Information & Communication Technology – Grade 13 – 3rd Term Test 2020 September

ICT – I

2 Hours

Answer all questions.

1. Consider the following three numbers in binary, octal and decimal notations respectively.

A - 10100_2

B - 2455_8 ✓

C - 1325_{10}

Which of the above is/are equivalent to $52D_{16}$ in Hexadecimal notation?

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

2. What is the decimal equivalent to the binary 100101.11_2?

(1) 32.00_{10} (2) 37.50_{10} (3) 37.75_{10} (4) 65.75_{10} (5) 54.25_{10}

3.Time Sharing Systems

(1) Do Not Use context switching

(2) Do not share the processor time among multiple programs

(3) Rarely switching among programs

(4) Introduced to minimize the response time and maximize the user interaction during program execution

(5) illusion of concurrent execution of single programs

4.A public key encryption system

(1) Allows only one to decode the transmission

(2) Allows only none to decode the transmission

(3) Allows only one correct sender to decode the data

(4) Does not encode the data before transmitting it

(5) Allows decode the transmission system

5. Consider the following Karnaugh map

AB / C	$\bar{A}\bar{B}$ 00	$\bar{A}B$ 01	AB 11	$A\bar{B}$ 10
$\bar{C}$ 0	1	1	1	0
C 1	1	0	0	0

$A\bar{B}$

$A\bar{B} + BC$

$(\bar{A} + B) \cdot (\bar{B} + \bar{C})$

BC

Which of the following is the correct logic expression that corresponds to the two marked segments on the Karnaugh map.?

(i) $BC + AB'$ (ii) $(A+B').(B+C)$ (iii) $A'B+C'B'$ iv) $(A'+B).(C'+B')$ (v) $(A'+B').(C'+B)$

6. Which of the following language is preferred for IoT analytics ?

i) Python ii) SQL iii) FIREFOX iv) HTML v) VB

7. The IEEE standard 32-bit floating point representation of the number -3.75 is

i) 1 01111111 11000000000000000000000 ii) 0 11000000 11100000000000000000000

iii) 1 10000000 11100000000000000000000 iv) 1 11000000 11100000000000000000000

v) 1 11000000 11000000000000000000000

8. Which of the following definitions refer to 'timeliness' which is a characteristic of valuable information?

i) ability to use the information for a variety of purposes ii) contain all important facts

iii) error free information iv) deliver information when it is required

v) ability to verify whether the information is correct

9. The gates required to build a half adder are _____

i) EX-OR gate and NOR gate ii) EX-OR gate and OR gate iii) EX-OR gate and AND gate

iv) EX-NOR gate and AND gate v) none of the above

10. A malicious attacker sends large number of SYNC segments to a server, pretending that each of them is coming from a different client by faking the source IP address in the datagram. Which type of attack is being performed in this situation?

i) SYNC flooding attack ii)espionage iii) Passive attack

iv) Denial-of-service attack v) fishing attack

11. Which of the following descriptions regarding Data Flow Diagrams (DFD) is **incorrect**?

i) External entities are external to the system being analyzed or designed

ii) Elementary processes are the lowest levels of detail shown in a DFD

iii) Data store contains data that is retained in the system

iv) A DFD is a diagram shows the way in which data is passed around the system and how data is transformed and stored within the system.

v) Data can be passed between two data stores.

12. What is the correct CSS statement to underline the text in a paragraph?

i) p {font-style : underline;} ii) p {text-decoration : underline;}

iii) p {text-style : underline;} iv) p {font-weight : underline;}

v) p {font-decoration : underline;}

13. Which of the following is **incorrect** regarding PROXY server?

i) it can prevent unauthorized access to a computer network.

ii) it can improve performance of the web by caching the web pages.

iii) It acts as an intermediary between client machine and server machine in the internet.

iv) It can share an internet connection among several computers.

v) It can filter out some web content to improve security.

14. Which of the following statements about a TCP connection is/are correct?

A – Reliable data transfer B – Connection oriented C – Guaranteed delivery

(i) A only (ii) B only (iii) C only (iv) A and B only (v) All A, B and C

15 If the subnet mask of a class C network is 255.255.255.224 . How many hosts are available in a single subnet ?

i). 8 ii). 30 iii) 64 iv) 62 v) 126

16. **Incorrect** statement about context diagrams is

i) It shows how system interacts with the external entities and processes
ii) It Represents the entire system as a single box iii) It provides the overview of the system
iv) It is a DFD with the highest level of abstraction v) none of the above

17. What will be the output when the following python program is executed.

```
for A in range ( 3,10,2):
    X= A%5
    print ( X)
```

i) 0 1 2 3 4
ii) 3 0 2 4
iii) 0 3 6
iv) 3
0
2
4
v) 2 4 1 3 0

18. Which of the following statement(s) is/are correct related to e-Business transactions?

A – Purchase and sale between 2 companies through internet is a B2B transaction type.
B – supply of goods and services of a company to their employees through internet is a B2C transaction type.
C – e-Bay is a website which allow C2C transactions.
D – online license renewal taxes is a B2E transaction

i) B and D only ii) A and C only iii) B, C and D only iv) A, B and C only v) A, B, C and D

19. What will be the output when the following python code is executed?

```
a=[10,'ab',78,90,'x']
print (a[1:4])
```

i) [10,'ab',78,90] ii) ['ab',78,90,'x'] iii) ['ab',78,90] iv) [10,'ab',78,90,'x'] v) error

20. What is the value after executing the python statement 25//2*(5-2) +5%2 ?

i) 37 ii) 36 iii) 38.5 iv) 6 v) 5

21. **Incorrect** sentence about spiral model

(i) It's a combination of iterative development process and a sequential linear development process.
(ii) significant changes are expected during the development.
(iii) divided into time slices to deliver specific features for a release
(iv) suitable for systems where requirements are complex
(v)Suitable for systems where project risk is medium to high

22. Correct Stages of the SDLC covered by SSADM

(i) System Analysis, Feasibility study, System Design, Implementation
(ii) System Analysis, System Design, Implementation, Feasibility study
(iii) Feasibility study, System Analysis, System Design.
(iv) Feasibility study, System Analysis, Implementation, System Design
(v) Feasibility study, System Design, System Analysis, Implementation

23. **Incorrect** statement about Data Flow is

(i) link other components in a DFD (ii) could be one-way or two-way
(iii) used to hold data within the system (iv) show flows of data to, from and within the system
(v) represented with solid arrows except data flows between two external entities.

24. Which describes the difference between SRAM and DRAM **incorrectly**?
(i) Both SRAM and DRAM are volatile.
(ii) DRAM does not need to be periodically refreshed while SRAM does.
(iii) Development cost of SRAM is higher than the DRAM
(iv) DRAM has capacitors in its circuit whereas SRAM has flilp-flops in its circuits.
(v) SRAM is used in cache memory

25. Consider the following statements about E-commerce.
A – An organization which doesn't do its business through on line is a pure brick organization.
B - In reverse auction an item will be sold at the highest bid.
C- Pure click organizations are just a concept, but doesn't exist in the real world.
D – Web advertising can be in a form of page banners, pop up messages, spamming and email hoaxes.
Which of the above are describes **correct** features of E-commerce?

(i) A and C (ii) B and D (iii) A and D (iv) C and D (v) B and C

26. Parallel computing
(i) results management assisting in the decision processes of the environment
(ii) is discovery and scheduling of tasks and workflow
(iii) is a distributed architecture of large numbers of computers connected to solve a complex problem
(iv) many programs or processes are done simultaneously.
(v) servers or personal computers run independent tasks

27. Which is true regarding FAT 16/32 file system?
(i) Provides high security for the file system.
(ii) Supports long file names
(iii) Supports the coding system such as Unicode
(iv) Can be used with modern operating systems such as Windows XP and 7
(v) Supports the operating systems such as Windows 95

28. The performance of an agent can be improved by
(i) approach (ii)Actuator (iii) Observing (iv) Perceiving v) Learning

Consider the following three tables in a relational database to answer questions 29-30

student

Student_id	name
001	Amal
002	Ravi
003	Lal

sport

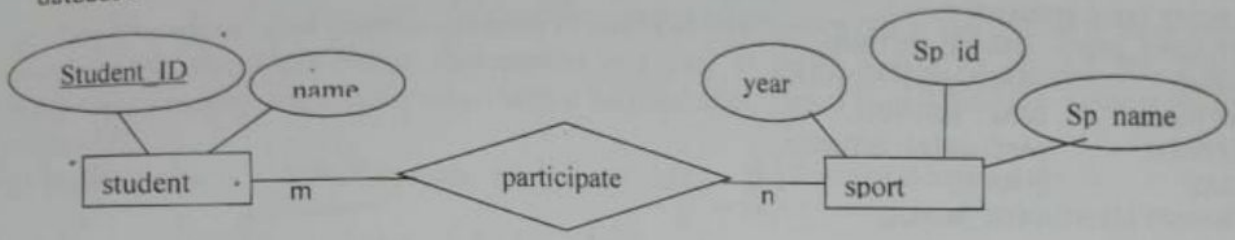
Sp_id	Sp_name
C001	cricket
C002	cricket
T003	Tennis

participate

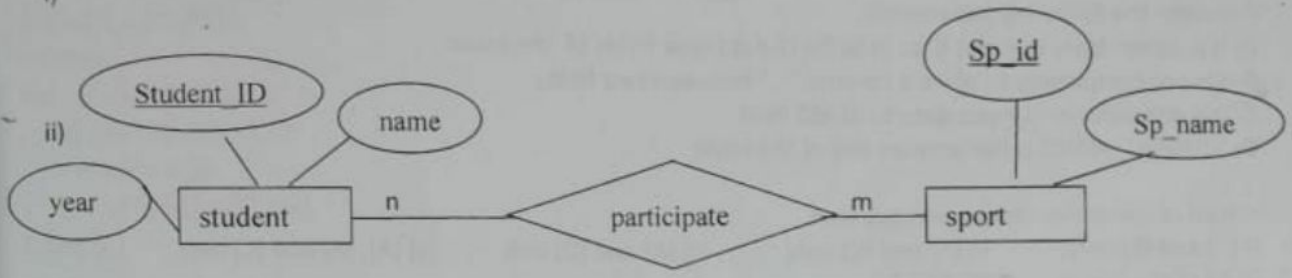
Student_id	Sp_id	Year
001	C001	1980
002	C001	1990
001	T003	2000

29. Which of the following is the most suitable Entity relationship diagram to represent the above relational database.

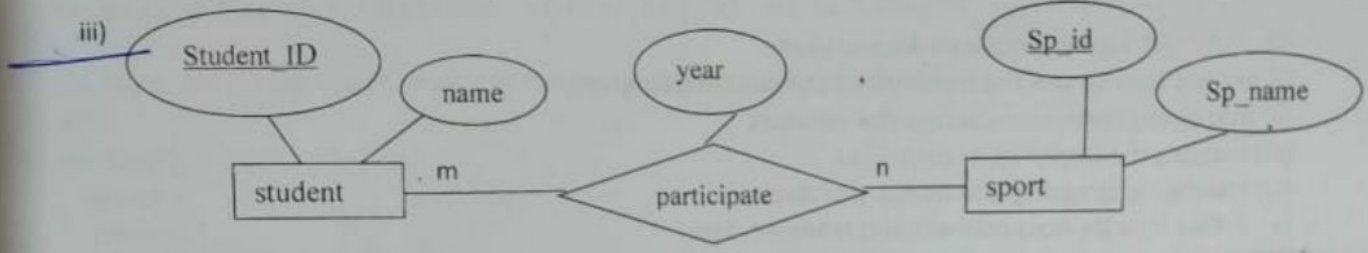
i)



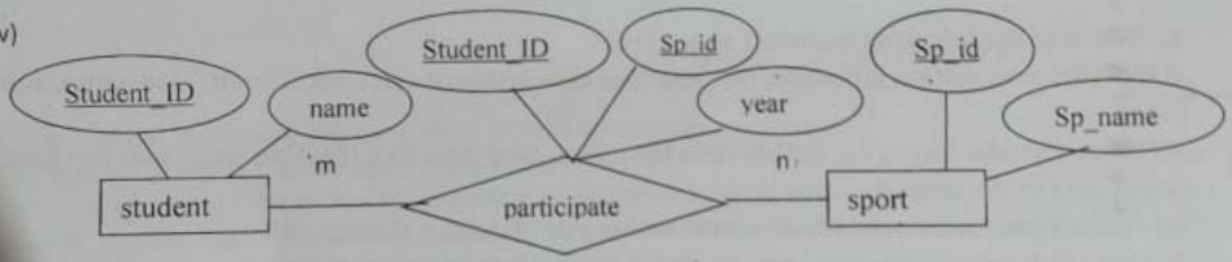
ii)



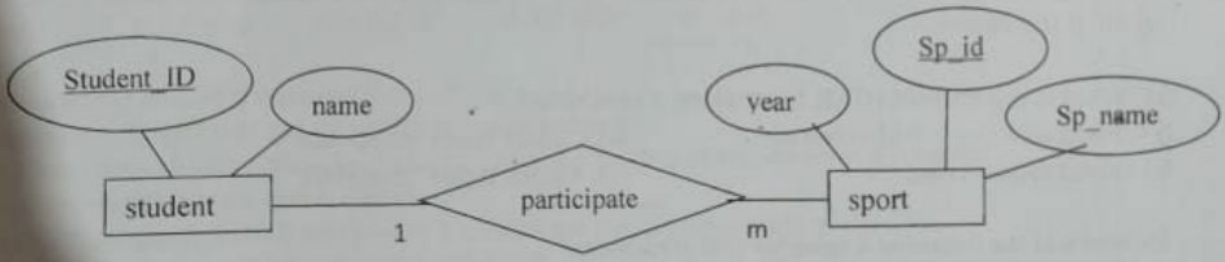
iii)



iv)



v)



30. Which of the following is **incorrect** with respect to the above tables?

i) Student_ID is the primary key of the student table
ii) Sp_id is the primary key of the sport table
iii) Sp_id is one of the primary keys of the participate table
iv) Both Sp_id and Sudent_ID are primary keys of the participate table
v) we cannot use two primary keys in participate table

31. The following MYSQL statement is used to create the student table in a database

```
CREATE TABLE STUDENT(
STUDENT_ADNO   CHAR(5)  NOTNULL,
NAME           VARCHAR(25) NOTNULL,
BIRTHDAY       DATE   NOTNULL,
ADDRESS        VARCHAR(25) NOTNULL,
CLASS          CHAR(3),
PRIMARY KEY(STUDENT_ADNO));
```

Consider the following statements.

A- It is compulsory to input data in to DATE data type fields of the table.

B-It is not compulsory to place a comma " , " between two fields.

C- It is compulsory to input data to CLASS field.

D- STUDENT_ADNO is the primary key of the table

Which of the above statements are true.

i) (A) and (B) only. ii) (A) and (C) only iii) (A) and (D) only iv) (A), (B) and (C) only

v) All of the above.

32. In TCP/IP model, Network Access Layer

(i) defines how to use the network to transmit IP datagram

(ii) manages connections across the network

(iii) isolates the upper layer protocols

(iv) handles addressing and delivery of data

(v) define how devices connect and transmit data

33. Which of the following is correct about PHP?

i) PHP performs system functions, i.e. from files on a system it can create, open, read, write, and close them.

ii)PHP can handle forms, i.e. gather data from files, save data to a file, thru email you can send data, return data to the user.

iii) You can add, delete, modify elements within your database through PHP.

iv) Using PHP, you can restrict users to access some pages of your website

v) All of the above.

34. What is the correct HTML for making a checkbox?

i) <checkbox> ii) <check> iii) < input type="check box">

iv) <input type="check" > v) <input type="checkbox" >

35. Which of the following is **false** for virtual memory?

(i) Virtual memory address is much larger than the physical memory address

(ii) Virtual memory is implanted with the concept of demand paging

(iii) Hard disk space is considered as part of the memory for the implementation of the virtual memory

(iv) Physical memory address is much larger the virtual memory address

(v)Sometimes virtual memory can reduce the performance of the system

36. Which of the following can be achieved through disk defragmentation?

A. Improve CPU performance B. Clustering file space C. Transfer data to a new format

D. Eliminate duplicates E. Create additional empty spaces

i) A only ii) A,B only iii) A,B,C only iv) D,B,E only v) all correct

37. The first widely-used commercial form of Artificial Intelligence (AI) is being used in many popular products like microwave ovens, automobiles and plug in circuit boards for desktop PCs. It allows machines to handle vague information with a deftness that mimics human intuition. What is the name of this AI?

(i) Boolean logic (ii)human logic (iii) Fuzzing logic (iv) Functional logic v) circuit

38. What will be the output of the following python code.

```
a=[5,11,2,10,30]
L=len(a)
for i in range (0,L-1):
  for j in range(i+1,L):
    if a[i]> a[j]:
      a[i],a[j]=a[j],a[i]
print (a)
```

(i) [30,11,10,5,2] ii) [2,5,10,11,30] iii) [6,12,3,11,31] iv) [11,5,10,2,30] v) syntax error

39. What will be the result when the following python code is executed?

```
i=20
def fun(i):
  i+=10
  return (i)
fun(5)
print (i)
```

i) 10 ii) 5 iii) 15 iv) 20 v) syntax error

40. Consider the following statements about process scheduling

A- A good scheduler should have minimum CPU utilization

B- Long term scheduler selects the process that should be brought into ready state

C- Mid term scheduler swaps out processes temporarily and balances load for better throughput.

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

i) A only ii) B,C only iii)A,B,C all iv) A,C only v) C only

41. Consider the following statements about CPU

(a) Registers hold data that can be readily accessed by the CPU.

(b) ALU determines which actions are to be carried out according to the values in a Program Counter (PC) register and a status register.

(c) Arithmetic-Logic-Unit (ALU) and Control Unit (CU) are two principal parts of the CPU.

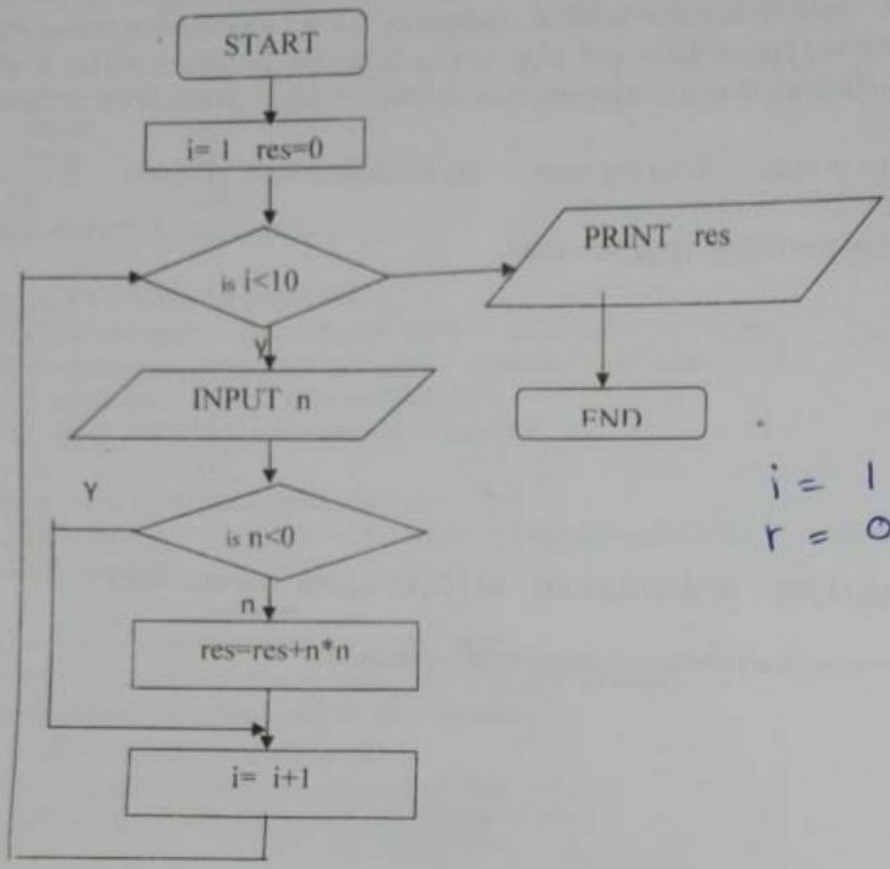
(d) ALU operations are controlled by the Control Unit.

(e) ALU sends signals to CPU components to perform sequenced operations.

Which of the following statements is/are true with respect to the Central Processing Unit (CPU)?

i) A only ii) A,B only iii) A,C and D only iv)C,D,E only v) A,B,C,D E all

Consider the following flowchart to answer the questions 42 to 43.



i = 1
r = 0

42.Which of the following is/are correct regarding the algorithm expressed by the above flow chart?

A- It takes 10 inputs

B- It ignores negative numbers

C- It calculates sum of square values of all the numbers input.

i) A only ii) B only iii) B & C only iv) A & B only v) A,B,C all

43. Which of the following python program(s) is/are correct for the algorithm given in the flow chart?

A -

```
res=0
i=1
while i <10:
    n=int(input())
    if (n<0):
        res=res+n*n
    i= i+1
print(res)
```

B -

```
res=0
for i in range(1,11):
    n=int(input())
    if (n>0):
        res=res+n*n
print(res)
```

C

```
res=0
i=1
while i <10:
    n=int(input())
    if (n>0):
        res=res+n*n
    i= i+1
print(res)
```

i) A only ii) A and B only iii) B and C only iv) C only v) A,B,C all.

44. If the following numbers were fed as inputs to the above algorithm, What will be the output?

1 2 -3 4 5 -6 7 -8 9 10

i) 276 ii) 280 iii) 176 iv) 380 v) 62

i = 1 2 3 4 5 6 7 8 9 10

r = 0 1 7 12 17 19 1 72

n = 1 -3 4 5 -6 7 -8 9 10

25
17 | 49 | 81

45. Some terms related to the stages of the Traditional Systems Development Life Cycle are listed on the left hand side (A, B, C). A brief description of these stages is given on the right hand side (P, Q, R).

A - Requirement analysis

B - Systems Maintenance

C - Test Cases

P - actions executed to verify a particular feature or functionality of a software application

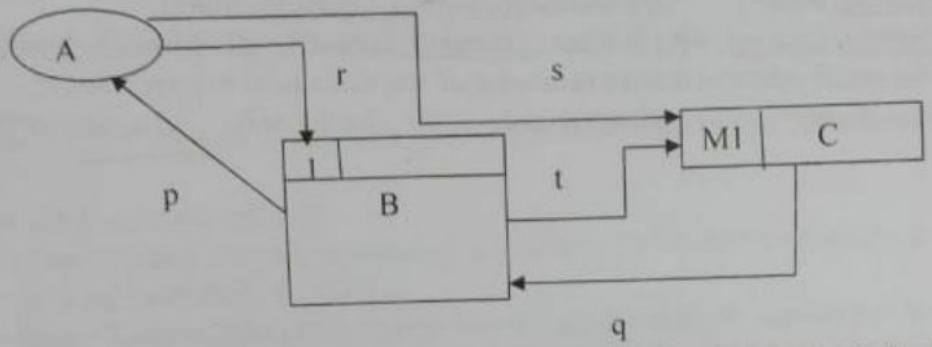
Q - process of studying and analyzing the user needs

R - involves making changes to hardware, software, and documentation to support its operational effectiveness

Match the terms with the CORRECT description.

(i) A-R, B-Q, C-P ii) A-P, B-Q,C-R iii) A-Q, B-R, C-P iv) A-R, B-P, C-Q v) A-Q, B-P, C-R

46. Consider the following data flow diagram(DFD)



According to the Structured System Analysis And Design Methodology(SSADM), data flow line drawn **incorrectly** is

i) p ii) q iii) r iv) s v)t

47.Which of the following is correct with respect to relational database?

i) A primary key is selected from alternate keys.

ii) Always Primary key and Foreign key are combined to create a compound key

iii) A foreign key is a candidate key.

iv) Primary key and foreign key establish the relationship between two tables.

v) A foreign key is an alternate key

48. Which of the following relation is in 3rd normal form

i) sport(sportId,sportName,TeacherName, TeacherId)

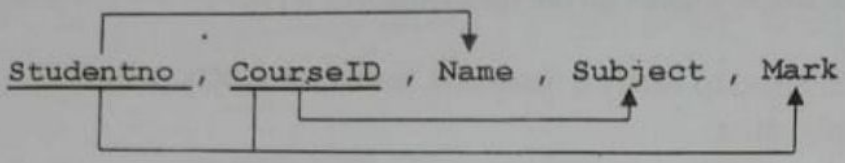
ii) Department(departmentNo,DepartmentName,ProjectNo,ProjectName,ProjectLocation)

iii) Doctor(DoctorId, DoctorName,Ward,WardID)

iv) Student(StudentId,studentName,Address)

v) Teacher(TeacherId, TeacherName, Address, SubjectName, SubjectID)

Consider the following functional dependency diagram on student marks for courses to answer Questions 49 and 50



49. If all the above data is put into a single relation which of the following best describes its normal form?

i) The relation is in 0NF ii) The relation is in 1NF iii) The relation is in 2NF
iv) The relation is in 3NF iv) none of the above

50. Consider the following relations

(a) Students(Studentno, Name) (b) Marks(Studentno, CourseID, Mark)
(c) Students(Studentno, Course) (d) Subjects(CourseID, Subject) (e) Marks(Studentno, Mark)

What would be the set of relation(s) after removing all the functional dependencies?

i) a,e only ii) b,c,d only iii) a,b,d only iv) d,e only v) a,b,c,d only.

PART B

Answer 4 questions only.

1. In a simple photocopy machine, a stop signal, S, is to be generated to stop the machine operation and energize an indicator light whenever either of the following conditions exists:

(1) there is no paper in the paper feeder tray; **or**

(2) the two micro switches in the paper path are activated, indicating a jam in the paper path.

The presence of paper in the feeder tray is indicated by a HIGH(1) at logic signal P.

Each of the micro switches produces a logic signal (Q and R) that goes HIGH(1) whenever paper is passing over the switch to activate it.

(i) Construct the truth table and Design the logic circuit to produce HIGH(1) at output signal S for the stated conditions.

(ii) Implement it using the two-input NAND gates.

2. (i) Explain what is done by the python interpreter when executing the following statements.

a) x=4.7

b) y=input("enter a number")

(ii) abc.txt file contains employee name , basic salary, and deductions respectively.

input file : saman, 10,000.00, 1500.00.

Draw a flow chart and write a python program to read the text file named abc.txt and calculate the net salary(net salary= basic salary- deductions) and write the employee name and net salary to another file named abc1.txt.

ex. output file: saman 8500.00

(iii) Write a python function to find the minimum number from a given list of 10 numbers. (do not use built-in functions)

3. A School has 6 sections, namely A\L Science, A\L Commerce, A\L Arts , O\L, Primary and Administration. The following table shows the number of computers available in each of the sections.

Section	Number of computers
A\L Science	30
A\L Commerce	18
A\L Arts	25
O\L	26
Primary	20
Administration	16

Each section needs to have their own local Area Network. Network Administrator has received a IP address block of 200.243.100.0/24 It is required to subnet the IP address block to satisfy the requirements of each section and allocate IP addresses to them.

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

(ii) What are the first and the last addresses of the IP address block?

(iii) How many host bits are required to create the required subnets?
(iv) After sub netting , write the relevant network address, subnet mask, valid IP addresses for each section and broadcast address for each section.

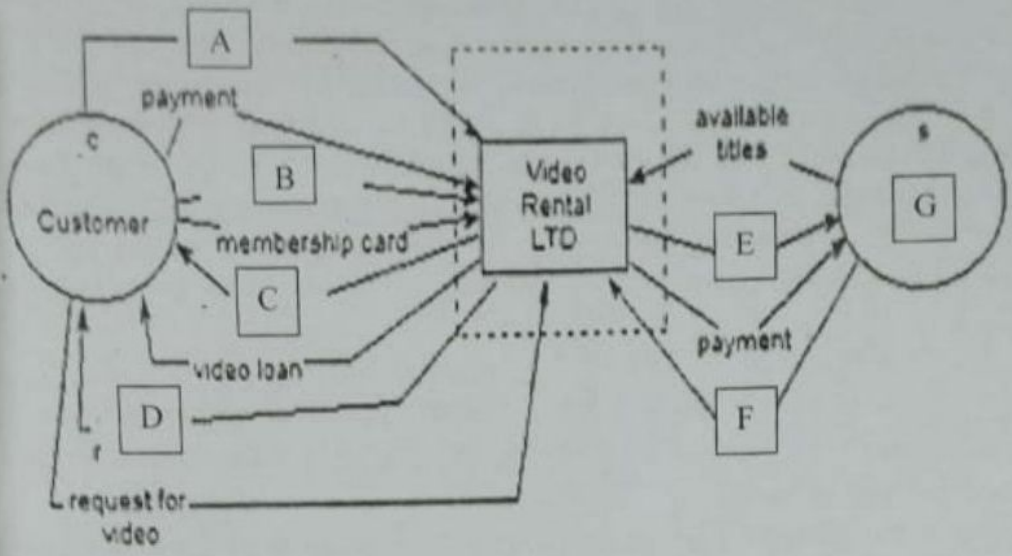
section	Network Address	Subnet Mask	Valid IP Address Range	Broadcast address
A\L Science				
A\L Commerce				
A\L Arts				
O\L				
Primary				
Administration				

The school links 5 of the sections to administration section and connects them to the internet through administration section. The network has 6 switches, a router and a firewall. All sections are situated in separate buildings.
The administrator allows all subnets to access the internet through a proxy server. Proxy server and the DNS server is located in the administration section.
(v) Draw the labeled network diagram to show the logical arrangement of the computer network.

4. Answer the qustions given below considering the case study of the Video rental store.

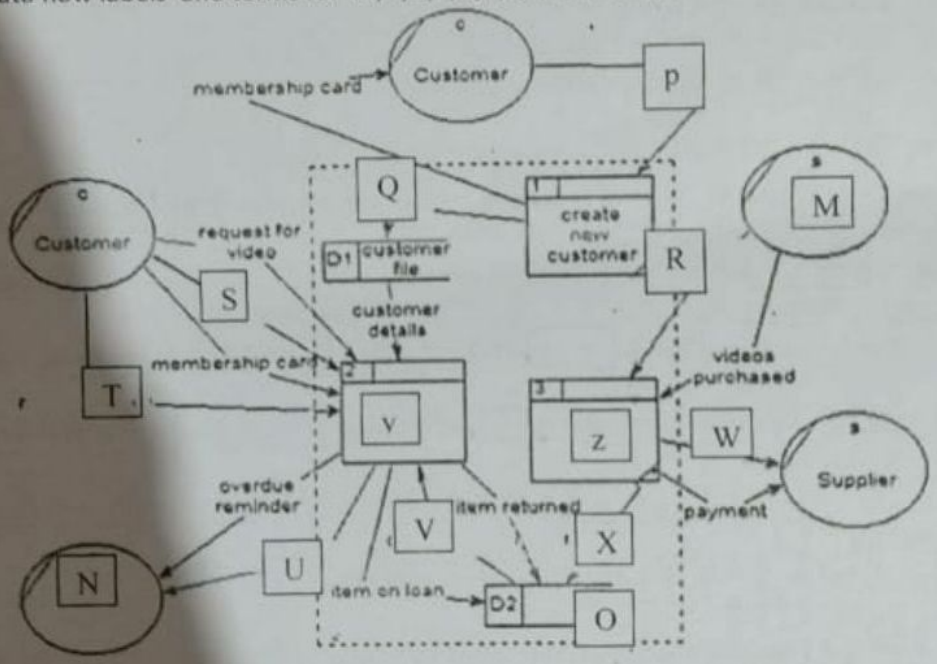
Video-Rental LTD is a small video rental store. The store, lends videos to customers for a fee, and purchases it's videos from a local supplier.
When a new customer fill out a form with personal details and credit card details, the counter staff give the new customer a membership card. Each new customer's form is added to the customer file.
A customer wishing to borrow a video, should provide the membership card and payment should be done using the credit card. Customer returns the video to the store after watching it.
If a loaned video is overdue by a day the customers credit card is charged, and a reminder letter is sent to the customer. Each day after that credt card is charged and each week a reminder letter is sent.This continues until either the customer returns the video, or the charges are equal to the cost of replacing the video.
The local supplier sends a list of available titles to Video-rental LTD, Who decide wheter to send them an order and payment. If an order is sent, then the supplier sends the requested videos to the store.
For each new video, a new stock form is completed and placed in the stock file.

(i) Write 4 activities involved in the above system
(ii) The context diagram with missing data flows A,B,C,D,E,F,G is given below. Identify them and write them down.



(iii) Write two functional requirements and two non functional requirements of the above system

(iv) Level 1 DFD for the above context diagram is shown below. Identify and write down suitable data flow labels and terms for M,N,O,P,Q,R,S,T,U,V,W,X,y,z



v) Briefly explain two system implementation methods.

5. (a) Neil and Sue Chatterton own and run Meringuebakery and cafe. This is located close to a town center and has lots of passing trade. Meringueproduces high-quality bread and pastries using traditional methods and high-quality ingredients. Since opening 12 months ago sales have grown strongly. At busy times a queue builds up at the counter as customers wait to pay. Market creator indicate that this is something that needs to improve. Neil and Sue are now planning to make greater use of technology to promote the business, and to reduce the time that customers have to wait to pay their bills. The website has been redesigned to allow customers to order their food before they arrive at the cafe. A contactless payment system will allow customers to pay securely by tapping their smart phones on a reader.

(i) State the type of e-business

(ii) Assume that a market creator willing to publish about bakery in their website
Briefly explain one possible e-business revenue model for market creator and the bakery owner.

(iii) State two methods that can be used by the planned e-business for processing online payment.

(iv) Briefly explain one e-marketing method that you would propose to attract customers to the planned e-business.

(b) Briefly explain the following .
(i) What is an agent ? Three characteristic features of an agent.
(ii) Business methods in digital economy

6. A group of ICT students were asked to design a database system for a restaurant. Students have gathered following requirements.
-The restaurant employs a number of chefs. A record is kept of each chef's name, emp no, address, phone number and salary.
-Each chef can prepare a number of meals. The name of the meal and the price of the meal is recorded.
-Each meal consists of a number of ingredients. The name of the ingredient and the quantity required for that particular meal is recorded.
-These meals are ordered by customers. A record is kept of the customer's name, customer no, address and phone number.
A record is kept of the time and date the meal is ordered

(i) From the above scenario write the entities and attributes associated with each entity

(ii) Draw an Entity Relationship diagram

(iii) Write the relational schemas

(iv) Briefly explain 3 advantages of normalization .

(v) Draw the normalized tables.