வடமாகாணக் கல்வித் திணைக்களத்துடன் இணைந்து
தொண்டைமானாறு வெளிக்கள நிலையம் நடாத்தும்
மூன்றாம் தவணைப் பரீட்சை - 2020
Conducted by Field Work Centre, Thondaimanaru.
In Collaboration with Provincial Department of Education
Northern Province
3rd Term Examination - 2020

தகவல் தொடர்பாடல் தொழினுட்பம் **- I**

Information Communication Technology - I

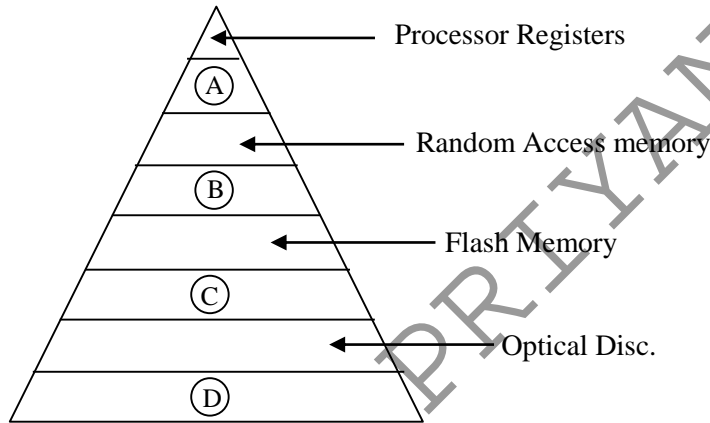| Three Hours | 20 | E | I |
| Gr. 12 (2021) |

Part – I

01. In the memory hierarchy diagram given, which of the following represents (A), (B), (C) and (D) respectively?

Processor Registers

(A)

Random Access memory

(B)

Flash Memory

(C)

Optical Disc.

(D)

   1) Magnetic Tape, Hard Disk, Read only Memory, Cache memory
   2) Cache memory, Hard disk, Read only memory, Magnetic Tape
   3) Cache Memory, Read only Memory, Hard Disk, Magnetic Tape
   4) Read only memory, Cache memory, Hard Disk, Magnetic Tape.
   5) Cache memory, Read only memory, Magnetic Tape, Hard Disk

02. Which of the following components is generally seen outside the central processing unit (CPU) of a computer?

   1) ALU   2) Control Unit   3) Registers

   4) L1 Cache Memory   5) L3 Cache Memory

03. Consider the following devices.

   A. Magnetic Ink character Reader (MICR)
   B. Touch Screen
   C. Plotter
   D. CD / DVD writer

   Which of the above can be used as both input and output devices?

   1) A and B only   2) B and C only   3) B and D only

   4) A, B and D only   5) All A, B, C and D

04. The second generation computers were based on

    1) Integrated Circuits (ICs).

    2) Large scale Integration (LSI) technology.

    3) Very Large Scale Integration (VLSI) technology.

    4) Transistors.

    5) Vacuum tubes.

05. Which of the following can be used to measure the clock speed of the central processing unit of a computer?

1) Gigahertz (GHz)   2) Gigabyte (GB)   3) Megabits per second (Mbps)

4) Instructions per second (Ips)   5) Revolutions per minute (Rpm)

06. Which of the following statements is true with regard to data and information?

    1) Decision can be made only when a massive volume of data is available.

    2) Validity of information depends on the accuracy of data.

    3) Information obtained by processing data is always accurate.

    4) In order to obtain information, data must be collected from multiple sources.

    5) The accuracy of information depends only on the accuracy of input data.

07. In a cash deposit machine (CDM), customers are expected to enter ten digits account number compulsorily, which of the following data validation method(s) is / are correct?

    A – range check   B – type check

    C – length check   D – format check

1) A and B only   2) A and C only   3) B and C only

4) B, C and D only   5) All A, B, C and D

08. Which of the following numbers is equivalent to the binary number 10110110_2?

1) 244_8 2) 162_{10} 3) 233_8 4) $B6_{16}$ 5) $C6_{16}$

09. $AC_{16} - 10110111_2 =$

1) 10000111_2 *2)* 1011001_2 *3)* 1010001_2 *4)* 1000001_2 *5)* 10101010_2

10. What is the binary equivalent to the decimal 14.875 ?

1) 1100.111_2 *2)* 1110.011_2 *3)* 1110.101_2 *4)* 1110.011_2 *5)* 1110.111_2

11. What is the decimal equivalent to the binary 1010.1011_2 ?

1) 10.1875   *2)* 10.875   *3)* 10.5625   *4)* 10.675   *5)* 10.6875

12. Which of the following represents the bitwise **XOR** operation of the two binary number 01010011 and 01100101

    1) 00110110   2) 11001001   3) 01110111   4) 01000001   5) 01100101
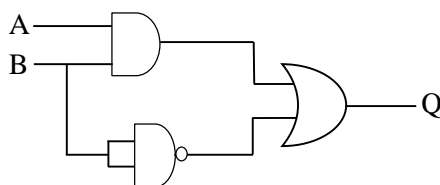
13. What are the most significant Digit (MSD) and the least significant Digit (LSD) of 0.057680 respectively?

    1) 0 and 0   2) 0 and 8   3) 5 and 0   4) 5 and 8   5) 8 and 0

14. The Boolean expression $(\overline{A} + \overline{B}).(\overline{A} + B)$ simplifies to....

    1) A   2) $\overline{A}$ 3) 1   4) B   5) $\overline{B}$

15. Which of the following Boolean expressions represents the output (Q) of the circuit shown below? (A and B are input).

    1) A + B   2) 1   3) A + $\overline{B}$ 4) $\overline{A}$ + B   5) 0
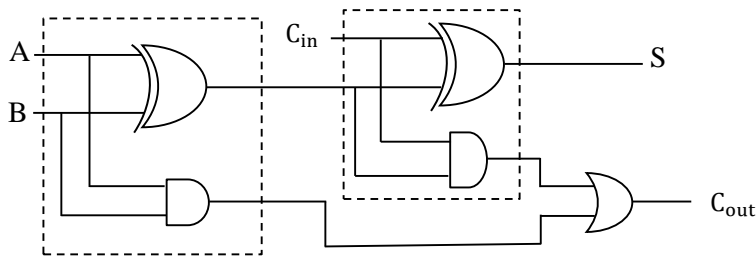
16. Consider the karnaugh map shown below.

Which of the following is the correct logic expression to a sum of products (SoP) Boolean expression?

    1) $\overline{A} + \overline{B} + \overline{C}\,\overline{D}$ 2) $\overline{A} + A\overline{B} + C\overline{D}$ 3) $\overline{A} + \overline{B} + C\overline{D}$

    4) $\overline{A}\,\overline{B} + \overline{A}B + A\overline{B} + C\overline{D}$ 5) $\overline{A} + A\overline{B} + \overline{C}D$

17. Consider the following logic circuit diagram.

Which of the following statements is / are correct about the above circuit?

A – The logic function of C_{out} can be stated as $C_{out} = (A \oplus B) C_{in} + AB$

B – It implements a full adder.

C – Surrounded by the dotted line implements a half adder.

1) A only   2) B only   3) A and B only

4) B and C only   5) All A, B and C

18. Which of the following is usually used to boot–up a computer system?

1) Software   2) Hardware   3) Malware

4) Firmware   5) Liveware.

19. Consider the following statements about operating systems:

A. An operating system is a program.

B. Process scheduling is a one of the main function of an operating system.

C. In an operating system, suspending the currently executing process and then resuming or starting another process is termed as swapping.

Which of the above statements is/are correct?

1) A only   2) A and B only   3) A and C only

4) B and C only   5) All A, B and C

20. Which of the following is correct with respect to big data?

1) High volume is one of the features of big data.

2) A Management information system (MIS) is always required to collect big data.

3) Data generated through social media such as face book cannot be considered as big data.

4) Big data is always structured.

5) Information obtained by processing big data is always accurate.

21. Share a single key for encryption and decryption processes is called.

1) asymmetric encryption   2) digital encryption.   3) hybrid encryption

4) public key encryption   5) symmetric encryption.

22. File Transfer Protocol (FTP) is a .... layer protocol.

Which of the following layer is the most suitable to fill the blank in the above statement?

1) Physical   2) Network   3) Transport

4) Application   5) Data link

23. Which of the following server converts the web address into IP address?

1) File server   2) DNS server   3) Proxy server

4) DHCP server   5) e–mail server.

24. Suppose you have the following IP address 192.16.8.101/26. What are the number of bits needed to identify the network, the number of bits needed to identify the subnet and the number of bit needed to identify the host.

1) 26 bits, 2 bits and 6 bits   2) 24 bits, 2 bits and 6 bits   3) 24 bits, 26 bit and 4 bits

4) 24 bit, 26 bits and 6 bits   5) 26 bit, 6 bits and 4 bits

25. A computer in a network is configured with the IP address 192.248.16.195 and the subnet mask 255.255.255.224. Which of the following IP address **cannot** be assigned to a computer in the same network?

1) 192.248.16.193   2) 192.248.16.225   3) 192.248.16.222

4) 192.248.16.220   5) 192.248.16.199

26. In communication networks, DHCP stands for

1) Dynamic Host Control Protocol.   2) Dynamic Host Control Parameters.

3) Dynamic Host Configuration Protocol   4) Dynamic Host Configuration Practice.

5) Domain Host Configuration Protocol

27. The first and the last IP addresses of a subnet are 192.192.192.0, 192.192.223.255 respectively. Which of the following is the subnet mask of this subnet?

1) 255. 255. 240. 0   2) 255. 255. 255. 224   3) 255. 255. 255. 240

4) 255. 255. 224. 0   5) 255. 255. 192. 0

28. Which of the following **is not** a private IP address?

1) 10. 10. 10. 10   2) 172. 30. 5. 10   3) 172. 32. 2. 16

4) 192. 168. 16. 5   5) 192. 168. 224. 16

29. Consider the following statements,

A. Mapping of private IP addresses into public IP addresses.

B. Sharing of the internet connection among multiple users.

C. Caching of web pages obtained from web servers.

Which of the above is/are the activity/activities of proxy server?

1) A only   2) B only   3) C only

4) B and C only   5) All A, B, and C

30. A LAN uses the subnet mask 255.255.248.0 How many different IP address can be assigned to devices in this LAN?

1) 6   2) 8   3) 254   4) 1022   5) 2046

31. Consider the following models.

   A. Relational model

   B. Network model

   C. Hierarchical model

   Which of the above is / are database models?

   1) A only   2) B only   3) A and B only

   4) A and C only   5) All A, B and C

32. Consider the following data flow diagrams.

   A.

   B.

   C.
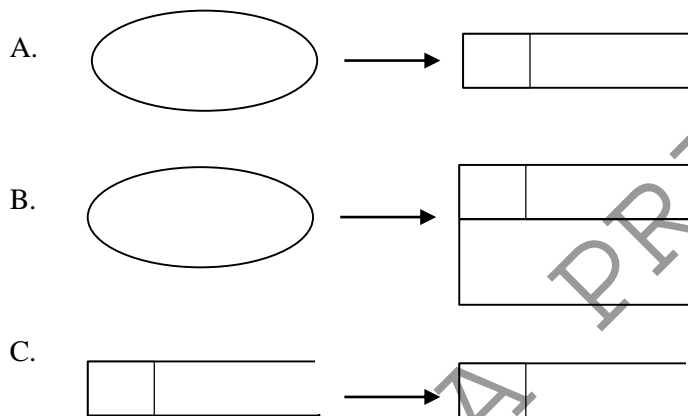
   Which of the above data flow diagrams is/are correct/s with respect to the rules of data flow modeling?

   1) A only   2) B only   3) C only

   4) A and C only   5) All A, B and C

33. Schedule feasibility of a system…………..

   1) Evaluates hardware and software.

   2) Evaluating the required span of the system.

   3) Involves with cost / benefit analysis.

   4) Determines the technical resources required for the project.

   5) Determines whether the organization's needs can be met by implementing the proposed system.

34. Consider the following terms.

   A - Input   B – Output   C – Process   D - Storage

   Which of the above are **essential** for a system?

   1) A and B only   2) A, B and C only   3) A, C and D only

   4) B, C and D only   5) All A, B, C and D

35. Consider the following items.

    A – Structured   B – Agile   C – Prototyping   D – Object oriented   E – Spiral

    "..............., ... and .... are system development methodologies".

    Which of the above are most appropriate respectively to fill the blanks in the above statement?

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

36. Which of the following is correct with respect to non functional requirements of a system?
    1) They define what a system is supposed to do.
    2) They define how a system is supposed to be.
    3) They are specific behaviors of a system.
    4) They are usually in the form of "System shall do < requirement>"
    5) They represent system functions.

❖ **Consider the following relations to answer question 37 – 39.**
    novel(novel_id , novel_name)
    writer(writer_id, writer_name, email)
    writer_of_novel(writer_id, novel_id)
    teacher(teacher_id, teacher_name, dob, writer_id)

    Where novel_id, writer_id and teacher_id are unique attributes in the relations novel, writer and teacher respectively.

37. Which of the following statement is correct with respect to the above relations?
    1) wrtter_id in teacher relation can take **Null** value.
    2) teacher_id is a part of the primary key in teacher relation.
    3) writer_id and novel_id in writer_of_novel relation can take **Null** value.
    4) novel_id is a candidate key of writer of novel relation.
    5) writer_name in writer relation is a candidate key.

38. Consider the following statements regarding the Data Definition Language (DDL) used to create the table writer_of_novel while maintaining data integrity.
    A – It has a primary key constraint.
    B – It has a foreign key constraint.
    C – It has a domain constraint.

    Which of the above statement (s) is / are correct?
    1) A only   2) A and B only   3) A and C only
    4) B and C only   5) All A, B and C

39. Assume that the above relations are converted into tables in a relational database. The following SQL query is executed on the database.

SELECT * FROM teacher WHERE writer_id isNOTNULL;

Which of the following statement is correct regarding the output of the above SQL query?

1) The attribute writer_name is in it.
2) The attribute novel_name is in it.
3) All teacher records with a value in the writer_id attribute of teacher table are in the output.
4) The tables teacher and writer are used to produce the output
5) It cannot be an empty table.

40. Consider the following statements:

A – An Expert system is a Decision Support System (DSS)

B – In an Expert system the reasons for an answer can be derived.

C – An Expert system has Inference Engine which updates its knowledge base.

D – Online medical Support system is an example for Expert systems.

Which of the above statement/s is / are correct regarding Expert system in Artificial Intelligence?

1) A and B only   2) B and D only   3) A and C only

4) A, B and C only   5) All A, B, C and D

வடமாகாணக் கல்வித் திணைக்களத்துடன் இணைந்து
தொண்டைமானாறு வெளிக்கள நிலையம் நடாத்தும்
மூன்றாம் தவணைப் பரீட்சை - 2020
Conducted by Field Work Centre, Thondaimanaru.
In Collaboration with Provincial Department of Education
Northern Province
3rd Term Examination - 2020

FWC

தகவல் தொடர்பாடல் தொழினுட்பம் **- II A**			
Information Communication Technology - II A	Gr. 12 (2021)	20	E	I

Part - II A

Structured Essay

❖ Answer **all four** questions on this **paper itself**

01. a)

i) Write down the two's complement representation of 24_{10} using 8 bits.

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

ii) Write down the two's complement representation of -83_{10} using 8 bits.

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

iii) Compute $-83_{10} + 24_{10}$ using the above representation (i) and (ii).

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

iv) State **one** advantage of using two's complement representation for data in internal operations of a computer.

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

b) Flip flops used to save bits in electronic circuit.

    i)   Create S – R flip flops by using **NOR gate**.

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

…………………………………………………………………………………………………….

    ii)   Describes how to save bits in flip flops?

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

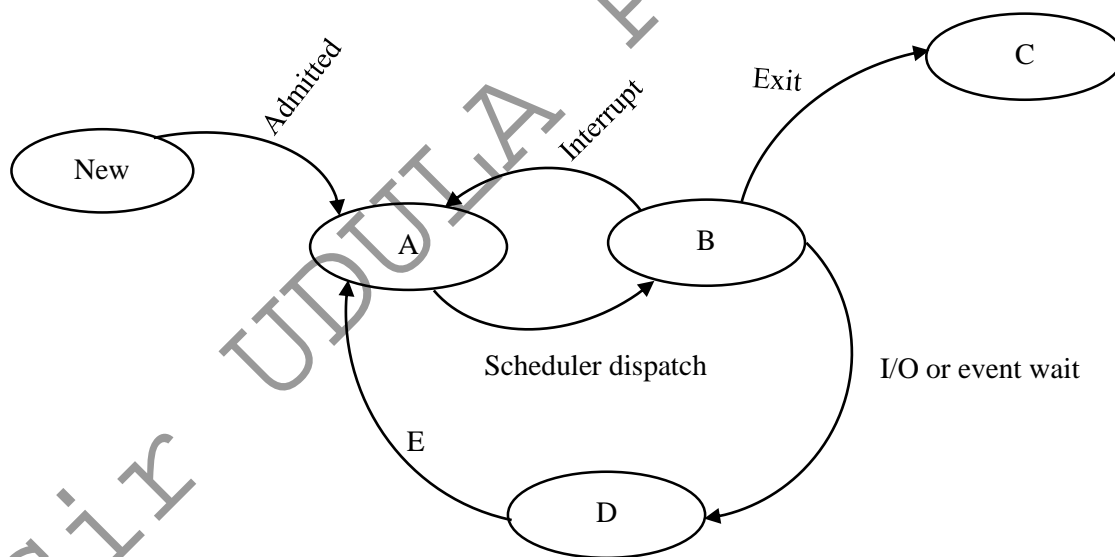*02.* a)   The state transitions that could occur in a process running on a computer with a **multi – tasking** operating system is shown in the following diagram.

    i)   Fill in the blanks in the table given below by providing most suitable terms for the labels A, B, C, D and E.

Label	Term
A	
B	
C	
D	
E	

ii) Write down the four stored information in process control block – PCB of an operating system?

………

………

………

………

………

b)

i) What is meant by linked file space allocation?

………

………

………

………

ii) Write down **one** drawback of Linked file space allocation?

………

………

………

………

c) A computer has an 18 – bits virtual memory address space where eight bits are used for a page address.

i) Calculate the total number of pages defined by the above addressing scheme.

………

………

………

ii) Consider the following virtual memory address:

101111001100001011

What is the page and displacement / offset of this address?

………

………

………

………

03. a)

    i)   Write down the suitable layers in OSI network reference model, for the given protocols, devices and functions in the following table.

		Layer
1)	Data encoding	
2)	Routing	
3)	UDP	
4)	Topology	
5)	Network switch	
6)	FTP	

    ii)   Compare and contrast TCP and UDP on the basis of connection and reliability.

        ……

        ……

        ……
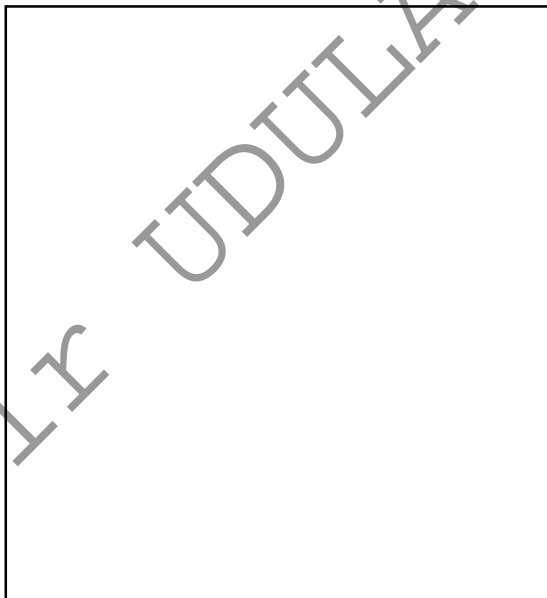
  b)
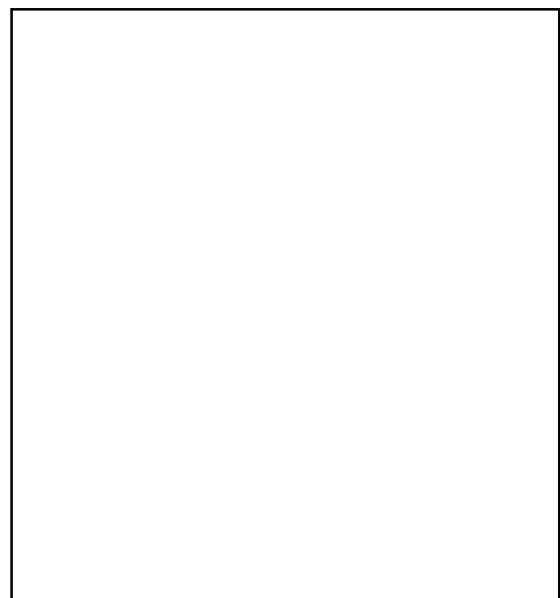
    i)   Draw diagram to depict the following LAN topologies.

        • **Star**   • **Ring**

ii) In data communication, Draw each signal encoding schemes for the data 10011010 in the following diagram.

| | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |

NRZ-L

NRZ-I

Manchester
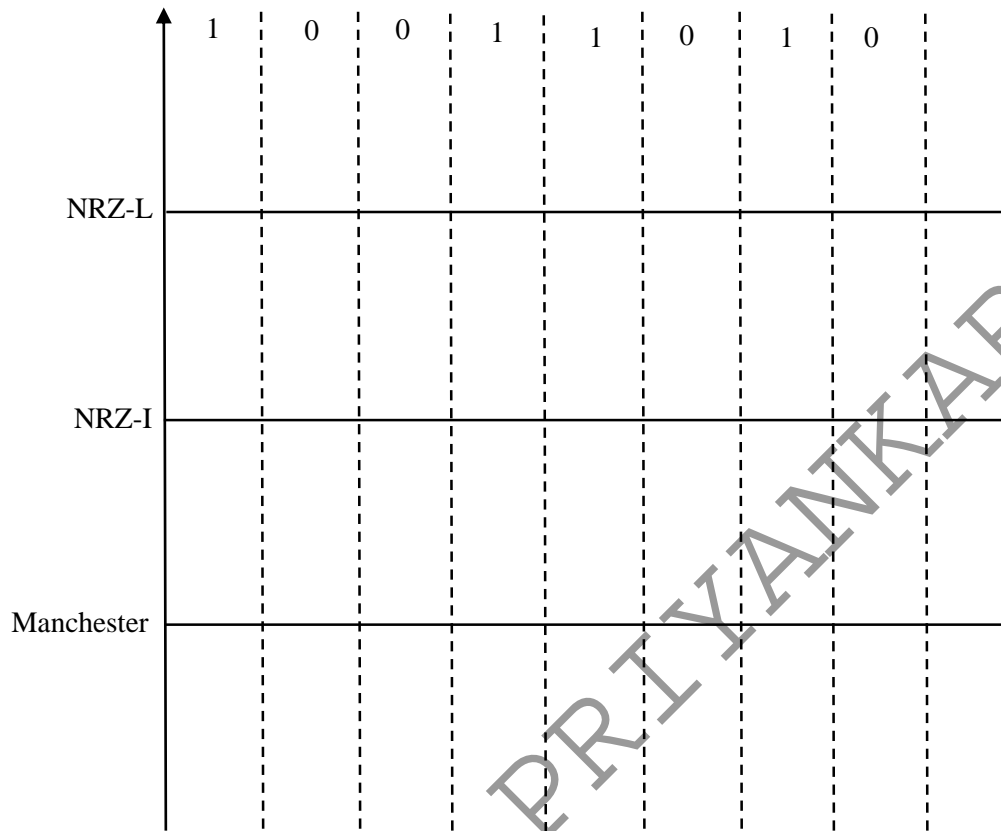
04. a)

i) Provide a suitable definition for a system.

……

……

……

……

ii) Identify and describe the phases of the waterfall model in software development.

……

……

……

……

……

……

……

……

……

iii) Identify two functional and two non functional requirements for a mobile phone.

……
……
……
……

b) Consider the following table.

staff

Staff _id	Name	Address	DOB	Salary
S007	A.Perera	Kandy	1974.05.10	50,000
S117	S.Nimal	Colombo	1986.11.01	35,000
S210	R.Kumar	Jaffna	1979.03.02	40,000
S085	E.Nazeer	Mawanella	1984.06.08	38,000

i) What is the degree of the above table?

……
……
……

ii) Write an SQL statement to display Names and Addresses of all the staff.

……
……
……
……
……

iii) Write an SQL statement to insert the following record to the staff table.

S250	N.Luxshya	Jaffna	1988.10.23	33000

……
……
……

வடமாகாணக் கல்வித் திணைக்களத்துடன் இணைந்து
தொண்டைமானாறு வெளிக்கள நிலையம் நடாத்தும்
மூன்றாம் தவணைப் பரீட்சை - 2020
Conducted by Field Work Centre, Thondaimanaru.
In Collaboration with Provincial Department of Education
Northern Province
3rd Term Examination - 2020

FWC

தகவல் தொடர்பாடல் தொழினுட்பம்   - II B
Information Communication Technology - II B

Gr. 12 (2021)   **20** **E** **I**

Part – II B

Essay Question

❖ **Answer any two questions only.**

01. a) Consider the following Boolean expression.

$$A\overline{B}C + BC + AB\overline{C}$$

   i)   Convert this Boolean expression into standard SOP from.

   ii) Give a Karnaugh map to represent this Boolean expression.

   iii) Simplify Boolean expression given by using karnaugh map.

   iv) Construct a logic circuit from section (iii) above, using NAND gate only.

   b) A half – adder obtains two inputs A, B and gives the outputs sum and carry.

   i)   Obtain the truth table for sum and carry of half – adder?

   ii) Construct a logic circuit for half – adder with the output of sum and carry are in same logic circuit.

02. a) i)   Compare the following protocols.

   • File Transfer Protocol (FTP)

   • Hyper Text Transfer Protocol (HTTP)

   ii) Give the main function of the following servers.

   • Proxy server

   • DHCP Server

   iii) What is the main advantage of using **classless** IP address rather than **classfull** IP address?

b) Consider the following scenario:

A company has several branches and networks. Following are the number of computers in each branch.

Branch No	Branches	No of computers
B01	Planning Branch	100
B02	Administration Branch	40
B03	Establishment Branch	25
B04	ICT Branch	06

Each branches need to have their own Local Area Network. Network administrator has received the 192.248.16.0/24 IP address block for the company. Assuming to assigning the IP address to the computer after the subnet placed in the order of the specified table form four branches.

i) How many addresses are available in the IP address block?

ii) After subnetting, write the relevant network address, Subnetmask and allocated usable range of IP addresses for each branch.

Note :- Use the following table format to present your answer.

Branch No	Network Address	Subnetmask	Usable IP Address Range
B01			
B02			
B03			
B04			

03. a) a company management wanted to introduce computerized system to maintain the employees information.

i) Briefly explain the reasons why computerized system is useful to maintain employee information.

ii) A company management has said that parallel implementation is more suitable way to install a new computer based information system. Briefly explain two reasons to support their statement.

b) Consider the following three tables used in a school database.

student

stuid	name	dob	address
S01	S.Jansan	2001.08.03	Jaffna
S02	T.Pirasanth	2001.05.23	Galle
S03	R.Perera	2000.09.17	Colombo
S04	A.Kanista	2001.03.12	Jaffna

subject

subid	name
Sub01	ICT
Sub02	Accounts
Sub03	Business

result

stuid	subid	grade
S01	Sub01	A
S02	Sub02	B
S01	Sub03	A
S03	Sub02	C

i) Write down appropriate SQL Statement to create student table. (primary key is stuid)

ii) Write down the appropriate SQL statement to obtain all details in student table.

iii) Write down the appropriate SQL statement to obtain details such student Name, Subject Name and Grade.

iv) If the address of student entered in the student table stuid = "S01" Should be changed to "Colombo", write an SQL statement to update the relevant record in the student table.

v) Write an SQL statement to delete result table from the database.