දකුණු පළාත් අධ්‍යාපන දෙපාර්තමේන්තුව
தென் மாகாணக் கல்வித் திணைக்களம்
Department of Education, Southern Province

12 ශ්‍රේණිය අවසාන වාර පරීක්ෂණය - 2024 (2025)
தரம் 12 ஆண்டிறுதிப் பரீட்சை - 2024 (2025) Grade 12 Final Term Test - 2024 (2025)

Information and communication Technology I	20	E	I	කාලය நேரம் Time	02 hours

නම பெயர் Name ..... විභාග අංකය சுட்டிலக்கம் Index No. .....

Should be considered:

- **Answer all the questions**
- **Write down your index number and name in the space provided in the answer sheet.**
- **For each question from 1 to 50, select the correct or most appropriate answer from the given answers of (1), (2), (3), (4) or (5).**

1. Consider the following statements regarding data.
   A. To find a student's Body Mass Index (BMI), his height in centimeters and weight in kilograms must be obtained.
   B. Various types of sweet bird songs can be heard in the areas surrounding the Sinharaja forest in the early morning.
   C. Thousands of white and red lotus flowers can be seen on the altar in a religious place.
   D. In a program broadcasting election results by a television station, a software layout was used to present the results attractively as soon as they were received from the election department in order to engage a larger audience.

   Among the above statements, which statements contain quantitative data and qualitative data?
   (1) A and C only (2) B and C only (3) C and D only (4) A and D only (5) B and D only

2. Which of the following is not a component of a computer system?
   (1) Modem (2) Antivirus software (3) Read Only Memory (ROM)
   (4) Artificial Intelligence (AI) (5) Software engineer

3. What is the processing method used in autonomous vehicle driving systems?
   (1) Batch processing (2) Online processing (3) Real time processing
   (4) Both online and offline processing (5) Batch processing and real time processing

4. When entering an employee's national identity card number into an employee information database at an institution, which of the following validation checks can be used to verify its accuracy?
   (1) Presence check, Type check, Length check (2) Presence check, Length check, Check digit
   (3) Presence check, Check digit, Type check (4) Presence check, Length check, Check digit
   (5) Type check, Presence check, Length check, Check digit

5. Consider the following statements about the history of computers.
   A - The foundation of modern computer technology was laid in 1906 with the invention of the vacuum tube by Forrest.
   B - The first digital computer that used stored programs was ENIAC.
   C - The first general purpose electronic digital computer was EDVAC.
   D - In the Mark 1 machine, a typewriter was used for data input, and punch cards were used for output.

   Which of the above statements are incorrect?
   (1) A and B only (2) B and C only (3) A and C only (4) B and D only (5) C and D only

6. Consider the following statements about the Von Neumann architecture.
A - Currently using computers are based on the Von Neumann architecture, which use the concept of stored programs.
B - According to the Von Neumann architecture, a computer consists of four main components.
C - The central processing unit (CPU) is one of the main components in the Von Neumann architecture and it is responsible for coordinating operations and generating clock signals.
D - The data bus is used to transmit data between the devices in the computer and the data bus is contained in the central processing unit.
Which of the above statements are true?
(1) A, C, and D only (2) B, C, and D only (3) A, B, and D only (4) A, B, and C only (5) All A, B, C, and D

7. Which of the following statement about computer classification is false?
(1) A washing machine is an analog computer.
(2) Digital computers are used in vehicle emission testing stations
(3) Super computers, mainframe computers, mini computers, hybrid computers and analog computers are used only for specific tasks.
(4) Super computers are used in weather research operations.
(5) Mainframe computers are used in airline seat reservation systems.

8. What is used to temporarily store memory references at locations needed to access data in main memory?
(1) Memory Address Register (MAR) (2) Memory Data Register (MDR) (3) General-purpose register
(4) Special-purpose register (5) Program counter

9. Consider the following statements about computer memory technologies
A - Static Random-Access Memory (SRAM) is built using transistors and diodes.
B - Cache memory and register memory are created using SRAM technology.
C - A bit storable flip flops are used to produce dynamic random access memory (DRAM) devices.
D - DRAM technology can produce higher-capacity memory and it does not require frequent refreshing.
Which of the above statements are correct?
(1) A and B only (2) A, B, and D only (3) A and C only (4) B, C, and D only (5) All A, B, C, and D

10. Which of the following statements about cache memory is incorrect?
A - The production cost of cache memory is lower than that of main memory (RAM)
B - Frequently used data is temporarily stored in cache memory and it has three levels as L1, L2, and L3.
C - L2 and L3 cache memory types do not use the data bus on the motherboard for data transmission to the CPU.
D - The fastest type of cache memory is the L1 cache.
(1) A, B, and D only (2) A, C, and D only (3) A and C only (4) B and C only (5) B, C, and D only

11. The result of taking the one's complement value of the eight bits of the number 115_{10} is,
(1) 01110011 (2) 10001100 (3) 11001100 (4) 10111100 (5) 10101100

12. Which of the following is equal to the decimal value 30.125?
A - 11110.001_2 B - $IE.2_{16}$ C - 36.1_8
(1) A only (2) A and B only (3) A and C only (4) B and C only (5) All A, B, and C

13. The decimal number equivalent of the 8-bit two's complement 11111111_2 is?
(1) -1 (2) +1 (3) -255 (4) +256 (5) +512

14. What is the answer when the bitwise XOR operation between decimal 45 and decimal 23 is obtained?
(1) 59 (2) 45 (3) 58 (4) 78 (5) 90

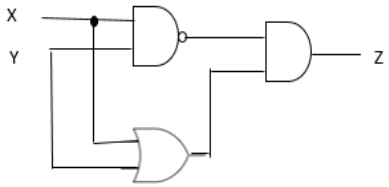
15. If character H in ASCII code is represented by 10010000 then what character is represented by 1000010?
(1) A (2) B (3) C (4) D (5) E

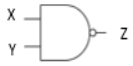
16. The hexadecimal number equivalent to the decimal 302_{10} is?
(1) ABC (2) 9FF (3) 2E1 (4) 334F (5) 12E

17. When binary 0101111 is subtracted from binary 11100000, the result will be equal to,
A - $B1_{16}$
B - 177_{10}
C - 261_8
D - $1011\ 0001_2$

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

18. What is the logic gate equivalent to the Z output of the logic circuit shown in the figure below?



(1) 

(2) 

(3) 

(4) 

(5) 

19. What is the answer when the Boolean expression F = $\overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}\,C\,\overline{D} + A\,\overline{B}\,\overline{C}\,\overline{D} + A\overline{B}\,C\,\overline{D}$ is simplified?
(1) $\overline{B}.\overline{D}$ (2) $\overline{B} + \overline{D}$ (3) A. $\overline{B}.\overline{D}$ (4) $\overline{C}.\overline{D}$ (5) $\overline{C} + \overline{D}$

20. Which of the following answer represents the correct Karnaugh map for the Boolean expression F=A.$\overline{B}$+A.C+$\overline{B}$.C?

(1)

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

(2)

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

(3)

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

(4)

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

(5)

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

21. What is the minimum number of NAND gates required to design the Boolean expression F = $\overline{X}\,Y + \overline{Y}\,\overline{Z}$ using only NAND gates and the minimum number of NOR gates required to design the same expression using only NOR gates respectively?
(1) 6 , 4 (2) 6 , 5 (3) 5 , 5 (4) 4 , 4 (5) 5 , 6

22. Which answer represents the Boolean expression F (A, B, C) = AB + AC as a standard sum of product (SOP) expression?
(1) $A\overline{B}\overline{C} + A\overline{B}C + ABC + AB\overline{C}$ (2) $A\overline{B}C + ABC + \overline{A}\,\overline{B}C + \overline{A}BC$ (3) $A\overline{B}C + AB\overline{C} + \overline{A}BC$
(4) $A\overline{B}C + ABC + \overline{A}\,\overline{B}C$ (5) $ABC + AB\overline{C} + A\overline{B}C$

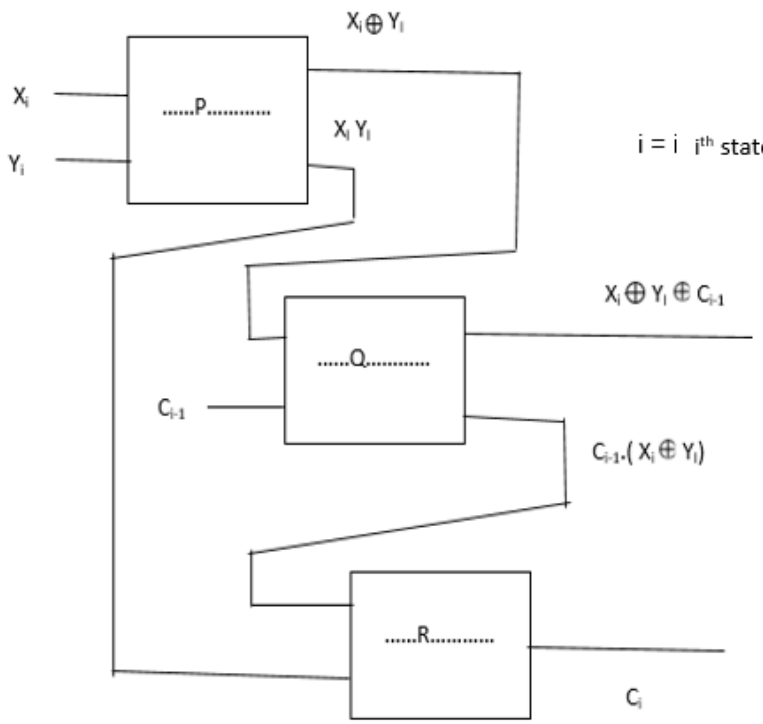
23. What is the answer to the Boolean expression F (A, B, C) = (A + B).(B +C) as an expression for the standard product of sum (POS)?

(1) $(A + B + C).(A + B + \overline{C}).(A + \overline{B} + C).(\overline{A} + B + C)$ (2) $(A + B + C).(A + B + \overline{C}).(A + \overline{B} + C).(\overline{A} + \overline{B} + C)$

(3) $(A + B + C).(A + B + \overline{C}).(\overline{A} + \overline{B} + C)$ (4) $(A + B + C).(A + B + \overline{C}).(\overline{A} + B + C)$

(5) $(\overline{A} + B + C).(A + \overline{B} + C).(\overline{A} + \overline{B} + C)$

24. Consider the following figure that illustrates the operation of a full adder.



The appropriate terms for the labels P, Q, R in the above diagram are,

(1) AND gate, XOR gate, OR gate (2) Half adder, Half adder, OR gate

(3) XOR gate, Half adder, OR gate (4) XOR gate, AND gate, OR gate

(5) XOR gate, AND gate, Half adder

25. Which of the following statement about flip flop is correct?

(1) Static random-access memory is designed using flip-flops.

(2) Dynamic random-access memory is designed using flip-flops.

(3) After an output occurs in relation to the second input of the combinational logic circuit, it is stored in memory and affects the next input

(4) NOR, NAND and AND gates are used to build flip-flops.

(5) In flip flop logic circuit, Q and $\overline{Q}$ are output signals and Set and Reset are not input signals.

26. In a byte-addressable system 16 bits are there for physical memory addresses and 14 bits are for virtual memory addresses. If the page size is 2KB, what is the number of bits allocated for the page number and frame number respectively?

(1) 5 , 3 (2) 4 , 3 (3) 3 , 5 (4) 4 , 5 (5) 5 , 5

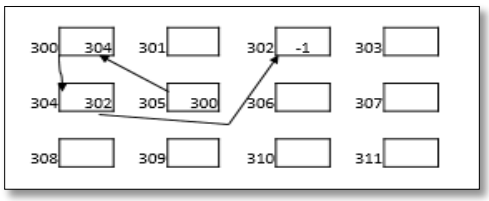
27. What is the state in which a running process cannot be entered?

(1) Terminated state (2) Ready state (3) Blocked state (4) Swapped in and waiting state

(5) None of the above

28. What type of operating system is used in airline ticket reservation systems?
    (1) Single-user, single-task (2) Single-user, multi-task (3) Multi-user, multi-task
    (4) Real-time operating system (5) Time-sharing system

29. The diagram below shows how the hard disk allocations are done for the file abc.py.



Consider the following statements for that.
A - An operating system that implements index allocation.
B - The starting sector number of the file allocation table (FAT) for that file abc.py is 305.
C - No external fragmentation occurs on the hard disk when storing file allocation.
D - The last sector number of the file is 302.
Which of the above statements are true?

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

30. Consider the following statements about the schedulers.
    A - The midterm scheduler is responsible for the processes between main memory and virtual memory.
    B - The short term scheduler is responsible for making new processes ready.
    C - In real time processing in modern operating system, the central processing unit provides sufficient time for the processes to be executed by long-term schedulers.
    D - The short term scheduler determines which process in main memory is suitable for sending to the processor after the process currently in the processor is executed.
    Which of the above statements are true?
    (1) A, B and C only (2) A,B and D only (3) B, C and D only (4) A, C, and D only (5) All A, B, C, and D

31. The following is a file allocation table (FAT) for linked allocation. The capacity of a block is 5KB. Which of the following statement is correct regarding that?
    (1) This represents a three file storage.
    (2) 305 is the directory information of a file.
    (3) 308 is the directory information of a file.
    (4) The capacities of the two stored files are the same.
    (5) The directory information of a file is 300.

32. Which statement regarding spooling is incorrect?
    (1) Spooling is the process of queuing various input and output operations on a computer.
    (2) Spooling allows a computer to perform multiple input/output operations simultaneously.
    (3) The space required to queue input/output operations for execution on the computer is provided only by main memory, not by the hard disk.
    (4) Spooling handles data from input/output devices that have different data access rates.
    (5) Spooling maintains a buffer when the computer's input/output devices get slow down.

33. The following is a case where the priority based scheduling algorithm is implemented for process management in an operating system.

Process	Arrival time	Burst time	Priority
P0	0	7	1
P1	3	3	2
P2	2	5	1
P3	1	6	4
P4	5	2	3

The order in which the operations run is?

(1) P0, P1, P2, P3, P4 (2) P0, P2, P1, P3, P4 (3) P2, P0, P1, P4, P3

(4) P2, P0, P1, P3, P4 (5) P0, P2, P1, P4, P3

34. The network class that the IP address 200.128.31.0 belongs to is,

(1) Class A (2) Class B (3) Class C (4) Class E (5) Class F

35. If a host uses the IP address 191.248.240.4 and the subnet mask 255.255.224.0, the network address of the network the host belongs to is?

(1) 191.248.240.0 (2) 191.248.0.0 (3) 191.248.224.0 (4) 191.240.0.0 (5) 191.248.128.0

36. An institution plans to create eight subnets using the 193.1.1.0/23 IP address range. How many hosts can be supported on each subnet?

(1) 126 (2) 128 (3) 62 (4) 32 (5) 30

37. When the network address range 200.128.128.0/25 is subnetted into four smaller networks, which of the following can not a subnet of that?

(1) 200.128.128.0/27 (2) 200.128.128.32/27 (3) 200.128.128.64/27 (4) 200.128.128.96/27

(5) 200.128.128.128/27

38. Consider the following statements about the amplitude modulation technique. Among them, the correct statement is,

(1) Changes only the amplitude of a signal (2) Changes both the amplitude and frequency of a signal

(3) Changes both the amplitude and phase of a signal (4) Changes both the frequency and phase of a signal

(5) Changes both the amplitude and frequency and phase of a signal

39. Selection that only contains guided media is,

(1) Fiber optics, Twisted pair, Microwave (2) Fiber optics, Twisted pair, Coaxial cable

(3) Coaxial cable, Twisted pair, Infrared (4) Twisted pair, Infrared, Fiber optics

(5) Fiber optics, Infrared, Microwave

40. Consider the following statements regarding networked servers.

A - A DHCP server automatically assigns IP addresses to devices that connect to the network.

B - A DNS server is used to share a single Internet connection between hosts on a private network.

C - A proxy server is required to translate domain names into IP addresses during internet access.

Which of the following is/are true?

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

41. As a networking device, which of the following can be used to connect different networks?

(1) Router only (2) Switch only (3) Hub only (4) Router and switch only (5) Switch and Hub only

42. Consider the following statements about signal encoding methods.

A - Non-returning zero level (NRZ-L) uses two different voltages to represent '1' and '0'.

B - In non-returning zero inversion (NRZ-I) and Manchester encoding, bits can be identified as a change in voltage level

C - Manchester encoding represents '1' and '0' by voltage changes from bottom to top and from top to bottom

Choose the correct statement/s from the above statements

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

43. Consider the following statements about encryption.

A - Encryption is the conversion of cipher text into plaintext

B - In asymmetric key encryption, the sender of the message ensures that the private key is not shared over the internet

C - In public key encryption, asymmetric keys are used for encryption and decryption

Among these statements, the false statement/statements are,

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

44. What is the testing strategy for testing the outputs corresponding to the inputs without considering the internal workings of a program?

(1) Black box testing (2) White box testing (3) Integration testing (4) System testing (5) Unit testing

45. Match the function/example given in List B with the type of information system given in List A.

List A	List B
A1 - Expert System	B1 – POS system in super market.
A2 - Enterprise Resource Planning Systems	B2 – Environmental changes are detected using sensors. Activators make environmental changes from the output processed and obtained in the embedded system.
A3 - Transaction Processing System	B3 - A system that assigns Ayurveda medicines using a knowledge base.
A4 - Smart Systems	B4 - The information system that controls the entire process of a manufacturing company.

(1) A1- B2, A2- B4, A3 - B1, A4 - B3 (2) A1-B3, A2-B4, A3-B1, A4-B2 (3) A1-B3, A2-B1, A3-B4, A4-B2
(4) A1-B3, A2-B2, A3-B1, A4-B4 (5) A1-B1, A2-B4, A3-B3, A4-B2

46. What is the software development model that is more oriented towards risk analysis?

(1) Spiral model (2) Waterfall model (3) Agile model
(4) Rapid application development model (5) None of the above

47. The suitable method for developing and installing a new computerized student attendance reporting information system in a school to replace the existing manual information system for recording student attendance is,

(1) Direct Installation (2) Parallel Installation (3) Phase Installation (4) Pilot Installation
(5) Staged Installation

48. When a proposal is made to build a new computer based information system to replace an existing manual information system in an organization, a feasibility study of the new system is conducted. Which statement is correct regarding this feasibility study?

(1) Whether the new system can be put into operation is studied under organizational feasibility.

(2) The improvement in the quality of the new system's work is considered under economic feasibility.

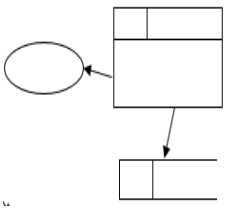
(3) The weakening of employee motivation, errors and fraud are considered under operational feasibility.

(4) The impact of the new system's changes on staff employment is considered under economic feasibility.

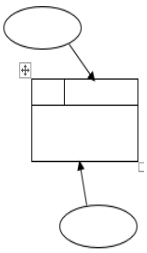
(5) The benefits of the new system are analyzed under technical feasibility.

49. Among the following data flow diagrams, which of the following answers represent the correct data flow?

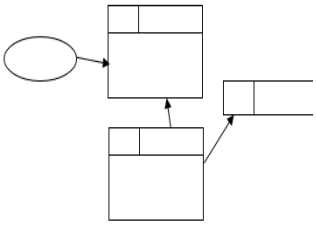
(1)



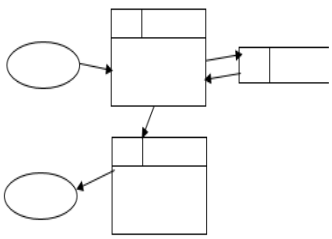
(2)



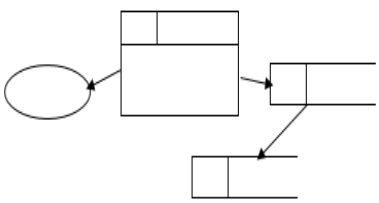
(3)



(4)



(5)



50. Which of the following statements is a functional requirement related to a banking application?

(1) The system should respond to transactions within three seconds.
(2) The system should allow users to transfer funds between accounts.
(3) The system should be available 99.9% of the time.
(4) The system should encrypt all sensitive data.
(5) Users should be able to use the system easily.

දකුණු පළාත් අධ්‍යාපන දෙපාර්තමේන්තුව
தென் மாகாணக் கல்வித் திணைக்களம்
Department of Education, Southern Province

12 ශ්‍රේණිය අවසාන වාර පරීක්ෂණය - 2024 (2025)
தரம் 12 ஆண்டிறுதிப் பரீட்சை - 2024 (2025) Grade 12 Final Term Test - 2024 (2025)

Information and communication Technology II	20	E	II	කාලය நேரம் Time	03 hours

නම பெயர் Name ..... විභාග අංකය சுட்டிலக்கம் Index No. .....

Should be considered:

- **Answer all questions in part A and only four questions selected from part B**

PART A – STRUCTURED ESSAY

Answer all four questions on this paper itself. Write your answers in the space provided for each question.

1.

(i) The cycle that a computer repeats from powering on until it is turned off is called the fetch execute cycle. State its three main steps in order.

.....

.....

.....

(ii) A computer program written by a student to find the area of a circle is as follows. Its instructions are executed in the order given.

Memory address	Instruction
0	R = 7
1	Area = 22/7*R*R
2	Print(Area)

(1) What is the first location loaded when a program is run?

.....

(2) To which unit are these instructions directed for decoding?

.....

(3) If the first instruction has already been accessed in the unit where the decoding is being performed, what is the location and memory address of the instruction to be executed next?

.....

(iii) What is the need for multi-core processors?

.....

.....

(iv) The electronic paths that transfer data between components of a computer are called buses. Name the three types of buses used in a computer system and briefly describe their function.

.....

.....

.....

.....

2. (a) Two devices, X and Y are connected to form a system called Z. X and Y are assigned values in an eight-bit system. The two's complement value of the eight bits of Z is 10110101.

(i) Is the number used to represent Z a positive number? Is it a negative number? Give the reason for your answer.

.....

.....

(ii) What is the decimal number that applies to the device Z?

.....

.....

.....

(iii) The two's complement value of the eight bits associated with device X is 00011001. What is the decimal value associated with device X?

.....

.....

.....

(iv) What is the decimal value associated with device Y?

.....

.....

(v) What is the two's complement value of the eight bits associated with device Y?

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(b) (i) Find the ASCII code corresponding to the word Test ($A = 65_{10}$ $a = 97_{10}$).

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(ii) Write the BCD code of the number 705.

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.....

3. (a) .

(i) Complete the truth table given below for a half adder with A and B as inputs.

A	B	Sum	Carry

(ii) What is the logical expression for the Sum output?

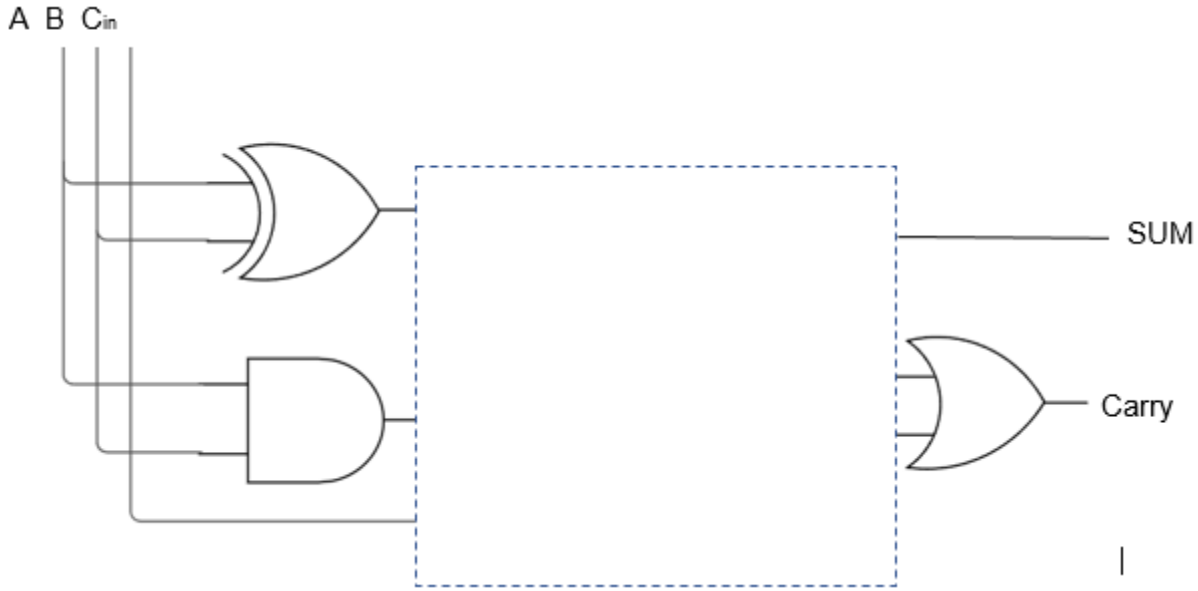
……

(b) (i) State the main difference between the full adder and the half adder.

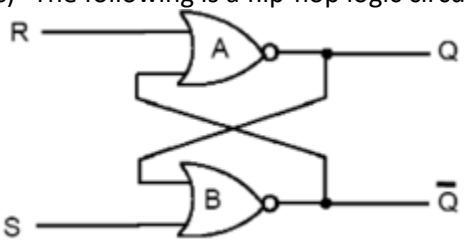
……

……

(ii) A 'full adder' is a combination of two half adders. Complete the following full adder circuit using two half adders.



(c) The following is a flip-flop logic circuit diagram.



(i) What is the output of Q when S=1 and R=0?

……

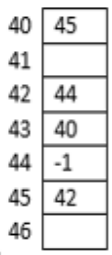
(ii) What values are present at the following terminals when the circuit is in the RESET state?

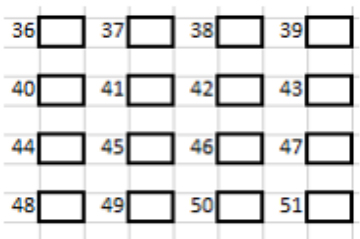
S - …… R- ……

4. (a) To illustrate how a file is stored in sectors on a hard disk, draw a diagram based on the information given in the file. According to which method is the file stored on the hard disk? Write.

(i)

Directory details		
File	Start	End
Abc.py	43	44





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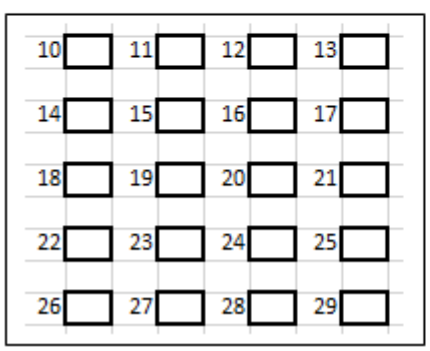
(ii)

Directory details		
File	Start	Length
pqr.xlsx	10	2
	15	4
	21	3



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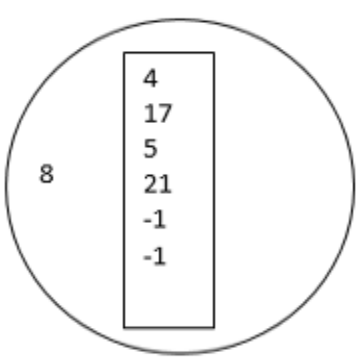
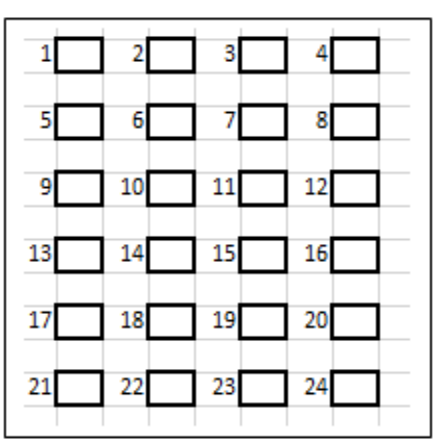
(iii)

Directory details	
File	Index block
xyz.pptx	8





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(iv) Write down an example for each operating system that includes the file storage methods (i), (ii) and (iii) above.

.....

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(b) (i) Write four information stored in the file control block (FCB) of a file.

.....

.....

.....

.....

(ii) What are the file storage methods that can only have internal fragmentation?

.....

.....

.....

(iii) What are the file storage methods that can have external fragmentation and internal fragmentation?

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(c) (i) What are the basic process states?

.....

.....

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(ii) Write four information that are recorded on the process control block (PCB) of a process.

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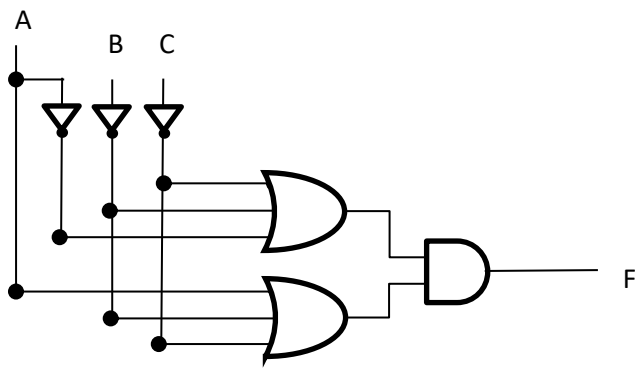
PART B- ESSAY

Answer only four questions from part B.

5. (a) Consider the following logic circuit that takes inputs A, B, C and creates an output F.

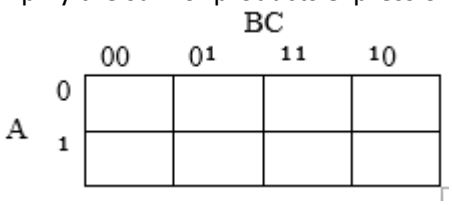


Construct the truth table for the above logic circuit.

(b) (i) Construct the output F as a product of sums (POS) expression.

(ii) Convert the expression obtained in (b) (i) above into a sum of products expression (SOP).

(c) Simplify the sum of products expression of the above using the following Karnaugh map format.



(d) Draw a logic circuit using only NAND or NOR gates for the simplified expression.

6. (a). XYZ Company has five divisions namely Accounts, Packaging, Production, Institutions and Warehouses. The computers and devices provided for the administrative work of each department of this company are as per the table below.

Division	Number of computers & devices
Accounts	10
Packaging	25
Production	43
Institutions	28
Warehouses	12

The top management of XYZ Company wants to set up a computer network that will allow communication between all divisions. The network administrator of the company wants to subnet each divisions through the institutions division. For this, the network administrator decides to obtain the IP address range 192.248.50.0/24 and subnet it in such a way that IP addresses are allocated to each division.

(i) How many IP addresses are there in the IP address range?

(ii) What are the first and last IP addresses in the IP address range?

(iii) Fill in the blanks labeled A to G in the table below showing information about the assignment of IP addresses for each division.

Division	Network address	Broadcast address	Subnet mask	Maximum number of hosts
Accounts	..... A	192.248.50.47	255.255.255.240	14
Packaging	192.248.50.112	..... B	255.255.255.224	30
Production	..... C	192.248.50.111	..... D	62
Institutions	192.248.50.0	..... E	255.255.255.224	30
Warehouses	..... F	192.248.50.128	..... G	14

(b)

(i) Indicate the networking devices to be used in each division when subnetting XYZ Institute in the format of the table below.

Division	Networking devices to be used
Accounts	
Packaging	
Production	
Institutions	
Warehouses	

(ii) What are the strategies that should be used to ensure that all users of the XYZ Institute's computer network can access the Internet at an optimal level and exchange e-mail messages? In which division and on which networking device should they be installed?

(c) Write down the data received by the receiver when the following data is transmitted over a data transmission medium using odd parity bits method. Clearly separate the parity bit of it.

(i) 10011001

(ii) 11101010

7.

(a) (i) List the seven layers of the Open Systems Interconnection Model (OSI Model) in order from bottom to top and describe the functions of each layer separately.

(ii) State which layers of the Open Systems Interconnection (OSI) model the following networking devices belong to?

1. Switch
2. Router
3. Hub
4. Multi-layer switch
5. Bridge

(b) The data 1011101010

(i) Represent in the Manchester encoding method.

(ii) Represent in the non-repeating zero inversion (NRZ –i) method.

(c) Select and write the appropriate words from the list of words for the following clauses.

(i) Digital signals are transmitted through frequency changes in the carrier wave by the ..... method.

(ii) In electronic communication, the frequency of the carrier wave is changed according to the information being transmitted by the method of .....

(iii) The variation in the amplitude of the carrier wave is used to represent digital data by the ..... method.

(iv) The amplitude of the transmitted wave used in radio transmission is changed according to the information being sent by the ..... method.

List of words –

(amplitude modulation, frequency modulation, frequency shift keying, amplitude shift keying, phase modulation)

(d) Write down one function performed by each of the following protocols.

(i) Telnet

(ii) IMAP (Internet Message Access Protocol)

(iii) PPP (Point to Point Protocol)

(iv) Ethernet

(v) HTTP (Hypertext Transfer Protocol)

(vi) Token Ring

8.

(a) The following table contains the burst time and arrival time of the four process P1, P2, P3, and P4 in the central processing unit. These times are in nanoseconds.

Process	Arrival time	Burst time
P1	0	5
P2	1	4
P3	3	8
P4	5	6

Quantum = 3

(i) Find the turn around time and waiting time of the above four processes using the Round Robin process scheduling algorithm.

(ii) Find the average waiting time.

(b) A two bytes addressable computer uses a virtual memory address space that is 32 bits long. When a blocked process is swapped and sent to virtual memory on this computer, the amount of space allocated in virtual memory for that process is 128KB. This process uses 512-byte pages and 14-bit physical memory address references when accessing main memory again.

(i) Find the number of pages created when the process described above is stored in the computer's virtual memory.

(ii) What is the length of a page in virtual memory in bits?

(iii) In a frame of physical memory, how many bits are used to represent the frame number?

9.

Consider the following case involving a student selection system for enrolling new students in grade one of a government school. This operates as a semi-automatic system.

When the government announces in the gazette that it is calling for applications for admission to Grade 1, applicants can submit completed applications to the school within the relevant time period. There are several recruitment criteria and one applicant can submit applications under several criteria. In this case, the applicant is the child's mother/father or guardian.

When applicants submit their completed applications to the school, clerk 1 of the school receives the applications, assigns them a reference number and stores them in temporary files according to that reference number. After the application time period has closed, suitable applications will be selected for interviews. This task will be entrusted to clerk 2. A deputy principal is appointed by the principal to supervise it. All these functions are also supervised by the principal. The basic information contained in the applications received will be checked according to the relevant criteria and suitable applications will be selected for interviews. Here, incomplete applications are filed in separate manual files, while applications that are suitable for interviews and those that are rejected are filed in separate manual files.

The application with the reference number is obtained from the appropriate file for the interview and the preparation of calling letters for the interview is done by clerk 1 and development officer (DO). Information about the sending of calling letters for interviews is stored digitally with a reference number in the interview calling list. Also the interview calling list is forwarded for conducting interviews.

Interviews are conducted in stages and at the end of the four stages namely interview panel 1, interview panel 2, interview panel 3 and interview panel 4, the interviewer will be able to know the marks he has received. The interviewee may attend the interview on the date and time specified in the interview calling letter. For this, the interviewer must first provide his/her interview calling letter, National Identity Card (NIC) and Google map to Interview Panel 1. Interview panel 1 will check the number of schools nearest to the school from the address of the interviewee and enter the relevant mark in the mark sheet. For this purpose, the Google Earthpro software prepared for the school is used to locate the house in relation to the interviewee's locational information and find out the names and number of the nearest schools. That information is stored in the nearest school information file. After the relevant mark is recorded

in the mark sheet, the application along with the mark sheet is forwarded to the Interview panel 2 and the National Identity Card (NIC) is given to the interviewer.

Interview panel 2 will call the interviewer for the reference number, check the electoral rolls and assign marks accordingly. For that, the Elections Department's voter registration verification file is downloaded and the information completed in the application is checked. According to that information, the relevant marks are recorded in the mark sheet and the mark sheet, application form and national identity card are given to the interview panel 3.

Interview panel 3 will check the residence proof information of the interviewer and give marks accordingly. The interview begins by calling the reference number, conducting the relevant tests and assigning scores. The residence proof information is also filed in a digitalized file. The mark sheet, application form and national identity card will be forwarded to Interview panel 4.

There, all the information in the application, the mark sheet will be checked and the final mark will be notified to the interviewer. The interview mark sheets are filed in a manual file called Interview marks. Also, the application will be placed in a manual file tray called Interviewed applications. The interview process will be completed by handing over the national identity card to the interviewer.

Draw a Level 1 Data Flow Diagram (Level 1 DFD) for the system described above. Clearly state your assumptions, if any.

10.

(a) The waterfall model is a traditional model used to design an information system. State two of its disadvantages.

(b) (1)The process that includes the basic steps used to create an information system is known as the system development life cycle. In systems analysis, which is an important step in the system development life cycle, what are the functional and non-functional requirements that are classified to properly identify the system requirements?

(2) When considering an ATM system owned by a banking network, classify the following as essential/non-essential functional or essential/non-essential non-functional requirements:

(i) Must be able to obtain money

(ii) Must be able to check account balance

(iii) Receipts should be issued

(iv) Cardless transactions should be possible

(v) The maximum amount of money available per day must be Rs.200000

(vi) User friendly touch interface should be available

(c) E-Voting is a proposed system for casting votes online. In order to cast vote for an individual, he/ she must fill out an electronic application provided through the relevant institution's website and register with the system to create a user account. An authorized officer of the institution will review the applications and enter the recommendation into the system. The relevant person will be informed of this via a short message. After successfully creating a user account, the relevant person will become a voter. After that he/ she can login to the E-Voting System by providing the phone number and the national identity card number. The system then verifies that he/ she is a valid voter and sends an OTP to his mobile device. Then he/ she must enter the OTP into the system. A QR code will then be generated and the voter will be sent the download link. A request for a QR code image is made using the download link, and the system can then download the QR code to the voter's mobile device. It is recommended that a voter cast his/ her vote after arriving at the polling station, scanning the QR code and national identity card, checking the voter information and confirming that they are a valid voter with the polling station superintendent. After that, the ballot paper is displayed only to the voter in order to preserve the confidentiality of a computer screen at the end of the voter. The voter can mark his/ her vote accordingly. After the voter declares the vote, the system completes the process after sending a confirmation SMS.

Draw a context diagram for the above description

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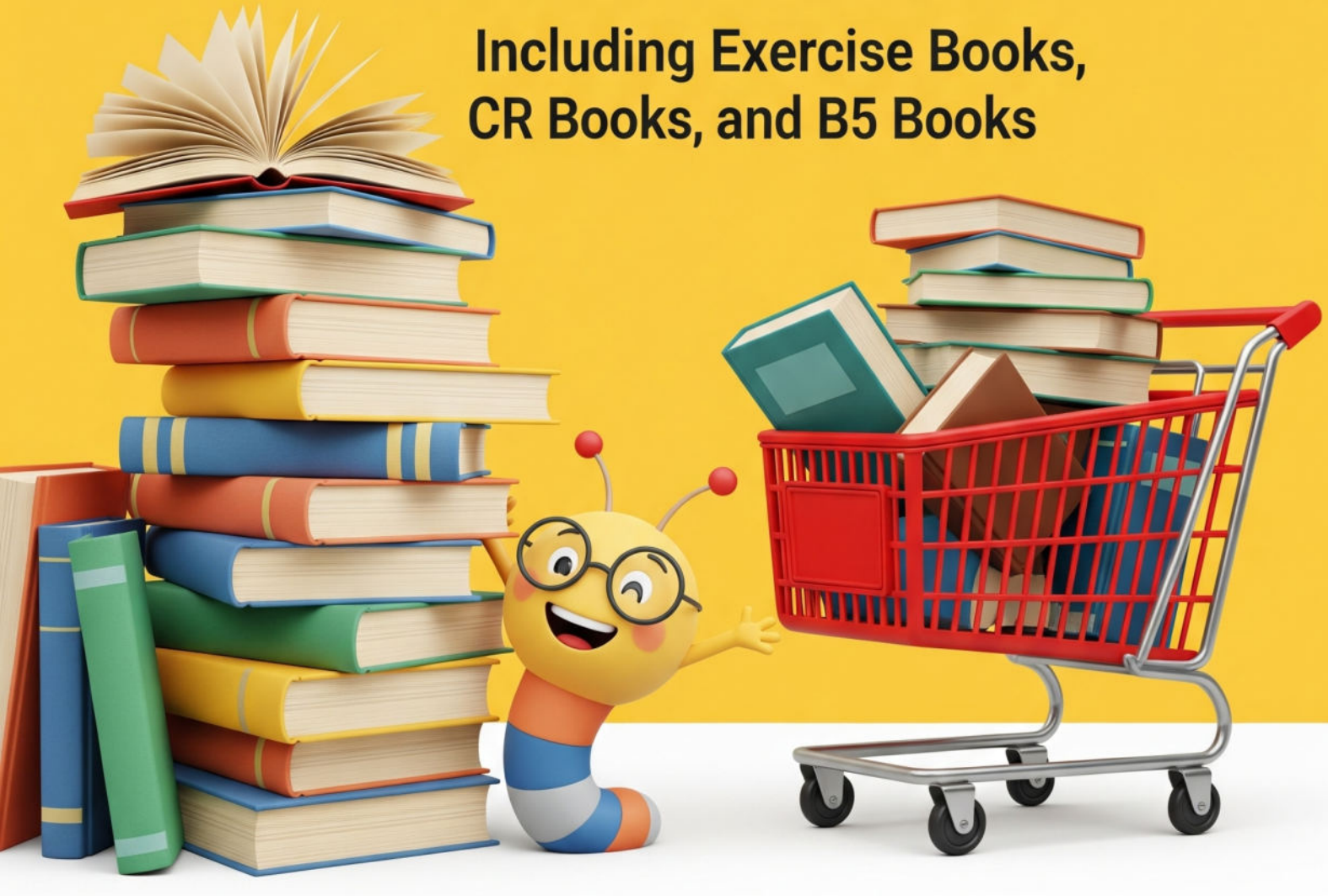

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