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## Provincial Department of Education - NWP

20 E I

### Third Term Test - Grade 12 - 2018

Index No : ..... Information and Communication Technology I Two - Hours

#### Instructions :

- Answer all the Questions
- Write down your index number in the space provided in the answer sheet.
- Select the correct or most appropriate answer from the given answers of 1,2,3,4 or 5

- Select the statement which shows the ascending order of accessing speed of storage devices correctly
  - Registers , optical disc, magnetic disc
  - Cache memory, solid disc,, magnetic disc
  - Optical disc, magnetic disc, solid disc
  - Magnetic tape, solid disc, optical disc
  - Cache memory, main memory, registers
- Select the correct statement about data and information
  - The accuracy of data which is used to process information is so important to make decisions correctly.
  - Data processing is , organizing information in meaningful manner to form meaningful data
  - Removing out dated data is not a step of data processing life cycle
  - Though the value of information is changing with time not changing with person
  - It is not difficult to process big data by using traditional data processing software
- The service which is not provided by internet
 

(1) World wide web (www)	(2) Web browsers
(3) File transfer protocol (FTP)	(4) IP telephones
(5) Telnet	
- Hardware is considered as a major component of a computer system. Select the correct statement/ statements about hardware
  - Scanner, joy stick and touch screen are examples for input devices of computer
  - Use of LCD technology reduces the consumption of electricity instead of using LED technology for the visual display unit of the computer
  - Cache memory is a device made up of semi conductors and help to speed up the functions of CPU

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



- 12). If two's complement of an integer is 11001011, the integer is,  
 (1) 51                    (2) (-53)                    (3) (-63)                    (4) 53                    (-61)
- 13). Which of the following answer shows the one's complements of  $(-9_{10})$  and  $(-16_{10})$  respectively are,  
 (1) 00001001 and 00010001                    (2) 00010110 and 11101111                    (3) 00001001 and 00010000  
 (4) 11110111 and 11110000                    (5) 11110110 and 11101111

- 14). What is the product of sum (POS) which is suitable for the column "F" (output) in the following truth table?

- (1)  $(\bar{A} + \bar{B}). (A + \bar{B})$   
 (2)  $(A + B). (A + \bar{B})$   
 (3)  $(\bar{A} + \bar{B}) + (A + B)$   
 (4)  $(A.B) + (A.B)$   
 (5)  $(A.B) + (A.\bar{B})$

A	B	F
0	0	0
0	1	0
1	0	1
1	1	1

- 15) What is a Boolean law defined by following expression?  
 $A + (B.C) = (A + B). (A + C)$   
 (1) Distributive Law                    (2) Redundancy Law                    (3) De Morgan's Law  
 (4) Commutative Law                    (5) Associative Law
- 16) Which of the following category is suitable for an existing irrigation system of a country  
 (1) Natural and Open                    (2) Natural and Living                    (3) Manmade and open  
 (4) Manmade and Closed                    (5) Physical and Closed
- 17) The most suitable Boolean expression for the following Karnaugh - map is,

- (1)  $\bar{A}BC + \bar{A}\bar{B}\bar{C} + ABC + AB\bar{C}$   
 (2)  $ABC + ABC + ABC + A\bar{B}\bar{C}$   
 (3)  $\bar{A}B\bar{C} + AB\bar{C} + A\bar{B}\bar{C} + ABC$   
 (4)  $ABC + \bar{A}B\bar{C} + ABC + \bar{A}\bar{B}\bar{C}$   
 (5)  $\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + ABC + A\bar{B}\bar{C}$

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

- 18). The LSD and the MSD of the decimal number 0.04397 are respectively,  
 (1) 4 and 7                    (2) 0 and 7                    (3) 7 and 4                    (4) 7 and 0                    (5) 0 and 4
- 19). If the ASCII value for A is 1000001 what is the ASCII code for the word WIND ?  
 (1) 0010110 0001000 0001101 0000100  
 (2) 0010111 0001001 0001010 0000101  
 (3) 0001111 0001001 0001101 0000101  
 (4) 0010111 0001001 0001110 0000100  
 (5) 0010111 0001000 0001101 0000101

- 20). Select the correct statement/statements about the computer software  
 A. Open source computer software can be taken without paying but cannot be developed without permission  
 B. System software is developed specially to satisfy special needs in a special environment  
 C. The person who bought a proprietary software become the owner of it  
 D. Operating system is a system software which manage the computer resources  
 (1) A only                    (2) C only                    (3) B and D only  
 (4) C and D only                    (5) D only

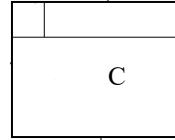
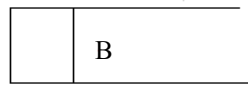
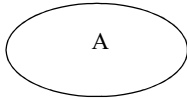
21. Applications of information and communication technology is getting popularized in various domains rapidly. Select the correct statement about these applications.
- (1) Students' motivation for self learning is reducing due to uses of ICT
  - (2) Computer simulations are used specially for the researches cannot be done in laboratories
  - (3) The reliability of legal activities reduces due to the use of ICT
  - (4) Radio Frequency Identification Device cannot facilitate live stock management
  - (5) Though e-learning is a new trend in 21<sup>st</sup> century it is impossible to deliver a better content
22. The correct statement about simple batch systems considering the evolution of operating systems is,
- (1) Is uniprogramming
  - (2) Have a direct access to hardware
  - (3) Minimize the response time
  - (4) Made to minimize the processor utilization
  - (5) Processor is so busy during input / output (I/O)
23. Consider the following statements about the file allocation
- A - Extending file size is difficult in contiguous allocation
  - B - No external fragmentation in linked allocation
  - C - Compaction occurs in indexed allocation
- Which of the above statement/statements is/are correct ?
- (1) A only
  - (2) A and B only
  - (3) A and C only
  - (4) B and C only
  - (5) A,B,C all
24. The alternation of the property of a transferred signal due to the capacitance and the induction of the communication medium is named as .....
- (1) Latency
  - (2) Noise
  - (3) Attenuation
  - (4) Distortion
  - (5) Bandwidth
25. Consider the following statements about the feasibility study to analyze the suitability of the proposed new system.
- A – Technical feasibility is analyzing the ability of getting hardware, software, and other accessories needed for the new system.
  - B – Economic feasibility is analyzing the total cost of the project and its turnover.
  - C – Study whether the proposed system will fit with the strategic objectives of the organization determined by the operational feasibility.
- Which of the above statement/statements is/are true?
- (1) A only
  - (2) A and B only
  - (3) A and C only
  - (4) B and C only
  - (5) A,B and C all
26. The smallest unit of storing a data file in a hard disk is
- (1) Sector
  - (2) Track
  - (3) Cylinder
  - (4) Cluster
  - (5) Plate
27. E-waste is a big issue today. The incorrect statement about e-waste is
- (1) Recycling the parts of electronic devices minimize the problem
  - (2) Drinking water can be polluted with time due to the poisonous chemicals are mixed with soil
  - (3) It is important to study about the environment friendly computer resources to face this challenge successfully.
  - (4) Developed countries have introduced regulations to prevent e-waste being dumped into landfill.
  - (5) The problem can be reduced by producing electronic devices using metals like cadmium and lead

28. What is the correct layer of doing data encryption in Open system interconnection (OSI) model?  
 (1) Application Layer (2) Session Layer (3) Network Layer  
 (4) Presentation Layer (5) Data link Layer
29. The computer operating system maintains a data structure called, ..... to manage every process.  
 Which answer is most appropriate to fill the above blank?  
 (1) Process control block (2) Process transitions  
 (3) Process state diagram (4) Process scheduling  
 (5) Process interrupt
30. Which of the following statement is correct about scheduling?  
 (1) Short term scheduler have the lowest speed comparing with others  
 (2) Long term scheduler is a process swapping scheduler  
 (3) Long term scheduler is a job scheduler  
 (4) Short term scheduler selects the processes from the pool and loads them into the memory for execution  
 (5) Mid term scheduler is a CPU scheduler
31. Optical disks are used to store data in an optical media. Select the correct statement about optical disks.  
 (1) Data can be rewritten many times in DVD RAM compared to DVD-RW.  
 (2) Capacity of a CD-R is in the range of 4.7-9.4 GB  
 (3) The capacity of DVD is greater than the capacity of Blue ray  
 (4) Ultraviolet rays can be used to write data in optical disks  
 (5) Function of a CD-ROM is same as the function of RAM
32. When a logical address of a page in the virtual memory is replaced by a physical address of a frame in the physical memory is called, .....  
 Which of the following is most suitable to fill the blank in the above statement  
 (1) Swapping (2) Mapping (3) Paging  
 (4) Spooling (5) Context Switching
33. Which of the following is a correct statement about Flip -Flop?  
 (1) Flip -Flop is used in SRAM  
 (2) Latch Flip - Flops are used only for logical circuits.  
 (3) When a certain value is given to Flip-Flop, they will not be remembered.  
 (4) Flip -Flop is used in Half- Adder.  
 (5) Temporary memory can be created by using Flip-Flop.
34. Web -based publishing, and format management are the examples for .....  
 What information system is suitable for the above blank?  
 (1) Decisions Support Systems (*DSS*)  
 (2) Knowledge Management Systems(*KMS*)  
 (3) Executive Support Systems(*ESS*)  
 (4) Content Management Systems (*CMS*)  
 (5) Enterprise Resource Planning Systems (*ERPS*)

35. The unit of measuring the speed of a laser printer  
(1) PPM            (2) LPM            (3) DPI            (4) DPS            (5) LMP
36. Which of the following layer is used in the user datagram protocol (UDP)  
(1) Application Layer  
(2) Physical Layer  
(3) Data link Layer  
(4) Network Layer  
(5) Transport Layer
37. Study the following incidents which is connected with Communication  
A – Radio Communication is a duplex.  
B - Mobile phone is a Full duplex.  
C – multiplexing is transmission of data in a communication media without mixing with each other.  
The correct statement / statements is / are,  
(6) A only  
(7) B only  
(8) A and B only  
(9) B and C only  
(10) A and C only
38. The most accurate statement about the Read Only Memory (ROM) is,  
(1) This is a type of volatile memory and data can be read only  
(2) Data in programmable ROM (PROM) are erasable and rewritable  
(3) The content in erasable programmable ROM (EPROM) can be cleared by ultraviolet light  
(4) The content in erasable programmable ROM (EPROM) can be cleared by an electric charge.  
(5) The content in EEPROM can be erased by infra red (IR) rays
39. What is the correct protocol to confirm that the e-mail sent by Amila was gone to Sithija's account  
(1) User Datagram Protocol  
(2) Transmission Control protocol  
(3) File Transfer protocol  
(4) Hypertext Transfer protocol  
(5) Domain name system protocol
40. What is the main purpose of a domain name server?  
(1) Provide web pages to clients  
(2) Issue the IP Address  
(3) Provide Domain names for IP Address  
(4) Provide IP Address for Domain names  
(5) Provide web pages for server computes using Hypertext Transfer Protocols

41. Consider the following statements regarding the waterfall model of the system's developmental life-cycle model:
- A – A Model that is suitable for systems where requirements are clear and stable
  - B – The waterfall model is used most commonly due the linear approach is followed in implementing systems in real world.
  - C – The time taken to finalize the output is unpredictable, and a client can see the output at the last stage.
- Which of the above statement/statements is/are true?
- (1) A Only.      (2) B Only              (3) A and C Only      (4) B and C Only      (5) A, B and C all
42. Select the incorrect statement out of the following statements about the Rapid application development model
- (1) This process is implemented in parallel with the stages of the systems development life cycle.
  - (2) The information system can be developed in short time using the Rapid application development model.
  - (3) In short time, you can see a basic model of the software.
  - (4) You can get the feedback from the client and adjust the system.
  - (5) This format is simple because the phases are always go through linear steps until the end of the system from the beginning a business institute.
- **In a business institute the Subnet Mask of a Computer Network is 255.255.255. 192. One IP Address of a host computer is 201.80.33.65. With this statement write the correct answers for the following questions (8-10)**
43. What is the Class of the IP Address?
- (1) Class A              (2) Class B              (3) Class C              (4) Class D              (5) Class E
44. How many Subnets Are Connected with this network?
- (1) 2                      (2) 4                      (3) 60                      (4) 65                      (5) 30
45. What is the Correct valid host Address of this subnet?
- (1) 201.80.33.0 and 201.80.33.62              (2) 201.80.33.1 and 201.80.33.62  
(3) 201.80.33.65 and 201.80.33.126              (4) 201.80.33.65 and 201.80.33.127  
(5) 201.80.33.67 and 201.80.33.127
46. The .....①..... focuses on codes of the information system and.....②..... check whether there will be errors by assembling the collected software that created as an individual units  
What is the particular order of the passwords for filling in the ① and ② above?
- (1) White box testing, Unit testing              (2) Black box testing, System testing
  - (3) Acceptance testing, Black box testing      (4) White box testing, Integrated testing
  - (5) System testing, Acceptance testing
47. What is the correct statement about the methods used in deployment of newly created systems?
- (1) In Phased deployment, part by part of the system will be installed and the whole system will be replaced at last.
  - (2) The pilot implementation is a simple, fast and cost-effective installation method.
  - (3) Direct implementation take unnecessary time and cost overhead.
  - (4) The risk of parallel implementation is high but the cost is minimum.
  - (5) In direct implementation two systems are in work, it is easy to identity the errors in the new system comparatively.

48. Select the correct sequence for the representatives of the symbols A, B, and C used in data flow diagram.

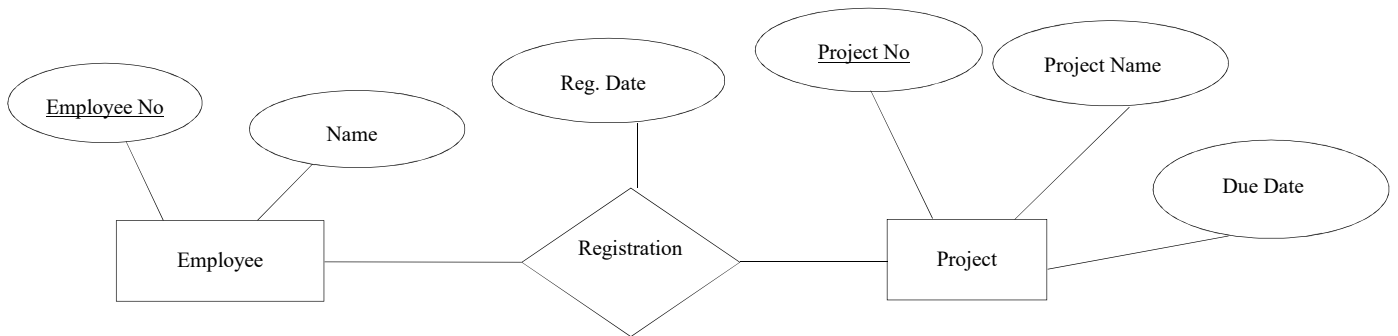


- (1) External entity, Data flow, Process
- (2) Process, Data store, External entity
- (3) External entity, Data store, Process
- (4) Data store, Process, External entity

49. Select the correct statement from the following statements about the relational database:

- (1) Specimens of the foreign key may not be empty.
- (2) The primary key is selected from the navigation keys.
- (3) The foreign key is selected from the alternate keys.
- (4) The subsystem as the foreign key must not always be a primary key to another table.
- (5) A candidate key is a subset of an alternate key.

50. The following ER diagram shows the project registration process of the employees of an institute.]



What is the most correct statement about the relations according to the above ER diagram.

- (1) Employee ( Employee No, Name)  
Project ( Project No, Project Name, Due Date)  
Registration ( Employee No, Project No, Reg. Date)
- (2) Employee ( Employee No, Name, Reg. Date)  
Project ( Project No, Project Name, Due Date)  
Registration (Employee No, Project No, Reg. Date)
- (3) Employee ( Employee No, Name)  
Project (Project No, Project Name, Due Date, Reg. Date)  
Registration ( Employee No, Project No, Reg. Date)
- (4) Employee ( Employee No, Name)  
Project ( Project No, Project Name, Due Date)  
Registration (Employee No, Project No, Reg. Date)
- (5) Employee ( Employee No, Name)  
Project ( Project No, Project Name, Due Date)  
Registration ( Employee No, Project No, Reg. Date)





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**Third Term Test - Grade 12 - 2018**

Index No : ..... **Information and Communication Technology II Three Hours**

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

**Part –A - Structured essay**

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

**Part A**

- 1) a) Software help in many ways to achieve an objective of an end user .  
i) Define “ system software”

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

- ii) Write two examples for utility software and write one use of each

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

- b) While the applications of information and communication technology is getting popularized rapidly the legal and ethical issues also increases gradually.

- i) Write down two ways of using others creations avoiding plagiarism

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

ii) What is meant by “ Intellectual Property laws “

.....

.....

.....

.....

.....

c) i) Secondary storage devices are used to store data for long time.  
Explain the two data access methods of them by using suitable

**Diagram**

**Explanation**

.....

.....

.....

.....

.....

.....

iii) The main memory of the computer is random access memory (RAM). Compare two features of SRAM and DRAM

SRAM	DRAM

2) a) i) Show how the computation is done in 8 bit two's complement arithmetic. Explain how do you deal with the carry, generated from the most significant bit

.....

.....

.....

.....

ii) Write one advantage and one disadvantage of the coding systems given in the following table.

<b>coding system</b>	<b>Advantage</b>	<b>Disadvantage</b>
<i>ASCII</i>		
<i>BCD</i>		
<i>UNICODE</i>		

iii) Convert the binary number  $10101111.100100010_2$  into hexadecimal number.

.....

.....

.....

.....

.....

b) i) Complete the following truth table to represent full adder.

<b>Inputs</b>			<b>Outputs</b>	
<i>A</i>	<i>B</i>	<i>Carry In</i>	<i>Sum</i>	<i>Carry out</i>
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

ii) Construct the logic circuit for Full Adder.

3) a) i) Describe "what is a file system?" and mention the file system that owns the following characteristics.

.....

.....

<b>Characteristic</b>	<b><i>FAT / NTFS</i></b>
Uses file encryption to increase the file security	
Doesn't support with Unicode system	
It allows sharing data between operating systems	
It has high speed to read and write data	

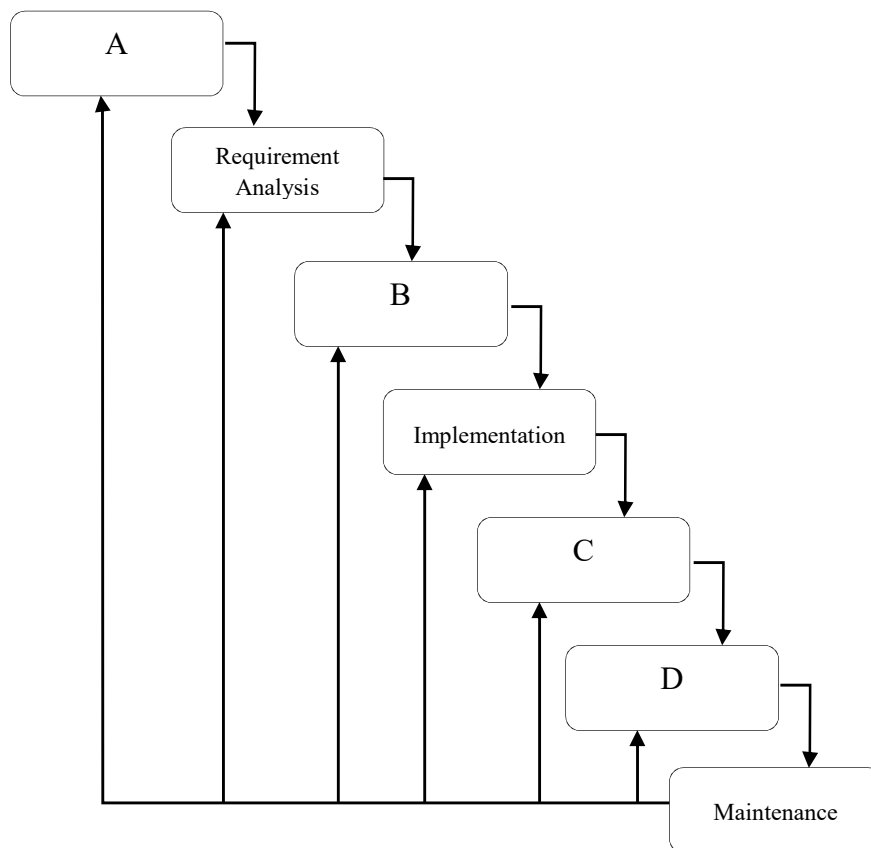
ii) Name the two types of interrupts that can change the execution of a process that runs in a CPU and briefly describe how one of the above mentioned type can be occurred?

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

iii) Describe spooling that occurs in the Input and Output device management of an operating system using the print spooling.

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

b) i) The following diagram illustrates the waterfall model used in software development



Write the appropriate terms for *A*, *B*, *C* and *D* of the above diagram.

*A* – .....

*B* – .....

*C* – .....

*D* – .....

- ii) The board of management decided to design a computer system to open the door when a person comes towards the entry door or exit door and record how many times the entry door and the exit door are opened in a day. List out the two functional requirements and two Non-Functional requirements of this system.

Functional requirements -:

.....  
.....

Non-Functional requirements -:

.....  
.....

- 4) a) Miuranga is a young boy who works in a software developing organization. He communicates with the members of software development group of his working place using encryption. He uses internet to get information and he uses e-mail services to communicate with his colleagues.

- i) In the process of encryption what is **symmetric key Encryption** and **Asymmetric key encryption**

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

- ii) Briefly explain what is a Network protocol?

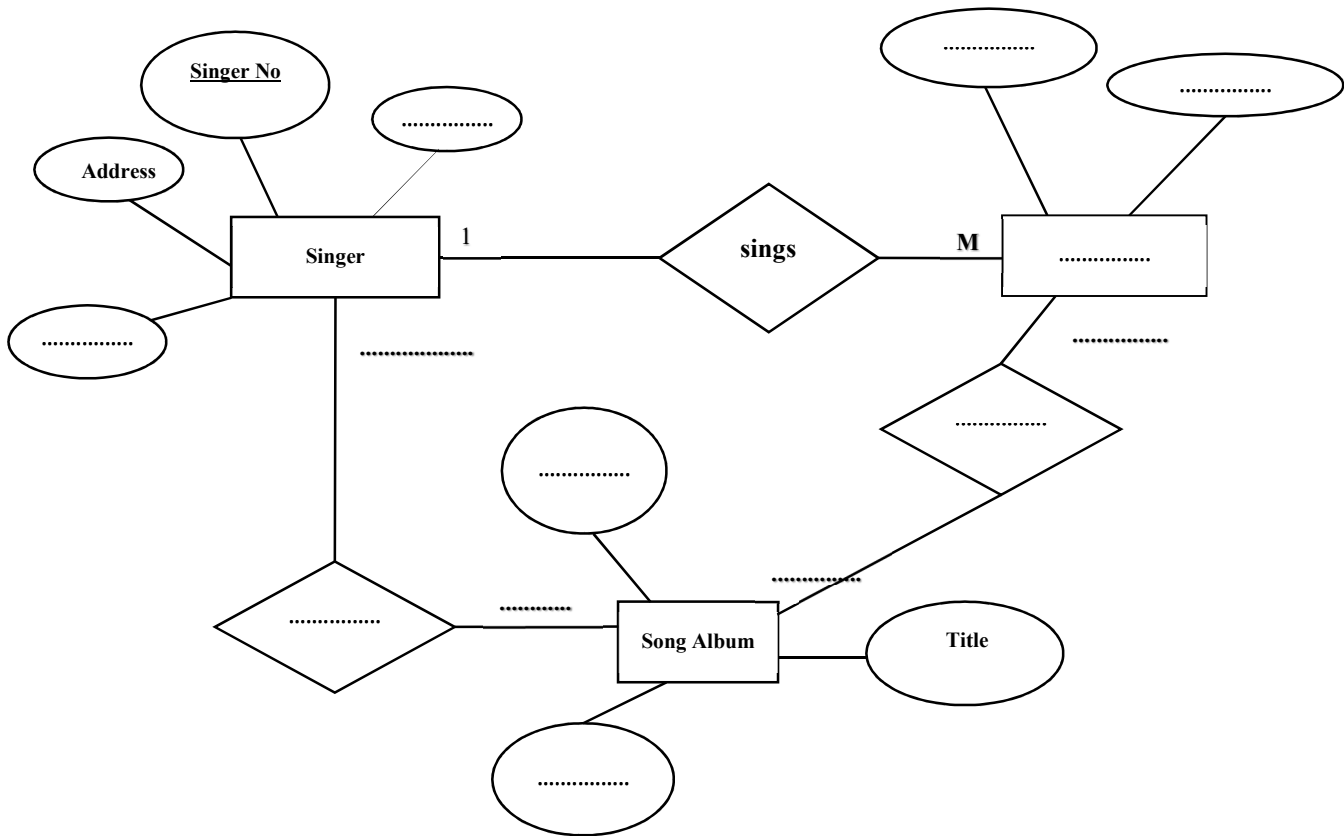
.....  
.....  
.....

- iii) Describe the process of **user datagram protocol (UDP)** and **transmission Control protocol (TCP)**. And state other two protocols where can be used in relevance of the above incident.

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

b) i) Complete the following entity relationship model by filling the blanks of it.

The Mihirisara Radio Station broadcasts songs of new singers very often. The technical section decided to store information about the Albums including the songs sung by the singers and the information about the singers in a data store for the convenience of broadcasting these songs. In order to identify each singer; singer number, name, phone number, and address are stored and album number, title and created date is stored to identify an album. There are many songs in the albums one song included only in one album. A song number and a name is used to identify a song. One album belongs to one singer, one singer can create several albums.



**Third Team Test – 2018**  
**Information Communication Technology -12 – Part II**  
**Part B**

1. A system was established to supply sea water after refining for green house which is situated in an area near a nuclear powerhouse. Here, there is a special instrument having sensors to measure the temperature of water (A), salt concentration of water (B) and radioactivity of water (C).

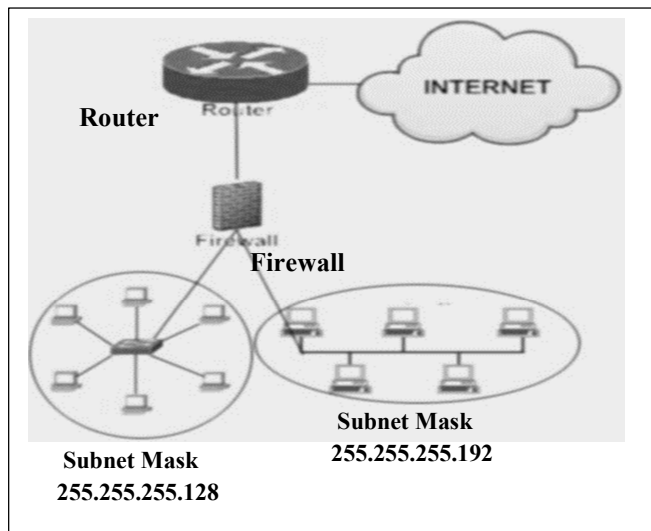
Release of water to the green house from this system happens only in the following instances.

- To release water to the green house, water is compulsory to be free from radioactivity.
- In the instance where the above condition is satisfying temperature of water should be at the standard value and salt concentration of water also should be at standard value.
- Even the temperature is not at the standard value, when water is which is free from radioactivity and at standard salt concentration is allowed to release water.
- Even the salt concentration is not at standard value, when water is free from radioactivity and at the standard temperature it is allowed to release water.

The water with radioactivity is denoted by Boolean value 1, the standard temperature of water denoted by Boolean value 1 and the standard salt concentration is denoted by Boolean value 1.

- (i) Construct a truth table to represent the above water refining system.
- (ii) Write Sum of Product (SOP) expression (not simplified) for the final output represented by the truth table.
- (iii) Construct the logic circuit for Boolean expression obtained in section (ii).
- (iv) Simplify the Boolean expression obtained in section (b) above using the Boolean laws. Clearly show the Boolean algebraic rules used for simplifications
- (v) Construct the logic circuit for simplified Boolean expression obtained in section (iii) above by using only NOR gates.

2) The network administrator of **vidulaka higher education** Center has bought **192.168.1.0/24** IP Address to provide internet connection to the computers of ICT Unit and Engineering Unit. Then he economically sub netted as below network diagram by giving subnet mask **255.255.255.128** for ICT Unit and **255.255.255.192** for engineering Unit.



After that Network administrator decided to connect 30 computers and 14 computers for administration unit and examination unit as two subnets under the 192.168.1.0/24 IP address.

- (a) What is the maximum valid host addresses which can be provide to ICT unit and engineering unit respectively ?
- (b) Write the two Subnet ID's which are related with above subnets.
- (c) Complete the following table to create subnets which are adding newly to the **administration unit and examination unit**

	<b>Administration unit</b>	<b>Examination unit</b>
subnet mask		
subnet ID		
first Host Address		
Last Host Address		
Broadcast Address		

- (d) Write the Network topologies of above network diagram and write one advantage and one disadvantage of using these topologies.

3.

- (a)
  - (i) Describe the difference between fixed point numbers and floating point numbers.
  - (ii) Show how a floating point number can be written using a model and name the parts of it.
  - (iii) Briefly explain the need of floating point numbers inside a computer.

(b) Convert the hexadecimal number  $2CD.42_{16}$  into a decimal number.

(c) Convert the decimal number  $375.04_{10}$  into a octal number.

(d) Convert the octal number  $5307.263_8$  into a hexadecimal number.

(e) Simplify the following binary numbers.

$$\begin{array}{r}
 \text{(i)} \quad 1\ 1\ 0\ 1\ 0.\ 1\ 1\ 1_2 \\
 + \quad 1\ 0\ 1\ 0\ 1.\ 1\ 0\ 1_2 \\
 \hline
 1\ 1\ 0\ 1.\ 1\ 1\ 1_2
 \end{array}$$

$$\begin{array}{r}
 \text{(ii)} \quad 1\ 0\ 1\ 1\ 1.\ 0\ 0\ 1_2 \\
 - \quad 1\ 1\ 1\ 0.\ 1\ 1\ 0_2 \\
 \hline
 \end{array}$$

(f) Calculate the following binary numbers using bitwise XOR operation.

$$1\ 1\ 0\ 1\ 0\ 1\ 1\ \mathbf{XOR}\ 1\ 0\ 1\ 1\ 0\ 1\ 0$$



04.

- (a). Explain the need of an operating system inside a computer.
- (b). State the different types of classifications of operating system and give an example for each of category.
- (c). Draw the process transition diagram that shows how an Operating System handles the processes during process management and briefly explain each of the steps.
- (d). Does a computer need device drivers. Justify your answer.
- (e). Describe the process of a context switch.
- (f). Explain the Scheduling Policies used in scheduling.

5. a) Explain the following two concepts of ICT in brevity

- (i). Parallel computing
- (ii). Grid computing

b) Health sector is developing rapidly due to the influence of information and communication technology. State three computer based systems can be used in health sector and explain the use of each briefly.

c)

- (i). Draw a fetch executes cycle to show the execution of instructions step by step in a computer.
- (ii). Draw the Von- Neumann Architecture model of a computer design and name its components and indicate the data flow and control flow clearly.

6. Draw a context diagram to show the operations of the Online Goods Ordering System (GOS) described below. Adhering to the standards of the Structured System Analysis and Design Methodology (SSADM). Clearly indicate external entities and data flow of your diagram. State any assumptions that you have made.

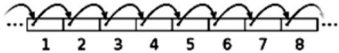
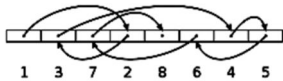
'Easy way' is a system that can order goods online (Gos). To order goods, person needs to register with this site and become a member. An application for a membership is to be obtained from the Goods Ordering System (GOS) web site, should be forwarded to the GOS and the membership has been granted by email after verifying the details. The user name and password for the GOS is also forwarded to the e-mail account. Person can purchase items by entering this username and password as a member of the order system.

When the GOS is given an order by a member, GOS checks whether all the goods are available by the Goods Query at the warehouse, and the order is brought back to the system by preparing the order according to the availability of the goods. The prepared order is submitted to the member by the system and confirms the order and retrieves it. After that, the bill is submitted to the member and the member pays the payment. A confirmed order is submitted to the warehouse and the supplier by the system and the supplier takes the Goods and delivery form from the warehouse the goods are handed over to the member by the supplier and the application is received to verify that the supplier has accepted the goods. A copy of the completed delivery form is sent to the system to confirm that the supplier has handed over the goods

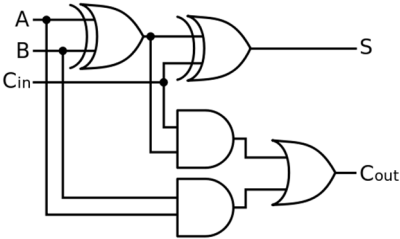
**Information and Communication Technology**  
**Third Term Test - 2018**  
**Grade 12**  
**Paper I**

Question Number	Answer	Question Number	Answer	Question Number	Answer	Question Number	Answer	Question Number	Answer
1.	4	11.	3	21.	2	31.	1	41.	3
2.	1	12.	2	22.	1	32.	2	42.	5
3.	2	13.	5	23.	2	33.	5	43.	3
4.	5	14.	2	24.	4	34.	4	44.	2
5.	3	15.	1	25.	2	35.	1	45.	3
6.	4	16.	3	26.	1	36.	5	46.	4
7.	2	17.	5	27.	5	37.	4	47.	1
8.	4	18.	3	28.	4	38.	3	48.	5
9.	3	19.	4	29.	1	39.	2	49.	2
10.	1	20.	5	30.	3	40.	3	50.	1

**Information and Communication Technology**  
**Third Term Test – 2018 - Grade 12**  
**Paper II**  
**Answers for Part A**

Question Number	Answer	Marks
1 (a) (i)	System software helps to setup the environment by controlling the system and working with the other software	01 mark
1 (a) (ii)	a) Virus guard –Protect the computer system from the harm of malware Device drivers -help to communicate with input output devices or any other s/w with the correct explanation give marks.	02 marks
1 (b) (i)	Citing Quating Referencing (2 marks for two answers)	02 marks
1 (b) (ii)	law that deals with protecting the rights of those who create original works	01 mark
1 (c) (i)	<p>Sequential access Start at the beginning and read through in order</p> <p><b>Sequential access</b></p>  <p>Random access Individual addresses identify directly and access the data immediately</p> <p><b>Random access</b></p> 	02 marks

1 (c) (ii)	SRAM	DRAM														
	No need to refresh data	Need to refresh data														
	Production cost is high	Production cost is less														
	Common	uncommon														
	Less consumption of electricity	High consumption of electricity	02 marks													
	large	small														
(2 marks for any two features should be written comparatively)																
<b>Total Marks</b>			<b>10</b>													
2(a) (i)	<pre> 4 1 -&gt; 0010 1001 13  -&gt; 0000 1101 -13 -&gt; 1111 0010 + 0000 0001 =&gt; 1111 0011 0010 1001 + 1111 0011 ----- 1 0001 1100 </pre> <p style="margin-left: 40px;">↑</p>		02 marks													
The carry out of the most significant bit is ignored in 2's complement addition																
2(a) (ii)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Coding system</th> <th style="width: 50%;">Advantage</th> <th style="width: 25%;">Disadvantage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><i>ASCII</i></td> <td> <ul style="list-style-type: none"> <li>Uses a linear ordering of letters.</li> <li>Different versions are mostly compatible.</li> <li>compatible with modern encodings</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>Not Standardized.</li> <li>Not represented all world languages.</li> </ul> </td> </tr> <tr> <td style="text-align: center;"><i>BCD</i></td> <td> <ul style="list-style-type: none"> <li>Easy to encode and decode decimals into BCD and vice versa.</li> <li>Simple to implement a hardware algorithm for the BCD converter.</li> <li>It is very useful in digital systems whenever decimal information is given either as inputs or displayed as outputs.</li> <li>Digital voltmeters, frequency converters and digital clocks all use BCD as they display output information in decimal.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>Not space efficient.</li> <li>Difficult to represent the BCD form in high speed digital computers in arithmetic operations, especially when the size and capacity of their internal registers are restricted or limited.</li> <li>Require a complex design of Arithmetic and logic Unit (ALU) than the straight Binary number system.</li> <li>The speed of the arithmetic operations slow due to the complete hardware circuitry involved.</li> </ul> </td> </tr> <tr> <td style="text-align: center;"><i>UNICODE</i></td> <td> <ul style="list-style-type: none"> <li>Standardized.</li> <li>Represents most written languages in the world</li> <li>ASCII has its equivalent within Unicode.</li> </ul> </td> <td>Need more memory to store Unicode compared to ASCII</td> </tr> </tbody> </table>		Coding system	Advantage	Disadvantage	<i>ASCII</i>	<ul style="list-style-type: none"> <li>Uses a linear ordering of letters.</li> <li>Different versions are mostly compatible.</li> <li>compatible with modern encodings</li> </ul>	<ul style="list-style-type: none"> <li>Not Standardized.</li> <li>Not represented all world languages.</li> </ul>	<i>BCD</i>	<ul style="list-style-type: none"> <li>Easy to encode and decode decimals into BCD and vice versa.</li> <li>Simple to implement a hardware algorithm for the BCD converter.</li> <li>It is very useful in digital systems whenever decimal information is given either as inputs or displayed as outputs.</li> <li>Digital voltmeters, frequency converters and digital clocks all use BCD as they display output information in decimal.</li> </ul>	<ul style="list-style-type: none"> <li>Not space efficient.</li> <li>Difficult to represent the BCD form in high speed digital computers in arithmetic operations, especially when the size and capacity of their internal registers are restricted or limited.</li> <li>Require a complex design of Arithmetic and logic Unit (ALU) than the straight Binary number system.</li> <li>The speed of the arithmetic operations slow due to the complete hardware circuitry involved.</li> </ul>	<i>UNICODE</i>	<ul style="list-style-type: none"> <li>Standardized.</li> <li>Represents most written languages in the world</li> <li>ASCII has its equivalent within Unicode.</li> </ul>	Need more memory to store Unicode compared to ASCII	03 marks	
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2(a)(iii)	$10101111.100100010_2$ $1010 \quad 1111.1001 \quad 0001 \quad 0000$ $A \quad F \quad . \quad 9 \quad 1 \quad 0$ $10101111.100100010_2 = AF.9_{16}$	01 mark																																													
2(b)(i)	<table border="1" data-bbox="349 380 1123 632"> <thead> <tr> <th>A</th> <th>B</th> <th>Carry-In</th> <th>Sum</th> <th>Carry-Out</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	A	B	Carry-In	Sum	Carry-Out	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	1	0	1	1	0	0	1	0	1	0	1	0	1	1	1	0	0	1	1	1	1	1	1	02 marks
A	B	Carry-In	Sum	Carry-Out																																											
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3(a)(i)	<p>A file system is used to control how data is stored and retrieved in operating systems.</p> <table border="1" data-bbox="279 1037 1318 1289"> <thead> <tr> <th>Characteristic</th> <th>FAT / NTFS</th> </tr> </thead> <tbody> <tr> <td>Uses file encryption to increase the file security</td> <td>NTFS</td> </tr> <tr> <td>Doesn't support to Unicode system</td> <td>FAT</td> </tr> <tr> <td>In case of any failure the files and folders are not recovered or restored. Maximum size of a file is a limited small size.</td> <td>FAT</td> </tr> <tr> <td>It has high speed to read and write data.</td> <td>NTFS</td> </tr> </tbody> </table>	Characteristic	FAT / NTFS	Uses file encryption to increase the file security	NTFS	Doesn't support to Unicode system	FAT	In case of any failure the files and folders are not recovered or restored. Maximum size of a file is a limited small size.	FAT	It has high speed to read and write data.	NTFS	03 marks																																			
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3(a)(ii)	<p>An interrupt generated within the processor by executing an instruction is called software interrupt.</p> <p>Signal created and sent to the CPU that is caused by some action taken by a hardware device</p> <p>Interrupt can occur due to a time expiry of I/O operation</p>	02 marks																																													
3(a)(iii)	Storing and managing the information, sent to the printer until it is being printed.	01 mark																																													
3(b)(i)	<p>A – Feasibility Study</p> <p>B – System Design</p> <p>C – Testing</p> <p>D – Deployment</p>	02 marks																																													
3(b)(ii)	<p>Functional requirement -:</p> <ul style="list-style-type: none"> <li>• When a person comes near the entrance of the Institute open the door</li> <li>• When a person comes to the exit door of the institution open the door</li> <li>• Record the number of times the door is open</li> </ul>	01 mark																																													

	Non-Functional requirement -: <ul style="list-style-type: none"> <li>Near the entrance of the Institute, a person will arrive and the door will be opened for an entire duration of less than 5 seconds</li> <li>The bell rings when the gates are opened</li> <li>Light a bulb when the door is opened (give marks for suitable answers)</li> </ul>	01 mark
<b>Total Marks</b>		<b>10</b>

**Answers for Part B**

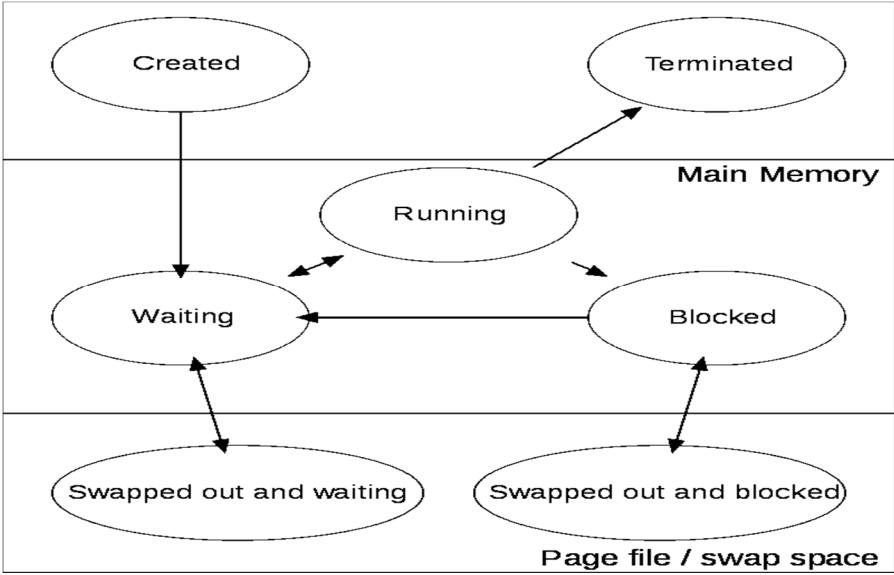
Question No	Answers	Marks																																				
1 (i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>Release Water (F)</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td></tr> </tbody> </table>	A	B	C	Release Water (F)	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	1	1	0	0	0	1	0	1	0	1	1	0	0	1	1	1	0	04 marks
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1 (ii)	$\bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC$	02 marks																																				
1 (iii)		03 marks																																				
1 (iv)	$\bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC$ $\bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC + \bar{A}BC$ - ( $X + X = X$ ) $\bar{A}C(\bar{B} + B) + \bar{A}B(\bar{C} + C)$ - Distributive Law $\bar{A}C + \bar{A}B$ - Distributive Law $\bar{A}(C + B)$ $\bar{A}(B + C)$	03 marks																																				

4(a)(i)	<p><b>Symmetric Key Encryption</b> is The encryption process where same keys are used for encrypting and decrypting. When using symmetric key encryption users must share a common key before to exchange of information.</p> <p><b>Asymmetric Key Encryption</b> - The encryption process where different keys are used for encrypting and decrypting Every user in this system needs to have a pair of dissimilar keys, private key and public key. These keys are mathematically related – when one key is used for encryption and the other key is used for decryption</p>	02 marks		
4(a)(ii)	Protocol is a communication network protocol defines the order and the format of data when the data is exchanged between two networking devices	01 mark		
4(a)(iii)	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;"><b>User Datagram Protocol (UDP)</b> UDP is the no frills transport protocol for several well-known application layer protocols such as DNS and SNMP.</td> <td style="width: 50%;"><b>Transmission Control protocol (TCP).</b> TCP provides a reliable in order delivery of data. It is a connection oriented protocol and uses sequenced acknowledgment with retransmission of packets when necessary.</td> </tr> </table>	<b>User Datagram Protocol (UDP)</b> UDP is the no frills transport protocol for several well-known application layer protocols such as DNS and SNMP.	<b>Transmission Control protocol (TCP).</b> TCP provides a reliable in order delivery of data. It is a connection oriented protocol and uses sequenced acknowledgment with retransmission of packets when necessary.	02 marks
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	<ul style="list-style-type: none"> <li>• HTTP</li> <li>• SMTP</li> <li>• POP3</li> <li>• DNS</li> </ul>	01 mark		
4(b)	<p>For Entities - 0.5 x 2 = 01 marks (Entities must be singular)  Correct relations with cardinality - 0.5 x 2 = 01 marks  Attributes = 1 mark (4 attributes are correct 1 mark, 3 attributes are correct 0.5 )  For primary keys - 0.5x2= 1 marks  <b>Total marks = 04</b></p>	04 marks		

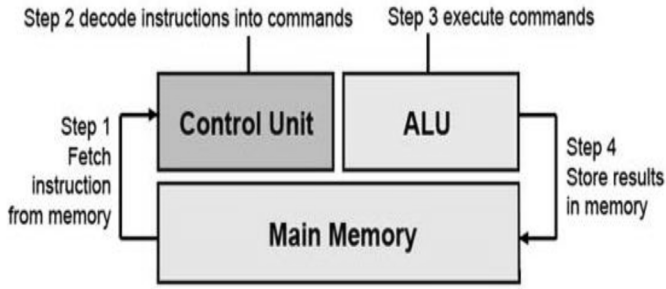
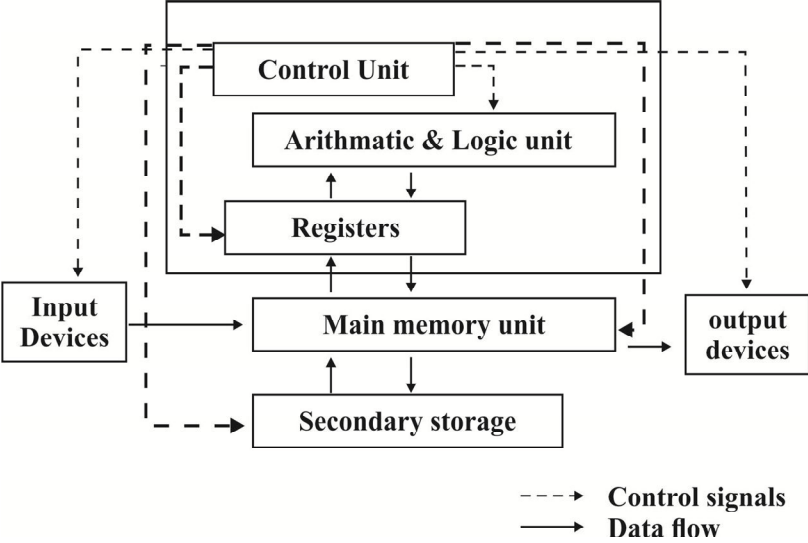
		<b>Total Marks</b>		<b>10</b>
1 (v)				03 marks
		<b>Total Marks</b>		<b>15</b>
2 (a)	<p><b>ICT Unit</b>            255.255.255.128            11111111.11111111.11111111.10000000  <math>2^n - 2</math>  <math>2^7 - 2</math>            128 - 2            Maximum Host address = 126</p>			01 mark
	<p><b>Engineering Unit</b>            255.255.255.192            11111111.11111111.11111111.11000000  <math>2^n - 2</math>  <math>2^6 - 2</math>            64 - 2            Maximum Host address = 62</p>			01 mark
2(b)	ICT Units - Subnet ID = 192.168.1.0 Engineering Units - Subnet ID = 192.168.1.128			02 marks
2 (c)		<b>Administration unit</b>	<b>Examination unit</b>	07 marks
	(subnt mask)	255.255.255.224 (01 mark)	255.255.255.240 (01 mark)	
	(subnt ID)	192.168.1.192 (01 mark)	192.168.1.224 (01 mark)	
	(first Host Address)	192.168.1.193 (0.5 mark)	192.168.1.225 (0.5 mark)	
	(Last Host Address)	192.168.1.222 (0.5 mark)	192.168.1.238 (0.5 mark)	
	(Broadcast Address)	192.168.1.223 (0.5 mark)	192.168.1.239 (0.5 mark)	
2(c)	<p><b>Advantages of Star Topology</b></p> <ol style="list-style-type: none"> <li>1. It is easy to create</li> <li>2. It is easy to connect the network and remove from the network</li> <li>3. Easy to identify errors.</li> </ol> <p><b>Disadvantages of Star Topology</b></p> <ol style="list-style-type: none"> <li>1. If the switch or Hub becomes inactive, Network will be disconnected</li> <li>2. The connecting devise are expensive</li> </ol> <p>(Correct network topology – 1 mark, advantage &amp; disadvantage – 1 mark)</p>			02 marks

	<p><b>Advantages of Bus Topology</b></p> <ol style="list-style-type: none"> <li>1. It is easy to create</li> <li>2. It will take low cost to create rather than other topologies</li> </ol> <p><b>Disadvantages of Bus Topology</b></p> <ol style="list-style-type: none"> <li>1. If the backbone become disconnect the network get failure</li> <li>2. Difficult to find out errors in the network.</li> </ol> <p>(Correct network topology – 1 mark, advantage &amp; disadvantage – 1 mark)</p>	02 marks																																
<b>Total Marks</b>		<b>15</b>																																
3(a)	<p>(i) the decimal point is located in the same position in fixed point numbers. It is not necessary that the decimal point should occupy the same position in floating point numbers.</p> <p>(ii) <math>a \times r^e</math> a = Mantissa r = Base e = Exponent</p> <p>(iii) Used in computing and storing large numbers</p>	02 marks  03 marks  01 marks																																
3(b)	<p>(i) <math>2CD.42_{16}</math></p> <table style="margin-left: 40px;"> <tr> <td>2</td> <td>C</td> <td>D</td> <td>.</td> <td>4</td> <td>2</td> </tr> <tr> <td><math>16^2</math></td> <td><math>16^1</math></td> <td><math>16^0</math></td> <td></td> <td><math>16^{-1}</math></td> <td><math>16^{-2}</math></td> </tr> <tr> <td><math>256 \times 2</math></td> <td><math>16 \times 12</math></td> <td><math>1 \times 13</math></td> <td></td> <td><math>0.0625 \times 4</math></td> <td><math>0.004 \times 2</math></td> </tr> <tr> <td>512</td> <td>+ 192</td> <td>+ 13</td> <td></td> <td>0.25</td> <td>+ 0.008</td> </tr> <tr> <td>717</td> <td></td> <td></td> <td></td> <td>258</td> <td></td> </tr> </table> <p><math>2CD.42_{16} = 717.258_{10}</math></p>	2	C	D	.	4	2	$16^2$	$16^1$	$16^0$		$16^{-1}$	$16^{-2}$	$256 \times 2$	$16 \times 12$	$1 \times 13$		$0.0625 \times 4$	$0.004 \times 2$	512	+ 192	+ 13		0.25	+ 0.008	717				258		02 marks		
2	C	D	.	4	2																													
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512	+ 192	+ 13		0.25	+ 0.008																													
717				258																														
3(c)	<p>(i) <math>375.04_{10}</math></p> <table style="margin-left: 40px;"> <tr> <td>8</td> <td> </td> <td>375</td> <td></td> </tr> <tr> <td>8</td> <td> </td> <td>46</td> <td>→ 7 ↑</td> </tr> <tr> <td></td> <td></td> <td>5</td> <td>→ 6</td> </tr> </table> <table style="margin-left: 40px;"> <tr> <td>.04 × 8 = .24</td> <td>→ 0</td> <td rowspan="3" style="vertical-align: middle;">↓</td> </tr> <tr> <td>.24 × 8 = 1.92</td> <td>→ 1</td> </tr> <tr> <td>.92 × 8 = 7.36</td> <td>→ 7</td> </tr> </table> <p><math>375.04_{10} = 567.017_8</math></p>	8		375		8		46	→ 7 ↑			5	→ 6	.04 × 8 = .24	→ 0	↓	.24 × 8 = 1.92	→ 1	.92 × 8 = 7.36	→ 7	02 marks													
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3(d)	<p>(i) <math>5307.263_8</math></p> <table style="margin-left: 40px;"> <tr> <td>5</td> <td>3</td> <td>0</td> <td>7</td> <td>.</td> <td>2</td> <td>6</td> <td>3</td> </tr> <tr> <td>101</td> <td>011</td> <td>000</td> <td>111</td> <td></td> <td>010</td> <td>110</td> <td>011</td> </tr> <tr> <td>1010</td> <td>1100</td> <td>0111</td> <td></td> <td></td> <td>0101</td> <td>1001</td> <td>1000</td> </tr> <tr> <td>10(A)</td> <td>12(C)</td> <td>7</td> <td></td> <td></td> <td>5</td> <td>9</td> <td>8</td> </tr> </table> <p><math>5307.263_8 = AC7.598_{16}</math></p>	5	3	0	7	.	2	6	3	101	011	000	111		010	110	011	1010	1100	0111			0101	1001	1000	10(A)	12(C)	7			5	9	8	04 marks
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10(A)	12(C)	7			5	9	8																											

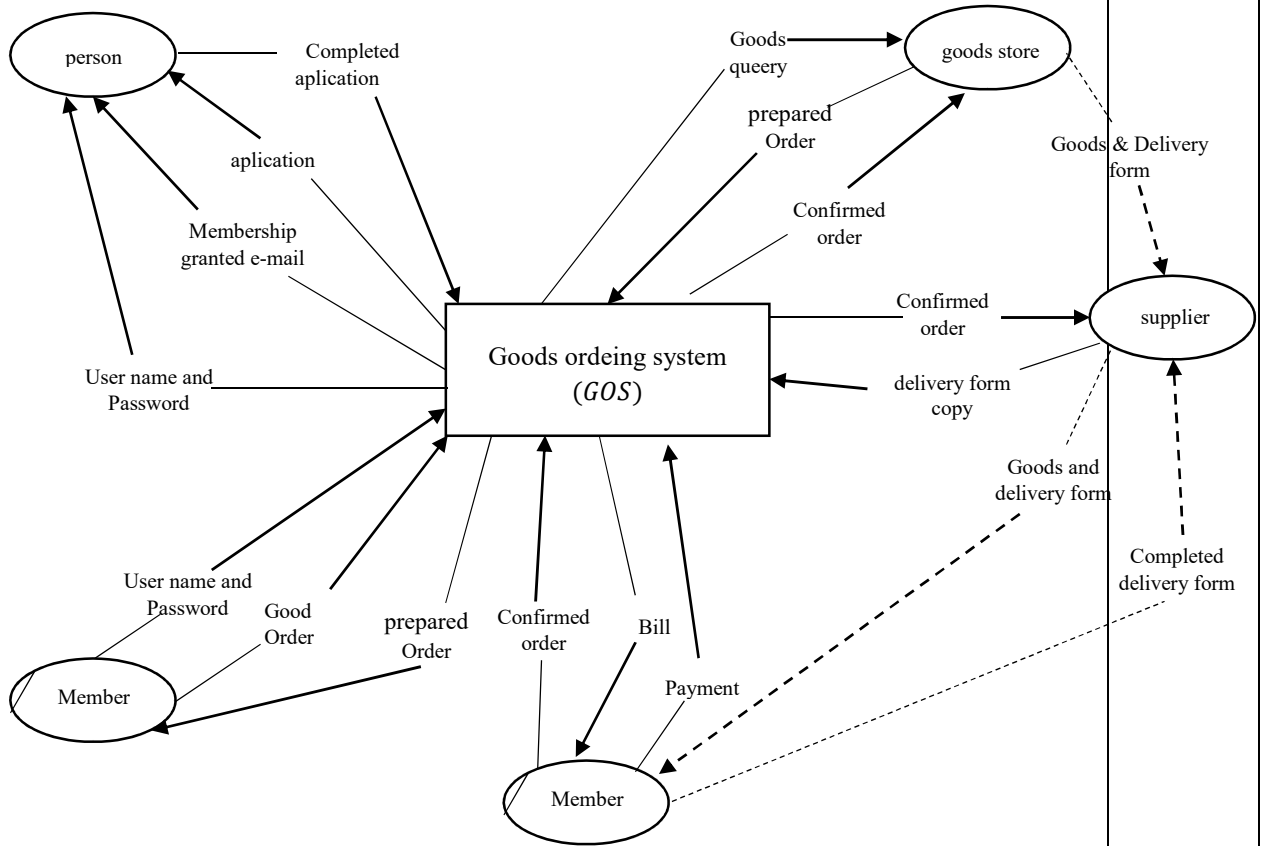


3(e)	<p>(i) <math display="block">\begin{array}{r} 1\ 1\ 0\ 1\ 0.\ 1\ 1\ 1_2 \\ +\ 1\ 0\ 1\ 0\ 1.\ 1\ 0\ 1_2 \\ \hline 1\ 1\ 0\ 1.\ 1\ 1\ 1_2 \\ \hline 1\ 1\ 1\ 1\ 1\ 0.\ 0\ 1\ 1_2 \\ \hline \hline \end{array}</math></p> <p>(ii) <math display="block">\begin{array}{r} 1\ 0\ 1\ 1\ 1.\ 0\ 0\ 1_2 \\ -\ 1\ 1\ 1\ 0.\ 1\ 1\ 0_2 \\ \hline 1\ 0\ 0\ 0.\ 0\ 1\ 1_2 \\ \hline \hline \end{array}</math></p>	02 marks
3(f)	$1\ 1\ 0\ 1\ 0\ 1\ 1\ \text{XOR}\ 1\ 0\ 1\ 1\ 0\ 1\ 0 = 0\ 1\ 1\ 1\ 0\ 1\ 1$	01 mark
<b>Total Marks</b>		<b>15</b>
4(a)	An operating system is needed inside the computer to manage Software and Hardware and run various programs by providing services .	02 marks
4(b)	Single user-single task Single user-multi task Multi user- multi task Multi-threading Real Time – OS	03 marks
4(c)	 <p><b>Basic Process States</b></p> <ul style="list-style-type: none"> <li>Created or New State</li> <li>Ready State</li> <li>Running State</li> <li>Blocked State</li> <li>Terminated State</li> </ul>	06 marks

	<p><b><u>Created or New State</u></b> When a process is first created, it occupies the “created” or “ new” state. In this state, the process awaits admission to the “ready” state.</p> <p><b><u>Ready State</u></b> This state is also known as “waiting” or “runnable” state. A process moves in to this state from New state. When a process becomes this state it is loaded into main memory and is awaiting execution on a CPU.</p> <p><b><u>Running State</u></b> This state is also known as “Active” or “Executing” state. A process moves in to this state when it is chosen for execution. In other words, a process that is being executing in the processor is in this state.</p> <p><b><u>Blocked State</u></b> This state is also known as “sleeping ” state. If a process becomes to this state, it will be removed from the CPU and will transfer to the main memory or virtual memory. These types of processes are unable to run until some external event happen.</p> <p><b><u>Terminated State</u></b> A process may be terminated, either from the running state by completing its execution or by explicitly being killed. usually when a process becomes to this state, it will be removed from the main memory or virtual memory.</p>	
4(d)	A computer needs device drivers to communicate with peripheral devices.	01 mark
4(e)	A context switch is a procedure that a computer's CPU follows to change from one task (or process) to another	01 mark
4(f)	Non-preemptive - ◦ Once a process is in the CPU, it will continue until it will end. Preemptive - ◦ Once a process is in the CPU, it will remove form the CPU before ending	02 marks
<b>Total Marks</b>		<b>15</b>
5 (a) (i)	Parallel computing- Parallel computing is a type of computation in which many programs or processes are done simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time.	02 marks
5 (a)(ii)	Grid computing- Grid computing is a distributed architecture of large numbers of computers connected to solve a complex problem. In the grid computing model, servers or personal computers run independent tasks .	02 marks
5 (b)	<ul style="list-style-type: none"> <li>• <b>Diagnostic System</b> - Computers are used to collect data and identify the cause of illness.</li> <li>• <b>Lab-diagnostic System</b> - All tests can be done and the reports are prepared by computer.</li> <li>• <b>Patient Monitoring System</b> - These are used to check the patient's signs for abnormality (ECG)</li> <li>• <b>Pharmacy Information System</b> - Computer is used to check drug labels, expiry dates, harmful side effects, etc. (or other suitable systems)</li> </ul>	03 marks

5 (c) (i)	 <p style="text-align: center;">(Give marks for diagrams with correct steps)</p>	02 marks
5 (c)(ii)	 <p style="text-align: right;">     - - - -&gt; Control signals      ———&gt; Data flow   </p>	04 marks
<b>Total Marks</b>		<b>15</b>

(6)



For external entities 1x4=4 marks

For System = 1 mark

For data flow 0.5x18=9 marks

If overall context diagram is correct - 01 mark

**Total marks = 15**

**Total Marks**

**15**