80 | E | I, II

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கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2019 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2019

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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 Colombo Weather Centre records daily rainfall values for one month.
Write down **two** examples for *information* that can be found by *processing* the above mentioned daily rainfall *data*.

(ii) Consider the following diagram with images of some computer ports labelled Ⓐ – Ⓔ.

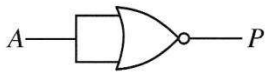
Image of the port					
Label	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ

Identify the name of each port using the list given below. Write down the label of each port and its matching port name.

List : {*Audio, HDMI, RJ45, USB, VGA*}

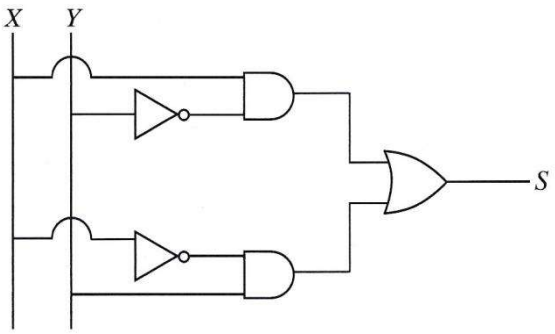
(iii) (a) Convert 1260_{10} to its octal equivalent.
(b) Convert $A1_{16}$ to its binary equivalent.

(iv) (a) Consider the following logic gate.



Draw the truth table (having two columns as *A* and *P*) for the above gate.

(b) Consider the following logic circuit.



Write down the relevant boolean expression for *S*.

[see page eight

2. (i) Some information technology related risks (labelled Ⓐ – Ⓓ) are given below.

Ⓐ losing user files and folders due to a hard disk failure

Ⓑ computer behaving abnormally after the use of a flash drive

Ⓒ data in a computer connected to the Internet accessed remotely without authorization

Ⓓ frequent power supply interruptions to a personal computer

Identify suitable solutions for the above risks from the labelled list (Ⓟ – Ⓤ) given below. Write down the risk label and the matching solution label.

List : {Ⓟ - *getting regular backups,* Ⓠ - *installing CCTV,* Ⓡ - *installing firewalls,*
Ⓢ - *use of surge protectors,* Ⓣ - *use of UPS,* Ⓤ - *use of anti-virus software*}

(ii) The 3R (**R**educe, **R**euse and **R**ecycle) technique is well accepted for waste reduction. Explain this technique with respect to reducing e-waste.

(iii) Write answers for the following:

(a) Write one way in which a person can protect a spreadsheet on his computer from unauthorized access. (Assume that the computer is not connected to the Internet.)

(b) A person cannot afford to buy commercial spreadsheet software for his computer. He has to use spreadsheet software often and he does not like the expense and the inconvenience of going to an ICT center each time for it. Suggest one thing that he could do fulfill his spreadsheet requirements.

(c) To facilitate student learning, a school principal wants to start a Learning Management System (LMS) in her school using an unused, new computer. Write down one benefit that students can obtain through this LMS.

(d) Explain how a student can include in his essay without plagiarizing, a part of the content of a website.

(e) A manager in a Colombo office wants to have a meeting with managers in Jaffna and Matara offices using a video conference. Write down the requirements that are needed in these locations in order to use this facility.

(iv) An office wants to create a computer network using a *hub*, three computers (named *server*, *computer A*, *computer B*) and a *printer* using a *star topology*.

Using named boxes for the devices (e.g., [hub]), draw a diagram to illustrate the above topology for the office.

3. Following are the partly shown tables of the relational database of a sports team management system in a school.

PlayerID	FirstName	LastName	StudentID
P1001	Saman	Perera	S1538
P1002	Raj	Selvam	S1201
P1003	Sharaf	Nazwar	S2735
P1004	Saman	Silva	S1465
P1005	Shane	Almaida	S2905
P1006	Nimal	Fernando	S1350
:			
:			

Table: Player (Includes the descriptions of players)

TeamID	PlayerID	YearJoined
T1	P1002	2013
T1	P1004	2014
T2	P1003	2015
T2	P1005	2015
T3	P1001	2014
T3	P1006	2013
:		
:		

Table: Player_Team
(Contains the players of each team and their years of joining)

TeamID	TeamName	AgeGroup	CaptainID
T1	Cricket	U19	P1002
T2	Cricket	U17	P1003
T3	Volleyball	U19	P1002
T4	Volleyball	U17	P1004
:			
:			

Table: Team
(Contains the names and age categories of teams and their captains)

(Note: **CaptainID** is a valid **PlayerID**)

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

(b) Write down the possible primary keys available in the **Player** table.

(ii) Which table(s) need(s) to be updated to accommodate the following changes?

(a) A new student, *Piyal Alwis* (**StudentID**: *S4205*), is admitted to the school and joins the *U17 Cricket* team in *2019*.

(b) *Nimal Fernando* is appointed the captain of the *U19 Volleyball* team.

(iii) (a) Write down the new record(s) to be added to the relevant table(s) for the change mentioned in part (ii) (a). Use the format: *tablename* → (*field1, field2, ...*) for each record.

(Note: Assume that *Piyal Alwis* is assigned the **PlayerID** *P1120*)

(b) In 2019, the school starts an Under 17 (*U17*) *Football* team (**TeamID**: *T7*) and appoints *Shane Almaida* as the captain. Write down the new record(s) to be added to the relevant table(s) for the above change. Use the format: *tablename* → (*field1, field2, ...*) for each record.

(Note that *Shane Almaida* is currently playing in the *U17 Cricket* team.)

(iv) Which tables are to be joined to write a query to find the name of the *U19 Cricket* captain?

4. (i) Consider the following statements with blanks labelled Ⓐ–Ⓕ. Identify the most suitable term to fill each blank from the list given below. Write down the statement label and the matching term.

Ⓐ - ..... determines the correspondence between domain names and IP addresses on the Internet.

Ⓑ - ..... is used to transfer large files from one computer to another over the Internet.

Ⓒ - ..... is one of the most important protocols for email transport between email servers.

Ⓓ - ..... is the top level domain of the domain name *www.nie.lk*.

Ⓔ - ..... could be used to find out web pages whose URLs are not known.

Ⓕ - ..... separates the user name and domain name of an email address.

List : {*# symbol, @ symbol, DNS service, FTP, HTTP, ICMP, IP address, IP service, lk, nie.lk, Search engines, SMTP, URL*}

(ii) Choosing from the examples given in the list, write down the correct example for each of the labelled items Ⓐ to Ⓓ given below. You are only required to write the label and the corresponding example.

Ⓐ - web browser

Ⓑ - programming language for dynamic web content creation

Ⓒ - web authoring tool

Ⓓ - content management system

List : {*Joomla, Kompozer, Mozilla Firefox, Pascal, PHP*}

(iii) The HTML source of the web page shown in **Figure 1** is given in **Figure 2** with certain missing tags labelled ① to ⑩.

Dengue fever: What is it and how to stop it?

Stop Dengue!

Dengue fever is a mosquito borne viral infection that causes a flu-like illness.

It can worsen into severe dengue and become deadly if not treated well.

Currently about one-third of the world's population is at risk of contracting dengue fever.

Dengue fever signs, symptoms	Five prevention tips
• High fever • Swollen lymph glands • Muscle, joint and abdominal pains • Nose bleeding • Excessive vomiting	1. Eliminate standing water 2. Use good mosquito repellent 3. Clean and monitor gradens well 4. Wear protective clothing 5. Use Guppi fish in ponds

For more information: Dengue prevention

Figure 1: The web page

[see page thirteen

5. Consider the following spreadsheet segment which consists of marks obtained by 40 students in a class for their three subjects at a school term test. Students' marks for Subject 1, Subject 2 and Subject 3 are shown in columns C, D and E respectively. This spreadsheet is used to compute the Z-score for each subject of each student and the final Z-score for each student.

	A	B	C	D	E	F	G	H	I
1	Index	Student	Marks			Z-Score			Final
2	No.	Name	Subject 1	Subject 2	Subject 3	Subject 1	Subject 2	Subject 3	Z-score
3	1	Kamal	27	34	43	-1.1081	-1.0146	-0.4915	-0.8714
4	2	Raju	45	50	62	0.0382	0.0879	0.8284	0.3182
5	3	Rauf	34	40	60	-0.6623	-0.6012	0.6895	-0.1913
6	4	Krishna	66	70	70	1.3756	1.4660	1.3842	1.4086
	....								
41	39	Roshan	84	73	85	2.3565	1.6417	2.1601	2.0528
42	40	Khan	40	60	50	-0.2936	0.7580	-0.0767	0.1292
43	Average marks of the subject		44.8750	44.8500	51.2000				
44	SD value of the subject		16.6027	14.7101	15.6471		Highest Z-score		2.0528
45									
46									

(i) Write down the formula that should be entered in cell C43 to calculate the average mark for Subject 1 in the form of *=function1(cell1:cell2)*

(ii) If this formula is copied to cells D43 and E43, write down the formula that will appear in cell D43.

(iii) The Z-score for a subject of a student can be calculated by using the following formula:

Z-score = (student's marks for the subject – average marks for the subject) / SD value of the subject

The SD values required for each subject are given in cells C44, D44 and E44 respectively.

(a) Write down the formula that should be entered to cell F3 to calculate Kamal's Z-score for Subject 1.

Note that this formula is to be copied to calculate the Z-scores for Subject 1 of all other students too.

(b) If this formula is copied to cell range F4 to F42, write down the formula that will appear in cell F42 which shows Khan's Z-score for Subject 1.

(iv) The final Z-score of a student is the average of the three Z-scores for the subjects. Write down the formula to calculate the final Z-score value of Kamal in cell I3 using **only** the functions **COUNT** and **SUM**.

(v) Assuming that student Z-score values for the three subjects and the final Z-score for all students have been calculated, write down a formula that should be entered in cell I44 to find the highest final Z-score value in the form of *=function2(cell3:cell4)*.

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6. (i) Following table shows five stages of the systems development life cycle (SDLC) with an activity for each stage.

Stage of SDLC	Activity
Identification of requirements	Ⓐ
Ⓑ	Designing interfaces
Ⓒ	Writing the computer programs
Testing and debugging	Ⓓ
Ⓔ	Adding new features to the system

Identify the suitable choice for each of the labels Ⓐ – Ⓔ from the labelled list (Ⓟ – Ⓣ) given below. Write down each label in the table and its matching choice label.

List : {Ⓟ - *Coding the solution,* Ⓠ - *Designing the solution,* Ⓡ - *Integration testing,* Ⓢ - *Interviewing,* Ⓣ - *Maintenance of the system*}

(ii) The book shop in your school operates with a computer-based information system. When a student goes to buy stationery, the clerk enters the item code and the quantity of each item the student wants to buy. The system then calculates the total cost for each item and the total bill value. Then the system displays the final bill on the screen and prints it.

Using the above scenario answer the following questions.

(a) Write down one *input*.

(b) Write down one *process*.

(c) Write down one *output*.

(iii) Identify the correct term from the given labelled list (Ⓟ – Ⓣ) for each of the following scenarios labelled Ⓐ – Ⓓ. Write down the scenario label and the matching term label.

Ⓐ - Sunil is developing a library management system and told the teacher that she will not be able to use any part of the system until the entire system is fully developed.

Ⓑ - After completion of a small information system for the school canteen, Azma decided to stop the existing system and operate the new system.

Ⓒ - After monitoring the new student information system initially introduced to Grade 6 classes, the Principal plans to introduce the system to the other classes of the school.

Ⓓ - The initial system was developed with two input screens and one report. Based on the user feedback two more input screens and reports were added to the system. More features are to be added based on further user feedback.

List : {Ⓟ - *direct deployment,* Ⓠ - *iterative software development,* Ⓡ - *phased deployment,* Ⓢ - *pilot deployment,* Ⓣ - *waterfall model*}

(iv) List **two** benefits of a computer-based information system over a manual information system.

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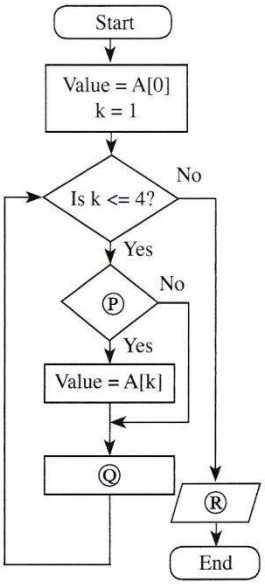
7. (i) Consider the following array **A** containing five integer values.

A[0]	A[1]	A[2]	A[3]	A[4]
80	100	70	65	95

(a) Write the output of the following pseudo-code when it is executed on the above array **A**.

```
BEGIN
   Value = A[0]
   k = 1
   WHILE (k<=4)
         IF A[k] < Value THEN
            Value = A[k]
         ENDIF
         k=k+1
   ENDWHILE
   DISPLAY Value
END
```

(b) Identify and write down the correct statements for Ⓟ, Ⓠ and Ⓡ in the flowchart on the right which is drawn using the above pseudo-code.

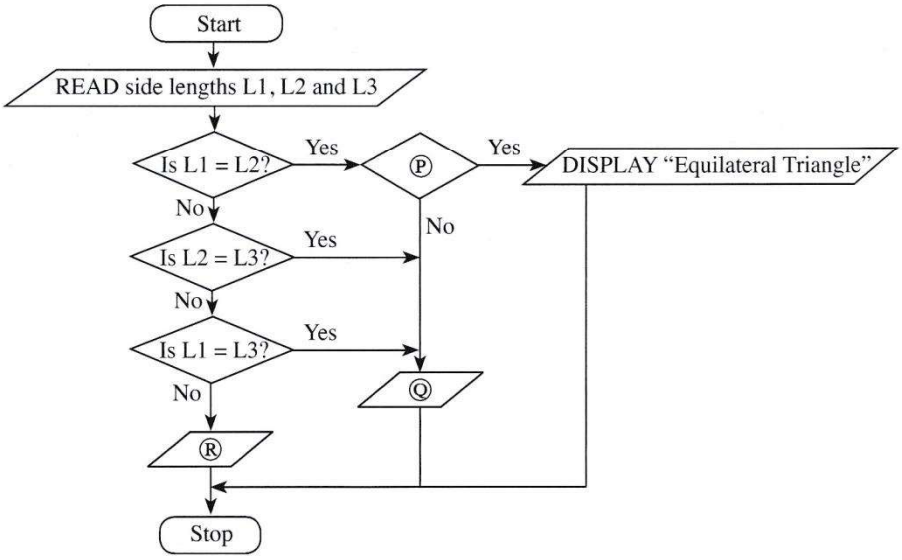


(c) Redraw the array **A** and its contents after the following assignments are carried out on the array **A**.

A[1] = 45
A[2] = 88
A[4] = 72

(ii) A triangle with all three sides of equal length is called an **equilateral** triangle. A triangle with two sides of equal length is called an **isosceles** triangle. A triangle with all sides of different lengths is called a **scalene** triangle.

The following flowchart with labels Ⓟ, Ⓠ, Ⓡ determines if a given triangle is an equilateral, isosceles or a scalene triangle.



Write down the relevant statements for the labels Ⓟ, Ⓠ and Ⓡ.