

සියලු ම හිමිකම් ඇවිරේ / මුද්‍රය් පතිප්‍රාග්‍රහණය කළ යුතුය / All Rights Reserved]

අධ්‍යයන පොදු සහතික පත්‍ර (ලක්ශ පෙළ) විභාගය, 2015 අගෝස්තු කළවිප පොතුත් තරාතරප පත්තිර (ඉයර තරප පරිශාස, 2015 ඕකස්ස් General Certificate of Education (Adv. Level) Examination, August 2015

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தகவல், தொடர்பாடல் தொழினுட்பவியல்	I
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20 E I

ஆய எட்கடி
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. Charles Babbage is considered as the “father of the computer” by some people. That is because he
 - (1) invented the mechanical calculator Pascaline.
 - (2) invented the first re-programmable electronic computing machine.
 - (3) took the leadership in building the first personal computer at IBM.
 - (4) introduced the concept of “Input, Process and Output” that is used in modern computers, for the first time.
 - (5) is the founder of the first electronic digital computer ENIAC (Electronic Numerical Integrator And Computer).
 2. The first generation computers were based on
 - (1) Very Large Scale Integration (VLSI) technology.
 - (2) Large Scale Integration (LSI) technology.
 - (3) Integrated Circuits (ICs).
 - (4) Transistors.
 - (5) Vacuum tubes.
 3. The decimal number equivalent to 110110_2 is
 - (1) 39.
 - (2) 48.
 - (3) 54.
 - (4) 55.
 - (5) 108.
 4. Consider the following list rendered by a web browser:
 1. Pineapple
 2. Mango
 3. Banana

Which of the following HTML tags can be used to create the above list?

- (1) <dd> (2) <d1> (3) (4) <o1> (5)

5. Random Access Memory (RAM) modules are often compared by their capacity, measured in and by their speed, measured in

Most suitable words to fill the blanks of the above statements are respectively

6. An application which requires more memory space than the maximum memory space available in the primary memory of a computer is ready for execution. Which of the followings is used by the operating system of that computer to satisfy this need?

- | | |
|---|--|
| (1) Random Access Memory (RAM)
(3) Cache Memory
(5) Extended Memory | (2) Read Only Memory (ROM)
(4) Virtual Memory |
|---|--|

7. $48B_{16} + 00101011_2 =$
(1) $4B6_{16}$ (2) 310_{16} (3) 503_{16} (4) 513_{16} (5) 559_{16}

25. Consider the following statements about the World Wide Web (WWW):

- A - It is a collection of interlinked, hypertext documents accessed via the Internet.
- B - It is a protocol for distributing information via computers connected to the Internet.
- C - It was invented by the World Wide Web Consortium (W3C).

Which of the above statement(s) is/are correct?

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

26. Consider the following statements on Dynamic Random Access Memory (DRAM) and Static Random Access Memory (SRAM):

- A - Registers are made of DRAM
- B - DRAM is faster than SRAM
- C - DRAM is more dense than SRAM

Which of the above statement(s) is/are correct?

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

27. ABC Holdings is a manufacturing organization in Sri Lanka which has its head office in Japan. What is the most convenient method to conduct weekly progress review meetings between the local staff in Sri Lanka and the senior management team in Japan?

- (1) Telephone calls (2) Skype (3) E-mail (4) SMS (5) YouTube

• Questions 28 to 31 are based on an algorithm represented by the following flow chart.

28. Consider the following statements:

- A - This algorithm takes only a single input.
- B - This algorithm does not have any repetition(loop).
- C - If the user inputs -1 for X, the algorithm will not terminate.
- D - When the user inputs for X, the algorithm will not terminate till the user enters another value.

Which of the above statement(s) is/are correct?

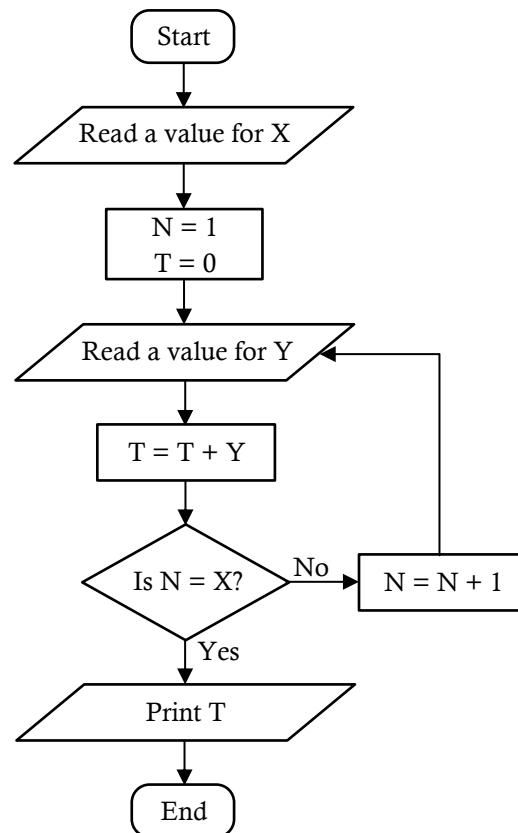
- (1) A only (2) A and B only (3) A and D only
 (4) B and C only (5) C and D only

29. The algorithm represented by the flowchart is considered as a poor algorithm because it does **not**

- (1) terminate for some input values.
- (2) contain finite number of steps.
- (3) specify the next step to be performed at least for a one step of the algorithm.
- (4) consist of a sequence of steps.
- (5) contain any variable type declarations.

30. The algorithm terminates

- (1) for input value 5.
- (2) when values 0,5,4 are given as input one after the other.
- (3) by printing the value 5 when it is given the input values 2,5,4 one after the other.
- (4) by printing the value 4 when it is given the input values 2,5,4 one after the other.
- (5) by printing the value 9 when it is given the input values 2,5,4 one after the other.



31. Which of the following Python programs implements the behaviour of the flowchart?

- ```
(1) x = int(input("Enter a value : "))
n = 1
t = 0
while n <= x:
 y = int(input("Enter the next value: "))
 t = t + y
 n = n + 1
print(t)
```
- 
- ```
(2) x = int(input("Enter a value : "))
n = 1
t = 0
while n <= x:
    y = int(input("Enter the next value: "))
    t = t + y
    n = n + 1
print(t)
```
-
- ```
(3) x = int(input("Enter a value : "))
n = 1
t = 0
iterate = True
while n != x:
 y = int(input("Enter the next value: "))
 t = t + y
 n = n + 1
print(t)
```
- 
- ```
(4) x = int(input("Enter a value : "))
n = 1
t = 0
while n != x:
    y = int(input("Enter the next value: "))
    t = t + y
    n = n + 1
print(t)
```
-
- ```
(5) x = int(input("Enter a value : "))
n = 1
t = 0
iterate = True
while iterate:
 y = int(input("Enter the next value: "))
 t = t + y
 if n == x:
 iterate = False
 else:
 n = n + 1
print(t)
```

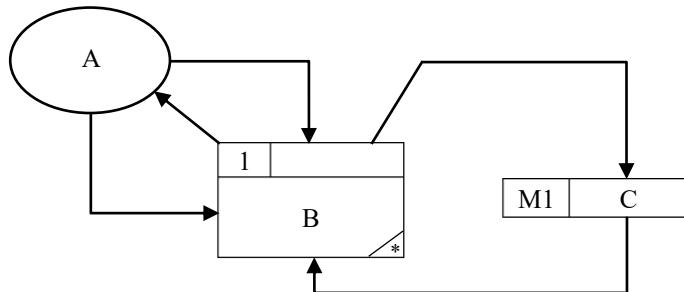
32. Consider the following statement regarding an Automatic Teller Machine (ATM) of a bank:

“System shall dispense cash in less than 10 seconds.”

Which of the following is correct with respect to the above statement?

- (1) This is an essential non-functional requirement.
- (2) This is a nice to have non-functional requirement.
- (3) This is an essential functional requirement.
- (4) This is a nice to have functional requirement.
- (5) This is not a requirement of the system.

33. Consider the following Data Flow Diagram:



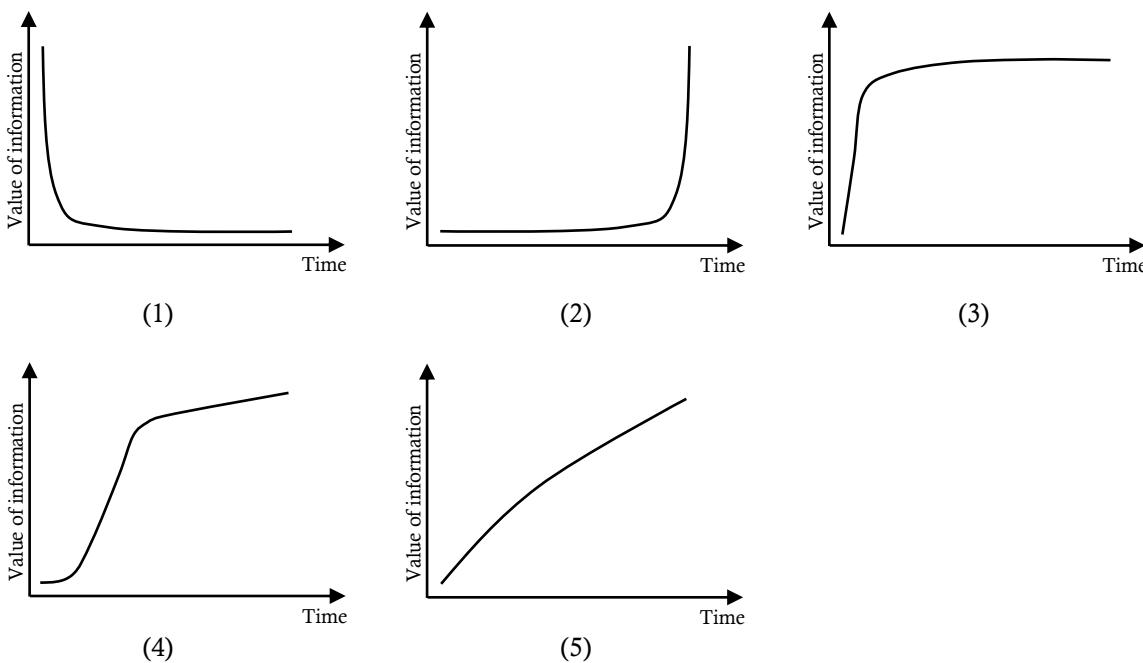
According to the Structured System Analysis and Design Methodology (SSADM), the components A, B and C in the above diagram represent..... respectively.

- (1) an external entity, a process and a data flow
- (2) a process, an entity and a data store
- (3) a user, a process and a table in an electronic database
- (4) a user, a function and a table in an electronic database
- (5) an external entity, a process and a data store

34. Which of the following statements is correct with respect to openness and closeness of a system?

- (1) An Automatic Teller Machine of a bank should be a close system.
- (2) A general purpose computer can be considered as an open system.
- (3) Human blood circulatory system is an open system.
- (4) A mobile phone is a close system.
- (5) A solar power generation system is a close system.

35. Which of the following graphs illustrates the Golden rule of information?



• Consider the following relations to answer questions from 36 to 38.

programmer (programmerId, programmerName, gender, NIC, mobilePhoneNumber, degree, universityName)  
 client(clientId, clientName, address, telephoneNumber)  
 project(projectId, projectName, clientId, startDate, endDate, cost)  
 workFor(programmerId, projectId, startDate, endDate)

36. Consider the following statements:

- A - A programmer works for at most one project at any given time.
- B - A programmer is assigned to a single client at any given time.
- C - One client can have more than one project.

Which of the above statement(s) is/are **always** correct?

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

37. Which of the following is correct with respect to attributes of the relations?

- (1) Attributes gender, NIC and mobilePhoneNumber are candidate keys of programmer relation.
- (2) Attribute startDate is a derived attribute.
- (3) Attribute NIC can be considered as an alternate key for the programmer relation.
- (4) Attribute startDate is a foreign key for the workFor relation.
- (5) Each record in the workFor relation can be uniquely identified by using projectId.

38. Which of the following is correct?

- (1) All relations are in 3<sup>rd</sup> normal form.
- (2) All relations except the programmer are in the 3<sup>rd</sup> normal form.
- (3) All relations except the client are in the 3<sup>rd</sup> normal form.
- (4) All relations except the project are in the 3<sup>rd</sup> normal form.
- (5) All relations except the workFor are in the 3<sup>rd</sup> normal form.

39. Consider the following database constraints:

- A - Primary key
- B - Data type
- C - Foreign key

Which of the above constraint/s does/do **not** allow users to duplicate data in a database table?

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

• Consider the following four relational database tables to answer questions 40 and 41.

**item table**

| item | product |
|------|---------|
| T001 | Laptop  |
| T002 | TV      |
| T003 | Camera  |

**item table**

| supplier | name                   |
|----------|------------------------|
| S001     | BeLap Company Ltd.     |
| S002     | DigiTV trading company |

**itemSupplier table**

| item | supplier |
|------|----------|
| T001 | S001     |
| T002 | S001     |
| T002 | S002     |

**delivery table**

| item | supplier | batch | quantity | date     |
|------|----------|-------|----------|----------|
| T001 | S001     | B01   | 450      | 1.5.2015 |
| T002 | S001     | AB1   | 45       | 1.5.2015 |
| T001 | S001     | B02   | 500      | 2.5.2015 |
| T001 | S002     | C01   | 75       | 5.5.2015 |

40. Which of the following actions is taken by a database management system when the SQL statement “delete from item” is executed?

- (1) It will ask the user to select records for deletion.
- (2) It may delete all the records from the 'item' table.
- (3) It will drop the 'item' table.
- (4) It will not delete any record from the 'item' table.
- (5) The SQL statement will not be executed since it has errors.

41. Which of the following is correct with respect to the above tables?

- (1) All the tables are in third normal form.
- (2) Normalization has been applied to these tables.
- (3) Integrity constraints are correctly applied to these tables.
- (4) There is no evidence to say that integrity constraints are properly applied.
- (5) Normalization and integrity constraints are properly applied.

42. What is the two's complement representation of  $6_{10}$ ?

- (1) 11111010      (2) 00000110      (3) 11111001      (4) 01011111      (5) 00000101

43. A file of 1 MB has been successfully sent from the machine X to machine Y in a network over a TCP connection. It has been observed that the 10<sup>th</sup> byte of the file has passed through the router R. Consider the following statements regarding this communication:

- A - The 10,000<sup>th</sup> byte must have gone through the router R after the 10<sup>th</sup> byte.
- B - The 10,000<sup>th</sup> byte must have gone through the same path from X to Y as the 10<sup>th</sup> byte.
- C - The 10,000<sup>th</sup> byte may or may not have gone through the router R.

Which of the above statement(s) is/are correct?

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

- Questions from **44** to **47** are based on the following Python program.

```
Program - p1.py
temp = [23,45,2,-2.0]

def f(b):
 n1,n2 = b[0],b[0]
 for m in b:
 if(m > n1):
 n1 = m
 if(m < n2):
 n2 = m
 return n1, n2

print(f(temp))
```

- 44.** Consider the following statements about this Python code:

- A - It contains a comment.
  - B - It contains a definition of a function.
  - C - It does **not** contain any selections.
  - D - It does **not** contain any iterations.

Which of the above statements are correct?



45. What is the data type of the variable **temp** in this Python code?

- (1) Integer      (2) Float      (3) Boolean      (4) Tuple      (5) List

46. What is the return data type of the function named " f "?

- (1) Integer      (2) Float      (3) Boolean      (4) Tuple      (5) List

47. Which of the following value/s is/are in the output of the above program?

- (1) 23 and 45      (2) 45 and -2      (3) -2 and 0      (4) 0      (5) 23

- 48.** Consider the following Python program:

```
temp = [23,45,2,-2,0]
print(temp[::2])
```

What is the output of the above program?

- (1) [23,45]      (2) [-2,0]      (3) [23,2,0]      (4) [2,-2,0]      (5) [23,45,2,-2,0]

49. Which of the following is **incorrect** about software agents?

- (1) They exhibit some degree of autonomy.
  - (2) They are a subset of reactive systems.
  - (3) They are proactive in terms of their ability to exhibit goal-directed behaviour.
  - (4) Electronic commerce is one of the key application areas of them.
  - (5) They are always cooperative in a multi-agent environment.

- 50.** Which of the following is/are examples for artificial intelligence techniques?

- A - Neural Networks  
B - Genetic Algorithms  
C - Ubiquitous Computing

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

10

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|                                                   |    |
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| தொற்றுரை கு சுன்னிலேடின தூக்குநியை                | II |
| தகவல், தொடர்பாடல் தொழினுட்பவியல்                  | II |
| <b>Information &amp; Communication Technology</b> | II |



ஆய நினை  
மூன்று மணித்தியாலம்  
*Three hours*

**Index No. :** .....

### **Important:**

- \* This question paper consists of 09 pages.
  - \* This question paper comprises of two parts, **Part A** and **Part B**. The time allotted for both parts is three hours.
  - \* Use of calculators is **not allowed**

## **PART A – Structured Essay:**

(pages 2-6)

- \* Answer all the questions on this paper itself. Write your answers in the space provided for each question. Note that the space provided is sufficient for your answers and that extensive answers are not expected.

## **PART B – Essay:**

(pages 7-9)

- \* This part consists six questions, of which, four are to be answered. Use the papers supplied for this purpose.
  - \* At the end of the time allotted for this paper, tie the two parts together so that Part A is on top of Part B before handing them over to the Supervisor.
  - \* You are permitted to remove only Part B of the question paper from the Examination Hall.

**For Examiner's Use Only**

## For the Second Paper

| For the Second Paper |              |       |
|----------------------|--------------|-------|
| Part                 | Question No. | Marks |
| A                    | 1            |       |
|                      | 2            |       |
|                      | 3            |       |
|                      | 4            |       |
| B                    | 1            |       |
|                      | 2            |       |
|                      | 3            |       |
|                      | 4            |       |
|                      | 5            |       |
|                      | 6            |       |
| Total                |              |       |

## Final Marks

|            |  |
|------------|--|
| In numbers |  |
| In words   |  |

## **Code Number**

|                    |  |
|--------------------|--|
| Marking Examiner 1 |  |
| Marking Examiner 2 |  |
| Marks checked by : |  |
| Supervised by :    |  |

**Part A – Structured Essay***Answer all four questions on this paper itself*Do not  
write  
in this  
column

1. (a) Consider the web form given in the figure which has been developed for sending text messages from a web application.

## Send Text Message

Fill in all the fields and click Send Message

Phone No.:

Message:

Figure: Form used to send text messages

The partial HTML code segment given below is prepared to generate the above form. Complete the code segment to render the above form.

```

<h2>Send Text Message</h2>
<p>Fill in all the fields and click Send Message</p>
<form action="" method="POST">
 <div class = "a">
 <div class = "l"> Phone No.:</div>
 <div class = "r"><input type=..... name="phone" size="20"></div>
 </div>
 <div class = "a">
 <div class = "l">Message:</div>
 <div class = "r"><.....name="message" rows="7" cols="30">
 </.....></div>
 </div>
 <div class = "a">
 <div class = "r"><input type="submit" value=.....></div>
 </div>
</form>
```

Do not  
write  
in this  
column

- (b) A well formed syntactically correct HTML code has been developed to render a web page which includes an image of a school. However, the browser does not display the image. Instead, it only displays the text "School" which is given as the 'text' attribute of alt. Give **two** possible reasons for this behaviour.

- (i) .....  
(ii) .....

- (c) Indicate whether the following CSS rules are syntactically correct or incorrect. If a rule is incorrect write the correct version.

(i) `p {color: red}` .....

`p {font-type: Arial;}` .....

.....

(ii) `body{color: red;}` .....

`{background-color: yellow;}` .....

.....

(iii) `h1, h3{color: blue;}` .....

.....

.....



2. (a) Assume that in a particular digital device integers are represented in 8-bits two's complement form. However, the results of computations are printed in decimal.

- (i) Give the representation of  $10_{10}$  in the above device.

- (ii) Give the representation of  $-25_{10}$  in the above device.

- (iii) Explain how the computation of  $10_{10} - 25_{10}$  done by the device by using your representations given in sections (i) and (ii) above.

(iv) List the steps necessary to transform the result Obtained in section (iii) above into decimal form in order to print the answer.

Do not  
write  
in this  
column

(b) A bank offers services, such as maintaining savings and current accounts, Automatic Teller Machine (ATM) services, processing loans, leasing properties and exchanging foreign currencies to its customers. The bank has decided to introduce Internet banking facility to its customers to grant them with more control on their accounts. This will facilitate its customers to check account balance, pay bills, transfer funds to other accounts and communicate with the bank online.

(i) State **two** reasons that can discourage bank customers from using Internet banking services.

(ii) Do you agree that providing the proposed Internet banking services is a B2C business type? Justify your answer.

(iii) The bank has realized that a significant number of loan applications they receive from their customers are getting rejected at the initial screening. Therefore, the management thinks that their customers could be provided with an expert system based loan pre-processing tool so that the customer disappointments could be reduced while saving bank staff's time. Do you agree with this idea? Justify your answer.



3. (a) Albert Einstein quoted "Energy cannot be created or destroyed; it can only be changed from one form to another."
- (i) State whether the process of changing energy from one form to another is a close system.

Do not  
write  
in this  
column

(ii) State a reason to justify your answer given for (a) (i), above.

- (b) Consider the following Data Definition Language (DDL) statement to answer the questions b (i) and b (ii).

```
CREATE TABLE unit (
 instituteCode varchar(10) NOT NULL,
 unitCode varchar(10) NOT NULL,
 unitTitle varchar(50) DEFAULT NULL,
 PRIMARY KEY (instituteCode,unitCode),
 FOREIGN KEY (instituteCode) REFERENCES institute(instituteCode))
```

(i) What is the primary key of the above table?

(ii) What are the integrity constraints used in the above DDL?

(c) Consider the following table:

index	name	address	class
1022	S.M.G.D. Dayasiri	No. 15, Peradeniya Road, Kandy	8 B
566	G.M.D. Priyangani	No. 147/7, Katugasthota Road, Kandy	11 C
923	F.D.C. Jayasingha	“Sadasiri”, Colombo Road, Mawanella	10 B

Do not  
write  
in this  
column

(i) What is the cardinality of the above table?

(ii) What is the degree of the above table?

4. (a) A 32-bit computer has a byte addressable main memory. The computer uses 32-bit addresses to access any byte in its memory. It is observed that a maximum of 4 GB memory is available for a process even after the main memory is replaced by an 8 GB memory. Explain, with all the calculations, why this happens.



- (b) An operating system uses seven state process transition model for process scheduling. A given process is currently in the running state of the above model. Fill the following table with the correct next possible state and condition for transitions.

Current state	Next possible state	Condition for transition
Running		



\* \*

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අධ්‍යාපන පොදු සහතික පත්‍ර (ලසක් පෙළ) විභාගය, 2015 අගෝස්තු

கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2015 ஓகஸ்ற்

## **General Certificate of Education (Adv. Level) Examination, August 2015**

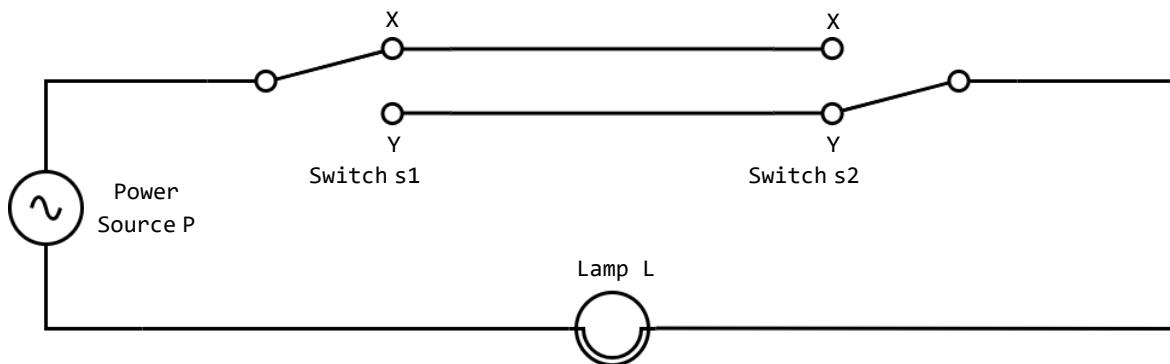
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<b>Information &amp; Communication Technology</b>	II

20 E II

## Part B

\* Answer any four questions only.

1. (a) Explain how to derive a Boolean expression from a given truth table.  
(b) In residential electrical wiring, the following circuit has been used to operate a light in a staircase.



As in the above circuit, two switches S1 and S2 are installed at the bottom and the top of the staircase to operate the lamp L. The lamp turned on by using the switch S1 at the bottom of the staircase can be turned off by using the switch S2 at the top of the staircase. Further, the lamp turned on by using switch S2 at the top of the staircase can also be turned off by using the switch S1 at the bottom of the staircase. Moreover, the lamp L turned on by a switch can be turned off by the same switch.

Assume that the connections to positions X and Y of a switch in the above circuit are represented by the truth values 1 and 0 respectively and the turned on and turned off states of the lamp L are represented by the truth values 1 and 0 respectively.

- (i) Construct a truth table to represent the functionality of the above circuit.
  - (ii) Derive a Boolean expression to represent the truth table obtained in section (i) above.
  - (iii) What is the logic gate which is equivalent to the functionality of the Boolean expression obtained in section (ii) above?
  - (iv) Construct a logic circuit for the Boolean expression obtained in section (ii) above with NOT, AND and OR gates only.

- 2.** (a) The IP address 125.214.169.218 is assigned to the server www.doenets.lk. The **ping 125.214.169.218** command issued from the machine A reported a round trip time (RTT) of 20 ms.

However, the **ping www.doenets.lk** command, issued some time later from the machine A, reported an error.

- (i) Draw a network diagram to depict the server, machine A and any other required components to describe the above scenario.

- (ii) Identify **two** possible causes for the above behaviour and explain them using the diagram developed in section (a) (i) above.

- (b) An organization has only one public IP address, 192.248.17.1, allocated to it. The organization has decided to allow web browsing on the computers on its LAN with 100 computers. It also wants to optimize the usage of its Internet connection by reducing the traffic on the link as much as possible.

Draw a network diagram to satisfy the above requirements. Explain the major decisions you made.

- 3.** The National University of Information Technology is a well-recognized university. They offer both bachelors and post-graduate degree programmes, diplomas as well as short courses in information technology and business management. All teaching of the above courses is being conducted at their sophisticated classrooms and state-of-the-art computer laboratories specifically designed to provide a student-centred interactive learning experience. The management of the university has realized that their brand name has become well known in the country as the number of inquiries they receive from far away provinces has increased. Furthermore, a recent study has revealed that their short courses and diplomas are also very popular among working professionals despite the burdens of their busy work schedules as well as the limited time available to devote for education. Hence, the management has proposed to start a distance education programme with the objectives of providing new value added services and capturing new markets.

- (a) Propose an ICT based system to implement the above distance education programme. Describe its main components by using a simple diagram.

- (b) Explain **three** advantages of the proposed system.

- (c) Discuss **three** challenges of the proposed system.

- (d) The management thinks that agent technology based techniques could be used to overcome some of the above challenges. Do you agree with this statement? Justify your answer.

- 4.** (a) Explain why compilers or interpreters are needed when using high level programming languages.

- (b) Your teacher has requested you to write a Python program to record the marks obtained by students at the term test. Each student has sat for the same three papers and each mark was given as an integer value out of 100 marks. Each student is identified by a unique index member which is also an integer. You should record the marks of student in a text file named 'marks.txt' in the following format.

Index\_no\_1,mark\_11,mark\_12,mark\_13

Index\_no\_2,mark\_21,mark\_22,mark\_23

.....

Where

Index\_no\_X : Index number of the X<sup>th</sup> student; X = 1, ..... , n

mark\_XY : Marks obtained by the X<sup>th</sup> student for the Y<sup>th</sup> paper: Y = 1, 2, 3

Index numbers and marks of the students should be entered through the keyboard, one item at a time and the program should be terminated when -1 is entered as the index number.

- (i) Propose an algorithm by using a flowchart for the program.

- (ii) Write a Python program to implement your flowchart.

5. A pharmacy named “DR Chemists” sells drugs to patients. A patient should produce a prescription to a pharmacist at the pharmacy to buy drugs. A prescription has one or more drugs prescribed by a doctor. A doctor can issue more than one prescription for a patient. However, a prescription is issued by one doctor. Pharmacist prepares a bill for each prescription and gives it to the patient. Five (05) pharmacists at the pharmacy handle all prescriptions.

A pharmacist handles more than one prescription while one prescription is handled only by one pharmacist. The upper part of the prescription contains the patient information such as name, age, address and telephone number. The middle part of the prescription consists of one or more drug names, quantities to be issued and the dosages. At the bottom part name, address and telephone number of the hospital and the name of the doctor are available.

The owner of the pharmacy wants to keep the necessary information to prepare the following list of reports.

1. Number of prescriptions handled by each pharmacist.
2. Number of prescriptions issued by each doctor.
3. List of information about doctors, their hospitals and drugs prescribed by them.
4. List of daily cash collection of the pharmacy.

Prepare an ER diagram to model the data required to produce the above reports. State clearly all your assumptions, if any.

6. Draw a context diagram to show the overview of the library system described below. Clearly indicate external entities and data flows of your diagram and state any acceptable assumptions that you have made.

The National Information Technology Library (NITL) provides e-books to its users through an online system named “Library Information Processing System (LIPS)”.

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