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

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2017 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர) பரீட்சை, 2017 ஆகஸ்ட்
General Certificate of Education (Adv. Level) Examination, August 2017

තොරතුරු හා සන්නිවේදන තාක්ෂණය	I		පැය දෙකයි
தகவல், தொடர்பாடல் தொழினுட்பவியல்	I	20 E I	இரண்டு மணித்தியாலம்
Information & Communication Technology	I		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 (×) in accordance with the instructions given on the back of the answer sheet.
* Use of calculators is *not* allowed.

1. Who proposed the stored program concept first?
   (1) Lady Ada Augusta (2) Charles Babbage (3) Howard Aiken
   (4) Blaise Pascal (5) Von Neumann

2. Which of the following components is generally seen outside the Central Processing Unit (CPU) of a computer?
   (1) RAM (2) Control Unit (3) ALU
   (4) General purpose registers (5) L1 cache memory

3. What is the two's complement representation of 45, if an integer is represented by 8 bits?
   (1) 11010011 (2) 10110011 (3) 11001101 (4) 00101111 (5) 00101101

4. Which of the followings is another name for web publishing?
   (1) Offline publishing (2) Desktop publishing (3) Media publishing
   (4) Online publishing (5) Self publishing

5. Which of the following secondary storage devices is generally considered to provide the fastest access to data?
   (1) Compact Disc (2) Digital Versatile Disc (3) Internal hard disk
   (4) Magnetic tape (5) Floppy disk

6. Which of the followings is usually used to boot-up personal computers?
   (1) Firmware (2) Malware (3) Adware (4) Ransomware (5) Liveware

7. Which of the followings is a main use of Complementary Metal-Oxide Semiconductor (CMOS) memory of a personal computer?
   (1) Keeping inputs for processing (2) Holding instructions for operations
   (3) Providing space for loading operating system (4) Retaining information for output
   (5) Keeping Basic Input Output System settings for the booting procedure

8. The execution of a series of non-interactive jobs on a personal computer with relative to the user is known as
   (1) multitasking. (2) multiuser processing. (3) multiprocessing.
   (4) batch processing. (5) online processing.

9. Which of the following numbers is equivalent to the binary number 101111_2?
   (1) 57_8 (2) 57_{16} (3) 57_{10} (4) 59_{16} (5) $5F_{16}$

10. $5D_{16} + 10111_2 =$
    (1) 73_8 (2) 75_{16} (3) 116_8 (4) 163_8 (5) 164_8

11. What is the binary representation of 9.25_{10}?
    (1) 1110011101 (2) 00001001.01 (3) 0000100101 (4) 1000100101 (5) 10001001.01

12. A .... on motherboard is used to expand the functionality of a computer. Which of the followings is the most appropriate to fill in the blank in the above statement?

(1) Bus   (2) Clock   (3) RAM   (4) Slot   (5) ROM
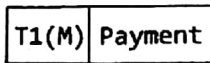
13. Consider the following HTML code:

```
<html>
    <head>
            <title>Countries</title>
    </head>
    <body>
            <p><!-- <h1> Sri Lanka </h1> --></p>
    </body>
</html>
```
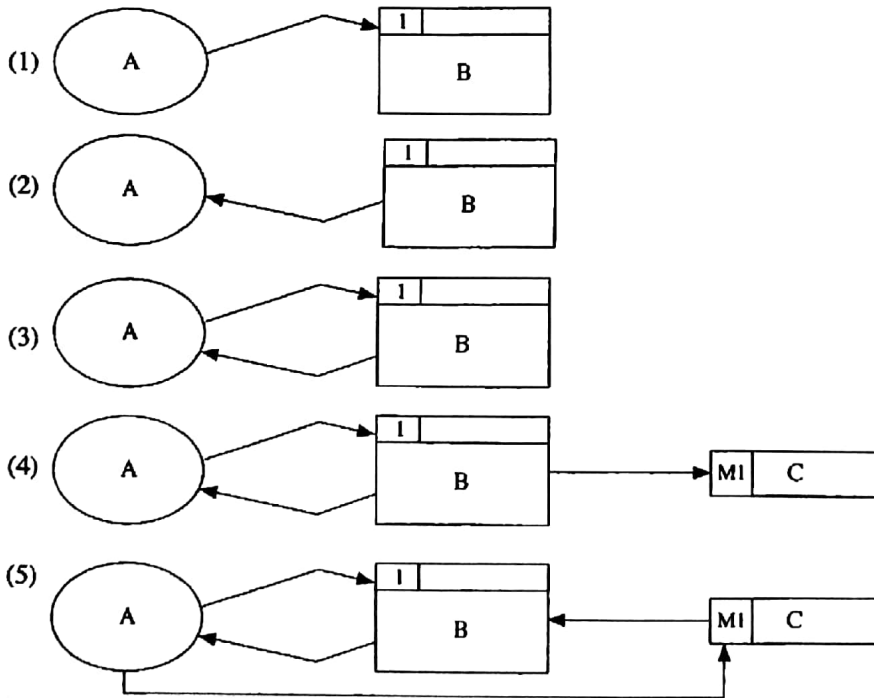
Which of the followings correctly describes the display, when the above code is rendered?
(1) The text "Country" appears on the title bar and the text "Sri Lanka" appears as a header.
(2) The text "Sri Lanka" appears on the title bar and the text "Country" appears as a header.
(3) The text "Country" appears on the title bar.
(4) The text "<!--<h1> Sri Lanka </h1>-->" appears on the title bar.
(5) The text "<!--<h1> Sri Lanka </h1>-->" appears in the body of the web page.

14. Consider the "Submit" button of an HTML form given below:

Submit

Which of the following tags/elements correctly implements the intended function of the above "Submit" button?
(1) <input type = "submit" value = "Submit">
(2) <input type = "button" value = "Submit">
(3) <button type = "button" >Submit</ button>
(4) <button type = "submit"></ button>
(5) <button type = "submit" value = "Submit"></ button>

15. Which of the following CSS rules renders the image in the file "school.png" as the background of a web page?
(1) body { background = "school.png"; }
(2) body { background: url ("school.png"); }
(3) body { background-image = "school.png"; }
(4) body { background-image: "school.png"; }
(5) body { background-image: url ("school.png"); }

16. In electronic mail systems, the protocol used by mail clients to retrieve messages from the mail server is
(1) Simple Mail Transfer Protocol (SMTP).   (2) File Transfer Protocol (FTP).
(3) Internet Control Message Protocol (ICMP).   (4) Internet Message Access Protocol (IMAP).
(5) Telnet.

17. The transport layer protocol User Datagram Protocol (UDP) can be used for
(1) reliable communication.   (2) guaranteed delivery.
(3) connection oriented communication.   (4) ordered delivery.
(5) exchanging state information among routers.

18. Which of the following statements regarding MAC addresses is correct?
(1) Every network device has a unique MAC address.
(2) Every network host has a unique MAC address.
(3) Every network interface has a unique MAC address.
(4) It is assigned for a device at the time of installation.
(5) It is used for routing.

19. The first and the last IP addresses of a subnet are 192.192.48.0 and 192.192.63.255 respectively. Which of the followings is the subnet mask of this subnet?
(1) 255.255.255.0   (2) 255.255.192.0   (3) 255.255.255.192
(4) 255.255.240.0   (5) 255.240.0.0

20. 172.16.48.200/24 is a
   (1) host address in a class B network.   (2) network address of a class C network.
   (3) host address in 172.16.48.0/24 subnet. (4) network address of a subnet with 255 hosts.
   (5) host address with 8 network bits.

21. In TCP/IP computer networks, Transport Protocol Data Unit (TPDU) is referred to as a

   (1) packet.   (2) frame.   (3) segment.   (4) window.   (5) message.

22. Which of the following statements best describes a nice to have non-functional requirement of an Automated
   Teller Machine (ATM)?
   (1) System shall facilitate users to withdraw money.
   (2) System should let users to deposit money.
   (3) System shall use 256-bit encryption for all communications.
   (4) System should provide users a touch screen interface.
   (5) System shall dispense money within 5 seconds.

23. The following symbol, appeared in a Data Flow Diagram (DFD) of a Sales Information System, represents a
   .... containing payment details.

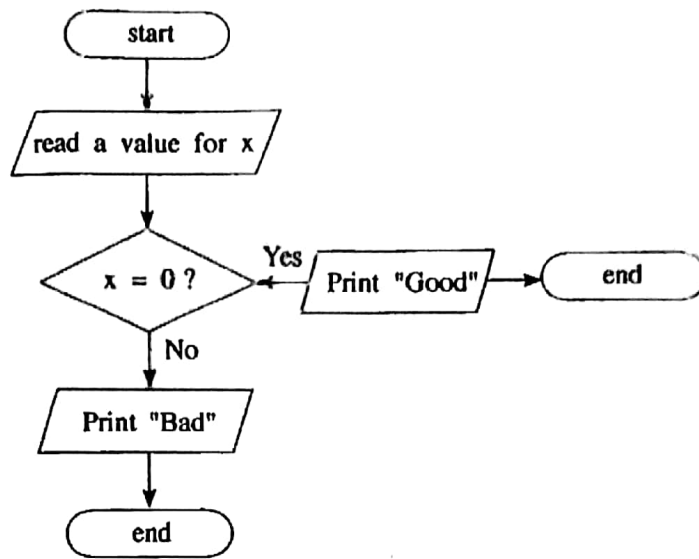 | T1(M) | Payment |
   |-------|---------|

   Which of the followings is most appropriate to fill in the blank in the above statement?
   (1) file tray   (2) cardboard file
   (3) file cabinet   (4) data file in a hard disk
   (5) temporary data file in a hard disk

24. Which of the following dataflow diagrams is correct with respect to the rules of dataflow modelling?

25. Consider the following flow chart:

What is the error with the above flow chart?

(1) It has two end symbols.
(2) Print is not a valid keyword.
(3) It has no process box.
(4) It has two print symbols.
(5) A flow direction is not correct.

26. Which of the following statements is true about e-business?
(1) It is a business process which conducts partially on online.
(2) It consists of front-end and back-end online processes.
(3) All 'brick vendors' conduct their business on online.
(4) Any e-commerce application is an e-business application.
(5) Any e-business application is an e-commerce application.

27. Students in a school are given tablet computers to improve their studies. Which of the followings is the most appropriate activity to achieve this objective?
(1) Downloading computerized study material
(2) Watching entertainment videos
(3) Instant messaging among friends
(4) Blog writing
(5) Playing computer games

28. Which of the following statements is true about Artificial Intelligence?
(1) Inference Engine in an Expert System completely mimics human decision making process.
(2) Knowledge Base in an Expert System consists only the primary knowledge of an expert.
(3) Expert systems are always implemented by using Genetic Algorithms.
(4) Genetic Algorithms provide only one solution to a given problem.
(5) Genetic Algorithm evolves a solution for a given problem over a number of iterations.

29. Which of the following statements is true about algorithms?
(1) A set of steps used to solve a problem is called an algorithm.
(2) A sequence of activities used to solve a problem is called an algorithm.
(3) To solve any problem, there can be at most one algorithm.
(4) An algorithm can contain an infinite number of steps.
(5) An algorithm does not need to terminate within a finite time.

30. Requirements of a system can be classified as Mandatory (Essential), Desirable (Optional), Functional and Non-functional.

"ATM of a bank shall not allow more than three attempts to enter a user's secret number incorrectly"

Which of the followings correctly classifies the above requirement?

(1) Mandatory, Functional
(2) Mandatory, Non-functional
(3) Desirable, Functional
(4) Desirable, Non-functional
(5) Mandatory or Desirable, Functional

• Consider the following relation to answer questions 31 and 32:

Student (index_no, national_id_no, name, date_of_birth, gender, blood_group)
where index_no is a unique attribute and the name attribute fully depends on the index_no attribute.

31. Which of the following statements is correct with respect to, the normal form of the above relation?
   (1) It is in the zero normal form.   (2) It is in the first normal form.
   (3) It is in the second normal form.   (4) It is in the third normal form.
   (5) Its normal form cannot be decided.

32. Which of the followings can be a candidate key of the above relation?
   (1) national_id_no (2) name   (3) date_of_birth (4) gender   (5) blood_group

• Consider the following relations to answer questions 33 to 36:

book (book_no, title, publisher, edition)
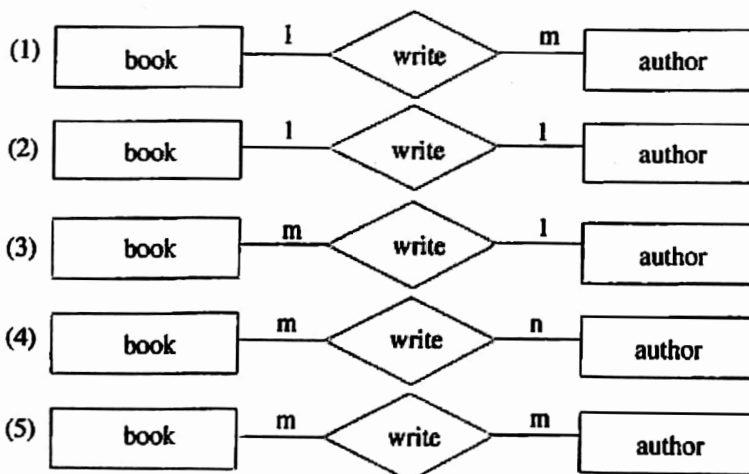author (author_id, name, email_address)
bookAuthor (book_no, author_id)
where book_no and author_id are unique attributes in the relations book and author respectively.

33. Which of the following statements is correct with respect to the relation bookAuthor?
   (1) book_no is the primary key.   (2) author_id is the primary key.
   (3) Any single attribute can be a candidate key. (4) author_id is a candidate key.
   (5) book_no is a part of the primary key.

34. Which of the following Entity Relationship (ER) diagrams correctly represents the relationship between the entities represented by the above relations?

(1) book —1— write —m— author

(2) book —1— write —1— author

(3) book —m— write —1— author

(4) book —m— write —n— author

(5) book —m— write —m— author

35. Assume that above relations are converted into tables in a relational database. The following SQL query is executed on the database:

SELECT * FROM bookAuthor

Which of the following statements is correct regarding the output of the above SQL query?
   (1) It cannot be an empty table.
   (2) title column is in it.
   (3) name column is in it.
   (4) All the tables book, author and bookAuthor are used to produce the output.
   (5) All records in the bookAuthor table are in the output.

36. Consider the following statements regarding the Data Definition Language (DDL) used to create the table bookAuthor while maintaining data integrity:

   A - It has a primary key constraint.
   B - It has a foreign key constraint.
   C - It has a domain constraint.

   Which of the above statement/s is/are correct?
   (1) A only   (2) A and B only   (3) A and C only
   (4) B and C only   (5) All A, B and C

37. Which of the following organs is a part of a closed system of the human body?
    (1) Eye   (2) Ear   (3) Heart   (4) Kidney   (5) Lung

38. Which of the following statements is correct?
    (1) Application software load applications into the main memory.
    (2) The programs stored in ROM are known as system software.
    (3) System software support data communication between peripheral devices.
    (4) Utility software is generally stored in ROM.
    (5) Utility software are incorporated in washing machines.

39. Consider the following data input devices:
    A - On screen keyboard (virtual keyboard)
    B - Bar code reader
    C - Magnetic card reader
    Which of the above devices can be used to input data more efficiently?
    (1) A only   (2) B only   (3) C only   (4) A and B only   (5) B and C only

40. Consider the following statements regarding CSS used in HTML:
    A - One style sheet can define the rendering of HTML elements in multiple documents.
    B - No additional download is needed to import style sheets.
    C - The HTML document must include a <link> tag.
    D - The style attribute is required in the relevant element.

    Which of the above statements are correct when using External Style Sheets?
    (1) A and B only   (2) A and C only   (3) B and D only
    (4) A, C and D only   (5) B, C and D only

41. Which of the following statements about Python data types/expressions is correct?
    (1) String is a mutable data type.
    (2) List is an immutable data type.
    (3) [1, 2, 3] is a tuple.
    (4) The expression [1, 2, 3] [1] will produce [2] when executed.
    (5) The type of {'a':1, 1:(1, 2)} is a Dictionary.

42. Consider the following values:
    A - 2.3e2
    B - TRUE
    C - "This isn't a string"
    D - "
    Which of the above values are valid in Python?
    (1) A and B only   (2) A and C only   (3) B and C only
    (4) A, B and C only   (5) A, C and D only

43. Consider the following Python statement:
    temp = [1, 2, 3, 4, 5, 6] [2::2]
    Which of the followings is the value of the variable temp after executing the above statement?
    (1) 2, 4, 6   (2) 3, 5   (3) [2, 3]   (4) [3, 5]   (5) [2, 4, 6]

44. Consider the following statements:
    A -   a = b = 2 + 3
    B -   a, b = 2, 3
    C -   a, b = (2, 3)
    D -   a = (2, 3)
    Which of the above are valid assignment statements in Python?
    (1) A and B only   (2) B and C only   (3) C and D only
    (4) A, B and C only   (5) All A, B, C and D

45. Consider the following Python expressions:

A - True or False and True

B - 3 > 2 and False

C - {2, 3} == {3, 2}

D - (2, 3) == (3, 2)

Which of the above expressions would result in the Boolean value True?

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

(4) B and D only   (5) C and D only

46. The content of two files with names "in.csv" and "out.csv" are shown in the figures "Fig. 1" and "Fig. 2" respectively.

```
Ruvan, 20, 50
Ramesh, 0, 5
Raj, 10, 10
```
Fig. 1: in.csv

```
Ruvan 20 50 70
Ramesh 0 5 5
Raj 10 10 20
```
Fig. 2: out.csv

Which of the following Python programs can be used to transform the data in "in.csv" to the content of the file "out.csv"?

(1)
```
f1=open("in.csv", "r")
f2=open("out.csv", "r")
for line in f1:
    items=line.strip().split(",")
    tot=int(items[1])+int(items[2])
    print(items[0], items[1], items[2], tot, file = f2)
f1.close()
f2.close()
```

(2)
```
f1=open("in.csv", "r")
f2=open("out.csv", "w")
for line in f1:
    items=line.strip()
    tot=int(items[1])+int(items[2])
    print(items[0], items[1], items[2], tot)
f1.close()
f2.close()
```

(3)
```
f1=open("in.csv", "r")
f2=open("out.csv", "w")
for line in f1:
    items=line.strip().split(",")
    tot=int(items[1])+int(items[2])
    print(items[0], items[1], items[2], tot, file = f2)
f1.close()
f2.close()
```

(4)
```
f1=open("in.csv", "r")
f2=open("out.csv", "w")
for line in f1:
    items=line.strip().split(",")
    tot=items[1]+items[2]
    print(items[0], items[1], items[2], tot, file = f2)
f1.close()
f2.close()
```

(5)
```
f1=open("in.csv", "r")
f2=open("out.csv", "w")
for line in f1:
    items=line.strip().split(",")
    tot=int(items[1])+int(items[2])
    print(items[0], items[1], items[2], tot, file = f1)
f1.close()
f2.close()
```

47. Consider the following statements on using NAND, NOR gates over NOT, AND, OR gates when constructing logic circuits:

A - They make logic circuit design simpler.

B - They help to construct logic circuits that consume less electricity.

C - They make logic circuit construction more economical.

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) B and C only

48. Which of the following functions gives the sum of all elements in any list of integers?

(1) def f(x):
    s = x[0]
    for i in range (0, len(x)):
        s=s+i
    return s

(2) def f(x):
    s = x[0]
    for i in range (1, len(x)):
        s=s+i
    return s

(3) def f(x):
    s = 0
    for i in x:
        s=s+i
    return s

(4) def f(x):
    s = 0
    for i in x:
        s=s+ x[i]
    return s

(5) def f(x):
    s = 0
    i = 0
    while i < len(x):
        s=s+ x[i]
    return s

49. Consider the following system implementation methods:
    A - Direct
    B - Pilot
    C - Parallel

    Which of the above method(s) is/are generally used to implement a home security system?
    (1) A only   (2) B only   (3) C only
    (4) A and B only   (5) A and C only

50. Consider the following clauses:
    A - can response to relevant environment changes
    B - always acts according to well-defined user instructions
    C - performs only pre-defined set of tasks
    D - can make decisions under incomplete information

    Which of the above can be considered as properties of software agent system?
    (1) A and B only   (2) A and C only   (3) A and D only
    (4) B and C only   (5) C and D only

* * *