

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

අධ්‍යයන පොදු සහතික පත (උසස් පෙළ) විභාගය, 2025
 கல்விப் பொதுத் தராதரப் பத்திர (உயர் தரப் பரீட்சை, 2025
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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 those 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 (X) in accordance with the instructions given on the back of the answer sheet.
- * Use of calculators is **not allowed**.

1. Which of the following best represents the typical life cycle of data?
 - (1) collection → processing → usage → archival → deletion
 - (2) collection → usage → processing → deletion → archival
 - (3) processing → collection → usage → deletion → archival
 - (4) processing → archival → collection → usage → deletion
 - (5) usage → archival → collection → deletion → processing
2. Which of the following is a characteristic of *open-source software*?
 - (1) Limited customizations
 - (2) Reliance on vendor for updates
 - (3) Usage restricted by the owner
 - (4) Source code not being publicly available
 - (5) Being usually free to acquire and use
3. An online examination system is to alert students if they leave any mandatory questions unanswered before submission of their answers. Which data validation techniques are sufficient for this requirement?
 - (1) Data type check only
 - (2) Data type check and presence check only
 - (3) Data type check and range check only
 - (4) Presence check only
 - (5) Range check only
4. Which of the following best describes a pointing device?
 - (1) It is used to control an indicator on the display.
 - (2) It is used to digitize a scene.
 - (3) It is used to identify characters.
 - (4) It is used to read codes.
 - (5) It is used to select images.
5. Which of the following is a secondary storage device in which the data is written to in a sequential manner and can be read from in a random manner?

(1) CD-R	(2) CD-ROM	(3) Magnetic Tape
(4) Solid State Drive	(5) USB flash drive	

6. Which of the following communication buses are involved in reading a data word from Main Memory?

A – Address Bus B – Control Bus C – Data Bus

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

7. While an instruction is being executed in the Central Processing Unit, that instruction and the relevant data are stored in the

- (1) address bus.
- (2) arithmetic and logic unit.
- (3) control unit.
- (4) data bus.
- (5) registers.

8. If writing a 64-bit data word to a random-access memory takes 0.625 ns, how long will it take to read the same word back under the same conditions?

- (1) 0.156 ns
- (2) 0.312 ns
- (3) 0.625 ns
- (4) 1.250 ns
- (5) 2.500 ns

9. Which of the following is true regarding EEPROM?

- (1) It can store user data similar to the random access memory.
- (2) Both of its writing and reading speeds are same.
- (3) Information written on it can be erased.
- (4) It requires electric power to retain information.
- (5) The operating system is stored in it.

10. What is the correct hexadecimal equivalent of decimal 33.75₁₀?

- (1) 11.6₁₆
- (2) 21.01₁₆
- (3) 21.11₁₆
- (4) 21.6₁₆
- (5) 21.C₁₆

11. If a document with 1024 characters is converted from EBCDIC to ASCII with parity bit, how much space would be saved?

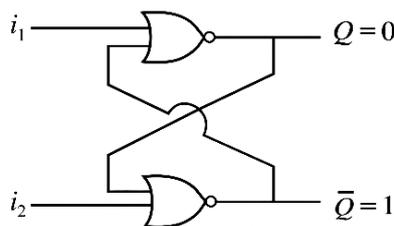
- (1) 0 bits
- (2) 512 bits
- (3) 1024 bits
- (4) 512 bytes
- (5) 1024 bytes

12. If the two signed numbers 185₁₀ and 96₁₀ are added using 8-bit registers, what is the value of the result stored in the relevant register?

- (1) -128₁₀
- (2) 25₁₀
- (3) 127₁₀
- (4) 255₁₀
- (5) 281₁₀

13. Consider the following flip-flop:

Which of the following statements will be true when $i_1 = 0$ and $i_2 = 1$?



- (1) Q output will remain at 0 and \bar{Q} output will remain at 1.
- (2) Q output will change to 1 and \bar{Q} output will change to 0.
- (3) Q output will change to 1 and then to 0.
- (4) \bar{Q} output will change to 0 and then to 1.
- (5) Q output will remain at 0 while \bar{Q} output will also change to 0.

14. What is the most simple Boolean expression that can be obtained through the given Karnaugh map?

		xy			
		00	01	11	10
z	0	1	0	0	1
	1	1	0	1	1

- (1) \bar{y}
- (2) $y + \bar{x}\bar{z}$
- (3) $\bar{y} + xz$
- (4) $\bar{y} + xyz$
- (5) $y\bar{z} + \bar{x}y$

15. Consider the following two statements P and Q:

P – Data is represented as a sequence of discrete values in a digital signal.

Q – Even with some corruption, a digital signal is easier to correctly interpret than an analog signal.

Which of the following is correct regarding the above two statements?

- (1) Both statements P and Q are correct and the point presented in statement P gives the reason for the point presented in statement Q.
- (2) Both statements P and Q are correct but the points presented in those two statements are not connected.
- (3) Statement P is correct but statement Q is incorrect.
- (4) Statement P is incorrect but statement Q is correct.
- (5) Both statements P and Q are incorrect.

16. What does the term *attenuation* refer to in signal transmission?

- (1) alteration in the properties of the transmitted signal
- (2) increase in the signal strength
- (3) loss of signal energy as it travels over a distance
- (4) time delay in propagation
- (5) the received signal makes no meaning

17. In which of the following is the frequency of the carrier signal varied according to the message signal?

- (1) in *amplitude modulation*
- (2) in *amplitude shift keying*
- (3) in *frequency modulation*
- (4) in *frequency shift keying*
- (5) in *pulse code modulation*

18. Which of the following statements are correct regarding the bus topology?

A – It consists of a main cable with terminators at each end.

B – Devices in the topology are directly connected to each other.

C – Problems occur when multiple nodes try to access the medium at the same time.

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

19. Which of the following statements best describes the primary function of a network switch?

- (1) It amplifies and regenerates signals to travel over long distances.
- (2) It connects devices within a LAN and forwards frames based on the MAC addresses.
- (3) It connects multiple networks together and routes data traffic between them.
- (4) It encrypts data before transmitting them through the network.
- (5) It maps domain names into IP addresses.

20. Which of the following statements describe the role of the Media Access Control (MAC) protocol?

A – It ensures orderly access to a shared communication medium.

B – It finds paths and routes data between network hosts.

C – It provides unique addresses to identify network interfaces within a LAN.

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

21. Which of the following ISO/OSI layers is responsible for the establishment and maintenance of an end-to-end reliable connection?

- (1) Application Layer
- (2) Data link Layer
- (3) Network Layer
- (4) Physical Layer
- (5) Transport Layer

22. Which of the following is true about *open systems*?

- (1) They operate independently without external software or hardware.
- (2) They limit interoperability to maintain internal control.
- (3) They support interoperability, portability and integration using common standards.
- (4) They improve performance by restricting third-party software and using only proprietary programs.
- (5) They are often incompatible with applications from other platforms.

23. Match the **Systems** labelled from **A1** to **A3** to the corresponding **Descriptions** labelled from **B1** to **B3**.

System
A1 – Decision Support System
A2 – Knowledge Management System
A3 – Enterprise Resource Planning System

Description
B1 – A system that stores and distributes organizational information such as best practices and expertise to employees
B2 – A system that helps managers analyze complex data to identify patterns and make business predictions
B3 – A system that integrates various business processes like accounting, procurement and supply chain operations

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

24. Which of the following system development lifecycle models facilitate iterative development and accommodate changing requirements?

- A – Spiral model
- B – Agile model
- C – Prototyping

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

25. Column **A** lists the phases of the *waterfall model* with labels **A1** to **A5** and column **B** lists some descriptions with labels **B1** to **B5**:

Column A
A1 – Requirement analysis
A2 – System design
A3 – Implementation
A4 – Testing
A5 – Maintenance

Column B
B1 – Updating the software after deployment
B2 – Writing codes based on detailed system specifications
B3 – Validating whether the system meets user needs and functions correctly
B4 – Identifying what the system should do through discussions with stakeholders
B5 – Creating detailed technical architecture and data flow diagrams

What is the correctly matched phase-description pair?

- (1) A1 – B5
- (2) A2 – B4
- (3) A3 – B2
- (4) A4 – B1
- (5) A5 – B3

26. Assume that a project is to be done to computerise the administration of all government schools. The system developers in the project have been advised to use the Structured System Analysis and Design Methodology (SSADM) for it.

What is a key benefit of using SSADM in this project?

- (1) It allows faster development with minimal documentation.
- (2) It avoids documentation effort completely.
- (3) It eliminates the need for system analysis.
- (4) It encourages rapid software deployment.
- (5) It ensures standardization and consistency of the entire project.

27. Which of the following statements about *system testing* are correct?

- A – It verifies that the complete and integrated system meets the specified requirements.
- B – It is normally performed by end-users to validate software functionality.
- C – It is performed before *unit testing* in the standard software testing life cycle.

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

28. A software tester reviews a code part that calculates a discount based on a person's age and purchase history by manually tracing each *if-then-else* condition branch.

What testing is this?

- (1) Acceptance testing
- (2) Black-box testing
- (3) Integration testing
- (4) System testing
- (5) White-box testing

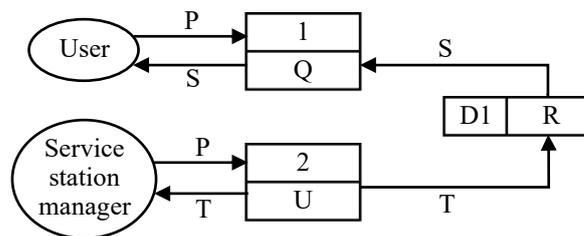
29. A university replaced its old Learning Management System (LMS) with a new one. However, the new LMS was initially made available only for the first year students. After this successful trial, it was made available for the other students too by stopping using the old LMS completely and Starting the new LMS on a specific date.

What type of deployment method is used in this changeover?

- (1) Direct only
- (2) Phased only
- (3) Pilot and direct only
- (4) Pilot and parallel only
- (5) Pilot and phased only

30. Assume that a vehicle maintenance information system is to be developed. When a vehicle's registration number is input to the system, the system should output the maintenance work records of the vehicle to the user. (e.g., On Aug 19th 2025, the oil of this vehicle was changed.) A service station manager, should also be able to add new work records to the system whenever such work is done to the vehicle.

Shown below is the first-level DFD of the system.



Which of the following gives the correct replacements for P to U in the diagram?

- (1) P – New work record Q – Display work records R – Service station managers
S – Work history T – Registration number U – Add work record
- (2) P – New work record Q – Add work record R – Registration numbers
S – Work records T – Registration number U – Display work records
- (3) P – Registration number Q – Add work record R – Service station managers
S – Work records T – New work record U – Display work records
- (4) P – Registration number Q – Display work records R – Work history
S – Work records T – New work record U – Add work record
- (5) P – Work history Q – Display work records R – Registration numbers
S – Work records T – New work record U – Add work record

31. Consider the following relations from a database at a University. The database is used to keep data about the marks of students taking different courses, the teachers who teach the courses and the department that each teacher is working at:

RESULT(Student_id, Course_id, Mark)

STUDENT(Student_id, Student_name, Student_phone)

COURSE(Course_id, Course_names, Teacher_id)

TEACHER(Teacher_id, Teacher_name, Teacher_phone, Dept_id)

DEPARTMENT(Dept_id, Dept_name, Dept_phone)

Which of the following is **not** a foreign key in this schema?

- (1) Student_id in the RESULT relation
- (2) Course_id in the RESULT relation
- (3) Student_id in the STUDENT relation
- (4) Teacher_id in the COURSE relation
- (5) Dept_id in the TEACHER relation

32. Consider the following schema of a table that is designed to store data about students:

Name	Type	Null	Key	Extra
Student_id	INT	NO	PRI	AUTO_INCREMENT
Student_name	VARCHAR(100)	NO		
Email	VARCHAR(50)	YES		
Age	INT	YES		

Which of the following statements are true?

A – Student_name cannot be empty when inserting a record.

B – The same email address (Email) could be entered for two students.

C – Inserting a student without specifying the Student_id will result in an error message.

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

33. Which of these is an advantage of using a compiled language compared to an interpreted language for implementing a program?

- (1) less development time
- (2) easier debugging
- (3) faster execution of the developed program
- (4) portability of the developed program
- (5) error detection at program run time

34. Which of the following statements are correct?

A – *Assembler* is a translator for the *Assembly* language.

B – Compilers detect only logical errors when compiling a program.

C – Program compilation is a major task of the operating system.

D – An interpreter converts a program completely to an executable file.

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

35. Consider the following A, B, C and D variable initializations in Python:

A = 1.2 B = "True" C = (1,2,3) D = True

Which of the following gives the correct data types of A, B, C and D respectively?

- (1) float, bool, list, bool
- (2) float, bool, str, str
- (3) float, bool, tuple, bool
- (4) float, str, dict, bool
- (5) float, str, tuple, bool

36. What is the execution output of the following Python expression?

```
(1,2,3)[-1]+ 3 * 4
```

- (1) 13 (2) 15 (3) 16 (4) 24 (5) TypeError

37. What is the execution output of the following Python code?

```
x = "01101"
t = 0
p = 0
for i in x:
    if(int(i)):
        t = t + 2 ** p
    p = p + 1
print (t)
```

- (1) 4 (2) 16 (3) 20 (4) 22 (5) 24

38. Following labelled Python code has been written to display all records from the 'Book' table of the 'Books_database':

```
import mysql.connector

mydb = A (host="localhost", user="devi", password="M4PQ#2Ag", database="Books_database")

mycursor = B

mycursor.execute(C)
myresult = mycursor.fetchall()

for x in myresult:
    print (x)

mycursor.close()
mydb.close()
```

Which of the following gives correct replacements for labels **A**, **B** and **C**?

- | | | |
|---------------------------------|-----------------------------|-----------------------------|
| (1) A – mydb.cursor() | B – "SELECT * FROM Book" | C – mysql |
| (2) A – mysql.connector.connect | B – mydb.cursor() | C – "SELECT * FROM Book" |
| (3) A – mysql.connector.connect | B – open('mydb', 'r') | C – "SELECT * FROM Book" |
| (4) A – mysql | B – open('mydb', 'r') | C – mysql.connector.connect |
| (5) A – mysql | B – mysql.connector.connect | C – open('mydb', 'r') |

39. Assume that you have to design the following systems. For which of them will you require the users to login to the system with usernames and passwords in order for them to use those systems?

- A – A learning management system for students to download learning resources and upload assignments
- B – An online banking system to let users transfer funds to other users
- C – A system to let the public know about the services of a Government department and its opening hours

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

40. Nithya saves the following HTML code as beach.html on her desktop computer:

```
<!DOCTYPE html>
<html>

<h1>Beach</h1>
<body>
<picture>
<source media="(min-width: 1024px)" srcset="beach_large.jpeg" alt="Large beach picture">
<source media="(min-width: 760px)" srcset="beach_medium.jpeg" alt="Beach picture">

</picture>
</body>
</html>
```

- Note :**
1. Assume that she has *beach_large.jpeg*, *beach_medium.jpeg* and *beach_small.jpeg* files also in the same folder of her computer.
 2. The picture element can be used to specify different images to be displayed for different devices or screen sizes.
 3. The media attribute specifies what media or device the linked resource is suitable for and the srcset attribute specifies the URL of the image to be used.

Which of the following statements are true?

- A – This file is using an external style sheet.
 B – When Nithya opens this file through the largest browser window of her computer, the *beach_small.jpeg* image is displayed.
 C – When Nithya emails only the beach.html file to Kamala and when Kamala opens it through her smart phone, the ‘Small beach picture’ text is displayed.

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

41. A web page is shown in Figure 41.1 and part of the HTML source that was used to make it is shown in Figure 41.2 with five tags labelled from A to E.

<p>Zero trash!</p> <p>This is a low cost way to compost kitchen waste:</p> <p>Get three concrete well rings.</p>  <p>Put the daily collection of compostable waste from your kitchen in one ring. Cover the waste with a thin layer of soil. Repeat until the ring is full. When it is full, use the second ring the same way. Once the second ring is also full, use the third ring. But now you can take covering soil from the first ring as the content in it would have been turned to compost by now. When the third ring is full, the first one is likely to be empty so that you can repeat filling it with waste using soil for covering from the second ring.</p> <p><i>Be happy that you are not burdening the town council anymore with kitchen waste and that you are making your own fertilizer!</i></p> <p><u>Watch a video on the method.</u></p>	<pre><A>Zero trash! This is a low cost way to compost kitchen waste: Get three concrete well rings. <p><C src="rings.jpg" alt="An image of three rings" width="200" height="100"></p> Put the daily collection of compostable waste from your kitchen in one ring. Cover the waste with a thin layer of soil. Repeat until the ring is full. When it is full, use the second ring the same way. Once the second ring is also full, use the third ring. But now you can take covering soil from the first ring as the content in it would have been turned to compost by now. When the third ring is full, the first one is likely to be empty so that you can repeat filling it with waste using soil for covering from the second ring. <p><D>Be happy that you are not burdening the town council anymore with kitchen waste and that you are making your own fertilizer!</D></p> Watch a video on the method.</pre>
<p>Figure 41.1 / රූපය 41.1</p>	<p>Figure 41.2 / රූපය 41.2</p>

[See page nine

Which of the following gives the correct replacements for A to E?

- (1) A – h1, B – p, C – img, D – em, E – href
 (2) A – h1, B – p, C – img, D – em, E – video
 (3) A – h1, B – p, C – href, D – b, E – video
 (4) A – style, B – em, C – img, D – p, E – href
 (5) A – style, B – p, C – body, D – em, E – video

42. Which of the following is the correct way to include the 'shop.css' external CSS file to an HTML file?

- (1) `shop.css`
 (2) `<css sre="shop.css">`
 (3) `<style src="shop.css">`
 (4) `<stylesheet>shop.css</stylesheet>`
 (5) `<link rel="stylesheet" href="shop.css">`

43. Which of the following technologies is most convenient to make the colour of all the second level (h2) headings of a website to blue?

- (1) Apache (2) CSS (3) HTML (4) MySQL (5) PHP

44. Which of the following statements are true?

- A – Even when analog inputs are given to the digital pins of an Arduino board, they are read as analog values.
 B – The USB port of an Arduino board can also be used to supply DC (direct current) electric power to it.
 C – To input the room temperature to an Arduino board, the V_{out} pin of the LM35 temperature sensor could be used.

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

• Consider the following code with labels **P-S** to answer questions 45 and 46. The code has been designed for an Arduino board to switch on/off a motor based on room temperature.

```
const int sensorPin = A0;
const int motorPin = 8;

void setup() {
  pinMode(motorPin, P);
}

void loop() {
  int sensorValue = Q (sensorPin);
  float voltage = sensorValue * 5.0 / 1024;
  float temp = voltage * 100;
  if (temp > 40)
    R (S , HIGH);
  else
    R (S , Low);
}
```

45. Which of the following contains the correct replacements for the labels?

- (1) P – INPUT, Q – analogRead, R – digitalRead, S – motorPin
 (2) P – INPUT, Q – digitalRead, R – analogRead, S – motorPin
 (3) P – OUTPUT, Q – analogRead, R – digitalRead, S – motorPin
 (4) P – OUTPUT, Q – analogRead, R – digitalRead, S – sensorPin
 (5) P – OUTPUT, Q – digitalRead, R – analogRead, S – sensorPin

46. Which of the following statements are true?

- A – The input from the temperature sensor could have been connected to any of the pins A1-A5 as well but then the ‘const int sensorPin = A0;’ line in the code should be changed to reflect that change.
 B – The motor should be connected to a GND pin of the Arduino board.
 C – The above code when correctly completed can be compiled and uploaded through the USB port to the Arduino microcontroller by using the ‘Upload’ button in the Arduino IDE.

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

47. Which of the following statements are true?

- A – IPv6 is highly suitable for scalability and efficient operation of Internet of Things (IOT).
 B – Once added to the Arduino board, an Ethernet Shield facilitates the board to connect to the Internet.
 C – Static IP addresses cannot be used for IOT devices.

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

48. What is the suitable replacement for the blank in the following statement?

By analyzing historical data of a person's previous hotel visits and his/her submitted to social media of the same, an AI-based hotel recommendation system should be successfully able to suggest hotels that the person would like.

- (1) email addresses (2) payment records (3) phone numbers
 (4) reviews (5) street addresses

49. Which of the following statements are true with respect to Artificial Intelligence (AI)?

- A – AI applications are also computer programs.
 B – All AI applications are automatically generated.
 C – When AI technology is used to generate new content, it is suitable to disclose that the content was generated by AI.

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

50. Which of the following problems are suitable to be solved using nature inspired computing technologies?

- A – make the monthly payroll list of the employees of a large multinational organization
 B – the use of autonomous robots to move goods in a warehouse avoiding collisions
 C – scheduling hospital operating theatre time slots for the patients in the surgery waiting

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

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