නව නිර්දේශයාපුතිය පාடத்திட்டம்/New Syllabus

NEW | 80 | E | I, II

අධ්‍යයන පොදු සහතික පතු (සාමාන්‍ය පෙළ) විභාගය, 2017 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2017 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2017

තොරතුරු හා සන්නිවේදන තාක්ෂණය	I, II	පැය තුනයි
தகவல் தொடர்பாடல் தொழினுட்பவியல்	I, II	மூன்று மணித்தியாலம்
Information & Communication Technology	**I, II**	**Three hours**

Information & Communication Technology I

Note :

(i) Answer **all** questions.

(ii) In each of the questions 1 to **40**, pick one of the alternatives (1), (2), (3), (4) which is **correct** or **most appropriate**.

(iii) Mark a cross (✗) on the number corresponding to your choice in the answer sheet provided.

(iv) Further instructions are given on the back of the answer sheet. Follow them carefully.

---

1. Which of the following decimal numbers is equivalent to the binary number 01011_2?
   (1) 11 (2) 35 (3) 15 (4) 10

2. Which of the following octal numbers is equivalent to the binary number 111110110010_2?
   (1) 7552_8 (2) 2667_8 (3) 2557_8 (4) 7662_8

3. The hexadecimal equivalent of 11101011000111010_2 is:
   (1) $DD63A_{16}$ (2) $1D63A_{16}$ (3) $1D33A_{16}$ (4) $1D631_{16}$

4. Consider the following statements:
   A - $2B_{16}$ is equivalent to 53_8
   B - 43_{10} is equivalent to 101011_2
   C - 101011_2 is equivalent to 53_8
   Which of the above statements are true?
   (1) A and B only (2) A and C only (3) B and C only (4) All A, B and C

5. Which of the following communication media uses the reflection of light to transmit data?
   (1) Unshielded Twisted Pair (UTP) (2) Optical Fiber
   (3) Coaxial cable (4) Shielded Twisted Pair (STP)

6. Some devices serve as either input or output devices only while others serve as both input and output devices. Which of the following serve as output devices only?
   (1) Touch screen display and scanner (2) Printer and webcam
   (3) Printer and speaker (4) Touch screen display and barcode reader

7. Which of the following truth tables is equivalent to the logic circuit given below?

A	B	Output
0	0	1
0	1	1
1	0	1
1	1	0

A	B	Output
0	0	0
0	1	0
1	0	1
1	1	0

A	B	Output
0	0	0
0	1	1
1	0	0
1	1	0

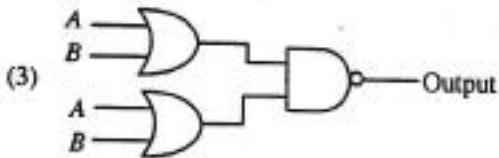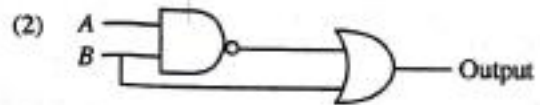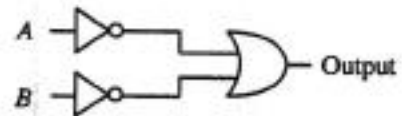| A	B	Output
0	0	0
0	1	1
1	0	1
1	1	0

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

8. Which of the following logic circuits has a truth table equivalent to the truth table of the logic circuit shown on the right hand side?

   (1)   Output

   (2)   Output

   (3)   Output

   (4)   Output

9. Consider the following statements:
   A - Managing the hardware
   B - Providing User Interface
   C - Providing Spreadsheet and Word Processing facilities
   Which of the above are key services of an operating system?
   (1) A and B only   (2) A and C only   (3) B and C only   (4) All A, B and C

10. Consider the following statements:
    A - Register memory in a computer has a smaller capacity than that of a hard disk.
    B - Data access speed of register memory is slower than the speed of a hard disk.
    C - Per bit cost to store data in register memory is higher than the per bit cost to store data in a hard disk.

    Which of the above statements are true?
    (1) A and B only   (2) A and C only   (3) B and C only   (4) All A, B and C

11. Consider the following statements:
    A - Logging into a computer using a stolen user ID and password of another person
    B - Downloading and installing a free and open source software without paying for a license
    C - The manager of an online shop, selling a list of email addresses of his customers to a marketing company without the consent from the customers
    Which of the above examples create ethical issues?
    (1) A and B only   (2) B and C only   (3) A and C only   (4) All A, B and C

12. The following four icons labelled as Ⓟ, Ⓠ, Ⓡ and Ⓢ are commonly used in word processing software to align text in a document.
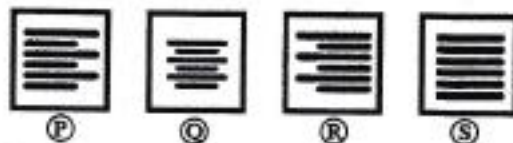
   Consider the following statements:

   A - Ⓟ aligns text to left and Ⓡ aligns text to right

   B - Ⓟ aligns text to left and Ⓢ aligns text only to right

   C - Ⓠ aligns text to centre and Ⓢ justifies text
   Which of the above statements are true?
   (1) A and B only   (2) A and C only   (3) B and C only   (4) All A, B and C

13. Consider the following statements regarding tasks carried out on a spreadsheet file in a folder by a right handed user:
    A - Place the mouse pointer on the file and single click the right button of the mouse
    B - Place the mouse pointer on the file and double-click the right button of the mouse
    C - Place the mouse pointer on the file and double-click the left button of the mouse
    Which of the above result/s in opening the spreadsheet file?
    (1) A only   (2) B only   (3) C only   (4) A and C only

14. Consider the following statements related to the use of short-cut keys in commonly used word processing softwares:

    A - Ctrl + C is used to copy text/objects
    B - Ctrl + A is used to select all text/objects in a document
    C - Ctrl + V is used to paste text/objects already copied

Which of the above statements are correct?

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

15. What would be the number displayed, if formula =2^3+(5-3)*6/4 is entered in a cell of a spreadsheet?

(1) 5   (2) 8.5   (3) 11   (4) -1.25

● Questions 16 and 17 are based on the given spreadsheet and information given below.

    * Circumference of a circle can be calculated with the formula $2\pi r$, where r is the radius of the circle.

    * Assume that the value of π is given in cell C2.

	A	B	C
1	Radius	Circumference	π
2	20	125.6637061	3.14159
3	21	131.9468915	
4	25	157.0796327	
5	22	138.2300768	
6			

16. What formula should be entered into cell B2 to calculate the circumference of the circle?

(1) =2*C2*A2   (2) =2*$C2^$A2   (3) =2*C2^A2   (4) =2^C2^A2

17. Which of the following will appear in cell A6 if the formula =SUM(A2:A5)/COUNT(A2:A5) is entered in cell A6?

(1) 1   (2) 17.6   (3) 22   (4) 88

18. Consider the following statements relating to a slide with multiple objects, created using a presentation software:

    A - The *animation effects* can be applied to multiple objects on a given slide
    B - The *slide transition* can be applied to the whole slide only
    C - The *slide transition effect* appears when slides change from one to the next during the *slide show view*

Which of the above statements are correct?

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

● Questions 19 to 22 are based on the following database tables that are used to store student subject marks.

Student Table

DoB	Name	Student_No	Class
20/11/95	Sarath	1001	1A
17/12/95	Kolitha	1002	1A
21/10/95	Kapila	1003	1A
18/12/95	Nalin	1004	1B

Subject Table

Sub_Code	Subject
01	Sinhala
02	Art
03	English

Marks Table

Sub_Code	Student_No	Marks
01	1001	85
02	1001	80
01	1002	65
03	1003	70

19. How many fields are in the Subjects table?

(1) 2   (2) 3   (3) 4   (4) 6

20. What would be the most suitable field as the primary key for the Student Table?

(1) Student_No   (2) DoB   (3) Name   (4) Class

21. What would be an example for a foreign key in the database?

(1) Sub_Code in Subject Table   (2) Sub_Code in Marks Table
(3) Marks in Marks Table   (4) DoB in Student Table

22. How many marks did Kapila obtain for English?

(1) 65   (2) 70   (3) 80   (4) 85

23. Consider the following statements related to database software:

   A - A collection of fields related to one object is called a record
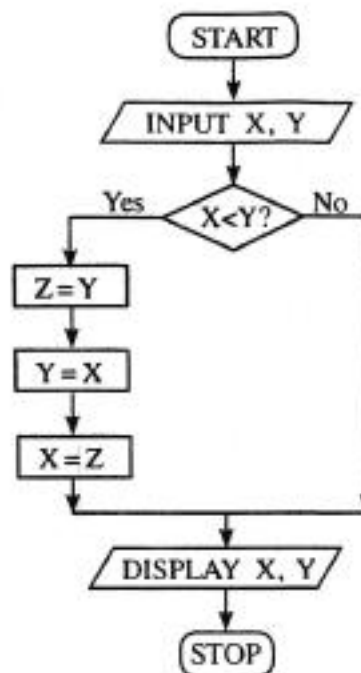
   B - A collection of related tables is called a database

   C - A Foreign key of one table is the primary key of another table

   Which of the above statements are correct?

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

24. Consider the algorithm in the following flowchart:

   What values will be displayed for X and Y respectively, if the inputs are $X = 10$ and $Y = 20$ for the given flowchart?

   (1) 10, 10   (2) 10, 20   (3) 20, 10   (4) 20, 20

25. Consider the following pseudocode with label Ⓟ to find the product of numbers from 1 to 10.

   ```
   product = 1
   number = 0
   repeat
        number = number + 1
        product = product * number
   until Ⓟ
   ```

   Which of the following expressions is correct for label Ⓟ?

   (1) $number > 10$ (2) $number < 10$ (3) $number >= 10$ (4) $number <= 10$

26. Which of the following pseudocode segments is equivalent to the logic of the algorithm given in the flowchart?


   ```
   (1) N=1
       while N<=10
           N=N+1
           display N
       end while
   ```
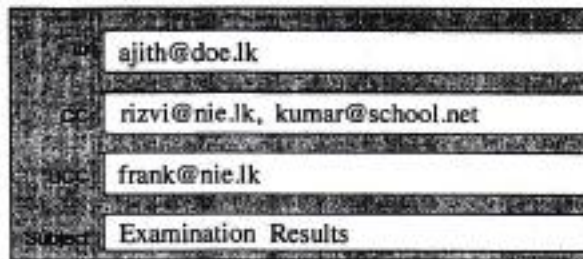
   ```
   (2) for N=0 to 10 do
           display N
   ```

   ```
   (3) N=0
       while N<=10
           display N
           N=N+1
       end while
   ```

   ```
   (4) for N=1 to 10 do
           display N
   ```

27. Consider the following pseudocode:

    $X = 0$
    do
        display ' * '
        $X = X + 2$
    while $X < 5$

As the output of the above pseudocode, how many times the ' * ' will be displayed?

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

28. Consider the following pseudocode:

    if average>70 then
        if Sport_colour = 'True' then
            Allrounder_award = 'True'
        end if
    end if

Which of the following is equivalent to the logic of the above pseudocode?

(1) if average>70 AND Sport_colour = 'True' then Allrounder_award = 'True'
(2) if average>70 OR Sport_colour = 'True' then Allrounder_award = 'True'
(3) if average>70 then Allrounder_award = 'True'
(4) if Sport_colour = 'True' then Allrounder_award = 'True'

● Use the following paragraph to answer questions **29** and **30**.

Currently users of a school library can reserve a book by filling a form. The library informs the user by sending a letter when the book is available. Sometimes, the library informs the wrong users by mistake. The librarian is planning to introduce a new information system to replace the current manual system. With the new system a user can reserve a book online. The system sends an email to the user when the book reserved is available to borrow. The librarian suggested that both manual system and the new system to operate till they make sure that the new system works without any problem.

29. Consider the following statements related to the librarian's proposal:

    A - The new system will improve efficiency of the reservation process
    B - The new system will improve accuracy of the reservation process
    C - The new system will have a negative impact on users who cannot get access to the Internet

Which of the above statements are valid?

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

30. Which of the following is the proposed deployment approach for the above Information System?

(1) Parallel (2) Phased (3) Direct (4) Both parallel and direct

31. Consider the URL "http://www.doenets.lk/exam/". The "doenets.lk" is called,

(1) Domain Name.
(2) Hypertext Transfer Protocol.
(3) Path where the resource is located.
(4) Resource.

32. Which of the following can be used to find a piece of information on a website when the relevant URL is not known?

(1) Search engine
(2) File Transfer Protocol (FTP)
(3) Email server
(4) Domain Name Server

33. Consider the following segment of an email sent to Ajith and three others:

To	ajith@doe.lk
CC	rizvi@nie.lk, kumar@school.net
BCC	frank@nie.lk
Subject	Examination Results

If you send the email to ajith@doe.lk as given above, who are the recipients that Ajith will see as having received this email?

(1) only ajith@doe.lk
(2) only ajith@doe.lk, rizvi@nie.lk and kumar@school.net
(3) ajith@doe.lk, rizvi@nie.lk, kumar@school.net and frank@nie.lk
(4) only ajith@doe.lk and frank@nie.lk

34. Which of the following in HTML, can be used to provide substitude information for an image if a user cannot view the image due to slow internet connection?
(1) src   (2) href   (3) alt   (4) img

35. What is the correct HTML code segment for creating the hyperlink, 'Ministry of Education' for http://www.moe.gov.lk?
(1) <a>http:// www.moe.gov.lk
(2) Ministry of Education
(3) Ministry of Education
(4) Ministry of Education

36. Which of the following HTML tags can be used to make a numbered list in HTML?
(1)   (2) <dl>   (3)   (4) <list>

37. Consider the following scenarios:
   A - Obtaining a copy of an original birth certificate online
   B - Paying water bills online using the website of the National Water Supply and Drainage Board
   C - Obtaining the revenue license for a vehicle online
Which of the above are e-government related services?
(1) A and B only   (2) A and C only   (3) B and C only   (4) All A, B and C

38. Consider the following statements:
   A - Uninterrupted power supply (UPS)
   B - Software firewall
   C - Use of user name and password to log into a computer
Which of the above are examples for logical security?
(1) A and B only   (2) A and C only   (3) B and C only   (4) All A, B and C

39. Which of the following is/are (an) example/s of safe use of Internet?
   A - Hiding personal information such as telephone numbers and addresses on social media
   B - Clicking on links in emails that come from unknown persons
   C - Communication with strangers on social media
(1) A only   (2) B only   (3) C only   (4) A and C only

40. Consider the following statements:
   A - Careless disposal of electronic waste into the environment.
   B - Handing over unusable Compact Fluorescent Light (CFL) bulbs and other electronic devices to recycling centres
   C - Sell or donate working electronic devices to others without discarding them
Which of the above are examples for safe e-waste disposal?
(1) A and B only   (2) A and C only   (3) B and C only   (4) All A, B and C

* *

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கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2016 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2016

තොරතුරු හා සන්නිවේදන තාක්ෂණය	II				පැය තුනයි
தகவல், தொடர்பாடல் தொழினுட்பவியல்	II	**20**	**E**	**II**	மூன்று மணித்தியாலம்
Information & Communication Technology	II				*Three hours*

Index No. : ....

Important :

* *This paper consists of* **06** *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 - 4)

* *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 5 - 6)

* *This part contains* **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		
Part	**Question Nos.**	**Marks**
A	1	
	2	
	3	
	4	
B	1	
	2	
	3	
	4	
	5	
	6	
Total		

Final Marks

In numbers	
In words	

Code Numbers

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

Part A — Structured Essay
Answer all four questions on this paper itself.

1. (a) State the operation of each HTML code segments given below. Assume that all images and HTML documents are in the same folder.

   (i) `<a href="coverPage.jpg" target = "_blank">Cover Page</a>`

   ....

   ....

   ....

   (ii) `<a href="content.html">Content</a>`

   ....

   ....

   (iii) `<a href="figures.html" target = "_self"> <img src = "figures.jpg"/></a>`

   ....

   ....

   ....

   (b) Which of the three mechanisms used to apply styles to HTML elements increases the maintainability of a web site?

   ....

   (c) Consider the following HTML code segment:

   ```
   <body>

       <h2>How web search engines work</h2>
       <p>A search engine maintains three processes.
       </p>
   </body>
   ```

   Write the internal styles required to apply the following styles for the elements in the above code segment.

Element	Property	Style
h2	Colour	Red
	Text	Centre aligned
P	Font	Courier New, 14 points high

   ....

   ....

   ....

   ....

   ....

   ....

   ....

   ....

2. Assume that the camera you have been using so far is no longer needed since you have received a latest camera as a gift. A friend suggested that your old camera could be sold on the Internet. Consequently, you were able to sell the camera to a buyer in an African country through a web site. You received the payment made by the buyer through a service like Paypal.

(a) State an example for each C2C and B2C e-commerce types with respect to the above transaction.

C2C: ....
....
....

B2C: ....
....
....

(b) Why is a service like Paypal necessary for this type of transactions?

....
....
....
....

(c) Some Internet users are reluctant to buy goods online from individual sellers. State **two** reasons for this reluctance and give an example for each.
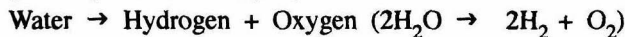
(1) ....
....
....

(2) ....
....
....

3. (a) A space station generates oxygen required for its astronauts by 'splitting' water (H_2O) into Hydrogen (H_2) and Oxygen (O_2) using electricity supplied by batteries in the space station. This process is given by the following equation.

Water → Hydrogen + Oxygen ($2H_2O → 2H_2 + O_2$)

Carbondioxide (CO_2) breathed out by astronauts and Hydrogen (H_2) generated from the above process are combined together to generate Water and Methane, as given by the following equation.

Hydrogen + Carbondioxide → Water + Methane ($4H_2 + CO_2 → 2H_2O + CH_4$)
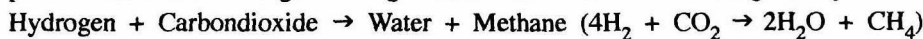
Generated Methane is removed by charcoal filters.

State whether the system described above is open or closed. Give **two** reasons for your answer.

....

(1) ....
....

(2) ....
....

(b) State **two** possible problems faced by an information system having a relational database in zero normal form.

(1) ....
....
....

(2) ....
....
....

(c) Assuming that the human brain is a system, compare and contrast a human brain and a computer based information system.

....

....

....

....

....

....

4. (a) Consider the following Python program:

```
#Print the sum of integers from 1 to 5 (including 1 and 5)
total = 0
i = 1
while (i <= 5):
        total = total + i

i = i + 1
print (total)
```

(i) What would be the output of the above program when executed? Justify your answer.

....

....

....

....

....

(ii) Modify and rewrite the above program, **without increasing** the number of statements, to compute the sum of integers from 1 to 10 (including 1 and 10).

....

....

....

....

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(b) An embedded system uses 16-bit wide address bus to access its byte addressable main memory. What is the maximum usable size of its main memory? Show your computations clearly.

....

....

....

....

....

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கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2016 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2016

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

Part B

✳ *Answer any four questions only.*

1. The top secret recipe for making milk rice at the restaurant chain SLFC is kept in an electronic safe at their head office. The lock (L) of the safe can either be in locked or unlocked states represented by logical truth values 0 and 1 respectively. This lock has three different key holes K1, K2 and K3 each with a unique key. These three keys are in the custody of three directors of SLFC. The lock opens when **at least two keys** are inserted into the corresponding key holes. The situation where the corresponding key is properly inserted into any key hole is represented by the logical truth value 1 and all the other situations are represented by the logical truth value 0.

   Assuming that only the following Integrated Circuits (ICs) are available, construct a logic circuit to operate the lock (L) of the safe, by using the truth tables and Boolean algebra. Clearly show the truth tables, Boolean expressions and the Boolean algebraic rules used to construct your circuit.
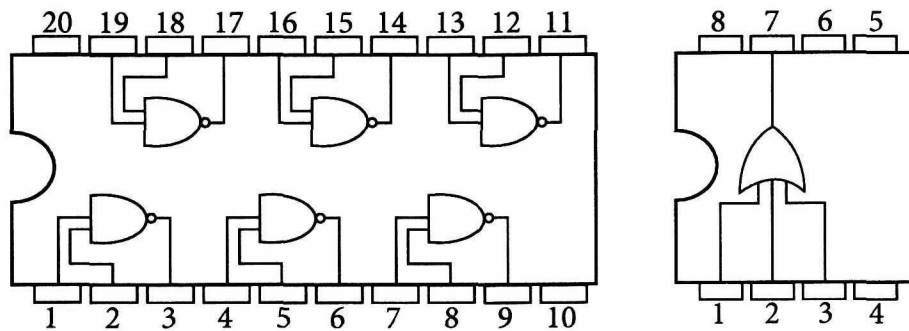
2. There are two Local Area Networks (LANs) L1 and L2 which are connected only by a router R. These LANs are not connected to any other networks. Machines P and Q are connected to LANs L1 and L2 respectively. The machine P has successfully delivered an IP packet IP1 to machine Q.

   In a LAN, an IP packet is sent from the source device to the destination device by inserting it into a frame, generated in the data link layer at the source device. In that LAN, source and destination devices are uniquely identified by the MAC addresses in that frame.

   An IP address is recognized by the network layer but it is not recognized by the data link layer.

   (a) Draw a network diagram to depict the network described above using commonly used symbols and notations.

   (b) State whether the destination IP address of the packet IP1 is the IP address of Q or R when it is going through LAN L1. Justify your answer.

   (c) Assume that the IP packet IP1 was in a frame F2 in LAN L2. State whether the source MAC address of frame F2 is the MAC address of P or R. Justify your answer.

3. The management of the Siri Lak bank has decided to develop a web portal to deliver personalized services to its employees. The services include, access banking plans, regulations and policies, register for learning opportunities provided by the bank, quick search, weather reports, communicate with other employees and leave and loan related services. According to the chief information officer of the bank, the primary goal of developing the portal is to enable its employees to manage their personal lives more easily.

   (a) What is the e-commerce type of the services provided by the above web portal? Justify your answer.

   (b) State **two** potential benefits obtainable to the employees from the above portal.

   (c) The management of the bank expects that they could get a better service from their employees after implementing the proposed portal. Do you agree with this idea? Justify your answer.

   (d) A consultant suggests to implement a 'personal user assistant agent' based on the intelligent agent technology to improve the services of the above web portal. State **three** possible ways to improve the services of the above web portal by such an agent.

4. A canteen of a school sells 10 different types of foods. These food types are placed in a shelf. Students can select foods while walking alongside the shelf and keep them on a tray. These trays are available at the entrance of the canteen. A student, after selecting the food, should proceed to the cashier with the food tray for the payment.

You are asked to develop a computer program to calculate the payment due for a food tray. For this purpose, each food type is given a unique integer from 1 to 10.

The integer value assigned for each food type and its unit price is shown in the following table.

Food type	1	2	3	4	5	6	7	8	9	10
Unit price (Rs)	10.00	12.00	15.00	10.00	25.00	45.00	50.00	25.00	10.00	12.00

   (a) State all the inputs required for the computer program and its expected output.

   (b) Draw a flowchart to represent the algorithm required to compute the payment due for a food tray.

   (c) Transform the above flowchart into a Python program.

5. An education institute maintains a timetable to manage its lectures, practical classes and seminars. The timetable consists of two hour time periods: 8.00 a.m. - 10.00 a.m., 10.00 a.m. - 12.00 noon, 1.00 p.m. - 3.00 p.m. and 3.00 p.m. - 5.00 p.m. Lectures, practical classes and seminars are assigned to one or more time periods. A lecture is assigned to a lecturer and a practical class is conducted by a group of demonstrators. At least two lecturers are responsible for a seminar.

Draw an Entity Relationship (ER) diagram for the above system. State all your assumptions clearly.

6. Draw a context diagram to show the operations of the online assignment management system described below adhering to the standards of the Structured System Analysis and Design Methodology (SSADM). Clearly indicate external entities and data flows of your diagram. State any assumptions that you have made.

The National University of ICT (NUICT) conducts distance learning programs. The students of NUICT are continuously assessed through online assignments. The students of NUICT use an online assignment management system called NetAssign to download assignments and upload answer scripts. The examiners use NetAssign to upload assignments and to download answer scripts. Once the answer scripts are marked, the examiners enter marks into NetAssign. The students can view only the grades determined by NetAssign. To use NetAssign, both examiners and students must provide authentication details to the system. These authentication details are provided by NUICT to its students and examiners.

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