80	E	I, II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2021(2022)
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2021(2022)
General Certificate of Education (Ord. Level) Examination, 2021(2022)

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

පැය තුනයි
மூன்று மணித்தியாலங்கள்
Three hours

අමතර කියවීම් කාලය	- මිනිත්තු 10 යි	**Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.**
மேலதிக வாசிப்பு நேரம்	- 10 நிமிடங்கள்	
Additional Reading Time	**- 10 minutes**	

Information & Communication Technology I

Instructions:

- *Answer **all** questions.*
- *In each of the questions **1** to **40**, pick one of the alternatives (1), (2), (3), (4) which is **correct** or **most appropriate**.*
- ***Mark a cross (X) on the number corresponding to your choice in the answer sheet provided.***
- *Further instructions are given on the back of the answer sheet. Follow them carefully.*

1. Which of the following is an example for a data processing task of a user?
(1) Installing word processing software in a personal computer
(2) Formatting the hard disk in a personal computer
(3) Reading an online newspaper using a web browser
(4) Calculating the average marks obtained by a student using a spreadsheet software

2. Which of the following group consists of only input devices?
(1) Barcode Reader, CRT Monitor, Joystick
(2) Barcode Reader, Plotter, Webcam
(3) Keyboard, Mouse, Scanner
(4) Multimedia Projector, Printer, Scanner

3. Which of the following **cannot** be used to permanently store data?
(1) Hard disk (2) Magnetic tape
(3) Random Access Memory (RAM) (4) USB Flash Drive

4. Which of the following correctly shows the given storage components of a particular computer system in **descending** order of their *storage capacity*?
(1) Hard disk, Cache memory, Main memory
(2) Hard disk, Main memory, Cache memory
(3) Main memory, Cache memory, Hard disk
(4) Main memory, Hard disk, Cache memory

5. In a ..... network topology, each network component is physically connected to a central node such as a hub or a switch.
(1) bus (2) mesh (3) ring (4) star

6. Krishna accessed the official web portal of the government of Sri Lanka (http://www.gov.lk) to renew her vehicle revenue licence online. Which of the following services was obtained by her?
(1) G2B (2) G2C (3) G2E (4) G2G

[see page two

7. If the character "A" is represented as 1000001_2 in ASCII coding scheme, what character will be represented by 1000100_2?

(1) B (2) C (3) D (4) E

8. Which of the following represents the given four numbers in the **descending** order?

(1) 10011110_2, 157_{10}, $9C_{16}$, 233_8
(2) 157_{10}, 10011110_2, $9C_{16}$, 233_8
(3) 233_8, 10011110_2, 157_{10}, $9C_{16}$
(4) $9C_{16}$, 233_8, 10011110_2, 157_{10}

9. Which of the following is the **first** software that must be installed on a computer after formatting its hard disk?

(1) Office package
(2) Operating system
(3) Antivirus software
(4) Web browser

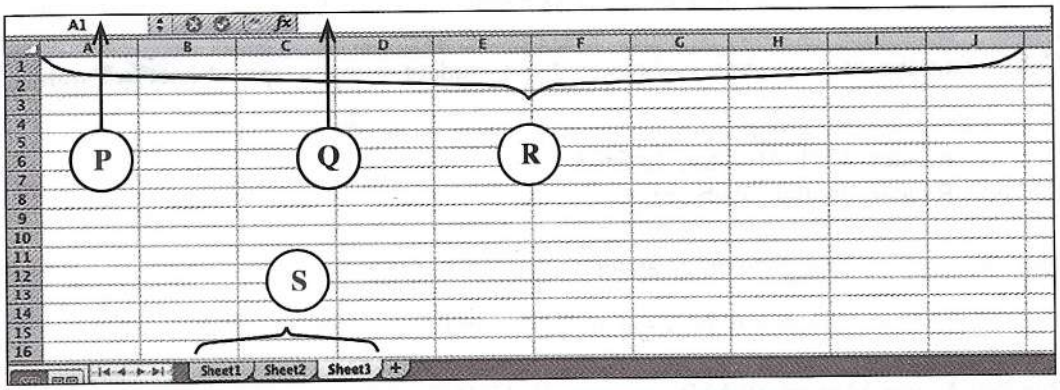
10. Which of the following group consists of only language translators?

(1) Assembler, Compiler, Interpreter
(2) Interpreter, Compiler, Web browser
(3) Assembler, Operating system, Compiler
(4) Web browser, Operating system, Interpreter

11. What is the shortcut key combination to "Find and Replace" words in *Microsoft Word* or *LibreOffice Writer*?

(1) Ctrl+A (2) Ctrl+C (3) Ctrl+H (4) Ctrl+X

12. Consider the following spreadsheet segment with four components labelled as P, Q, R and S:



Which of the following represents the P, Q, R and S labels in the correct order?

(1) Column Headings, Formula Bar, Name Box, Sheet Tabs
(2) Name Box, Column Headings, Sheet Tabs, Formula Bar
(3) Name Box, Formula Bar, Column Headings, Sheet Tabs
(4) Sheet Tabs, Formula Bar, Column Headings, Name Box

[see page three

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- Consider the following segment of a marksheet entered into an electronic spreadsheet to answer questions **13** and **14**:

A7 =COUNT(A1:D5)

	A	B	C	D	E
1	Name	ICT	Maths	Religion	Total
2	Sahan	60	55	70	
3	Oshini	35	absent	60	
4	Raji	75	65	absent	
5	Pooja	55	45	75	
6					
7					

13. What is the correct formula to be entered in cell E2 to calculate the total marks obtained by Sahan?

(1) =B2+C2+D2 (2) B2+C2+D2 (3) E2=B2+C2+D2 (4) E2->B2+C2+D2

14. What will be the value displayed in cell A7 if the formula =COUNT(A1:D5) is entered into it?

(1) 10 (2) 12 (3) 16 (4) 20

15. Which of the following actions can be used to move to the next slide in a slide show of an electronic presentation?

A - Clicking the "Left" button of the mouse device
B - Pressing the "Ctrl" key of the keyboard
C - Pressing the "Right arrow" key of the keyboard

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

16. Which of the following statements are correct regarding relational databases?

A - A *record* is a collection of fields.
B - A *table* is a collection of records.
C - A *relational database* is a collection of tables.

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

- Questions **17** to **19** are based on the following partly shown database tables that are used to store data about students, subjects and enrollment details in a school.

Student

Student_ID	Student_Name
1001	Saman
1002	Raj
1003	Sharaf
1004	Shane

Subject

Subject_ID	Subject_Name	Teacher_Name
S001	Chemistry	Perera
S002	Physics	Selvam
S003	Combined Maths	Nazwar
S004	Geography	Silva
S005	Political Science	Almeida

Enroll

Student_ID	Subject_ID	Date
1001	S002	04/01/2022
1005	S001	05/01/2022
1003	S002	09/01/2022
1001	S003	04/01/2022

17. What would be the primary key of the Enroll table?

(1) Student_ID (2) Subject_ID
(3) Subject_ID + Date (4) Student_ID + Subject_ID

18. What would be a foreign key in the database?

(1) Subject_ID in the Subject table (2) Student_ID in the Student table
(3) Date in the Enroll table (4) Subject_ID in the Enroll table

[see page four

19. Shane dropped the "Geography" subject and enrolled for the "Political Science" subject. Which table/tables needs/need to be updated for this purpose?

(1) Subject table
(2) Subject table and Enroll table
(3) Enroll table
(4) Student table, Subject table and Enroll table

20. Which of the following is the correct HTML tag sequence for a web page?

(1) HTML, Body, Title, Head
(2) HTML, Head, Title, Body
(3) HTML, Title, Head, Body
(4) Head, Title, HTML, Body

21. Which of the following statements are correct?

A - HTML tags determine how the web pages are displayed in a web browser.
B - A URL uniquely identifies a web page on the World Wide Web (WWW).
C - Hyperlinks allow to link web pages on the World Wide Web.

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

22. What is the correct HTML statement for creating a hyperlink to the official web portal of the Government of Sri Lanka (http://www.gov.lk)?

(1) Government of Sri Lanka Web Portal
(2) <a> "http://www.gov.lk" Government of Sri Lanka Web Portal
(3) <a> src="http://www.gov.lk" Government of Sri Lanka Web Portal
(4) Government of Sri Lanka Web Portal

23. Consider the following HTML statements for creating a table:

```
<html>
<body>
<table border=2>
 <tr> <th>Company Name </th> <th> Contact Number </th> </tr>
 <tr> <td rowspan=2> ABC Ltd </td> <td> 011-2222222 </td> </tr>
 <tr> <td> 011-9999999 </td> </tr>
 <tr> <td> XYZ & Sons </td> <td> 011-7777777 </td> </tr>
</table>
</body>
</html>
```

Which of the following is the correct table created by the above statements?

(1)

Company Name	Contact Number
ABC Ltd	011-2222222
	011-9999999
XYZ & Sons	011-7777777

(2)

Company Name	Contact Number
ABC Ltd	011-2222222
XYZ & Sons	011-7777777
	011-9999999

(3)

Company Name	ABC Ltd	XYZ & Sons
Contact Number	011-2222222	011-7777777
		011-9999999

(4)

Company Name	ABC Ltd	XYZ & Sons
Contact Number	011-2222222	011-7777777
	011-9999999	

24. Which of the following is a correct example for an Internet Protocol (IP) address?

(1) 172.64.85 (2) 172.64.85.24 (3) 192.214.78.80.1 (4) 192.214.78.256

25. Which of the following is the commonly used folder that stores deleted messages in an email system?

(1) Draft (2) Inbox (3) Spam (4) Trash

[see page five

26. Consider the following URL:

http://www.nie.lk/index.html
A B C

Which of the following correctly identifies the parts A, B and C of the above URL?
(1) A-domain name, B-protocol, C-top level domain
(2) A-domain name, B-top level domain, C-protocol
(3) A-protocol, B-domain name, C- top level domain
(4) A-protocol, B- top level domain, C-domain name

27. Which of the following combinations correctly shows an internet service and its corresponding protocol?
(1) Email, SMTP (2) WWW, FTP (3) Email, FTP (4) File Transfer, SMTP

28. Which of the following best describes the  icon in GIMP image manipulation software?
(1) blurs or sharpens an image
(2) copy one part of a graphic to another part
(3) lightens or darkens an image's shadows
(4) removes unnecessary colours and spots in an image

29. Consider the following statement with blanks labelled Ⓐ and Ⓑ:
The primary colours .....Ⓐ..... are used to create images on computer screens with each colour having .....Ⓑ..... colour variations, if represented with 8-bits.
Which of the following is suitable to fill in the blanks labelled Ⓐ and Ⓑ, respectively?
(1) Ⓐ: Red, Green, Blue Ⓑ: 128 (2) Ⓐ: Red, Green, Blue Ⓑ: 256
(3) Ⓐ: Yellow, Blue, Red Ⓑ: 128 (4) Ⓐ: Yellow, Blue, Red Ⓑ: 256

30. A ..... spreads by inserting copies of itself into executable files in a computer.
(1) computer worm (2) hijacker (3) spyware (4) trojan horse

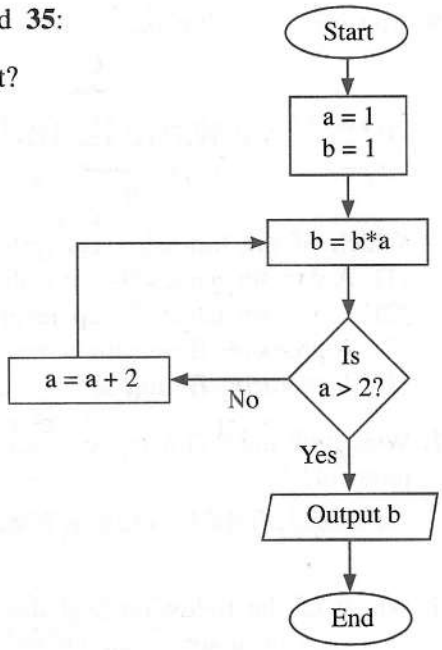
31. Which of the following could arise due to the usage of ICT?
A - e-waste problems
B - security threats
C - health hazards
(1) A and B only (2) A and C only (3) B and C only (4) All A, B and C

32. Which of the following statements are true with regard to the pilot deployment of a new software system?
A - The existing system is replaced by the new system as soon as its development is completed.
B - Introduce the newly developed system to a selected set of users before making it available to all.
C - The new system is deployed in stages and the success of each stage leads to the next stage.
(1) A only (2) B only (3) C only (4) A and B only

33. Which of the following control structures can be used in an algorithm?
A - Sequence
B - Repetition
C - Selection
(1) A and B only (2) A and C only (3) B and C only (4) All A, B and C

[see page six

- Consider the given flowchart to answer the questions **34** and **35**:



34. What will be displayed as the output of the given flowchart?

(1) 1 is displayed.
(2) 3 is displayed.
(3) 15 is displayed.
(4) Nothing is displayed.

35. If the labels 'Yes' and 'No' are interchanged in the given flowchart, what will be displayed as its output?

(1) 1 is displayed.
(2) 3 is displayed.
(3) 15 is displayed.
(4) Nothing is displayed.

36. How many times will the statement "`count = count - 3`" execute in the following code segment?

```
count=12
WHILE count >= 3
      count = count - 3
END WHILE
```

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

- Consider the following "Books" array which is used to store prices of 8 books to answer questions **37** and **38**.

Books:	96	75	105	200	54	100	63	80

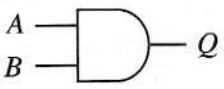
37. Which of the following correctly defines the "Books" array in a PASCAL program?

(1) var Books = array[7];
(2) var Books : array[0-7];
(3) var Books : array[0..7] of integer;
(4) var Books : array[0 to 7] of integer;

38. Which of the following represents the most expensive book?

(1) Book[3] (2) Books[3] (3) Book[4] (4) Books[4]

39. Consider the following logic gate:



When $B = 1$, then what would definitely be the output at Q?

(1) A (2) $\overline{A}$ (3) $A + B$ (4) $\overline{A} + B$

40. Given below is the truth table for a logic gate with inputs **A**, **B** and output **Q**:

A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

What is the logic gate indicated by the above truth table?

(1) AND (2) NAND (3) NOR (4) OR

[see page seven

* *

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80	E	I, II

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கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2021 (2022)
General Certificate of Education (Ord. Level) Examination, 2021 (2022)

තොරතුරු හා සන්නිවේදන තාක්ෂණය I, II
தகவல் தொடர்பாடல் தொழினுட்பவியல் I, II
Information & Communication Technology I, II

Information & Communication Technology II

* *Answer **five (05)** questions only, including the **first question** and **four** others.*
* *First question carries **20** marks and each of the other questions carries **10** marks.*

1. (i) The teachers in a particular school are expected to mark their attendance using a fingerprint machine, which is connected to a computer system. The system generates a monthly attendance report.

Write down **one** example for an input and **one** example for an output of the above information system.

(ii) (a) Draw a diagram to connect four computers namely C_1, C_2, C_3 and C_4 based on the *mesh* topology.

(b) Consider the following computer ports labelled Ⓐ – Ⓓ.

Ⓐ	Ⓑ	Ⓒ	Ⓓ
			

Match each of the above ports with the name of the ports given in the following list in the **label → port** format.

Ports : {Audio, HDMI, PS/2, Parallel, RJ45, Serial, USB, VGA}

(iii) (a) Convert 47_{10} to its binary equivalent.

(b) Following is an extract from the ASCII table. Write down the correct octal value replacement for the '?' symbol.

Character	Decimal	Hexadecimal	Binary	Octal
a	97	61	1100001	?

(iv) (a) Draw the logic gate circuit for the following Boolean expression:

$$F = \overline{C} + A\overline{B}$$

(b) Write down the value of F when $A = 0$, $B = 1$ and $C = 1$.

(v) There is a very important software that runs on a computer. It manages various resources of the computer. It also lets the users communicate with the computer. This particular software coordinates and fulfils the requirements of all processes with respect to their central processing unit (CPU), memory and storage needs.

(a) What is the specific software referred to in the above paragraph?

(b) Give **one** example for it.

[see page eight

(vi) The following table shows some of the icons labelled Ⓐ–Ⓓ of the Audacity audio editing software.

			
Ⓐ	Ⓑ	Ⓒ	Ⓓ

Identify the suitable description for each of the icons Ⓐ–Ⓓ from the description list numbered ①–⑥. Write down each icon label and its corresponding description number in **label → number** format.

Description	Trim Audio	Record	Select	Stop	Skip to End	Play
Number	①	②	③	④	⑤	⑥

(vii) Match the descriptions labelled Ⓟ–Ⓢ with the correct terms from the list of terms given below and write down the relevant term against each label in the **label → term** format.

Label	Description
Ⓟ	Used for electronic mail exchange among mail servers on the Internet
Ⓠ	Provides access to the software installed in the cloud
Ⓡ	Folder to store mails that are composed to be sent, but not completed yet
Ⓢ	Used to uniquely identify a computer on the Internet

List of terms : {FTP, SMTP, URL, IP address, IaaS, Trash, Draft, SaaS}

(viii) The following algorithm is used to select players for a Rugby pool. The selection is done based on the height, weight, and age of the player.

```
If((Age>=21) AND (Height>=160 OR Weight>=70))
        Output "Qualified for the pool"
Else
        Output "Not qualified for the pool"
```

The age, height, and weight of three candidates are given below.

Name	Age	Height (cm)	Weight (kg)
Nirmal	21	159	71
Rajeev	36	165	72
Saleem	25	150	69

Write down the names of all players who are qualified for the pool.

(ix) (a) Write down **one** recommendation to avoid the Computer Vision Syndrome (CVS).

(b) Write down **one** proper method for electronic waste (e-waste) management.

(x) Write down **two** advantages of computerized Database Management Systems (DBMS).

[*see page nine*

2. (i) Match the descriptions labelled Ⓐ–Ⓓ with the correct terms from the list of terms given below and write down the relevant term number against each label in the **label → term number** format.

Label	Description
Ⓐ	Used to connect two or more computer networks
Ⓑ	Used in satellite communication to transmit data
Ⓒ	Used to transmit data using reflection of light
Ⓓ	Used in connecting TV antenna and analog CCTV cameras

List of terms : {1 – Coaxial Cable, 2 – Fibre Optics Cable, 3 – Microwaves, 4 – Modem, 5 – Radio Waves, 6 – Repeater, 7 – Router, 8 – Unshielded Twisted Pair Cable}

(ii) Consider the following statements labelled Ⓟ–Ⓢ and the two words given against each statement within square brackets. Write down the statement label and the appropriate word corresponding to the blank in each of the statements in the **label → word** format.

Ⓟ The quality of a given digital image is determined by the ..... [*ppm*, *dpi*] value.

Ⓠ ..... [*RGB*, *CMYK*] primary colour model is widely used in computer screens.

Ⓡ Image files such as JPEG and TIFF that are compressed using ..... [*lossy*, *lossless*] compression facilitates fast downloading from the Internet.

Ⓢ ..... [*Vector*, *Raster*] images can be created using software such as Adobe Photoshop and GIMP.

(iii) Match the descriptions labelled Ⓚ–Ⓝ with the correct terms from the list of terms given below and write down the relevant term number against each label in the **label → term number** format.

Label	Description
Ⓚ	Releasing unsuitable photographs of young girls on the Internet and making use of such images for threatening or blackmailing
Ⓛ	The act of presenting another's creative work as one's own
Ⓜ	The gap between those who have access to Information and Communication Technology (ICT) and those who do not
Ⓝ	Deceiving users via email to collect their credit card information

List of terms : {1 – Misuse of Social Media, 2 – Phishing, 3 – Plagiarism, 4 – Cybercrime, 5 – De-Skilling, 6 – Digital Divide}

[*see page ten*

3. Following are the **partly shown** database tables that are used to store details about food items, purchases and suppliers of a school canteen. The canteen sells food items which are purchased from the suppliers.

Table: Item
(Contains data of the items available in the canteen with their selling prices in Rupees.)

Item_ID	Item_Name	Selling_Price
F001	Tea bun	40
F002	Fish roll	70
F003	Chicken roll	65
F004	Vegetable roll	60

Table: Purchase
(Contains data of the purchasing prices of items from different suppliers. Note that a particular food item can be purchased from many suppliers for different prices.)

Item_ID	Supplier_ID	Purchasing_Price
F001	S007	30
F001	S004	35
F003	S001	60
F004	S004	55

Table: Supplier
(Contains data about suppliers.)

Supplier_ID	Supplier_Name	Supplier_Location
S001	Saman	Maradana
S002	Raj	Borella
S003	Sharaf	Dematagoda
S004	Shane	Maradana

(i) (a) Write down the *primary key* of the **Purchase** table.

(b) Write down the *foreign keys* in the **Purchase** table.

(ii) Which tables need to be updated to accommodate the following?

(a) The supplier S004 changes his location (Supplier_Location) to Rajagiriya.

(b) The canteen decides to increase the selling price of a fish roll to 80 Rupees due to a 10 Rupee price increase by the supplier.

(iii) A new supplier Kamal (**Supplier_ID: S008**) from Wellawatte starts supplying vegetable rolls to the school canteen for 50 rupees. Write down the new record(s) to be added to the relevant table(s) for the above change. Use the ***tablename*** → (***field1***, ***field2***, ...) format for each new record.

(iv) What are the appropriate tables to be joined to write a query to find the names of the suppliers who supply fish rolls to the canteen?

[see page eleven

4. (i) Use the following list of terms in answering questions (a) and (b).

List of terms : {Mozilla Firefox, Google, IaaS, HTTP, Pascal, PHP, Twitter, WordPress, Joomla, Internet Explorer}

(a) Match the descriptions labelled Ⓐ–Ⓓ with the correct terms from the list of terms given above and write down the relevant term against each label in the **label → term** format.

Label	Description
Ⓐ	Search engine
Ⓑ	Internet service protocol
Ⓒ	Commonly used programming language for dynamic web development
Ⓓ	Social network

(b) Identify the most suitable term to fill each blank labelled Ⓟ–Ⓢ from the list of terms given above and write down the relevant term against each blank label in the **label → term** format.

- Web pages can be developed using a Content Management Systems (CMS) such as .....Ⓟ..... and .....Ⓠ..... .
- The public can access a website through a web browser such as .....Ⓡ..... or .....Ⓢ..... .

(ii) The HTML source of the web page shown in Figure 1 is given in Figure 2 with certain missing tags labelled ❶ to ❿.

You are required to write down the label number and the corresponding HTML tag selecting from the list given below.

List : {title, h2, ul, li, table, tr, th, td, img, src, center, a}

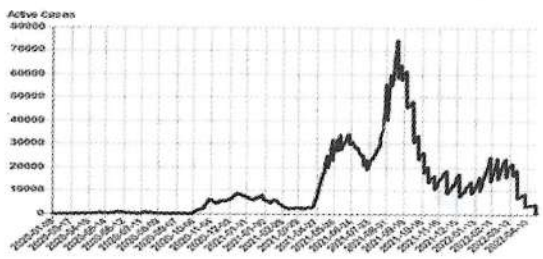
Sri Lanka's strong vaccination programme assisted in controlling COVID-19

Sri Lanka has made great progress in controlling the spread of COVID-19; however, the threat is not over yet.

- **Progress of COVID-19 Immunization as of 11.04.2022**

Type of Dose	Number of Vaccinations	% of Population
First Dose	17,033,222	77.6%
Second Dose	14,449,321	65.9%
Booster Dose	7,959,881	36.1%

- **Monthly Covid 19 active cases in Sri Lanka from 2020 to 2022**



For further information: World Health Organization

Figure 1: Web page

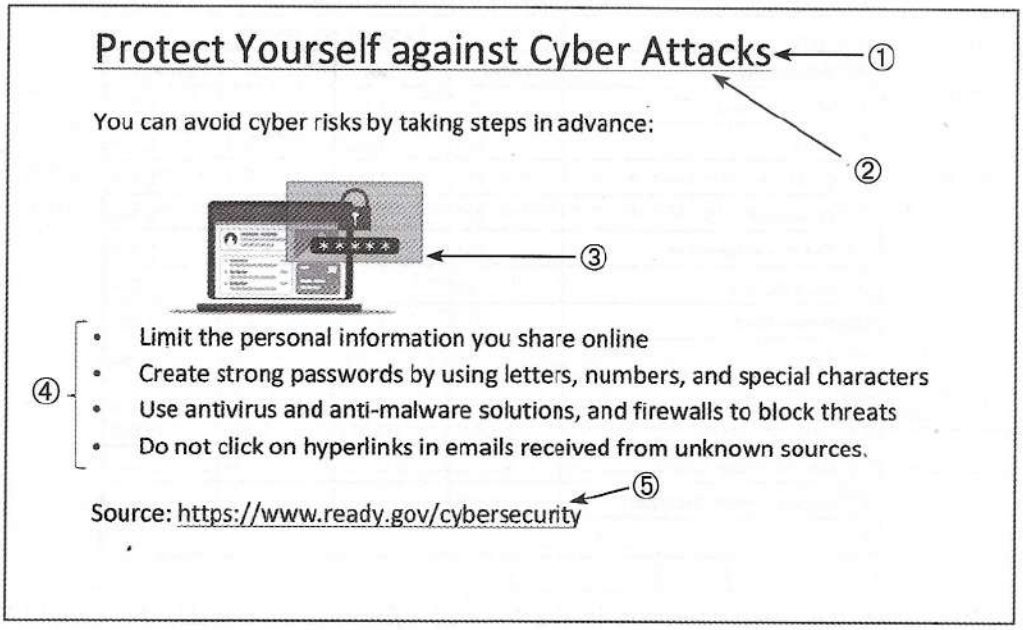
[see page twelve

```
<html>
<head> <❶> Covid 19 Vaccination in Sri Lanka </❶> </head>
<body>
<center> <❷> Sri Lanka's strong vaccination programme assisted in controlling COVID-19 </❷>
    </center>

Sri Lanka has made great progress in controlling the spread of COVID-19; however, the threat is
not over yet.

<❸>
  <❹><h3>Progress of COVID-19 Immunization as of 11.04.2022</h3></❹>
<❺ border="4" align="center">
  <❻>
    <❼>Type of Dose</❼>
    <❼>Number of Vaccinations</❼>
    <❼> % of Population </❼>

  </❻>
  <❻>
    <td>First Dose </td>  <td>17,033,222 </td>  <td> 77.6% </td>
  </❻>
  <❻>
    <td>Second Dose</td>  <td>14,449,321</td>    <td> 65.9% </td>
  </❻>
  <❻>
    <td>Booster Dose</td>  <td>7,959,881</td>    <td> 36.1% </td>
  </❻>
</❺>

<❹><h3>Monthly Covid 19 active cases in Sri Lanka from 2020 to 2022</h3></❹>

<❽> <❾ src="active_cases.png" width="400" height="180" alt="Vaccine Photo"> </❽>

</❸>
<p>
<h3> For further information: <❿ href="https://www.who.int/srilanka">  World Health Organization
    </❿></h3>
<p>

</body>
</html>
```

Figure 2: HTML Source

[see page thirteen

5. (i) Segment of a word-processed document is shown below with some formatting done. These formatting tasks are labelled as ①–⑤. Before formatting, all the text in the original document had the same font size.



Following are the icons of some formatting tools in a word processing software:

Icon of the formatting tool						Picture		
Icon label	Ⓟ	Ⓠ	Ⓡ	Ⓢ	Ⓣ	Ⓤ	Ⓥ	Ⓦ

Identify the icons of formatting tools, indicated by the labels Ⓟ–Ⓦ which are required to do the formatting tasks indicated by the labels ①–⑤. Write down the label of each formatting task ①–⑤ and its matching icon label of the formatting tool in the **task label → icon label** format.

[see page fourteen

(ii) The following spreadsheet segment shows some statistics of road accidents reported for 2018.

	A	B	C	D	E
1	**Accident Data for Year 2018**				
2		**Type of Accident**			
3	**Vehicle Type**	Fatal	Minor	Critical	Damages
4	Motor Cycles	1,227	4,524	3,382	1,358
5	Lorry	344	1,022	843	1,668
6	Dual Purpose Vehicle	318	1,396	977	1,668
7	Private Buses	237	653	498	1,046
8	Three - Wheelers	365	2,496	1,354	1,728
9	SLTB Buses	62	232	189	269
10	Motor Cars	210	1,486	952	3,036
11	Cycle	42	108	71	62
12					
13	**Total -Accidents**	**2,805**	**11,917**	**8,266**	**10,835**
14	**Lowest value-Critical**			71	
15	**Highest value-Accidents**	4,524			
16					

(a) Write down the correct formula in the form of *=function(cell1:cell2)* that should be entered in cell B13 to find the total number of vehicles involved in fatal accidents.

(b) Assume that the formula entered into the cell B13 is copied to cell range C13:E13. Write down the formula displayed in the cell D13.

(c) Write down the formula in the form of *=function(cell3:cell4)* that should be entered in cell D14 to get the lowest value recorded for critical accidents.

(d) Write down the appropriate cell range in the form of *(cell5:cell6)* for the formula written in cell B15 to identify the highest number of any accident.

(e) Write down the most suitable chart type available in spreadsheet software from the given list of charts for the following:

(1) To show comparisons of the types of accidents involving each vehicle type in the same graph.

List of charts for part (1): {Area, Bar, Pie, Scatter}

(2) To show the number of fatal accidents for each vehicle type.

List of charts for part (2): {Area, Line, Pie, Scatter}

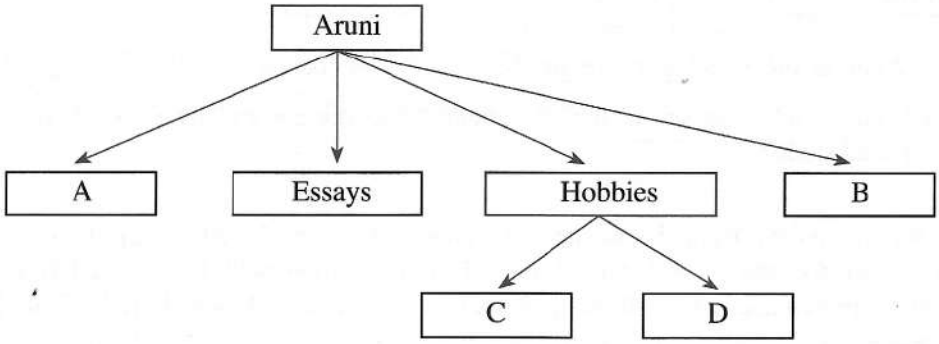
[see page fifteen

6. (i) Aruni is an O/L student. In addition to her studies, she writes essays that she submits to various newspapers. She has stored a considerable number of mp3 files in her computer. In addition, many digital pictures that she has taken are also stored on her computer. Her parents have also asked her to store all the online payment receipts on her computer as well.

Aruni stores **all** the files related to the above, in **one** single folder (directory) on her computer.

(a) Write down a problem that Aruni might face when searching a particular file in the existing storage scheme.

(b) Following folder structure is suggested for Aruni. Match the folder labels against the folder names given in the list, in the **folder label → name** format.



List of folder names : {Receipts, Music, Pictures, Studies}

(c) Write **one** practice Aruni can follow to avoid her hard disk becoming full.

(d) Write **one** practice that Aruni could have followed to avoid losing data in the event of a computer failure.

(ii) A hospital is planning to introduce a new computerized system to overcome the issues in the existing patient management system. A team was assigned to do the development of the above system.

(a) The team decides to develop the system in small portions allowing the hospital management to provide regular feedback. What is the most suitable system development life cycle model that the team should use?

(b) The hospital management conducts a testing session to decide whether the newly developed system can be approved or not. What is the test that the hospital management should perform?

(c) The hospital management wanted to terminate the existing system immediately and replace it with the newly developed one. What is the deployment method wanted by the hospital management?

(d) The development team suggested introducing the new system initially to the Kandy branch of the hospital before deploying it to all other branches. What is the deployment method suggested by the development team?

(iii) A school library is planning to introduce a computerized library management system to replace the existing manual system. List **two** techniques that could be used for requirement identification.

[*see page sixteen*

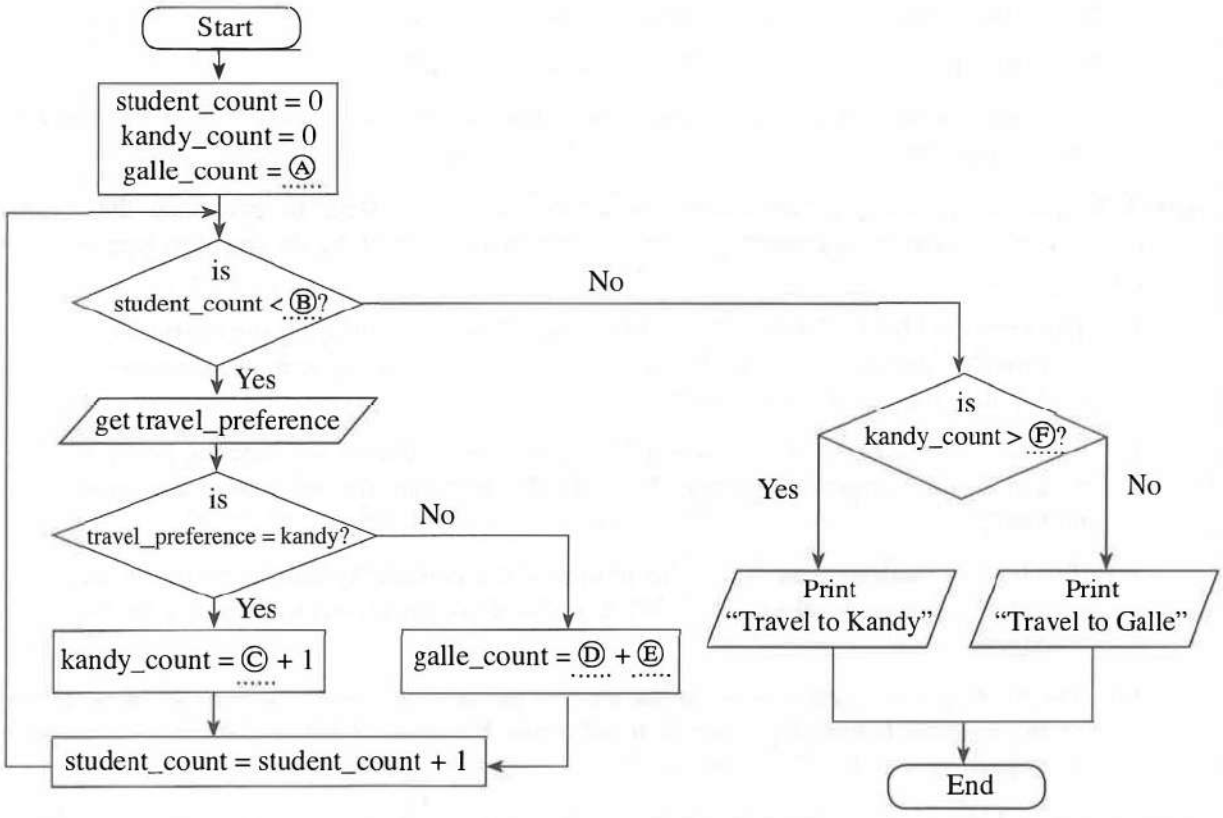
7. (i) Answer parts (a) and (b) based on the following pseudocode:

```
BEGIN
  counter = 0,   x = 0
    WHILE  counter<20
      DISPLAY "Enter a Number"
      READ num
      x = x + num
      counter = counter + 1
    ENDWHILE
   DISPLAY x
END
```

(a) What is the exact purpose of the above pseudocode?

(b) What would happen if the statement "`counter = counter + 1`" is removed from the pseudocode?

(ii) A teacher asked from 50 students to choose their preferred travel destination (either Kandy or Galle) for the annual school trip. The destination will be decided based on the highest student preference. The following flowchart with blanks labelled from Ⓐ to Ⓕ represents this scenario.



Write down the appropriate answers to match the labels Ⓐ to Ⓕ in the **label → answer** format.

3 Paper I answers

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்

අ.පො.ස. (උ.පෙළ) විභාගය/ க.பொ.த. (உயர் தர)ப் பரீட்சை - 2020 2021

නව නිර්දේශය/ புதிய பாடத்திட்டம்

විෂය අංකය / பாட இலக்கம் 20 **විෂය / பாடம்** ICT

ලකුණු දීමේ පටිපාටිය/புள்ளி வழங்கும் திட்டம்
I පත්‍රය/பத்திரம் I

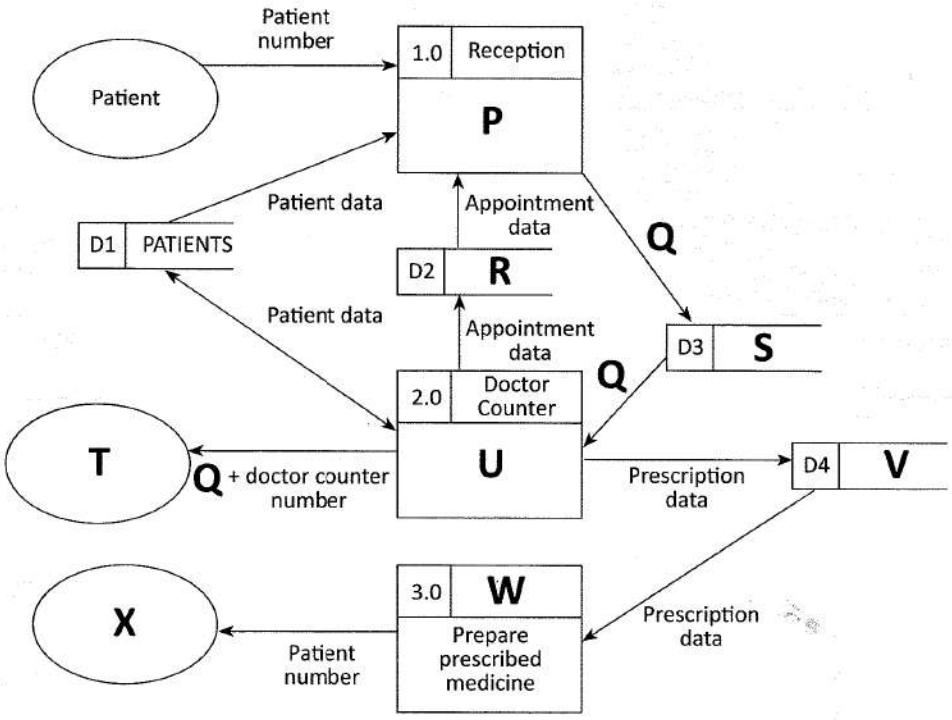
ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.	ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.	ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.	ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.	ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.
01.	3	11.	4	21.	2	31.	5	41.	2
02.	4	12.	4	22.	1	32.	5	42.	2
03.	4	13.	5	23.	5	33.	4	43.	4
04.	5	14.	1	24.	2	34.	3	44.	2
05.	4	15.	4	25.	2	35.	4	45.	4
06.	4	16.	3	26.	3	36.	3	46.	5
07.	4	17.	5	27.	4	37.	5	47.	5
08.	3	18.	5	28.	3	38.	5	48.	5
09.	2	19.	3	29.	1	39.	1	49.	4
10.	2	20.	5	30.	5	40	2	50	3

✪ විශේෂ උපදෙස්/ விசேட அறிவுறுத்தல் :

එක් පිළිතුරකට/ ஒரு சரியான விடைக்கு ලකුණු 01 **බැගින්/புள்ளி வீதம்**
මුළු ලකුණු/மொத்தப் புள்ளிகள் 1 × 50 = 50

(c) The following is the labeled data flow diagram for the events that take place when a patient visits the clinic to consult a doctor.

Do not write in this column



Write in the spaces provided below, the **Number** of the suitable content for each of the labels **P** to **X** choosing from the given list.

P - ..... **Q** - ..... **R** - ..... **S** - ..... **T** - .....

U - ..... **V** - ..... **W** - ..... **X** - .....

List

Number	Content
1	APPOINTMENTS
2	Examine patient
3	MEDICINES
4	Patient sitting area display panel
5	Pharmacy
6	Pharmacy display panel
7	PRESENT
8	Validate patient number
9	Validated patient number

[07 *marks*]

(d) Give **one** (1) difference between *white box testing* and *black box testing*.

.....

.....

[01 *mark*]

* *

[*see page eight*]

5 Paper II mark scheme

Notes
1. Essential keywords sufficient for credit in some answers are underlined.
2. Acceptable alternatives for a given word or set of words are separated by slashes.
3. ←-- *A* indicates that any credit for the item should be given only if A is correct.
4. Rounding off of 0.5 marks should only be done to the **final total** for Paper II.

1. (a) (i) Underline parts containing errors. **[2]**

```
1.  <html>
2.  <body background-color="green">
3.  <h1> Welcome all of you to online ICT Seminar </h1>
4.  <a url="#one" >A/L Student Section</a>
5.  <p> O/L ICT is not available</a>
6.  <-- Section 1 -->
7.  <h4> A/L ICT </h4>
8.  <hr><p>Good Morning</p></hr>
9.  <br> <p> This section is for students </p>
10. </body></html>
```

The above total mark is decided as follows:

2 marks for **4 or 5** places distinctly underlined
1 mark for maximum **1, 2 or 3** places distinctly underlined

NOTE:

- ▼ Deduct **1 mark** for one or more incorrect underlines.
- ▼ If everything is underlined, then **0 marks**.

(ii) Write relevant code lines to make A/L Student Section (line 4) a hyperlink to A/L ICT (line 7). **[1]**

0.5 marks for each:

```
Line 4: <a  href="#one"> A/L Student Section </a>
Line 7: <h4  id = "one">  A/L ICT  </h4>
```

Or

```
Line 7: <a id="one"><h4> A/L ICT  </h4></a>
```

Or

```
Line 7: <a name="one"><h4> A/L ICT  </h4></a>
```

NOTE: HTML 5 does not support it.
h4 tag can be written as the outer tag as well. i.e.,

```
Line 7: <h4> <a id="one"> A/L ICT  </a></h4>
```

NOTES:

★ Instead of "one", any other id (without spaces) can also be used on lines 4 and 7.
★ Quotes on lines 4 and 7 are essential.
★ Ignore space and case defects.

(b) (i) Write a suitable cascading style sheet. **[1]**

0.5 marks for each line:

```
.art {font-size: 14px; text-align: center;}
h1 {color: yellow;}
```

NOTES:

▼ "art" must be in lower case as in question.
▼ If written within the `<body> ... </body>` or `<head> ... </head>`, then do **NOT** give marks.

(ii) Write relevant HTML code lines to include style sheet to a web page. **[1]**

```
<head>
<link   rel="stylesheet" type="text/css"  href="neat.css">
</head>
```

NOTES:

★ "text/css" is optional.
▼ "stylesheet" has to be a single word.

(c) (i) Fill the blanks in the code. **[4]**

```
<html><body>
<h2>Chess Tournament</h2>
<dl>
  <dt>Category I <ul><li>Team A</li><li>Team C</li> </ul> </dt>
  <dt>Category II<dd>Team B</dd><dd>Team D</dd></dt>
</dl>
<h3>Registration Form</h3>
<form method="get">
   <fieldset>
          <label for="Team">Select the team:</label>
           <select name="team">
              <option value="a">Team A</option>
              <option value="b">Team B</option>
              <option value="c">Team C</option>
              <option value="d">Team D</option>
           </select><br><br>
         <label for="comment">Your Comments:</label>
        <textarea name="comment"  rows="3" cols="30"></textarea><br><br>
         <input type="checkbox"  name="food">
         <label for="fr">Food Required</label>
         <input type= "checkbox" name="accom">
         <label for="ar">Accommodation Required</label><br><br>
         <input  type="submit" value="Submit">
   </fieldset>
</form>
</body></html>
```

0.5 marks *allocated to each of the following:*

A: 2 dl tags

B: 2 ul tags

C: 4 dd tags

D: 2 fieldset tags (▼ "fieldset" has to be a word.)

E: 2 select tags

F: 2 textarea tags (▼ "textarea" has to be a word.)

G: 2 checkbox tags (▼ "checkbox" has to be a word.)

H: 1 input tag

NOTES:

★ Ignore case.

(ii) Write the relevant HTML code line to show "Team B" as the default selection. **[1]**

```
<option value="b" selected >Team B</option>
```

NOTES:

★ Ignore case in all **except** for "b".

2. **(a)** Write down the suitable cloud computing service type. **[3]**

1 mark for each:

```
(i) Platform as a Service / PaaS
(ii) Infrastructure as a Service / IaaS
(iii) Software as a Service / SaaS
```

NOTE:

★ Ignore case.

(b) Fill the blanks in the statements. **[2]**

0.5 marks for each:

```
(i) Encryption
(ii) Phishing
(iii) Software piracy
Copyright
```

NOTE:

★ Ignore case.

(c) Write **True**, **False** or **Cannot comment**. **[3]**

1 mark for each:

```
(technical feasibility) False
(operational feasibility) True
(organizational/institutional feasibility) Cannot comment
```

NOTE:

★ Ignore case.

(d) (i) E-Business selling foods: B2B, B2C or C2C? **[1]**

B2C / Business to Consumer / Business to Customer

NOTE:

▼ Upper case needed for the abbreviated answer (i.e., B2C)

★ Ignore case for the other answer (i.e., Business to Consumer)

(ii) What is the electronic payment service commonly called? **[1]**

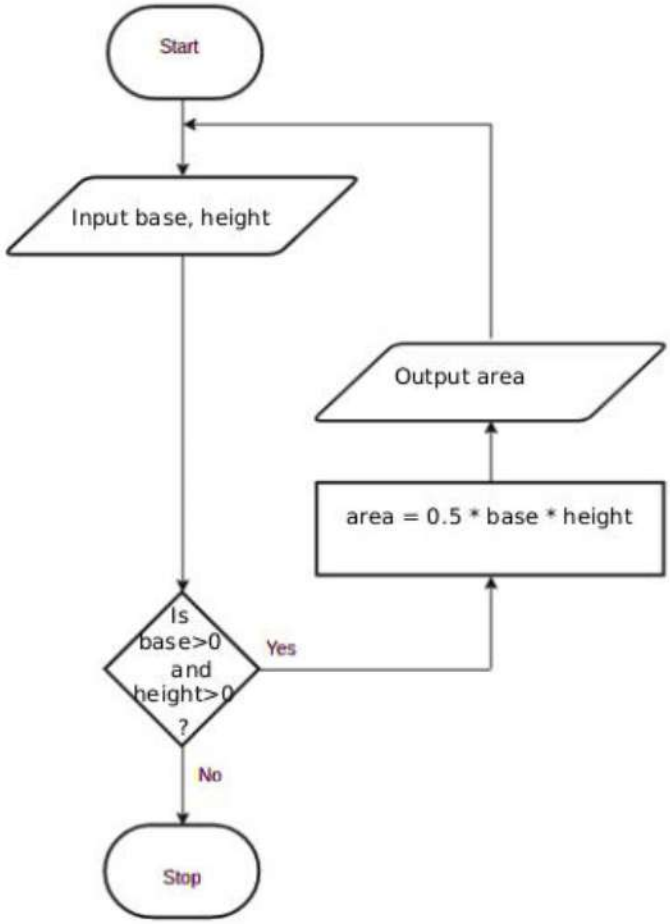
payment gateway

NOTE:

★ Ignore case.

3. **(a)** Fill the four components in the flowchart. **[4]**

1 mark for each correct component.



NOTES:

★ For "input": any other word that conveys the meaning is acceptable. e.g., *get, read*

★ For "output": any other word that conveys the meaning is acceptable. e.g., *display, print, show*

★ For condition: "is base and height > 0?" is also acceptable and "is", "?" are not essential.

★ For variable names: b/B,h/H acceptable. Other meaningful names are also acceptable. If any other *single letter* is used for a variable, then it has to be defined.

▼ For credit for the output component to be given, it has to indicate displaying whatever was computed in the computation block.

(b) Fill the four blanks in the factorial code. **[4]**

1 mark for each:

```
num
num == 0
factorial = factorial*i (correct indentation essential.)
factorial
```

NOTE:

★ "`factorial *= i`" is also acceptable for the third blank.

▼ Correct case essential.

(c) Write the output of the python program. **[2]**

```
2
3
5
```

The above total mark is decided as follows:

2 marks for the exact answer (with or without vertical alignment)
1 mark for either `2 3` or `2,3,5` or `2,3`

NOTES:

▼ Correct order important.

4. **(a)** Write down one functional requirement w.r.t. appointment scheduling. **[1]**

Any answer having the following meaning:

For any given hour, no more than 20 patients should be scheduled.

(b) Give one non-functional requirement w.r.t. the validity check. **[1]**

Any answer having the following meaning:

The validity check should be done fast.

(c) Write the suitable content numbers. **[7]**

P – 8 Q – 9 R – 1 S – 7 T – 4

U – 2 V – 3 W – 5 X – 6

The above total mark is decided as follows:

7 marks for all 9 labels correct
6 marks for maximum 8 labels correct
5 marks for maximum 7 labels correct
4 marks for maximum 5 or 6 labels correct
3 marks for maximum 4 labels correct
2 marks for maximum 3 labels correct
1 mark for maximum 1 or 2 labels correct

(d) Give one difference between white box and black box testing. **[1]**

Any **one** from the following:

White box	Black box
code remains visible to testers	code remains hidden from testers
a low-level testing that involves detailed testing of code	high-level testing that does not involve detailed program level testing
Generally done by developers	Generally done by independent testers/users
Design documents are usually used for testing	Specification document is required for testing
Tests the logic and implementation of software	Tests functionality of software
Programming knowledge and implementation details are required	Prior knowledge of programming is not required
Types of tests include path testing, control structure testing, loop testing, conditions testing	Types of tests: boundary value analysis, comparison tests etc
Generally tesing tools depend on programming language	Generally tesing tools are independent of programming language

NOTE:

▼ No partial marks. Comparison must involve both types.

5. **(a)** Show the complete truth table for the given circuit. **[2]**

A	B	C	X
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

The above total mark is decided as follows:

2 marks for all 8 rows correct
1.5 marks for maximum 5,6,7 rows correct
1 mark for maximum 3,4 rows correct
0.5 marks for maximum 1,2 rows correct

NOTE:

★ Having *Output* as the X column title is acceptable.

▼ If the *X* column is not labelled, or the label is different from *X* / *Output*, **reduce 1 mark** from the earned total.

(b) Complete the Karnaugh map according to the given format. **[4]**

0.5 marks for each correct cell:

		AB			
		00	01	11	10
C	0	0	0	1	1
	1	0	0	1	0

(c) Using the K map, derive a simplified SOP expression for X. **[3]**

C \ AB	00	01	11	10
0	0	0	1	1
1	0	0	1	0

$X = AB + A\overline{C}$

Marks allocated as follows:

A: **2 marks** for marking the two loops on the correct Karnaugh map (**1 mark** for each)
B: **1 mark** for correct, simplified final SOP expression as $X = AB + A\overline{C}$ (←-- A)

NOTE:

★ For component **B**, the term **X** is not compulsory.

(d) Using the K map, derive a simplified POS expression for X. **[3]**

C \ AB	00	01	11	10
0	0	0	1	1
1	0	0	1	0

$X = A(B + \overline{C})$

Marks allocated as follows:

A: **2 marks** for marking the two loops on the correct Karnaugh map (**1 mark** for each)
B: **1 mark** for correct, simplified final POS expression as $X = A(B + \overline{C})$ (←-- A)

NOTE:

★ For component **B**, the term **X** is not compulsory.

(e) Out of the two expressions which one is better to implement a more simplified logic circuit than the given logic circuit? Explain. **[3]**

The POS, $X = A(B + \overline{C})$, is better than the SOP, $X = AB + A\overline{C}$.

Explanation:

With POS, we can implement a simpler logic circuit with one OR gate, one AND gate and one NOT gate (only three gates) whereas the SOP leads to a logic circuit with two AND gates, one OR gate and one NOT gate (four gates).

Marks allocated as follows:

A: **1 mark** for correctly identifying that the POS is better than the SOP
(←-- correct SOP and POS expressions for 5(c) and 5(d))

B: **2 marks** for correct explanation on why the POS is better than the SOP given as follows:
(←-- A)

1 mark: POS has fewer (3) literals and leads to a logic circuit with 3 gates

1 mark: SOP has more (4) literals and leads to a logic circuit with 4 gates

or alternatively:

B: **2 marks** for correctly showing the two correct circuit diagrams and identifying the better one **or** for indicating generally that POS results in a circuit that has fewer gates when compared to the circuit resulting from SOP (←-- A)

IMPORTANT: Note the dependency in marking component **A**. This basically means **not** to give credit for part **(d)** if the student is not basing his/her argument using the expressions $X = AB + A\overline{C}$ and $X = A(B + \overline{C})$.

6. **(a)** Explain how the odd parity check could be used to detect any error in the transmission of 1010110. **[2]**

Marks allocated as follows:

A: **1 mark** for `adding 1 as the parity bit`
B: **1 mark** for `receiver has to get the total number of bits odd; if not error`

NOTE:

★ Ignore the position where the parity bit is added.

(b) Fill the empty entries in the IP address table. **[6]**

0.5 marks for each correct cell.

Division/ Unit	Network ID	Broadcast ID	Subnet Mask	No. of Nodes	Usable IP Address Range
Marketing	192.174.19.0	192.174.19.63	255.255.255.192	64	192.174.19.1-192.174.19.62
Stores	192.174.19.64	192.174.19.79	255.255.255.240	16	192.174.19.65-192.174.19.78
Supplies	192.174.19.96	192.174.19.111	255.255.255.240	16	192.174.19.97-192.174.19.110
Operations		192.174.19.159		32	

IMPORTANT: **Any** or **no** answer to the three cells on the last row (Operations) is considered acceptable.

(c) **(i)** Which network topology will you suggest for Mohan? **[1]**

`ring`

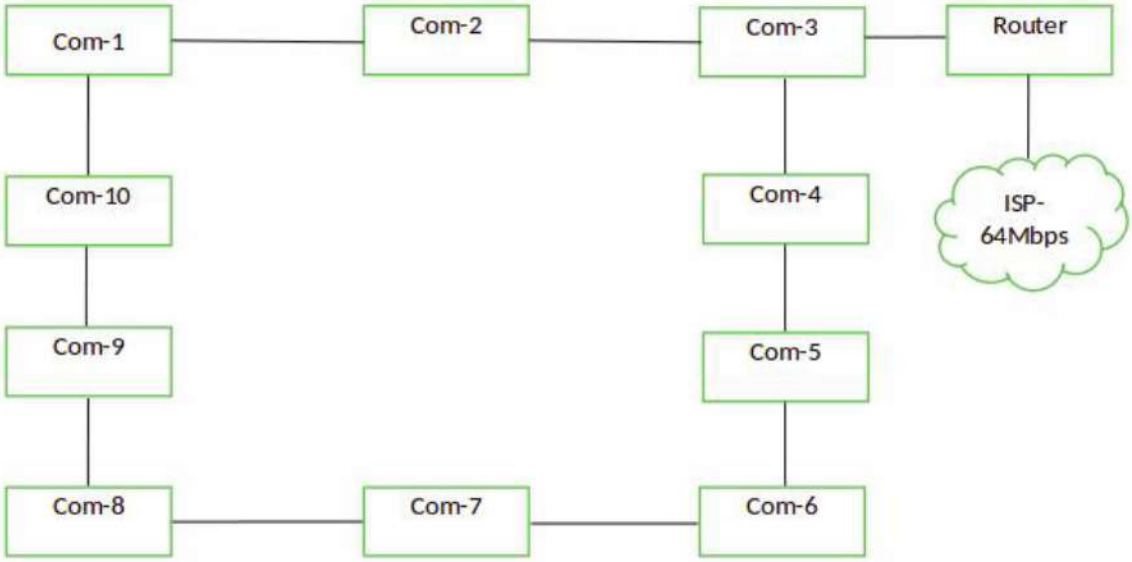
or alternatively

`mesh`

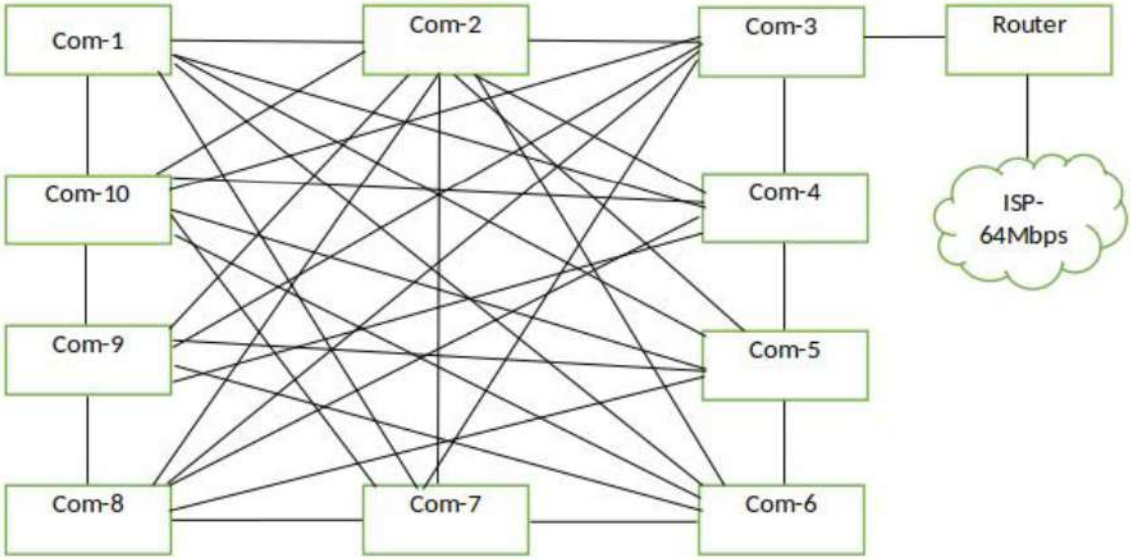
NOTE: `mesh` is acceptable as an answer. But may not be very beneficial due to extra interconnections needed, performance degradation and inadequate user requirement to go for a mesh.

(ii) Draw the logical arrangement of the network. **[2]**

Ring:



[if the student has chosen a mesh:]



1 mark for each:

A: 10 computers properly connected to Router /
10 computers properly connected to Router along with a firewall and/or proxy
(←-- topology chosen is either **ring** or **mesh**)

B: Router connected to Internet connection

NOTES:

★ The following symbols are also accepted for this part and for part (v):

Router	Firewall
	

★ Instead of "ISP", "Internet" is also acceptable.

(iii) Technical suggestion to improve connection speeds for clients. **[1]**

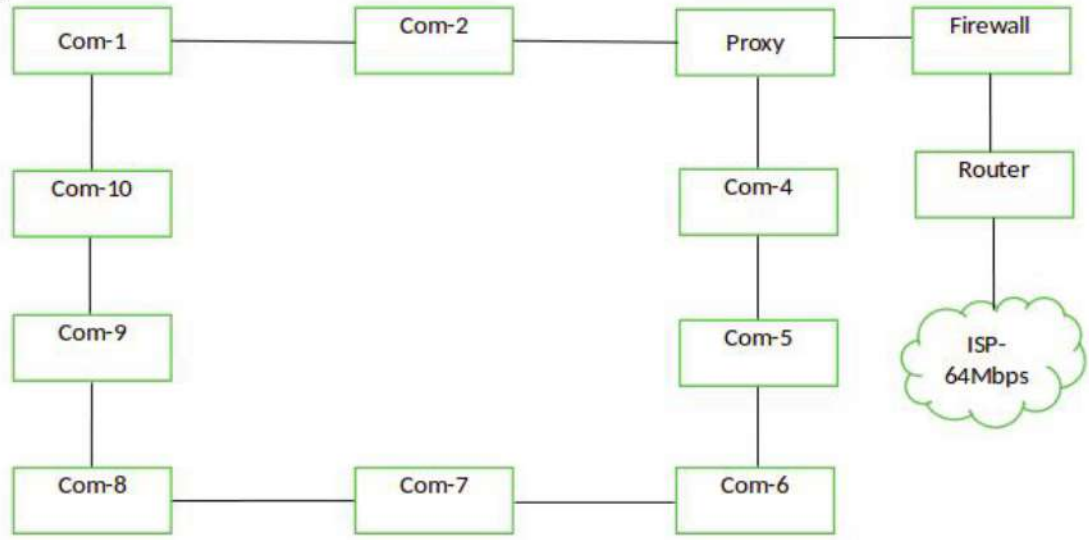
Add a Proxy Server

(iv) Mechanism to protect the network by filtering the communication traffic **[1]**

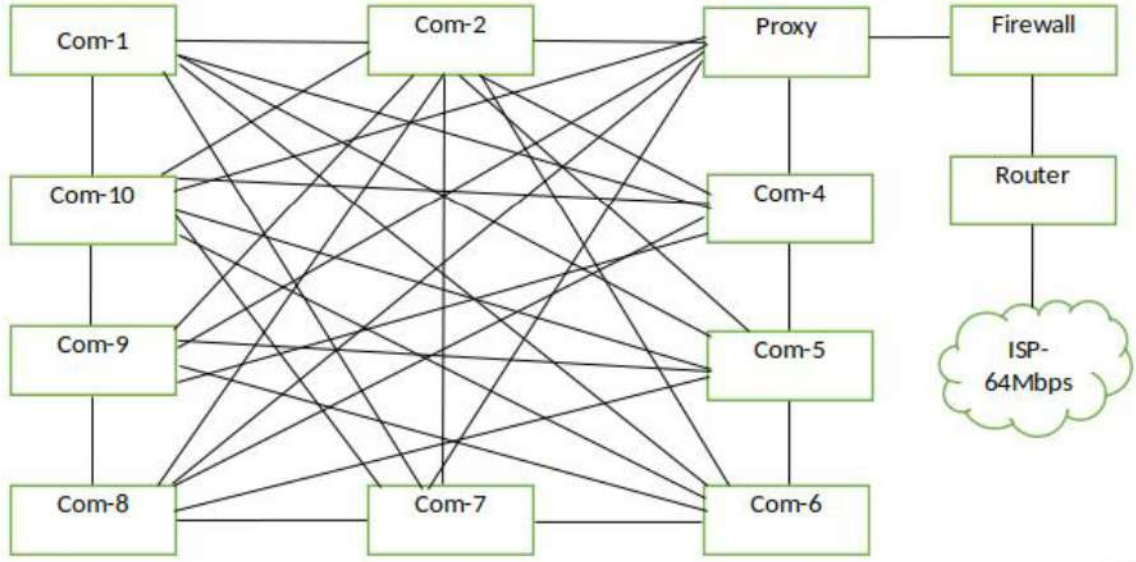
Have a firewall

(v) Include the solutions for (iii) and (iv) in the logical network arrangement. **[2]**

Ring:



[if the student has chosen a mesh:]



1 mark for each:

A: properly adding and labelling proxy (←-- topology chosen is either **ring** or **mesh**)
B: properly adding and labelling firewall

7. **(a)** **(i)** What is the ecommerce business type applicable in this scenario? **[1]**

B2C / Business to Consumer / Business to Customer

(ii) What is the revenue model used in this E-Commerce site? **[1]**

online sales

(iii) Do you recommend the same revenue model of (ii) for offering digital learning material? Justify. **[1]**

If **Yes**, then justification should relate the possibility of online sales as a revenue model for digital content.
If **No**,then justification should relate the challenges with online sales for the digital content (in that case, use subscription as a revenue model).

(iv) Suggest a strategy to increase the business revenue with the help of the proposed streaming channel. **[1]**

Advertisements as a revenue model or a suitable answer

(v) Write down a key challenge the bookshop has to face when implementing the digital content channel. **[1]**

Answer could be in the following themes with an explanation why it is important:

- Cost-effectiveness: giving *free* access to this service
- Content quality: Recording/preparation and editing must meet standards; reducing bandwidth consumption of the viewers
- Copyright issues: Should avoid improper use of IP/Copyright material within content and through the channel offering
- Technical suitability: Should provide uninterrupted service (availability); compatibility with many devices/browsers (compatibility), service efficiency, security, etc.