අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2013 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2013 ஓகஸ்ட்
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නව නිර්දේශය	
புதிய பாடத்திட்டம்	
New Syllabus	

තොරතුරු හා සන්නිවේදන තාක්ෂණය   **I**
தகவல், தொடர்பாடல் தொழினுட்பவியல்   **I**
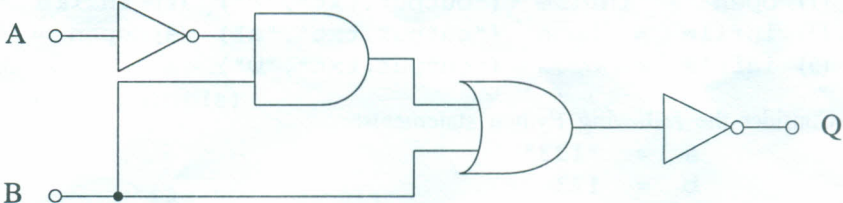**Information & Communication Technology I**   **20 E I**

පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Instructions:

* Answer **all** the questions.
* Write your **Index Number** in the space provided in the answer sheet.
* Use of calculators is **not** allowed.
* Instructions are 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 with a cross** (✕) in accordance with the instructions given on the back of the answer sheet.

1. The Boolean expression $(x + y) . (x + z)$ simplifies to ....
   (1) x   (2) $x . (y + z)$ (3) $x . y . z$ (4) $x + y . z$ (5) $x + y + z$

2. Which of the following Boolean expressions represents the output (Q) of the circuit shown below?
   A and B are inputs.

   (1) $A'.B' + A.B'$
   (2) $A'.B' + A.B$
   (3) $A.B + A'.B'$
   (4) $A'.B + A.B'$
   (5) $A'.B + A'.B'$

3. A high speed temporary storage, which is a part of the microprocessor that holds data and instructions during the execution, is called ....
   (1) Registers.   (2) RAM.   (3) Virtual Memory.
   (4) EPROM.   (5) Flash Memory.

4. Microprocessors are usually compared by their clock speed, measured in .... or by their word size, measured in .... that can be processed in a single clock cycle. Which of the following is most appropriate to fill the blanks in the above statement?
   (1) Bits, Megahertz   (2) Bytes, Gigahertz   (3) Gigahertz, Bytes
   (4) Megahertz, Bits   (5) Seconds, Bits

5. Typically the cache memory is used to store ....
   (1) a large volume of data temporarily.   (2) the least frequently accessed data permanently.
   (3) the least frequently accessed data temporarily.   (4) the most frequently accessed data temporarily.
   (5) the most frequently accessed data permanently.

6. Sharing a single microprocessor among number of application programs using context switching is known as
   (1) Multi-user processing.   (2) Multitasking.   (3) Multiprocessing.
   (4) Batch processing.   (5) Online processing.

7. Babbage's Difference Engine is based on ....
   (1) mechanical technology.   (2) vacuum tube technology.
   (3) transistor technology.   (4) Integrated Circuit (IC) technology.
   (5) Very Large Scale Integrated (VLSI) Circuit technology.

8. Which of the following components is located outside the microprocessor?
   (1) Arithmetic Logic Unit (ALU)   (2) RAM
   (3) Control Unit   (4) Registers
   (5) Level 1 cache memory

[see page two

9. Which of the following is an **incorrect** Karnaugh Map layout to represent a Boolean function of four (4) Boolean variables a, b, c and d?

(1)

ab\cd	01	00	10	11
01				
00				
10				
11				

(2)

ac\bd	01	00	10	11
01				
00				
10				
11				

(3)

ab\cd	01	00	11	10
01				
00				
11				
10				

(4)

ad\bc	11	10	00	01
11				
10				
00				
01				

(5)

ac\bd	00	10	11	01
00				
10				
11				
01				

10. What is the output of the following Python program?

```
s = "Nimal Perera"
print(s[1:3])
```

(1) Ni   (2) im   (3) ra   (4) er   (5) Pe

11. Which of the following is a valid Python statement that can be used to open a file called "output.txt" so that new data can be added to the end of the file without deleting its original content?

(1) open = infile ("output.txt","r")   (2) infile = open ("output.txt","r")
(3) infile = open ("output.txt","a")   (4) open = infile ("output.txt","a")
(5) infile = open ("output.txt","w")

12. Consider the following Python statements:

```
a = "123"
b = 123
c = ['a',2,(1,2,3)]
```

What are the data types of the variables a, b and c, respectively?

(1) List, Integer, String   (2) String, Integer, List   (3) Integer, Integer, List
(4) String, String, String   (5) String, Float, Tuple

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

```
x = 6
while x > 0:
    x = x - 2
    print(x, end = ' ')
```

(1) 6   (2) 4 2   (3) 2 4 6   (4) 4 2 0   (5) 0

14. Which of the following is an invalid Python identifier?

(1) _name   (2) Name   (3) Name_   (4) 6Name   (5) _6_names

15. Consider the following Python program:

```
a = [1, 2]
b = [3, 4]
c = a + b
print(c)
```

What is the output?

(1) [4,6]   (2) 10   (3) [1,2,3,4]   (4) [[1,2],[3,4]]   (5) [1,2]+[3,4]

16. What is the value after executing the Python expression $10 - 3 * 2 + 2.0$?

(1) 16   (2) 16.0   (3) 6   (4) 6.0   (5) 28

17. Which of the following is a syntactically correct Python program?

```
(1) def max(a, b)         (2) def max(a, b):        (3) def max(a, b)
        if(a > b)                 if(a > b):                if(a > b) then return a
            return a                  return a              else return b
        else                      else:
            return b                  return b
```

```
(4) def max(a, b)         (5) function max(a, b):
        if(a > b):                if(a > b):
            return a                  return a
        else:                     else:
            return b                  return b
```

● Use the following flowchart to answer the questions **18** and **19**.

18. What is the output of the algorithm represented by this flowchart?
    (1) 0
    (2) 5
    (3) 4
    (4) 10
    (5) 15
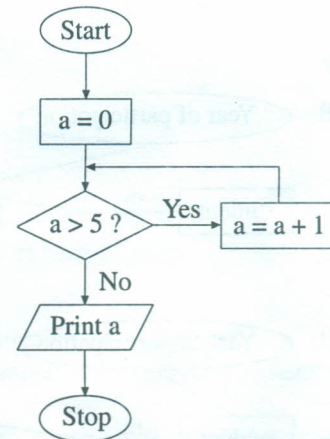
19. Which of the following Python programs correctly represents this flowchart?

```
(1) a = 0                 (2) a = 0
    while (a > 5):            while (a > 5):
        a = a + 1                a = a + 1
        print(a)             print(a)
```

```
(3) a = 0                 (4) a = 0
    while not (a > 5):       while not (a > 5):
        a = a + 1                a = a + 1
    print(a)                 print(a)
```

```
(5) a = 0
    while (a < = 5):
        a = a + 1
        print(a)
```

```
        ( Start )
            │
            ▼
        ┌───────┐
        │ a = 0 │
        └───────┘
            │
            ▼
        ╱ a > 5 ? ╲  Yes   ┌───────────┐
        ╲         ╱ ─────► │ a = a + 1 │
            │              └───────────┘
            │ No
            ▼
        ╱ Print a ╱
            │
            ▼
        ( Stop )
```

20. The binary number equivalent to the 25_{10} is
    (1) 0100101.   (2) 0100111.   (3) 0011001.   (4) 0010110.   (5) 0010111.

21. $124_8 + 165_8 =$
    (1) 201_8 (2) 289_{10} (3) 289_8 (4) 311_8 (5) 389_8
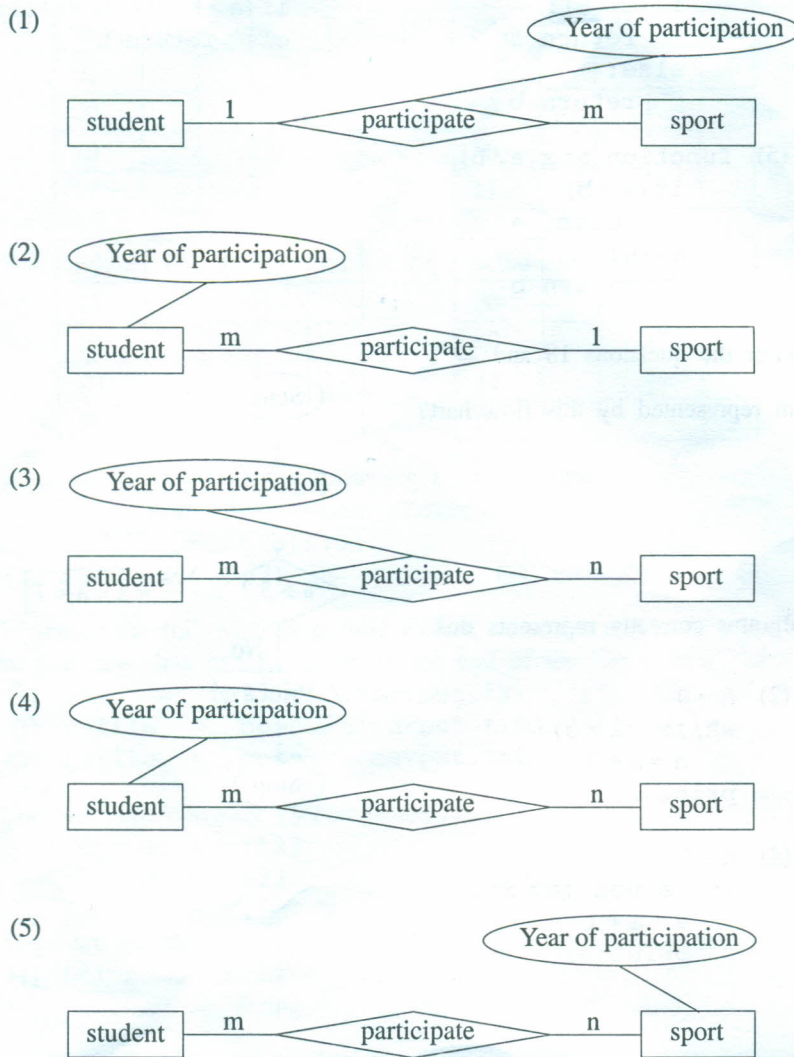
22. Consider the following attributes related to business:
    A - Speed of services
    B - Purchase and distribution
    C - Security of goods sent
    D - Confidence in quality of items ordered
    Which of the above is/are disadvantage(s) of e-business?
    (1) A only   (2) C only   (3) A and B only
    (4) C and D only   (5) All A, B, C and D

23. Which of the following is the most appropriate Entity Relationship (ER) diagram to represent students' participation in different sports in school?

(1)

```
                              ( Year of participation )
                             /                        \
[ student ]----1----< participate >----m----[ sport ]
```

(2)

```
( Year of participation )
      \
[ student ]----m----< participate >----1----[ sport ]
```

(3)

```
( Year of participation )
      \         /
[ student ]----m----< participate >----n----[ sport ]
```

(4)

```
( Year of participation )
      \
[ student ]----m----< participate >----n----[ sport ]
```

(5)

```
                              ( Year of participation )
                                              \
[ student ]----m----< participate >----n----[ sport ]
```

24. Which of the following can be considered as an expert system?
    (1) A bank teller machine   (2) A fully automatic washing machine
    (3) A microwave oven   (4) A diagnosis system of a health care facility
    (5) An electronic blood pressure meter

25. Which of the following is a testing strategy which considers the internal implementation of a program into account?
    (1) Black box testing   (2) White box testing   (3) Integration testing
    (4) Acceptance testing   (5) Unit testing

26. Which of the following information system development models has an extremely short and linear development process?
    (1) Waterfall model   (2) Object-Oriented model
    (3) Spiral model   (4) Incremental Development model
    (5) Rapid Application Development model

27. Which of the following is correct with respect to a relational database?
    (1) Any subset of Alternate Keys is called Candidate Key.
    (2) A Primary Key is selected from Alternate Keys.
    (3) A Foreign Key is an Alternate Key.
    (4) Always Primary Key and Foreign Key are combined to create a Compound Key.
    (5) Primary Key and Foreign Key establish the relationship between two tables.

28. Consider the following data flow diagram:
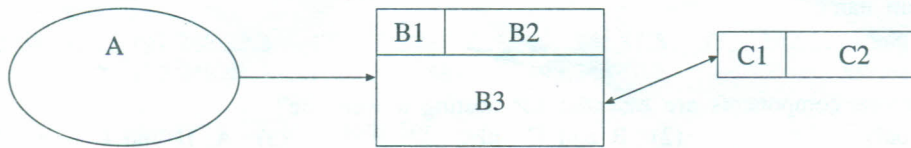
In the above data flow diagram A, B3 and C2 represent .... respectively.
Which of the following terms is the most appropriate to fill the blank?
(1) a process, an external entity and a data store
(2) an external entity, a process and a data store
(3) an external entity, a data store and a process
(4) a data store, a process and an external entity
(5) a data store, an external entity and a process

29. Consider the following systems in a human body:
    A - respiratory system
    B - digestive system
    C - nervous system
    D - blood circulatory system
Which of the above are closed systems?
(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

30. Which of the following statements best describes a non functional requirement of a system?
(1) A user shall be able to measure the blood pressure using an electronic blood pressure meter.
(2) A microwave oven should not exceed its temperature above 400° C.
(3) An electronic calculator should be able to compute square root of a given positive integer.
(4) An Automatic Teller Machine of a bank shall be able to check the validity of an ATM card.
(5) An internet banking system shall provide balance inquiry facility to its customers.

31. Which of the following statements is true with regard to data and information?
(1) Decision can be made only when a massive volume of data is available.
(2) Validity of information depends on the accuracy of data.
(3) Information obtained by processing data is always accurate.
(4) In order to obtain information, data must be collected from multiple sources.
(5) The accuracy of information depends only on the accuracy of input data.

32. Consider the following techniques:
    A - Computer Aided Learning (CAL)
    B - Computer Based Learning (CBL)
    C - Computer Based Assessment (CBA)
Which of the above techniques is/are used in ICT based Teaching and Learning?
(1) A only   (2) B only   (3) A and B only
(4) B and C only   (5) All A, B and C

33. The generation of monthly salary slips of employees in an organization is an example for
(1) Batch processing.   (2) Real time processing.   (3) Online processing.
(4) Transaction processing.   (5) Interactive processing.

34. Consider the following statements about Firmware:
    A - Firmware is the program required to bootup a computer system.
    B - Firmware is incorporated in washing machines.
    C - Firmware can be easily changed later on.
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

35. Consider the following components:
    A - Web authoring tool
    B - Domain name
    C - Web pages
    D - Web server

    Which of the above components are essential for hosting a web site?
    (1) A and B only   (2) B and C only   (3) A, B and C only
    (4) A, C and D only   (5) B, C and D only

36. Which of the following tag is used to render a heading on an HTML page?
    (1) <h2>   (2)   (3)   (4) <hr>   (5) <td>

37. Which of the following could be used to define a new markup language for sharing information?
    (1) CSS   (2) XML   (3) HTML   (4) XHTML   (5) JavaScript

38. Consider the following HTML code segment:

    ```
    <dl>
    <dt>Teacher</dt>
    <dd>A person who teaches in a school.</dd>
    <dt>Student</dt>
    <dd>A person who is studying at a school</dd>
    </dl>
    ```

    Which of the following shows the correct rendering of the above HTML code segment?

    (1)
    ```
    Teacher
        A person who teaches in a school.
    Student
        A person who is studying at a school
    ```

    (2)
    ```
    Teacher
    - A person who teaches in a school.
    Student
    - A person who is studying at a school
    ```

    (3)
    ```
    Teacher
        : A person who teaches in a school.
    Student
        : A person who is studying at a school
    ```

    (4)
    ```
    Teacher
        : A person who teaches in a school.
    Student
        : A person who is studying at a school
    ```

    (5)
    ```
    Teacher
        - A person who teaches in a school.
    Student
        - A person who is studying at a school
    ```

39. Which of the following statements is correct with regard to HTML tags?
    (1) The <br> is used to render a blank line before and after the text.
    (2) The <p> is used to render a blank line before and after the text.
    (3) The <br> is used to render a blank line before the text.
    (4) The <p> is used to render a blank line only before the text.
    (5) The <p> is used to render a blank line only after the text.

40. Consider the following HTML code segments:
    A - <embed height="50" width="100" src="song.mp3"></embed>
    B - Song
    C - <embed height="50" width="100" href="song.mp3"></embed>

    Which of the above code fragment(s) can be used to embed the audio file named 'song.mp3' in a web page?
    (1) A only   (2) B only   (3) C only   (4) A and B only   (5) B and C only

41. What is the main function of a PROXY server in Internet communication?
    (1) Allocate and release IP addresses   (2) Translate domain names to IP addresses
    (3) Protect a network from viruses   (4) Provide printing services to users
    (5) Share an Internet connection among several computers

42. An organization has been allocated a Class C IP address range having a subnet mask of 255.255.255.0. If the organization is to setup a web server and an email server, what are the IP addresses that can be allocated to these two servers?
    (1) 192.248.87.2, 192.248.32.3   (2) 192.248.87.4, 192.248.87.5   (3) 192.248.32.3, 192.248.33.3
    (4) 192.248.40.2, 192.248.41.3   (5) 192.248.87.1, 192.248.60.2

43. In communication networks, ISDN stands for
    (1) Integrated Service Domain Name.   (2) Internet Service Directory Name.
    (3) Integrated Service Digital Network.   (4) Internet Service Digital Network.
    (5) Integrated Service Domain Network.

44. In the OSI reference model, detection of errors during communication between two computers in a network is a function of the ....
    (1) physical layer.   (2) data link layer.   (3) network layer.
    (4) transport layer.   (5) application layer.

45. The command that can be used to login to a remote computer through a network is
    (1) ipconfig.   (2) ftp.   (3) telnet.   (4) tracert.   (5) route.

46. Which of the following devices can be used to connect two physical networks having IP addresses 72.110.0.0 (subnet mask 255.255.0.0) and 192.248.10.0 (subnet mask 255.255.255.0)?
    (1) Hub   (2) Repeater   (3) Switch   (4) Router   (5) Multiplexer

47. Consider the following statements regarding relational databases:
    A - Changing the column order of relations in a database structure does not necessarily require changes in application programs.
    B - Main objective of normalization of databases is to reduce data redundancy.
    C - Adding new data to the database always requires changes to the existing programs.
    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

48. Ubiquitous Computing is a/an .... computing environment. The user will be able to use both .... and .... services.
    Which of the following is most appropriate to fill the blanks in the above statement?

    (1) everywhere, mobile, local   (2) everywhere, local, remote   (3) everywhere, local, paid
    (4) virtual, local, remote   (5) virtual, mobile, global

49. What is the two's complement of -6_{10}?
    (1) 11111010   (2) 00000110   (3) 11111001   (4) 01011111   (5) 00000101

50. Consider the following two relations:
        student(stdNo, name)
        courseMarks(courseId, stdNo, marks)
    Which of the following SQL (Structured Query Language) statements on the above relations is syntactically correct?
    (1) select stdNo, marks from student, courseMarks
    (2) select * from student and courseMarks
    (3) select s.stdNo and c.marks from student s, courseMarks c
    (4) select student.stdNo, courseMarks.marks from student, courseMarks
        where student.stdNo = courseMarks.stdNo
    (5) select student.stdNo and courseMarks.marks from student and courseMarks
        where student.stdNo = courseMarks.stdNo

* * *

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