Total No. of Questions : 12]

SEAT No. :

PB-4036

[Total No. of Pages : 3

[6265]-1

F.Y. M.C.A. (Engineering)

DISCRETE MATHEMATICS & STATISTICS

(2020 Pattern) (Semester - I) (310901)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q.No.1 or Q.No.2, Q.No.3 or Q.No.4, Q. No.5 or Q.No.6, Q.No.7or Q.No.8, Q.No.9 or Q. No. 10, Q. No.11 or Q. No. 12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) How many integers Between 1 - 1000 are divsible by 2, 3, 5, or 7? **[6]**

b) Explain with example, notation used and mathematical expression to describe the following terms : **[5]**

i) Equality of set

ii) Universal set

iii) Power set

iv) Union of sets

v) Subset

OR

Q2) a) Verify that If A & B are finite sets, then $|A \cup B| = |A|+|B|-|A \cap B|$. **[6]**

b) Prove that $(p \rightarrow (q \rightarrow r)) \Rightarrow ((p \rightarrow q) \rightarrow (p \rightarrow t))$ **[5]**

Q3) a) For each of these relations on set A = {1, 2, 3, 4} decide whether it is reflexive, symmetric, transitive relation **[6]**

R1 = {(1, 1), (1, 2), (2, 2), (2, l), (3, 3), (4, 4)}

R2 = {(1 ,3), (1, 4), (2, 3), (2, 4), (3, 1), (3, 4)}

b) Explain the following Terms with Example : **[6]**

i) Injective Function

ii) Bijective Function

iii) Surjective Function

P.T.O.

OR

Q4) a) Write following statements in symbolic forms : **[6]**

i) Mohan is rich but unhappy

ii) Mohan is neither rich nor happy

iii) Mohan is poor or he is both rich and unhappy

b) Let $f(x) = 2x + 3$, $g(x) = 3x + 4$, $h(x) = 4x$ for $x \in R$, where R = set of all real numbers. Find gof, fog, foh, hof, goh, hog. **[6]**

Q5) a) Find the number of distinguishable permutation of letter in **[6]**

i) ASSOCIATIVE

ii) REQUIREMENTS

iii) COMMITTEE

b) A box contains 6 white balls. Find the number of ways, 4 balls can be drawn from the box if **[6]**

i) two must be white

ii) all of them must have the same color

OR

Q6) a) Four persons are chosen at random from a group containing 3 men, 2 women and 4 children. Find the chance that exactly two of them will be children. **[6]**

b) i) Suppose repetitions are not permitted, then how many 4 digit numbers can be formed from the six digits 1, 2, 3, 5, 7, 8?

ii) How many such a numbers are less than 4000?

iii) How many numbers in (i) are even?

iv) How many numbers in (ii) are odd?

v) How many of the numbers in (i) contain both the digits 3 and 5? **[6]**

Q7) a) A committee of 12 students consists of 3 representatives from first year, 4 from second year and 5 from third year. Out of these 12 students, 3 are to be excluded from the committee by drawing lots. What is the chance that : **[6]**

i) 3 students belong to 3 different classes?

ii) 2 belong to one class and I belong to another class?

iii) 3 belong to the same class?

b) List and Explain Axioms of Probability Every Data Scientist Should Know? **[5]**

OR

Q8) a) Define : **[6]**

i) Probabillty

ii) Sample space

iii) Event

b) In a class, there are 15 boys and 10 girls. Three students are selected at random. Find The probability that 1 girl and 2 boys are selected. **[5]**

Q9) a) Explain the Types of Regression and their properties in detail. **[6]**

b) Find the variance and standard deviation for the following data : 57, 64, 43, 67, 49, 59, 44, 47, 61, 59. **[6]**

OR

Q10) a) What are the sampling methods or Sampling Techniques? Explain in detail. **[6]**

b) Explain Correlation Coefficient Types, Formulas with Examples. **[6]**

Q11) a) Describe hypothesis testing in detail. **[6]**

b) In each of 4 races, the Democrats have a 60% chance of winning. Assuming that the races are independent of each other, what is the probability by using the Binomial Distribution that **[6]**

i) The Democrats will win 0 races, 1 race, 2 races, 3 races or all 4 races?

ii) The Democrats will win at least 1 race

OR

Q12) a) A fair coin is tossed twice. Let X be the number of heads that are observed. **[6]**

i) Construct the probability distribution of X

ii) Find the probability that at least one head is observed

b) What are the three types of random variables? Explain in Detail. **[6]**

⌘⌘⌘

Total No. of Questions : 12]

SEAT No. :

PB-4037

[Total No. of Pages : 2

[6265]-2
F.Y. M.C.A (Engineering)
DATA STRUCTURES AND ALGORITHMS
(2020 Pattern) (Semester - I) (310902)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary***

Q1) a) Explain Linear & Non-Linear Data structure with proper example. **[6]**

b) Explain the Transpose of Matrix with example. **[5]**

OR

Q2) a) What are two-dimensional array? Explain row major and column major representation of array storage **[6]**

b) Explain the term Divide and Conquer for algorithm design. **[5]**

Q3) a) Write a C/C++ program to create a singly linked list with 4 nodes. **[6]**

b) How the doubly linked list can be represented? Draw the node structure of a double linked list. **[6]**

OR

Q4) a) With the diagrammatic representation explain the addition of polynomial using Linked list i) 3x3 + 4x2 + x ii) 4x3 + x2 + 10x **[6]**

b) How polynomial manipulations are performed with lists? Explain the operations. **[6]**

Q5) a) Write a C/C++ program to implement insert and delete operations on stack. **[6]**

b) How stacks are useful to implement using recursion process? Explain with application. **[6]**

OR

P.T.O.

Q6) a) Write an algorithm to convert postfix expression from infix expression using stack. **[6]**

b) What is priority queue? Explain its array implementation? **[6]**

Q7) a) What is AVL tree? Explain Left & Right Rotation with proper example. **[6]**

b) Write a program to search an element in a binary tree. **[5]**

OR

Q8) a) What is meant by binary search tree? Construct binary search tree by inserting the following data sequentially. **[6]**

45 32 15 70 51 67 21 85 92 40.

b) Define following terms : **[5]**

i) Binary Search Tree

ii) Degree of a node

iii) Height of a node

Q9) a) Analyze DFS and BFS algorithm in graph. **[6]**

b) Explain Prim's Algorithms with suitable example. **[6]**

OR

Q10)a) Discuss the graph representation techniques in brief. **[6]**

b) Demonstrate the use of Dijkstra's single source shortest path algorithm. **[6]**

Q11)a) Write a function in C/C++ to implement binary search method. Show the step wise execution of the binary search algorithm to search an element 48 in following list. 1,5,8,13,19,20,23,44,48,58,61. **[6]**

b) Explain Linear search with proper example. **[6]**

OR

Q12)a) Show the stepwise execution of the Bubble sort algorithm for the following list. **[6]**

23, 8, 44, 1, 61, 13, 58, 20, 48, 19

b) Explain Insertion sort algorithm with a proper example. **[6]**

Total No. of Questions : 12]

SEAT No. : ____

PB-4038

[Total No. of Pages : 2

[6265]-3
F.Y. M.C.A (Engineering)
OBJECT ORIENTED PROGRAMMING
(2020 Pattern) (Semester - I) (310903)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Explain following terms in the context of Object Oriented Programming: **[6]**

i) Polymorphism

ii) Data Hiding

iii) Data Encapsulation

b) What is an importance of comments in object oriented programming explain with an example. **[5]**

OR

Q2) a) What are the advantages of Object Oriented Programming,explain in brief. **[6]**

b) Explain in detail Object Oriented Paradigm. **[5]**

Q3) a) Write a C++ program to find largest number among three numbers using class,constructor,function. **[6]**

b) What are the primitive data types in C++, explain each primitive data type with an example. **[6]**

OR

Q4) a) List out and explain different control flow statements used in C++.**[6]**

b) Create and Implement table of ‘5’ using for loop,class,class object in C++. **[6]**

P.T.O.

Q5) a) What is unary operator ? How to overload unary operators in C++? **[6]**

b) Explain Multiple Inheritance in C++ with the help of diagram and sample program. **[6]**

OR

Q6) a) Explain Type Casting in detail. **[6]**

b) How to overload operator '*' in C++,Elaborate in detail. **[6]**

Q7) a) Explain Friend Function and Friend Class in C++ in detail. **[6]**

b) Explain Virtual Destructor in detail. **[5]**

OR

Q8) a) Explain Virtual Function along with sample program. **[6]**

b) What is static function? How to define and used it in C++ program. **[5]**

Q9) a) Explain Function Overloading Template in detail. **[6]**

b) Explain Generic programming in C++. **[6]**

OR

Q10)a) What are the standard exceptions in C++? Explain any 4 standard exceptions. **[6]**

b) Explain in detail what are the benefits of templates in C++. **[6]**

Q11)a) Explain following file operations functions with an example: **[6]**

i) get()

ii) getline()

iii) tellg()

b) Explain error handling in File input output operations with the help of program. **[6]**

OR

Q12)a) Explain following terms in detail: **[6]**

i) istrearn

ii) ostream

iii) fstream

b) Write a single file handling program in C++ to reading and writing student data(Roll no, Name, Class) on a file. **[6]**



Total No. of Questions : 12]

SEAT No. : [ ]

PB4039

[Total No. of Pages : 2

[6265]-4

F.Y. M.C.A. (Engineering)

SOFTWARE ENGINEERING & PROJECT MANAGEMENT

(2020 Pattern) (Semester - I) (310904)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) Explain Personal and Team Process Models. **[6]**

b) Define SQA. Explain the concept of Verification and Validation. **[6]**

OR

Q2) a) Explain Waterfall model in detail. **[6]**

b) Differentiate between Verification and validation. **[6]**

Q3) a) Draw Activity diagram for opening e-mail account. **[6]**

b) What is meant by requirements analysis? Explain the characteristics of a good quality software requirements specifications (SRS) document. **[6]**

OR

Q4) a) Draw use case Diagram for Hospital Management system. **[6]**

b) Explain Kano Model for prioritizing software requirements. **[6]**

Q5) a) What is Extreme programming (XP)? Explain its values. **[6]**

b) Explain SCRUM-Process flow and Scrum roles? **[5]**

OR

Q6) a) Explain pair programming in detail. **[6]**

b) Write short note on test driven development. **[5]**

P.T.O.

Q7) a) Write short note on Gantt Charts in scheduling project work. **[6]**

b) Explain CPM and PERT with Examples. **[6]**

OR

Q8) a) What are the various factors for estimating software cost? **[6]**

b) Explain Work breakdown structure with example for project planning. **[6]**

Q9) a) What are the types of Risks in Software Engineering? Explain the Process of Risk Management. **[6]**

b) Explain risk mitigation, Risk Monitoring and management. **[6]**

OR

Q10)a) What is Software Configuration Management? Explain Configuration management for Web Applications. **[6]**

b) Explain the elements of Software Quality Assurance. **[6]**

Q11)a) Explain various approaches to leadership and leadership styles. **[6]**

b) Describe codes of Ethics and Professional Practices. **[5]**

OR

Q12)a) What are Ethics in projects? Explain Ethical Leadership and common Ethical Dilemmas. **[6]**

b) Write a short note on Project Leadership. **[5]**



Total No. of Questions : 12]

SEAT No. :

PB-4040

[Total No. of Pages : 3

[6265]-5

F.Y. M.C.A. (Engineering)

INFORMATION SYSTEMS AND ENGINEERING ECONOMICS

(2020 Pattern) (Semester - I) (310905)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***

Q1) a) What is management? Explain functions and activities of Management. **[6]**

b) Explain the concept of organizational structure along with the types. **[6]**

OR

Q2) a) What is the role of Information systems with respect to Indian Railways. **[6]**

b) Write a note on MOA(Memorandum of Association) along with its clauses. **[6]**

Q3) a) Write a note on UIDAI. **[6]**

b) Write a note on knowledge management system. **[6]**

OR

Q4) a) Explain the concept of online banking. **[6]**

b) Explain the concept of Business Process Integration along with its types in details. **[6]**

Q5) a) What is MIS? Explain role and structure of MIS. **[6]**

b) Write a note on SCM. **[5]**

OR

Q6) a) Explain Information-Technology Infrastructure in a Bank. **[6]**

b) Write a note on CRM. **[5]**

Q7) a) Explain Simpson's model for decision making. **[6]**

b) Explain structured and unstructured decisions. **[6]**

OR

P.T.O.

Q8) a) Explain with example decision making under certainty. **[6]**

b) What are the features of Decision Support Systems. **[6]**

Q9) a) Explain three golden rules of book keeping. **[6]**

b) Journalise the following transactions in the books of Shri. Herambh

2011 April 1 Herambh started business with cash Rs. 71,000
2 Purchased goods from Mahesh Rs. 20,000 on credit
5 Deposited cash into Bank of India Rs. 30,000
9 Sold goods to Dhiraj Rs. 25,000 on credit
11 Purchased furniture of Rs. 10,000 for cash
14 Paid to Mahesh by Cheque of Bank of India Rs. 10,000
18 Received a bearer cheque for Rs. 15,000 from Dhiraj
30 Paid salary by cheque Rs. 4,000 **[6]**

OR

Q10) a) Write a note on Assets and Liabilities. **[6]**

b) Following is the Trial balance of Kalpana Traders as on 31st March 2009. You are required to prepare Balance Sheet as on that date. **[6]**

Trial balance as on 31st March, 2009

Particulars	**Amount (Rs.)**	**Particulars**	**Amount (Rs.)**
Stock on 01-04-2008	30,000	Capital	35,500
Purchases	85,000	Discount Received	1,500
Return Inward	2,500	Sales	1,27,500
Wages	5,300	Return Outward	1,000
Salaries	6,600	Creditors	15,000
Carriage Inward	1,200	Bills payable	5,000
Carriage outward	200		
Power & Fuel	700		
Advertisement	1,300		
Office Expenses	400		
Printing and Stationary	800		
Commission	1,000		
Furniture	8,500		
Machinery	30,000		
Cash in hand	1,200		
Drawings	800		
Debtors	7,500		
Bill Receivables	2,500		
	1,85,500		1,85,500

Adjustment- Closing stock was valued at cost Rs.32,000

Q11) a) Calculate Current Ratio and Quick ratio from the following information. **[6]**

Particulars	Rs.
Inventories	50,000
Trade Receivables	50,000
Advance tax	4,000
Cash and cash equivalents	30,000
Trade payables	1,00,000
Short term borrowings(bank overdraft)	4,000

b) Explain advantages and Limitations of Ration Analysis. **[5]**

OR

Q12) a) From the given information calculate **[6]**

i) PVRatio

ii) Profit when sales are Rs. 30,000

iii) New Break Even point if selling price is reduced by 20%

Given

Fixed Expenses Rs. 6,000

Break Even Point Rs. 15,000

b) What is Marginal costing? What are it's features. **[5]**

⌘⌘⌘

Total No. of Questions : 12] **SEAT No. :**

PB-4041

[Total No. of Pages : 2

[6265]-6
F.Y.M.C.A.
Engineering
Data Base Management System
(2020 Pattern)(Semester-II) (310912)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary***

Q1) a) Explain components of DBMS along with its Architecture **[8]**

b) Explain database Schema with example **[4]**

OR

Q2) a) Write difference between DBMS and File Processing System **[6]**

b) Explain different layers of data abstraction **[6]**

Q3) a) What is DDL? Explain all DDL Commands with example. **[6]**

b) What is trigger? Explain types of triggers with example. **[6]**

OR

Q4) a) What are joins in SQL? Explain types of joins with suitable example. **[6]**

b) Write a cursor which will update the employee salary by 5000 and display the count of employees received the increment. **[6]**

P.T.O.

Q5) a) Normalize following relation up to 3NF with proper explanation {Order no, Order Date, Item No, Item Name, Quantity, Unit Price, Total, Clerk No, Clerk Name} **[6]**

b) What is the need of normalization? Explain 2NF in detail **[5]**

OR

Q6) a) Explain different Anomalies and data redundancy issues with normalized data **[6]**

b) State and explain BCNF with an example **[5]**

Q7) a) Explain the concept of conflict and view serializability with proper example. **[6]**

b) Explain the need of concurrency control in transaction management. **[6]**

OR

Q8) a) State & Explain ACID Properties of transactions with suitable example **[6]**

b) Write a short note on **:** **[6]**

i) Shadow Paging

ii) Checkpoints

Q9) a) What are Parallel databases? Explain Shared Memory Architecture in detail. **[6]**

b) Explain Concurrency Control in Distributed Database. **[6]**

OR

Q10) a) Explain 2-tier and 3-tier architecture of databases. **[8]**

b) Differentiate between client - server and centralized architecture. **[4]**

OR

Q11)a) Explain how to deal with massive datasets using Map Reduce and Hadoop. **[6]**

b) Explain working of different nodes in HDFS. **[5]**

OR

Q12)a) What is NoSQL explain benefits and drawbacks of NoSQL **[6]**

b) Explain the concept of Indexing in NoSQL. **[5]**

.

Total No. of Questions : 12]

SEAT No. : [ ]

PB4042

[Total No. of Pages : 2

[6265]-7

First Year M.C.A. (Engineering)

COMPUTER NETWORK

(2020 Pattern) (Semester - II) (310913)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Compare Characteristics of LAN, MAN and WAN. **[6]**

b) Explain Manchester and Differential Manchester Encodings. **[6]**

OR

Q2) a) What is topology? Explain different types of it with diagrams. **[6]**

b) Explain role of any 3 network hardware devices in detail. **[6]**

Q3) a) How Hamming Code technique is implemented for Error Controlling. **[6]**

d) Identify services provided by Link Layer. **[6]**

OR

Q4) a) Explain any two Flow control techniques in link layer. **[6]**

b) Describe PPP. **[6]**

Q5) a) Explain Static and Dynamic channel allocation. **[6]**

b) Explain pure ALOHA and slotted ALOHA in detail. **[5]**

OR

Q6) a) Draw and explain the working of CSMA/CD in detail. **[6]**

b) Draw and explain the frame format of Standard Ethernet. **[5]**

P.T.O.

Q7) a) Compare IPV4 with IPV6. **[6]**

b) Explain role of NAT in networking. **[6]**

OR

Q8) a) Describe link state routing with suitable example. **[6]**

b) Write notes on **[6]**

i) RIP

ii) BGP

Q9) a) Explain in detail TCP and SCTP **[6]**

b) Explain roll of Transport layer in data transmission. **[6]**

OR

Q10)a) Differentiate between TCP and UDP. **[6]**

b) Explain TCP Congestion controlling mechanism. **[6]**

Q11)a) Write Short note on DNS. **[6]**

b) Explain HTTP in detail. **[5]**

OR

Q12)a) Explain any 2 application layer protocols in detail. **[6]**

b) Write a short note on SNMP. **[5]**



Total No. of Questions : 12]

SEAT No. :

PB-4043

[Total No. of Pages : 2

[6265]-8

F.Y. M.C.A. (Engineering)

JAVA PROGRAMMING

(2020 Pattern) (Semester - II) (310914)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) What is meant by package? How they are created? Explain with example. **[6]**

b) What is inheritance? With example explain the use of 'super' keyword in it. **[6]**

OR

Q2) a) Explain the concept of Interfaces in Java with example. **[6]**

b) Explain the concept of static Members of Java. **[6]**

Q3) a) Explain thread Synchronization with example. **[6]**

b) What is the utilization of file class? Explain different constructors associated with file class. **[6]**

OR

Q4) a) What is meant by multithreading? Explain different ways of creating thread in Java. **[6]**

b) What are the reader and writer classes available in java? **[6]**

Q5) a) What is the use of Adapter classes in Java? Explain with example. **[6]**

b) Explain different types of containers in AWT. **[5]**

OR

Q6) a) Write an AWT GUI application (called AWT Counter). Each time the "Count" button is clicked, the counter value shall increase by 1. **[6]**

b) Explain lifecycle of an applet with diagram. **[5]**

P.T.O.

Q7) a) Illustrate with diagrams the JDBC driver models. **[6]**

b) Using the JDBC API and any relational database make the following queries: **[6]**

i) create a table MOVIES with columns: id of type INTEGER AUTO INCREMENT, title of type VARCHAR (255), genre of type VARCHAR (255), year of Release of type INTEGER. Note that a table named MOVIE may already exist. In that case, delete it.

ii) add any three records to the MOVIES table

OR

Q8) a) What is JDBC? List the steps that connect database with Java Application. **[6]**

b) What are the different types of statements? **[6]**

Q9) a) Writer a program to change the host name to its specific IP address. **[6]**

b) What are differences between TCP and UDP. Explain methods in both the classes. **[6]**

OR

Q10) a) Write down steps to establishing a TCP connection between two computing devices using Socket Programming. **[6]**

b) Write a program to print the InetAddress of local system. **[6]**

Q11) a) Write a servlet that prints “Hello World!”. **[6]**

b) What is the difference between servlet Context and servlet Config. **[5]**

OR

Q12) a) What are the life cycle methods of JSP? **[6]**

b) Explain MVC Architecture and its advantages. **[5]**



Total No. of Questions : 12]

SEAT No. : ____

PB-4044

[Total No. of Pages : 3

[6265]-9
F.Y. M.C.A (Engineering)
OPERATING SYSTEM
(2020 Pattern) (Semester - II) (310915)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data, if necessary.***

Q1) a) Define Operating System. State various functions of operating system. **[6]**

b) Explain the role of User mode and Kernel mode in Virtual Machine. **[6]**

OR

Q2) a) Differentiate Multi Processing and Multi-Tasking Operating System. **[6]**

b) Explain any 5 Bash shell commands with example. **[6]**

Q3) a) Consider the following five process : Apply S.J.F. (Preemptive tech.)**[6]**

Process Queue	Burst time	Arrival time
P1	6	2
P2	2	5
P3	8	1
P4	3	0
P5	4	4

Calculating the average waiting time, Turnaround Time and Throughput.

b) Explain the term context switching with example. **[6]**

P.T.O.

OR

Q4) a) Consider the set of 5 processes whose arrival time and burst time are given below. **[6]**

Process Id	Arrival time	Burst time
P1	0	5
P2	1	3
P3	2	1
P4	3	2
P5	4	3

If the CPU scheduling policy is Round Robin with time quantum = 2 unit, calculate the average waiting time and average turnaround time as well as Throughput

b) Explain various types of schedulers and their functions. **[6]**

Q5) a) What is Semaphore? Discuss various uses of it with example. **[6]**

b) Explain the term deadlock with Principles. **[5]**

OR

Q6) a) How the semaphore is implemented to solve Consumer - Producer problem. **[6]**

b) Explain the term : **[5]**

i) Critical Section

ii) Race Condition

Q7) a) Suppose you have a memory system with the following free memory blocks available:

Block A: 200 KB Block B: 350 KB Block C: 150 KB Block D: 500 KB

Four processes arrive for memory allocation with the following memory requirements:

Process P1 requires 180 KB. **Process P2 requires 300 KB.**

Process P3 requires 400 KB. **Process P4 requires 250 KB.**

Apply both the Best-Fit and Worst-Fit memory allocation strategies to allocate memory to these processes. Calculate the total internal fragmentation for each strategy after allocation. **[6]**

b) What is Belady's anomaly? Explain with example. **[6]**

OR

Q8) a) A system uses 3 page frames for storing process pages in main memory. It uses the Optimal Page Replacement algorithms policy. Assume that all the page frames are initially empty. What is the total number of page faults that will occur while processing the page reference string given below - 4 , 7, 6, 1, 7, 6, 1, 2, 7, 2

Also calculate the hit ratio and miss ratio. **[6]**

b) Explain the terms Logical address and Physical address with example.**[6]**

Q9) a) Consider a disk with 200 tracks and the queue has random requests from different processes in the order : 55, 58, 39, 18, 90, 160, 150, 38, 184 Initially arm is at 100. Find the Seek time using SCAN. (higher end) **[6]**

b) What are methods of doing free space management? **[6]**

OR

Q10)a) Distinguish Look and C-Look with example. **[6]**

b) Explain tree structure and acyclic file directories. **[6]**

Q11)a) Describe is Linux File System? **[6]**

b) Explain Scheduling Process Types in Linux. **[5]**

OR

Q12)a) Explain stages of Linux Booting Process. **[5]**

b) Illustrate main methods for memory allocation in Linux? **[6]**

Total No. of Questions : 12]

SEAT No. :

PB-4045

[Total No. of Pages : 2

[6265]-10

F.Y. M.C.A. (Engineering)

MOBILE COMPUTING

(2020 Pattern) (Semester - II) (Elective - I) (310916A)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) Explain the generations of Cellular network (1G, 2G, 2.5G, 3G, 4G) with respective standards. **[6]**

b) Explain Types of Handoff. **[6]**

OR

Q2) a) Explain channel allocation in cellular system. **[6]**

b) Explain GPRS. **[6]**

Q3) a) Explain Wireless multiple access protocols. **[6]**

b) Explain Mobile IP. **[6]**

OR

Q4) a) Explain WAP in detail. **[6]**

b) Explain Wireless networking in detail. **[6]**

Q5) a) Explain data replication for mobile computers. **[6]**

b) Explain adaptive clustering for mobile wireless networks. **[5]**

OR

Q6) a) Explain Disconnected operations in mobile data management. **[6]**

b) Explain File system in Mobile computers **[5]**

P.T.O.

Q7) a) Differentiate between Palm O.S and Android O.S. **[6]**

b) Explain Architecture of Android. **[6]**

OR

Q8) a) How to create new views and menus in Android. **[6]**

b) Explain J2ME. **[6]**

Q9) a) Explain following terms : **[6]**

i) Introducing Intents

ii) Adapters

iii) Introducing Dialogs

b) Explain File Management tools of Android OS. **[6]**

OR

Q10) a) Explain the location-based services. **[6]**

b) Write note on **[6]**

i) Capturing Date and Time in Android

ii) Validating and Handling Input data

Q11) a) Explain GTalk service for Sending and receiving Data messages. **[6]**

b) Write note on Manage network and Wi-Fl connections. **[5]**

OR

Q12) a) Explain in brief SQLite database. **[6]**

b) Explain Sensor Manager in Android. **[5]**



Total No. of Questions : 12]

SEAT No. : ____

PB-4046

[Total No. of Pages : 2

[6265]-11

F.Y. M.C.A. (Engineering)

ARTIFICIAL INTELLIGENCE

(2020 Pattern) (Semester - II) (Elective - I) (310916B)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) What is artificial intelligence (AI)? What are the types of Artificial Intelligence? What are the advantages and disadvantages of artificial intelligence? **[6]**

b) Explain Intelligent Agents and Environment in detail. **[6]**

OR

Q2) a) Explain in detail applications of AI in real world. **[6]**

b) How the components of agent programs work in AI? **[6]**

Q3) a) What is depth limited search? Explain with an example. **[6]**

b) How does bidirectional search work in AI? **[6]**

OR

Q4) a) Explain A* algorithm along with example, advantages, disadvantage, time and space complexity. **[6]**

b) What are the conditions for optimality in A* search? **[6]**

Q5) a) What is knowledge representation and What are types of knowledge? **[6]**

b) Explain TMS (truth maintenance system). **[5]**

OR

P.T.O.

Q6) a) What is quantification in AI? What are the 2 types of quantification? **[6]**

b) Describe predicates in artificial intelligence? How predicate logic is used in AI? **[5]**

Q7) a) Explain in detail Search Vs planning in AI. **[6]**

b) Write a short note on non linear planning. **[6]**

OR

Q8) a) List out and explain any six components or elements of planning in AI. **[6]**

b) Explain Hierarchical Plan to travel from a certain Source to Destination by Bus by using Hierarchical Planning of AI. **[6]**

Q9) a) Explain Neural Networks. **[6]**

b) Explain The basic components of ANN. **[6]**

OR

Q10) a) Describe Feedforward Networks in AI. **[6]**

b) What is the Error Backpropagation Learning Algorithm? How does Error Backpropagation Work? Explain in Detail. **[6]**

Q11) a) What are the main components of the expert system? Explain Four main components of the expert system in Detail. **[6]**

b) Explain Utilization and Functionality in expert system of AI. **[5]**

OR

Q12) a) What are the steps to build expert system? **[6]**

b) What are the Five parts of an expert system? Explain in detail. **[5]**



Total No. of Questions : 12]

SEAT No. :

PB-4047

[Total No. of Pages : 2

[6265]-12

F.Y. M.C.A. (Engineering)

CYBER SECURITY

(2020 Pattern) (Semester - II) (Elective - I) (310916C)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) Demonstrate how should an organization evaluate its cyber security needs? **[6]**

b) What is the need for an international convention on cyber space? Discuss in detail. **[6]**

OR

Q2) a) Discuss the importance of cyber security in todays interconnected world with respect to safeguarding individuals, organizations and nations. **[6]**

b) Discuss the potential impact of cyber terrorism and cyber warfare on national security and international relations. **[6]**

Q3) a) How to overcome the vulnerability of weak authentication using biometric and unprotected broadband communication using cryptography? **[6]**

b) Explain any 5 cyber security safeguards to protect your data while employees work from home. **[6]**

OR

Q4) a) What are the common vulnerabilities found in software systems and how do they pose risks to cyber security? **[6]**

b) What role does auditing play in cyber security and how does it contribute to the overall security of an organization's data and system? **[6]**

P.T.O.

Q5) a) Discuss the process of measuring the performance of host based and Network based intrusion prevention system. **[6]**

b) Compare Intrusion Detection System and Intrusion Prevention System with each other. **[5]**

OR

Q6) a) Under which scenario system integrity validation should be revised? Discuss. **[6]**

b) Which techniques should be implemented to prevent unauthorized access by outsider? **[5]**

Q7) a) Explain the significance of digital signature with a suitable example. **[6]**

b) Discuss the processes applicable for message authentication. **[6]**

OR

Q8) a) List and discuss various types of firewalls. **[6]**

b) Write short notes on PGP and S/MIME. **[6]**

Q9) a) Explain the concept of international cyber space in detail. **[6]**

b) What is the need of national cyber security policy with respect to Indian citizens? **[6]**

OR

Q10) a) Explain the concept of international laws with reference to cyber security. **[6]**

b) What is the role of private sector in cyber space? Explain in detail. **[6]**

Q11) a) Explain the process of cyber-crime investigation in detail using cyber forensics. **[6]**

b) What is the significance of preliminary investigation in cyber forensics? Discuss. **[5]**

OR

Q12) a) Discuss the process of validating E-mail header information. **[6]**

b) Write short notes on **[5]**

i) Tracing Internet Access

ii) Tracing Memory in real time.



Total No. of Questions : 12]

SEAT No. :

PB-4048

[Total No. of Pages : 2

[6265]-13

F.Y. M.C.A. (Engineering)

BLOCK CHAIN

(2020 Pattern) (Semester - II) (310916-D) (Elective - I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) Explain Distributed Hash table in detail. **[6]**

b) Explain Hash Function and digital signature in detail. **[6]**

OR

Q2) a) Explain the Steps of Byzantine General problem and Fault Tolerance With Example. **[6]**

b) Explain properties of zero knowledge proof and its types. **[6]**

Q3) a) Explain following terms : **[6]**

i) Merkle tree

ii) Soft and hard fork.

b) What is Blockchain? Explain advantages of blockchain over conventional distributed database. **[6]**

OR

Q4) a) Explain following terms : **[6]**

i) Gas Limit

ii) Transactions and Fee

iii) Anonymity

iv) Reward

v) Chain Policy

b) What is blockchain network? Explain blockchain Mining Mechanism in detail. **[6]**

P.T.O.

Q5) a) Explain energy utilization of blockchain technologies. **[6]**

b) Explain the difference between Proof-of-Work and Proof-of-Stake. **[5]**

OR

Q6) a) Explain Sybil attack with scenario. **[6]**

b) Explain how Nakamoto consensus be used in blockchain. **[5]**

Q7) a) What is Distributed Ledger? Explain in detail. **[6]**

b) What is Smart Contract? Explain types of Smart Contracts. **[6]**

OR

Q8) a) What is difference between Bitcoin and Ethereum Blockchain? **[6]**

b) What is GHOST protocol for ethereum? Explain in detail. **[6]**

Q9) a) Explain the "Evil Sides" of Blockchain and Legal Regulations for Blockchain. **[6]**

b) Write a short note on future of blockchain. **[6]**

OR

Q10) a) Discuss use of Blockchain in Healthcare. **[6]**

b) List and explain any two Blockchain applications. **[6]**

Q11) a) Draw and Explain the Architecture of Hyperledger Fabric System. **[6]**

b) Differentiate between Ethereum & Hyper ledger blockchain platforms. **[5]**

OR

Q12) a) How Does Hyper Ledger Fabric Work? Explain. **[6]**

b) What is Hyper ledger? Describe features of a Hyper ledger blockchain. **[5]**

⌘⌘⌘

Total No. of Questions : 12]

SEAT No. :

PB-4049

[Total No. of Pages : 3

[6265]-15

S.Y. M.C.A. (Engineering)

DATA SCIENCE

(2020 Pattern) (Semester - III) (410901)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) What is Data science? Explain purpose of data science. **[6]**

b) Explain Data Science Roles with the skill set, technical knowledge and mindset required to carry it. **[6]**

OR

Q2) a) Differentiate between Qualitative vs Quantitative Data and Big Data Vs. Little Data. **[6]**

b) Explain the Data science process in detail. **[6]**

Q3) a) What is a Data Warehouse? Explain Benefits of Data Warehouse? **[6]**

b) What is Data preprocessing? What are different Data preprocessing techniques? **[6]**

OR

Q4) a) Which are the major 5 steps of data preprocessing? Explain the importance of each step? **[6]**

b) Explain different types of Data warehouse? **[6]**

Q5) a) Explain working of Nearest Neighbor classifiers with suitable example. **[6]**

b) Write a program to identify a person is native speaker or not using decision tree algorithm by Importing the reading skills dataset. **[5]**

OR

P.T.O.

Q6) a) How Decision tree works? Explain with example step by step. **[6]**

b) What is Regression? Explain types of regression. **[5]**

Q7) a) Consider Following transactional table and generate association rules algorithm, where support count is 2 and confidence 70%. **[6]**

TID	List of Items
1	I1, I2, I5
2	I2, I4
3	I2, I3
4	I1, I2, I4
5	I1, I3
6	I2, I3
7	I1, I3
8	I1, I2, I3, I5
9	I1, I2, I3

b) What is the purpose of Apriori algorithm? Explain steps of Apriori algorithm. **[6]**

OR

Q8) a) What is frequent pattern mining? Explain Frequent Item sets, Closed Item sets and Association Rules with example. **[6]**

b) What are the advantages and disadvantages of FP growth algorithm? **[6]**

Q9) a) What is KMeans Clustering? Explain the steps of KMeans Clustering. **[6]**

b) Explain hierarchical clustering with suitable example. **[6]**

OR

Q10) a) Explain Applications of Clustering. **[6]**

b) What is outlier detection? How to detect outlier using density based clustering algorithm? **[6]**

Q11) a) What is Data Visualization? Explain types of Data Visualization. **[6]**

b) Explain benefits of data visualization in business or enterprises for overall development? **[5]**

OR

Q12) a) How data visualization plays important role in data analysis? Explain how bar chart and Pie chart use in data visualization with diagram? **[6]**

b) Explain any 5 charts types used in data visualization with diagram. **[5]**

▽▽▽▽

Total No. of Questions : 12]

SEAT No. : ____

PB-4050

[Total No. of Pages : 2

[6265]-16
S.Y. M.C.A (Engineering)
WEB TECHNOLOGIES
(2020 Pattern) (Semester - III) (410902)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) What is HTML Tag? Explain any five Tags of HTML. **[6]**

b) Describe Cascading Style Sheet with its types and different selectors used in CSS. **[6]**

OR

Q2) a) Discuss the concept of frames and tables along with its attributes in HTML. **[6]**

b) Explain the structure of HTML document with a suitable example. **[6]**

Q3) a) Explain the concept of XML DTD and XML Schema with a suitable example. **[6]**

b) What is XSLT? Discuss in detail with a suitable example. **[6]**

OR

Q4) a) Write XML code for developing online slam book. **[6]**

b) Develop a code for XML DTD for online feedback of consumer application. **[6]**

Q5) a) What is Client side scripting? Describe any two client side scripting technologies with a suitable example. **[6]**

b) Discuss properties and methods of JavaScript. **[5]**

OR

P.T.O.

Q6) a) Discuss the concept of cookies in JavaScript. How are they created, read, and deleted? **[6]**

b) Provide examples illustrating the usage of various JavaScript objects, properties, and methods. **[5]**

Q7) a) Implement an AngularJS form with input validation and submit functionality using ng-model and ng-submit directives. **[6]**

b) Implement an AngularJS form with input validation and submit functionality using ng-model and ng-submit directives. **[6]**

OR

Q8) a) How does AngularJS integrate with HTML? Discuss the role of AngularJS directives in this integration. **[6]**

b) What are controllers in AngularJS and how do they facilitate interaction between the view and the model? **[6]**

Q9) a) What is the use of interface and abstract classes in PHP? Explain with a suitable example. **[6]**

b) How a session is created and handled? How does a session work? **[6]**

OR

Q10)a) What is a cookie in PHP? Explain the life cycle of cookie in detail. **[6]**

b) Discuss the PHP exceptions in detail. **[6]**

Q11)a) Discuss various advantages and limitations of ASP.Net. **[6]**

b) Describe the concept of event handling in ASP.Net with suitable example. **[5]**

OR

Q12)a) What is ASP.NET, and why is it used in web development? Discuss its significance and advantages compared to other web development frameworks. **[6]**

b) Describe the life cycle of an ASP.NET application. What are the different stages involved, and how does the application behave at each stage?**[5]**

Total No. of Questions : 12]

SEAT No. :

PB-4051

[Total No. of Pages : 2

[6265]-17
S.Y. M.C.A (Engineering)
CLOUD COMPUTING
(2020 Pattern) (Semester - III) (410903)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Explain Cloud Computing Characteristics with Architecture. **[6]**

b) Elaborate the Cloud Types in brief with the suitable diagram. **[6]**

OR

Q2) a) Describe Advantages and Disadvantages of Cloud computing. **[6]**

b) Write a note on :- **[6]**

i) Client-Server Model

ii) P-to-P Computing

iii) Grids Computing

Q3) a) Explain the Cloud Computing Services (any two) with neat diagram. **[6]**

b) Commit: DBaaS (Database as a services) in brief with Suitable Diagram? **[6]**

OR

Q4) a) Classify the features of SAAS, IAAS and its benefits.? **[6]**

b) Describe the Platform as a Service (PaaS) in brief with suitable Diagram? **[6]**

Q5) a) Explain the Virtualization of CPU and Data-Centre Automation.? **[6]**

b) Write a note on :- **[5]**

i) Implementation Levels of Virtualization.

ii) Standards for Security.

P.T.O.

OR

Q6) a) Explain the Virtualization Structures/Tools and Mechanisms. **[6]**

b) Explain the Virtual Clusters and I/O Virtualization. **[5]**

Q7) a) Differentiate between AWS Google and Microsoft Azure? **[6]**

b) What are the Resource Provisioning Methods in Cloud Computing? **[6]**

OR

Q8) a) Write a note on :- **[6]**

i) Google Cloud Applications

ii) Amazon Cloud Services

iii) Microsoft Cloud Services

b) Explain in brief Cloud Applications with related example. **[6]**

Q9) a) Write a note on :- **[6]**

i) Public Key Infrastructure (PKI)

ii) Identity and Access Management (IAM)

iii) Single Sign-On (SSO).

b) Why service-level agreement (SLA) is important in cloud computing? What are the 3 types of SLA? **[6]**

OR

Q10)a) Explain in brief Hardened Virtual Server Images with the help of Suitable diagram? **[6]**

b) What is Cloud Security? Explain the Regulatory Issues and Accountability in Cloud Security. **[6]**

Q11)a) Write in brief about Future of Cloud-Based Smart Devices. **[6]**

b) Explain in brief Docker at a Glance. **[5]**

OR

Q12)a) Explain Mobile Cloud, Jungle Computing. **[6]**

b) Explain Cloud with Operating System in details? **[5]**

Total No. of Questions : 12]

SEAT No. : [ ]

PB4052

[Total No. of Pages : 2

[6265]-18

S.Y. M.C.A. (Engineering)

BIG DATA ANALYTICS

(2020 Pattern) (Semester - III) (410904A)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) Draw a neat diagram of Data Analytics life cycle and explain it. **[6]**

b) Explain different data types? How big data is different from normal data. **[6]**

OR

Q2) a) Explain about Velocity, Volume, Variety, Veracity of Big data in detail. **[6]**

b) Write about the evolution of Big Data? **[6]**

Q3) a) Explain clustering. What is Partition and Hierarchical clustering methods? **[6]**

b) Discuss in detail about SVM Support Vector Machine Technique. **[6]**

OR

Q4) a) Describe structure of association rule in detail. **[6]**

b) What are Recommenders? What is Dimensionality Reduction? List out types of Recommenders system. **[6]**

Q5) a) Explain content-based & Collaborative filtering in detail. **[6]**

b) Give detail working of Apriori Algorithm with example. **[5]**

OR

Q6) a) How does clustering of social network graph works? **[6]**

b) How to create graphs of your social network? **[5]**

P.T.O.

Q7) a) What is big data Visualization? Why it is important? **[6]**

b) Explain the Analytical techniques used in Big data Visualization. **[6]**

OR

Q8) a) Which are the different techniques for visual data representation? **[6]**

b) Explain the Visualizing Big Data, Tools used in data visualization. **[6]**

Q9) a) Draw Hadoop Architecture and explain in detail. **[6]**

b) Explain job tracker, task tracker, data node, name node in map reduce. **[6]**

OR

Q10)a) Analyze the limitations of Hadoop 1.0? **[6]**

b) Describe the key differences between relational database and HDFS? **[6]**

Q11)a) What is Hadoop cluster configuration? How map reduce works explain with example. **[6]**

b) List out and explain the SHELL commands of Hadoop HDFS. **[5]**

OR

Q12)a) Describe Hadoop ecosystem with neat diagram. **[6]**

b) Define HDFS. What are different Features of HDFS? **[5]**



Total No. of Questions : 12]

SEAT No. : ____

PB4053

[Total No. of Pages : 2

[6265]-19

S.Y. M.C.A. (Engineering)

MACHINE LEARNING

(2020 Pattern) (Semester - III) (410904B) (Elective - II)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) Define the three main types of Machine Learning. **[6]**

b) Briefly describe the concept of a positive class and a negative class in machine learning with an example. **[6]**

OR

Q2) a) What is Dimensionality Reduction in Machine Learning? Briefly explain the concept of Subset Selection. **[6]**

b) Why is cross-validation important when evaluating a Machine Learning model. **[6]**

Q3) a) What is binary and multiclass classification? **[6]**

b) Describe common metrics used for classification performance. **[6]**

OR

Q4) a) Explain the concept of kernel methods used to handle non-linear data in SVMs. **[6]**

b) Explain the concept of “One-vs-One” and “One-vs-Rest” strategies for multiclass classification. **[6]**

Q5) a) Differentiate Ridge and Lasso Regression with example. **[5]**

b) Explain how the Least Squares method finds the best-fitting line in univariate regression. **[6]**

OR

P.T.O.

Q6) a) Explain the different techniques to prevent over fitting. **[6]**

b) What is Univariate and Multivariate linear regression? Explain with example.**[5]**

Q7) a) Explain the concept of K-Nearest Neighbors (KNN) for classification tasks with an example. **[6]**

b) How does the Apriori algorithm identify frequent item sets for association rule mining? **[6]**

OR

Q8) a) Define the terms "confidence" and "support" used in association rule mining.**[6]**

b) What is hierarchical clustering in Machine Learning? Explain in detail. **[6]**

Q9) a) Explain the relationship between conditional probability, joint probability, and marginal probability. **[6]**

b) How does a Naïve Bayes classifier calculate the probability of a class given a set of features? **[6]**

OR

Q10)a) Define a Gaussian Mixture Model (GMM).Explain with example. **[6]**

b) How does maximum likelihood estimation help determine the parameters of a discriminative model? **[6]**

Q11)a) Define exploration and exploitation in the context of reinforcement learning. Give example. **[5]**

b) What is stacking in ensemble learning? Discuss the advantages and disadvantages of using stacking compared to other ensemble methods.**[6]**

OR

Q12)a) What is a neuron in an artificial neural network? Briefly describe the basic structure and function of a neuron. **[6]**

b) Explain why linear activation functions limit the capabilities of neural networks.**[5]**



Total No. of Questions : 12]

SEAT No. : [ ]

PB4054

[Total No. of Pages : 2

[6265]-20

S.Y. M.C.A. (Engineering)

OBJECT ORIENTED ANALYSIS & DESIGN

(2020 Pattern) (Semester - III) (410904C) (Elective - II)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6,Q7 or Q8,Q9 or Q10,Q11 or Q12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Explain 4+1 Architecture model, detailing each of its five views and their respective purposes. **[6]**

b) Explain different notations used in Use Case Diagram with an example. **[6]**

OR

Q2) a) Describe the basic building blocks of UML (Unified Modeling Language). **[6]**

b) Draw Use Case diagram for Library Management System. **[6]**

Q3) a) Draw the class diagram of Hospital Management System. **[6]**

b) Explain with example - Associations, Dependencies, Generalizations. **[6]**

OR

Q4) a) Draw the class diagram of Hotel Management System. **[6]**

b) Explain the terms association name and association classes in detail. **[6]**

Q5) a) Discuss any 2 applications of UML in embedded systems. **[6]**

b) Write a short note on Component diagram. **[5]**

OR

Q6) a) Discuss any 2 commercial applications of using component diagram. **[6]**

b) Write a note on deployment diagram. **[5]**

P.T.O.

Q7) a) Draw the activity diagram for Ticket Vending Machine. **[6]**

b) Explain in detail about interaction diagram with example. **[6]**

OR

Q8) a) Draw the sequence diagram for Railway Reservation system **[6]**

b) Compare between join and fork of activity diagram with example. **[6]**

Q9) a) Explain the process of Architectural design. **[6]**

b) Explain the Client Server architecture with example. **[6]**

OR

Q10)a) Explain the term "Real time software Architecture." **[6]**

b) Differentiate OOAD and SSAD. **[6]**

Q11)a) What is a creational design pattern. Explain its role in creating objects and classes within a system. **[6]**

b) Write a short note on Proxy design pattern. **[5]**

OR

Q12)a) Describe the Observer design pattern and its role in establishing a one-to-many dependency between objects. **[6]**

b) Write a short note on structural design patterns. **[5]**



Total No. of Questions : 12]

SEAT No. : ____

PB4055

[Total No. of Pages : 2

[6265]-21

S.Y. M.C.A. (Engineering)

INTERNET OF THINGS

(2020 Pattern) (Semester - III) (Elective - II) (410904 D)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Explain Physical design of IoT. **[6]**

b) Define IoT and its characteristics. In detail. **[6]**

OR

Q2) a) Explain the importance of real-time scheduling in embedded systems. **[6]**

b) What are the communication protocols in IoT. **[6]**

Q3) a) Write a short note Machine-to-Machine (M2M) communication? **[6]**

b) Explain how IoT standards contribute to security and data privacy? **[6]**

OR

Q4) a) Write short note on international factors driving the global value chain in IoT? **[6]**

b) What are the main design principles for developing IoT solutions? **[6]**

Q5) a) Describe what role does data processing play in the Functional View of IoT architecture? **[6]**

b) Explain how has IoT architecture evolved over time? **[5]**

OR

Q6) a) Write a short on how an Architecture Reference Model differ from a specific architecture? **[6]**

b) What are the key challenges in designing IoT architectures? **[5]**

P.T.O.

Q7) a) Explain how RFID protocols support data transmission and tag identification? **[6]**

b) Write a short note on the key components of the BACNet protocol architecture? **[6]**

OR

Q8) a) What is Modbus and explain how is it used in industrial automation? **[6]**

b) Describe the significance of the Network layer in IoT protocols? **[6]**

Q9) a) Discuss the initial steps in building a secure IoT platform? **[6]**

b) Write a short note on key components of the Smartie methodology? **[6]**

OR

Q10)a) Explain in brief the measures that can enhance trustworthiness in smart city IoT platforms? **[6]**

b) How can unauthorized access be prevented in IoT devices and systems?**[6]**

Q11)a) Write the case study on Home automation. **[6]**

b) Explain how IoT will help in Surveillance applications. **[5]**

OR

Q12)a) What is the role of IoT in smart city. **[6]**

b) Write a case study on IoT application in Health Services. **[5]**

Total No. of Questions : 12]

SEAT No. :

PB-4056

[Total No. of Pages : 2

[6265]-23

S.Y. M.C.A. (Engineering)

SOFTWARE TESTING AND QUALITY ASSURANCE

(2020 Pattern) (Semester - III) (410905)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right side indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) Explain concept of verification and validation in detail with example? **[6]**

b) Write Note on:- **[6]**

i) Six - Sigma
ii) CMM
iii) TQM

OR

Q2) a) What is Software Quality Assurance? Explain various activities and benefits of SQA? **[6]**

b) Write Note on:- **[6]**

i) Quality Analyst
ii) Quality Control
iii) Principles of software testing

Q3) a) What is Software Testing? What are the objectives of software Testing? **[6]**

b) Write Test case for a login page of Gmail. **[6]**

OR

Q4) a) Explain Testing Lifecycle in detail? **[6]**

b) Difference Between Test Plan and Test case. **[6]**

Q5) a) Write a note on Positive and negative testing. **[6]**

b) What is white box testing? What are the impact caused by failure of white box testing? **[5]**

P.T.O.

OR

Q6) a) Write Short notes on:- **[6]**

i) SCRUM

ii) BVA

iii) Agile Methodology

b) Difference between Black box Testing and White Box Testing. **[5]**

Q7) a) Explain in detail System testing and Acceptance testing? **[6]**

b) Write a note on **[6]**

i) Usability testing

ii) Accessibility testing

OR

Q8) a) What is integrated Testing? What are the 4 approaches of integrated testing? **[6]**

b) Explain the Program Evaluation and Review Technique (PERT) with example. **[6]**

Q9) a) What is software testing Automation? Explain the design and architecture for Automation? **[6]**

b) Write short notes on : **[6]**

i) Cypress

ii) Test cafe

iii) Protractor

OR

Q10) a) What are challenges in Automatic Tracking the Bug? Write common problems face during automatic bug tracking? **[6]**

b) What is Test tool? Explain the requirement for test tool? **[6]**

Q11) a) What is Selenium tool Suit? What are the Advantages and Disadvantages of Selenium Tool? **[6]**

b) Can Selenium be used to launch web browser? Justify your answer. **[5]**

OR

Q12) a) What is Selenium? Explain its history in brief? **[6]**

b) Explain Selenium grid in detail. **[5]**

