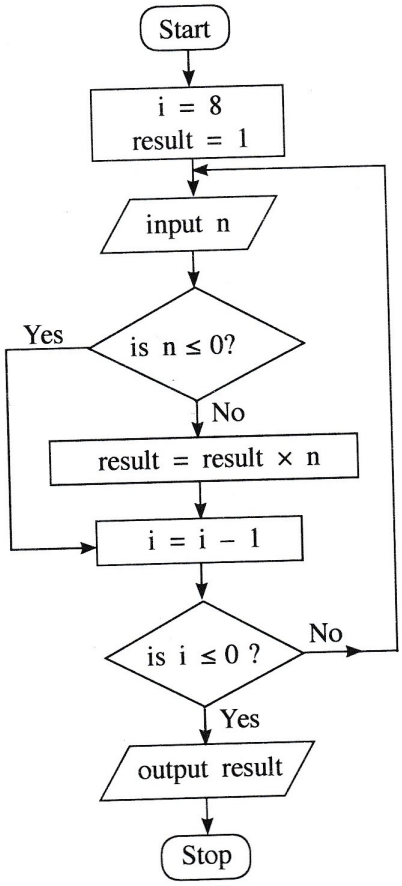
		AB = 00	01	11	10
C	0	0	0	0	1
	1	1	1	0	1

Which of the following is the correct logic expression that corresponds to the two marked segments on the Karnaugh map?

(1) $A\overline{B} + B\overline{C}$ (2) $\overline{A}\overline{C} + AB$ (3) $(\overline{A} + \overline{C})(A + B)$
(4) $(A + C)(\overline{A} + \overline{B})$ (5) $AC + \overline{A}\overline{B}$

[See page eight

- Consider the following flowchart to answer the questions **40** to **42**:



40. Which of the following statements is/are correct about the algorithm expressed by the flowchart?

A – It takes 8 inputs.
B – It outputs the product of the positive numbers in the input.
C – If every input is zero, then the output will be zero.

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

41. If the following is fed as the input to the algorithm, what will be the output?

3 2 -4 4 1 -9 5 -6 -1

(1) -25920 (2) -216 (3) 120 (4) 216 (5) 25920

42. Which of the following Python programs has/have the same functionality (i.e., the same output for a given input) as the algorithm in the flowchart above?

A –
```
i = 8
result = 1
while (i > 0):
    n = int(input())
    if (n > 0):
        result = result * n
    i = i-1
print (result)
```

B –
```
result = 1
for i in range(8):
    n = int(input())
    if (n > 0):
        result = result * n
print (result)
```

C –
```
result = 1
i = 8
while 1:
    n = int(input())
    if (not(n <= 0)):
        result = result * n
    i = i - 1
    if (i <= 0):
        break
print (result)
```

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

[*See page nine*

43. Which of the following statements is correct?

(1) A high level language program that is translated into machine code and executed on computer *X* will not execute on another computer having the same processor as *X*.
(2) A program in a high-level language must be first converted into assembly language code before converting into machine code.
(3) Interpreted programs run faster than compiled ones.
(4) Programs in some high-level languages are translated into a form called byte-code because such byte-codes execute faster than machine codes obtained by usual compilations.
(5) Some modern processors execute programs in high-level languages without translating them into machine code.

44. What is the value of the following Python expression?

```
(100 // 3) % 4 | 8
```

(1) 0 (2) 0.125 (3) 3 (4) 8 (5) 9

45. What will be the output if the following Python code is executed with "abcabc" as the input?

```
result = 1
s = input()
if (len(s) > 3):
        result = 2
if (len(s) < 6):
        result = 3
elif (len(s) > 6):
        result = 4
else:
        result = 5
print(result)
```

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

46. What will be the output of the following Python code?

```
x = 100
for i in range(1,5):
        x = x - i
print(x)
```

(1) 0 (2) 5 (3) 85 (4) 90 (5) 100

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

```
L = [1,-2,4,3,2,-7,11,2,8,-1]
x = 0
for i in range(len(L)):
        if (L[i] < 0):
                continue
        if (L[i] > 10):
                break
        x = x + L[i]
print(x)
```

(1) 0 (2) 1 (3) 10 (4) 21 (5) 31

[See page ten

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

```
x = 50
def func(y):
        x = 2
        y = 4
func(x)
print(x)
```

(1) 50 (2) 2 (3) 4 (4) syntax error (5) name error

49. Which of the following is **not** an information stored in a *Process Control Block* (*PCB*) of the operating system?

(1) free disk slots (free disk blocks that could be utilized by the process)
(2) memory management information for the process
(3) program counter (address of the next instruction to be executed for the process)
(4) process identification number (unique identifier for the process)
(5) process state (e.g., Blocked, Ready, etc.)

50. Consider the following SQL statement:

Update school set contact_person = 'Sripal W.' *where school_id* = '04';

Which of the following is true when the above SQL statement is executed?

(1) It adds an additional field with the name *contact_person* and adds value into that new field as 'Sripal W.' only in the records having *school_id* = 04
(2) It adds an additional value to the *contact_person* as 'Sripal W.' only in the records having *school_id* = 04
(3) It changes the field name of *contact_person* as 'Sripal W.' when selecting the records with *school_id* = 04
(4) It changes the value of *contact_person* as 'Sripal W.' only in the records having *school_id* = 04
(5) It selects all the records having *school_id* = 04 and *contact_person* as 'Sripal W.'

* * *