G.C.E. (A/L) Examination – November 2018

Conducted by Field Work Center (FWC), Thondaimanaru

In Collaboration with the Northern Provincial Education Department

தகவல் தொடர்பாடல் தொழினுட்பவியல் (ICT)

தகவல் தொடர்பாடல் தொழினுட்பவியல் I Information & Communication Technology I	Two hours Gr. 13 (2019)	20	T	I

Instructions:

- Answer all questions
- Write down your index number on the space provided.
- In each of the questions 1 to 40, pick one of the alternatives *(1),(2),(3),(4),(5)* which is correct or most appropriate. Mark a cross (X) on the number corresponding to your choice in the answer sheet provided.
- No use of calculators.

1. Binary equivalent of 26_{10} is.
(1) 011001_2 (2) 011010_2 (3) 010101_2 (4) 010111_2 (5) 0100100_2

2. What major technology was used in third generation computers?
(1) Vacuum tube (2) Transistor (3) Microprocessor
(4) Integrated circuit (5) LSI

3. "Analytical engine was designed by ……. ".
Which one is most appropriate to fill in the blank?
(1) John Von Neumann (2) Ada Lovelace (3) Blaise Pascal
(4) Maurice Wilkes (5) Charles Babbage

4. In data communication, DSL stands for.
(1) Digital Subscriber Line (2) Digital Super Line (3) Digital Sub Line
(4) Dual Subscriber Line (5) Dual Super Line

5. The unit in which the instructions fetching into the central processing unit are decoding is called.
(1) Program counter (PC) (2) Arithmetic logic unit (3) control unit
(4) Register (5) Main memory

6. $F2B_{16}$ =
(1) 4753_8 (2) 7435_8 (3) 7345_8 (4) 7453_8 (5) 3547_8

7. The simplified form of Boolean function $f(a,b) = \bar{a}(a+b) + (a+b)(a+\bar{b})$ is.
(1) a (2) b (3) ab (4) $a+b$ (5) 1

[see page no 2

8. Which one is the valid IPV4 address?

(1) 124.256.2.1 (2) 126.1.2.257 (3) 10.4.6 (4) 15.3.2.4.1 (5) 192.168.5.4

9. Two's complement of 19_{10} is.

(1) 00010011_2 (2) 11101100_2 (3) 10111010_2 (4) 11011011_2 (5) 00000110_2

10. Type which improves efficiency of pure ALOHA is.

(1) Upper ALOHA
(2) Lower ALOHA
(3) Higher ALOHA
(4) Slotted ALOHA
(5) Improved ALOHA

11. Consider the following statements about proxy server.

A – sharing an Internet connection among multiple computers
B – converts data packets obtained from private IP addresses into the public IP address
C – resolving IP addresses for computers

Which of the above is/are correct?

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

12. Consider the following statements about operating system.

A – allocating and resolving memory requiring by processes
B – providing priority for processes
C – handling files & folders

Which of the above is /are the function(s) of process management in an operating system?

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

13. Consider the followings about static random access memory (SRAM).

A –It is used as a technology for cache memory
B – It has lesser speed than random access memory (DRAM)
C – Its density is higher than DRAM technology

Which of the above is/are correct?

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

14. In a relational database, which of the following is correct about primary key?

(1) all the tables in a database should have primary keys
(2) a table may have more than one primary keys
(3) a primary key could be created by using a field or set of fields in a table
(4) a primary key should be always in first column of a table
(5) primary key is called an alternate key

15. What is the value of 7%3 in Python programming?

(1) 3 (2) 7 (3) 2 (4) 10 (5) 1

[see page no 3

16. In Python programming, which of the following is not an arithmetic operator?

(1) + (2) / (3) % (4) > (5) **

17. In digital electronics, which of the following is a truth table for half-adder?

(1)

A	B	Carry	Sum
0	0	0	1
0	1	1	0
1	0	0	1
1	1	1	0

(2)

A	B	Carry	Sum
0	0	1	0
0	1	0	1
1	0	1	0
1	1	0	1

(3)

A	B	Carry	Sum
0	0	1	0
0	1	0	0
1	0	0	1
1	1	0	1

(4)

A	B	Carry	Sum
0	0	0	1
0	1	0	0
1	0	1	0
1	1	0	1

(5)

A	B	Carry	Sum
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

18. Consider the followings about computer programming languages.

A – Python is a third generation computer programming language

B – Programs written in first generation computer language are also called machine code

C – Program translators are necessary to be executed the programs written in high level computer programming languages in computer

Which of the above statement(s) is/are true?

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

19. Among the following IP addresses, what is class C IP address?

(1) 192.170.2.3 (2) 34.2.6.5 (3) 125.5.5.5 (4) 130.1.6.57 (5) 224.5.4.1

20. Which one of the following is a valid subnet mask?

(1) 0.255.0.255 (2) 0.255.255.0 (3) 255.255.255.192 (4) 0.0.0.255 (5) 0.255.255.255

21. Which of the following Python program is syntactically correct?

(1)
a = input(int("Enter a number:"));

(2)
a = input(int("Enter a number:)

(3)
a = input(int(Enter a number:"))

(4)
a = input(int("Enter a number:")

(5)
a = input(int("Enter a number:"))

22. Which of the following is a valid identifier in Python programming?

(1) a_b (2) ab (3) a-b (4) _a_b_ (5) for

[see page no 4

23. Consider the Python statement print (4*2+8/2-1+3**2).

Which one is the precedence of operators in the following table from left to right in the evaluation?

(1)	*	/	**	+	-	+
(2)	**	/	*	+	+	-
(3)	**	*	/	+	-	+
(4)	+	-	+	/	*	**
(5)	-	+	+	*	**	/

24. The system which is used to book railway tickets is best called.

(1) Management information system
(2) Transaction processing system
(3) Decision support system
(4) Expert system
(5) Executive information system

25. "……. is a data structure keeping by an operating system for each processes".

Which of the following is the most appropriate to fill in the blank?

(1) Context switching system
(2) Process control block (PCB)
(3) Scheduler
(4) Swapping
(5) Paging

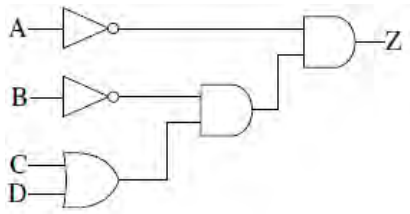
26. The changes doing in software time to time after it was deployed is called ……

(1) System analysis (2) System design (3) System development
(4) System maintenance (5) Feasibility study

27. Which of the following is a function of SMTP (Simple Mail Transfer Protocol)?

(1) monitoring network devices in the Internet
(2) helping users to retrieve e-mail messages from mail server
(3) sending e-mail messages to the mail server
(4) transferring files from one computer to another in the Internet
(5) routing data packets in the Internet

28. What is the output Z of the following logic circuit?



(1) $AB(C+D)$ (2) $ABCD$ (3) $\overline{(A+B)}(C+D)$ (4) $\bar{A}B(C+D)$ (5) $\bar{A}\bar{B}(\bar{C}+D)$

[see page no 5

29. ……layer of the OSI network model consists of MAC and LLC sub layers. Which of the following is the most appropriate to fill in the blank?

(1) Physical (2) Transport (3) Network (4) Datalink (5) Application

30. Which of the following relation is in third normal form (3NF)?

(1) Employee (EmpID,EmpName,ProjectID,ProjectName)
(2) Project (ProjID,ProjName,EmpId,EmpName)
(3) Student (RegID,StudentName)
(4) Borrowing (MemberID, BookName, BoodID, MemberName)
(5) Supplier (SupplierID, SupplierName, ProductID, ProductName)

31. Which of the following is correct about L1 cache memory?

(1) It is always situated on RAM
(2) It is always situated on CPU
(3) It is situated between register and RAM
(4) It is always situated on ROM
(5) It is produced by using DRAM technology

32. Which of the following is a major weakness of waterfall model in system development?

(1) resource management is complex
(2) very useful for changing user requirements
(3) useful for very short-term software development
(4) defining prior user requirements are necessary
(5) useful for rapid software development

33. What is the maximum usable size of memory that is obtained by 32-bits memory bus of processor?

(1) 2KB (2) 2GB (3) 32GB (4) 4GB (5) 64KB

34. Consider the following data table.

EmpID	EmpName	Address	DateOfBirth	BasicSalary
E001	R.Kanapalan	Jaffna	2/3/1974	80000.00
E002	G.C.A.Perera	Galle	4/3/1975	75000.00
E003	M.A.M.Hakeem	Kandy	7/5/1971	85000.00

The degree and cardinality of this table are respectively.

(1) 5,4 (2) 4,5 (3) 25,20 (4) 3,5 (5) 5,3

35. $BC_{16} + 76_8 =$

(1) 327_8 (2) 372_2 (3) 723_8 (4) 237_8 (5) 273_8

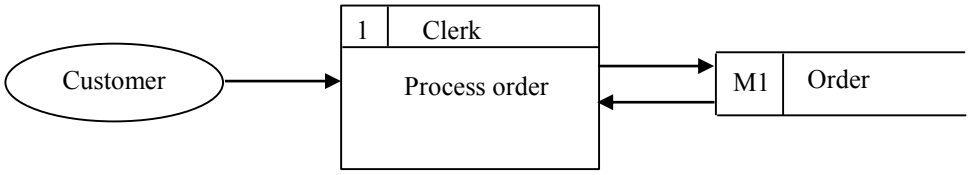
36. $25.75_{10} =$

(1) 10101.10_2 (2) 11000.01_2 (3) 10100.00_2 (4) 11001.11_2 (5) 10010.11_2

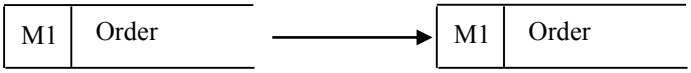
[see page no 6

37. Consider the following components of a dataflow diagram constructed using structured system analysis and design methodology (SSADM).

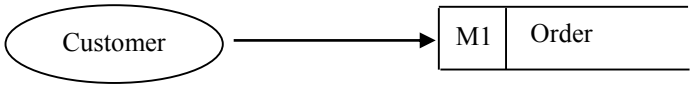
A -



B -



C -



Which of the above is/are valid symbols set?

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

38. Consider the following statements about malware.

A – computer virus spreads from on computer to another by replicating by itself

B – worms spread over computer network and consumes the storage capacity of storage devices

C – Trojan horses appears first as a useful application and steals useful information after entered into computer

D – spyware is another name for computer virus

Which of the above is/are correct?

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

39. Which of the following can be the applications of an expert system?

A – playing chess game against computer

B – helping for trouble shooting of engines in motor vehicles

C – providing financial advises for organizations

D – helping to find locations to dig water wells

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

40. Consider the following statements about algorithms.

A – they are used as problem solving approaches

B – pseudocode is considered as a graphical representation of algorithm

C – flowchart is considered as a textual representation of algorithm

Which of the above is/are incorrect statement(s)?

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

[see page no 7

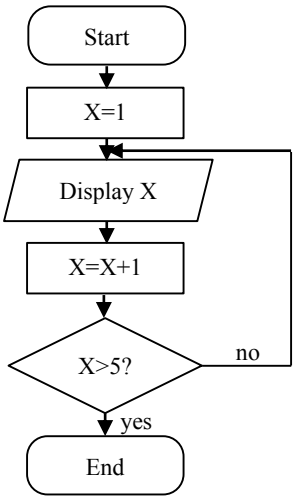
41. Which one of the following is a default network port number for HTTP in computer network?

(1) 110 (2) 80 (3) 22 (4) 21 (5) 143

42. How many IP addresses can be allocated for hosts in a computer network comprises of 124.12.4.0/22?

(1) 510 (2) 1022 (3) 1024 (4) 2048 (5) 2046

43. What is the correct statement about the following flowchart?



(1) Its output is 2
(2) Its output is 1,2,3,4,5
(3) Its output is 2,3,4
(4) It does not contain sequence
(5) It does not contain iteration

44. Which of the followings is/are the characteristics of UDP comparing with TCP?

A - connection-oriented
B - low overhead
C - ordered sequence of packets
D - unreliable

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

45. The steps in a software testing are given below.

A – deciding the expected result
B – comparing actual output with the expected result
C – deciding the functionality for the testing
D – conducting testing

What is the correct order for the steps given above?

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

46. Which of the following is not a functional requirement of an online banking system?

(1) user shall be able to login into the system
(2) user shall be able to understand the interface of the system with least effort
(3) user shall be able to transfer money from one bank account to another
(4) user shall be able to verify his/her bank transactions details
(5) user shall be able to his/her bank account balance

[see page no 8

47. Which of the following is/are software process model(s)?

A – Waterfall model B – Relational model C – Spiral model

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

48. Which of the followings is/are the feature(s) of agile process in comparison with the traditional software development process?

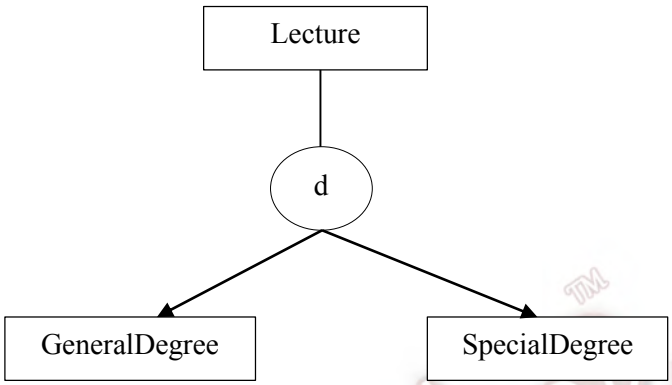
A – adopting the changing user requirements easily

B – tasks are divided for every release on time basis

C – users are experiencing about software from the initial stage of the software development

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

49. Consider the following statements about enhanced entity-relationship diagram (EER) given below.



A – Lecture is a super class

B – GeneralDegree is a sub class

C – (d) indicates the relationship between super class and sub class

Which of the statements about EER diagram is/are correct?

(1) A only (2) B only (3) C only (4) A,B only **(5)** A,B Call

50. Consider the following employee data table.

empid	name	address	salary
e001	Dias	Colombo	60000
e002	Kavinth	Jaffna	50000
e003	Razzul	Kandy	65000
e004	Perera	Matara	70000

Which of the following SQL statement(s) is/are used to insert a new record into this table?

A – insert into employee values (empid varchar(5) primary key, name varchar(25), address varchar(80), salary int(8))

B – insert into employee (empid,name,address,salary) values(empid varchar(5) primary key, name varchar(25), address varchar(80), salary int(8))

C – insert into employee values (empid varchar(5), name varchar(25), address varchar(80), salary int(8),primary key(empid))

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

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[end

G.C.E. (A/L) Examination – November 2018
Conducted by Field Work Center (FWC), Thondaimanaru
In Collaboration with the Northern Provincial Education Department
தகவல் தொடர்பாடல் தொழினுட்பவியல் (ICT)

இதனுள் எதுவும் எழுதலாகாது

தகவல் தொடர்பாடல் தொழினுட்பவியல் II Information & Communication Technology II	Three hours Gr. 13 (2019)	20	T	II

Part – II A

Answer all the questions

1.

(a) Secondary storage devices use three types of technologies for writing and reading data. State them with an example for each.

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(b) Briefly explain with the help of a suitable example why an Interrupt Request-IRQ is necessary in computer hardware.

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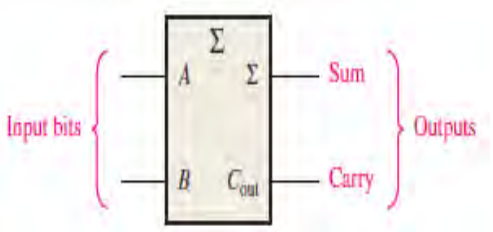
(c) Logic symbol for half-adder is given below with its usual symbols. Write down Boolean expressions for sum and carry by using the symbols on it.



(i) Sum……..

(ii) Carry……

A, B – input bits, Sum, Carry - outputs.

(d) Using 8-bits two's complement method, add 19_{10} and (-13_{10}). Show your calculations.

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2.

(a) Choose the words from the list given below to fill the banks in. Write down only the numbers suitable for each bank.

(i) In an operating system, suspending the current process temporarily and resuming it again or starting another process is called …….

(ii) The …… decides which processes are to be admitted to the ready queue.

(iii) In the operating system, ……is a data structure containing the information needed to manage a particular process.

(iv) …….. is used to map /translate the virtual addresses / process pages used by the application into physical addresses / memory frames used by the hardware to process instructions.

(v) …… decides which of the ready process is to be executed (allocated a central processing unit).

(vi) A process can be suspended temporarily out of memory to a backing store in order to free memory, to place another process in the main memory and then brought back into memory for continued execution is called ……

(vii) A program in execution is called ……..

(viii) ……. temporarily removes processes from main memory and places them in secondary storage (swapping).

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Lists:

[① - Process, ② - Swapping, ③ - Short term scheduler, ④ - Long term scheduler, ⑤ - Middle term scheduler, ⑥ - Process control block (PCB), ⑦ - Context switching, ⑧ - Page table]

(b) In a seven states process transition diagram of an operating system, a give process is currently in the ready state. Write down the next possible states and write down the conditions / events for them.

	States	**Conditions / events**
(i)		
(ii)		
(iii)		
(iv)		

(c) State two advantages of a digital signal over an analog signal.

(i) ……

……

(ii) ……

……

3.

(a) A library uses the following table to store details such as students, books and books borrowing. Assume that the primary key is (StudentID + BookID).

Borrowing

StudentID	**StudentName**	**BookID**	**BookTitle**	**Date**
S1	Smith	B1	Python	12-04-2017
S1	Smith	B2	Databases	17-01-2017
S2	Ford	B1	Python	25-02-2017

(i) Which normal form is violated by this table? Justify your answer.

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.....

(ii) Give any one example for insert anomaly in which the table is in un-normalized form.

.....

.....

.....

(iii) Convert the table into third normal form (3NF).

.....

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.....

.....

(b) The Librarian requires a report that should consists of the title of books borrowed by students and date borrowed after the table is converted into third normal form. Write down a SQL statement to obtain these details.

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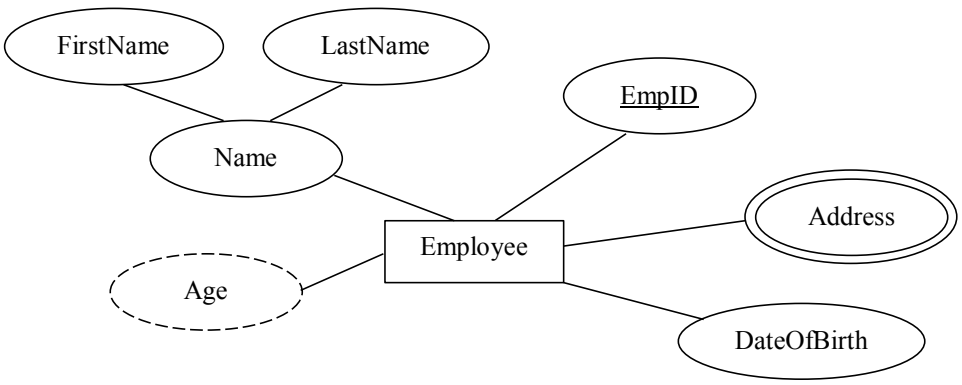
.....

(c) The segment of an entity-relationship (ER) diagram is given below.



Write down the types of attributes in the spaces given below.

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(i) Name……

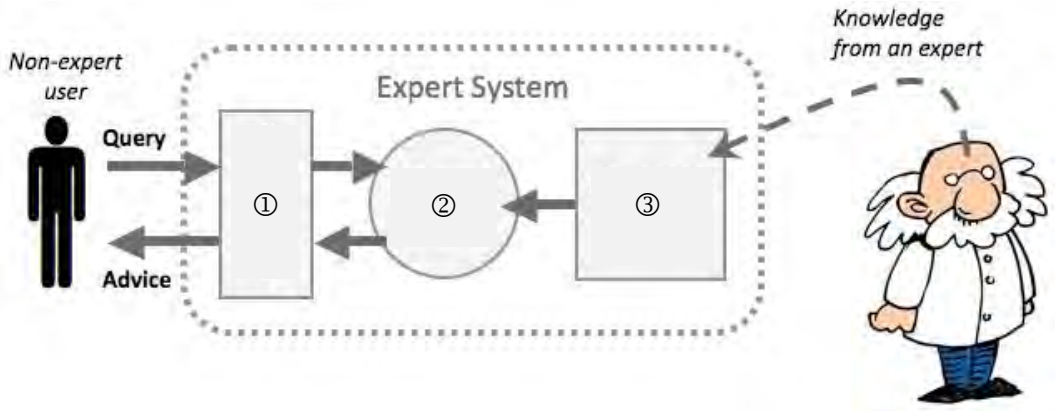
(ii) EmpID……...

(iii) Address……..

(iv) Age……

4.

(a) The following diagram consists of the components of an expert system. Write down the suitable words for ①,②,③ from the lists given below.



Lists: [User interface, Knowledgebase, Inference engine]

①……

②……

③……

(b) Assume that you are using an Internet connection with the speed of 1000 Mbps bandwidth. Convert this speed to bps. Show your computations.

……

……

……

(c) In data communication, Draw each signal encoding schemes for the data 11010010 in the following diagram.

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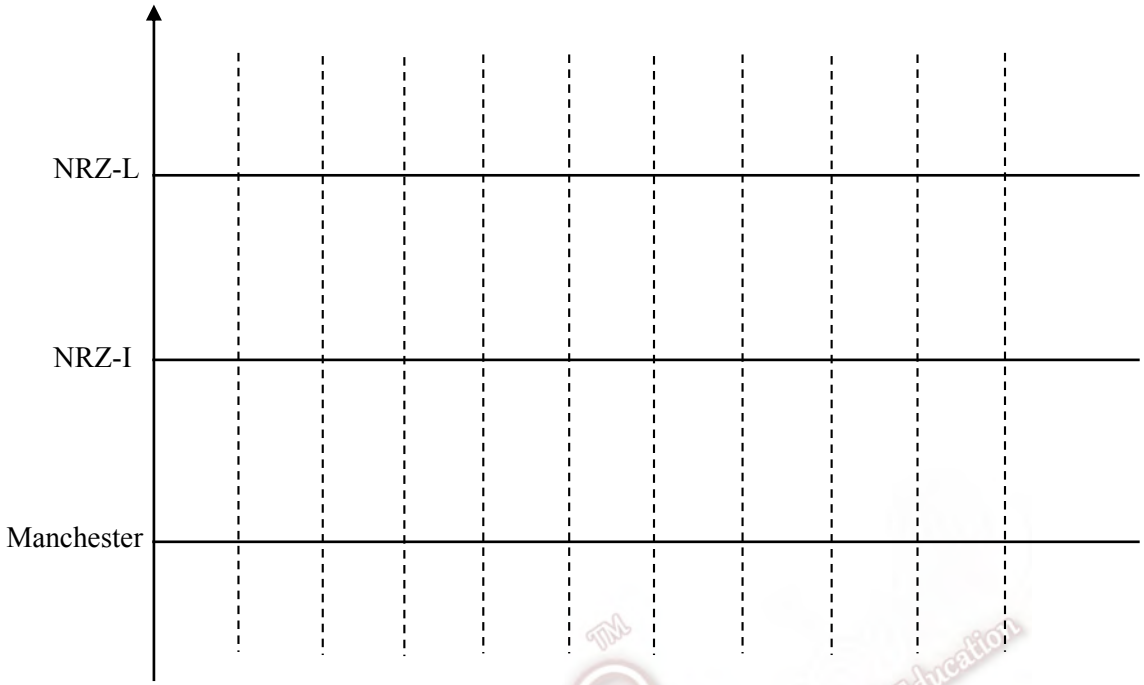

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Part – II B

Answer any four questions only

(1)

(a) A half-adder obtains two inputs A and B and gives outputs Sum and Carry.

(i) Give truth table for the half-adder.

(ii) Draw the logic circuit for the half-adder with the outputs Sum and Carry in the same logic circuit.

(b) A system controls the flow of vehicles through a barrier based on three lights A, B and C. When a light is red, the signal is 0. When a light is green, the signal is 1. The barrier will open when the output X is 1.

The barrier opens if either:

- Light A is red and lights B and C are both green.

or

- Light A is green and lights B and C are both red.

(i) Construct truth table for this system.

(ii) Derive a Boolean expression in SOP (Sum of product) form.

(iii) Draw a logic circuit for the Boolean expression obtained in **(ii)** above.

(2)

(a) Compare computer network models OSI and TCP/IP in the same diagram.

(b) Suppose you are assigned a class C network 200.138.10.0 with subnet mask 255.255.255.240.

(i) Howe many maximum of subnets could be created?

(ii) What is the maximum number of hosts in each subnet?

(iii) Write down the usable host address range for each of the first three subnets.

(iv) Identify the broadcast address of each of the first three sub networks.

(c) Two communicating devices are using a single-bit parity check for error detection. The transmitter sends the byte 10101010 and because of the channel noise, the receiver gets the byte 10011010. Indicate, with a brief explanation, whether or not the receiver will detect the error.

(3) Consider the following scenario.

A cooperative bank in a busiest city of Sri Lanka is currently handling its activities manually. They are facing manual errors and delay in processing. It has a huge amount of customers. Bank manager decides to computerize bank's activities in order to provide effective services for customers and obtain effective services from banking employees. In addition, it is expected to face competition from other computerized banks in the city. Functions such as money deposit, money withdrawal, pawning services, and cheque transactions are to be computerized. Further, it is also expected to introduce the services such as automated teller machine facility and the Internet banking service. The preliminary report including these needs is prepared and sent to the head office by the bank manager. A tender for computerizing is called by the head office and a software development firm is selected. That firm starts its preliminary works for computerizing at the bank.

(a) State two major drawbacks of bank's activities by using manual system.

(b) Head office of bank and software development firm are jointly doing a feasibility study initially. At the end, a feasibility report is generated. Write down three feasibility studies that should be considered in this context.

(c) Selected software development firm is required for data gathering tasks about bank's manual activities. Give three suitable data gathering techniques for this.

(d) Write down three functional requirements of the proposed computer based system.

(e) Bank is planning to introduce an expert system for the processing of bank loan facilities to its customers. Write down a suitable expert system for this and explain a supportive reason for that.

(4)

(a) Compare and contrast first and third generation computer programming languages (three comparisons are enough).

(b) Draw a flowchart algorithm to obtain the smallest number form ten numbers obtained from user.

(c) Explain what is done by the Python interpreter when executing the following Python statements.

(i) a = 4

(ii) b = [3,5,6,4]

(iii) c = input("Enter a number:"))

(5) Consider the following scenario.

A University library has a lot of books. Each book has many copies. Students may borrow copies of book. A student may borrow more than one books at a time. Students can reserve books.
Librarian is to obtain the following information.

- Books borrowed by the students (Book number, student registration number, borrowed date, returned date)
- book details (title, author name, published year)
- Publishers details (publisher number, publisher name)

Books are written by authors. Books are published by publishers. Authors are uniquely identified by their names.

Construct a single ER diagram for the above mentioned scenario and identify attributes and associate them with entity or relationship types and mark primary key attributes for each entity. State any assumptions necessary to support your design.

(6) Consider the following scenario.

A web based bus ticket booking system (BTBS) is used in a bus booking office in a city. Person gives his /her booking request by contacting manager in the office. Manager provides these details to the system and manager registers the person into the system as a passenger. After person is registered, manager obtains login details for the person from the system and hand it over to the person. Passenger can now see the booking details in the system by using his /her login details. he /she may provide updates details to the system if necessary.

Draw a context diagram for this scenario using structured system analysis and design methodology (SSADM). Clearly show external entities and data flows used. State them if you have used any assumptions.

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