Total No. of Questions : 12]

SEAT No. :

P3190

[Total No. of Pages : 3

[5873]-201

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

DISCRETE MATHEMATICS

(2019 Pattern) (Semester - I) (310901)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full Marks.***
3) ***Assume suitable data, if necessary.***

Q1) a) Using mathematical induction, prove that **[6]**

$1^2 - 2^2 + 3^2 - 4^2 + ... + (-1)^{n-1} n^2 = (-1)^{n-1} n(n + 1)/2$

b) Write the following statements in symbolic forms : **[6]**

i) I will go to a movie only if I will not study discrete structures

ii) If I finish my homework before dinner and it does not rain, then I will go to the ball game.

iii) Either the food is good or service is good, but not both.

OR

Q2) a) Determine the whether the following expression is tautology, contradiction or contingency. **[6]**

i) $p \rightarrow ((q \vee r) \wedge (p \wedge q))$.

ii) $p \vee q \leftrightarrow (r \wedge q)$.

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

Q3) a) Let A = {1,2,3,4,5,6} and R={x,y||x–y|=2}. Draw the Relation Matrix and Draw its Diagraph. **[6]**

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

i) Injective Function

ii) Bijective Function

iii) Surjective Function

OR

P.T.O.

Q4) a) Let A = {a, b, c, d} where R1 = {(9a, a), (9a, b), (b, d)} and R2={(a, d), (b, c), (b, d), (c, b)} Find R1R2, R2R1, $R2^2$, $R2^3$ **[6]**

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

Q5) a) How many different seven persons committee can be formed each containing 3 women from an availabel set of 20 women and 4 men from an available set of 30 men? **[5]**

b) Solve the following : **[6]**

i) How many different car number plates are possible with 2 letters followed by 3 digits.

ii) How many of these number plates begin with 'MH'

OR

Q6) a) A die is rolled 6 times and the sequence of faces is noted. In how many sequences does the face "5" appear an even number of times? Also find the number of sequences in which "5" appears exactly twice or the face "3" appears exactly 4 times. **[6]**

b) Suppose repetitions are not possible. **[5]**

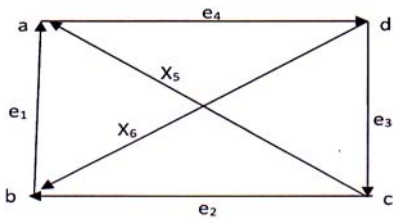
i) How many three digit numbers can be formed from six digits 2, 3, 4, 5, 7, 9?

ii) How many of these numbers are less than 400?

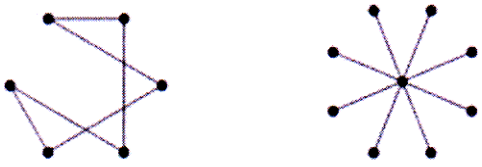
iii) How many numbers are even?

iv) How many are multiple of 5?

Q7) a) Consider the following graph and find out incidence matrix and Adjacency matrix of a graph. **[6]**



b) Which of the graphs below are bipartite? Justify your answers. **[6]**



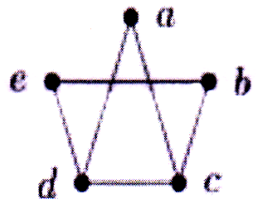
G1 G2

OR

Q8) a) Are the two graphs below equal? Are they isomorphic? If they are isomorphic, give the isomorphism. If not, explain. **[6]**

Graph 1: V={a,b,c,d,e}, V={a,b,c,d,e}, E={{a,b} {a, c} {a, e}, {b, d}, {b, e}, {c, d}}.

Graph 2:



b) Describe representations of the graph with example. **[6]**

Q9) a) Suppose characters a,b,c,d,e,f have probabilities 0.07, 0.09, 0.12, 0.22, 0.23, 0.27 respectively. Find an optimal Huffman code and draw Huffman tree. What is the average code length? **[6]**

b) Construct the binary tree for the following expression : A + B * C + D + E. **[6]**

OR

Q10) a) Create a binary search tree generated by inserting integer in order **[6]**

50, 15, 62, 5, 20, 58, 91, 3, 8, 37.60, 24

b) Explain Kruskal's Algorithm with example. **[6]**

Q11) a) Define the following terms with suitable example. **[6]**

i) Group ii) Integral Domain iii) Ring

b) Let (A,*) be a monoid such that for every x in A, x*x=e. Where e is identity element. Show that (A,*) is an abelian group. **[5]**

OR

Q12) a) Define the following terms with suitable example. **[6]**

i) Field

ii) Monoid

iii) Homomorphism

b) Prove that the intersection of two sub monoids of a Monoid(S,*) is a sub-Monoid of (S,*) **[5]**

Total No. of Questions : 12]

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P3191

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[5873]-202

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

DATA STRUCTURES

(2019 Pattern) (Semester - I) (310902)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full Marks.***
3) ***Assume suitable data, if necessary.***

Q1) a) Explain two-dimensional arrays with row and column major implementation. Explain address calculation in both cases with example. **[6]**

b) What is ADT? Write an ADT for Array. **[6]**

OR

Q2) a) Differentiate linear vs nonlinear, static vs dynamic data structures. **[6]**

b) Write a pseudo C algorithm for simple transpose of sparse matrix. Also mention the time complexity. **[6]**

Q3) a) Write a function in C/C++ to traverse the doubly linked list from right to left, Printing out the contents of the data field of each node. **[6]**

b) Write C code to evaluate a polynomial term. **[6]**

OR

Q4) a) Write Pseudo C code for inserting node in the circular linked list. **[6]**

b) Compare singly linked list and doubly linked list with suitable example. **[6]**

Q5) a) Convert the following infix expression to postfix using stacks. Show the contents of stack after every pass. **[6]**

(a + b / c) * (d + e)

b) Explain use of stack in backtracking. **[5]**

OR

P.T.O.

Q6) a) Evaluate the following postfix expression with given values by showing contents of stack. **[6]**

AB^C*D–EF/GH+/+

A=4, B=2, C=3, D=3, E=8, F=4, G=1, H=1

b) Explain array based implementation of stacks. **[5]**

Q7) a) Explain Circular queue as an array. Give advantage of circular queue. **[6]**

b) Explain Linked queue and operations on it. **[6]**

OR

Q8) a) What is deque? Explain it with suitable example. **[6]**

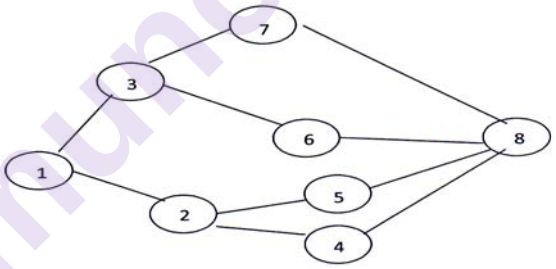
b) What is queue? Write pseudo c code for insertion and deletion of an element in a queue. **[6]**

Q9) a) Write a C/C++ function to insert a node in Binary Search Tree. **[6]**

b) Explain Dijkstra's shortest path algorithm with an example? **[6]**

OR

Q10) a) For the following graph, give the result of DFS and BFS traversals. Starting vertex is 7. **[6]**



b) Explain application of tree as decision tree with example. **[6]**

Q11) a) Write a pseudo C code for Quick sort algorithm. **[6]**

b) Write a C/C++ non recursive function for binary search. **[5]**

OR

Q12) a) Show the stepwise execution of the Bubble sort algorithm for the following list. Give the time complexity of algorithm 23, 8, 44, 1, 61, 13, 58, 20, 48, 19 **[6]**

b) Explain sentinel search with suitable example. **[5]**

Total No. of Questions : 12]

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P6583

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

310903 : OBJECT ORIENTED PROGRAMMING

(2019 Pattern) (Semester - I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) Explain main pillars of Object Oriented Programming. **[6]**

b) Describe the need of header files in Object-Oriented Programming. **[5]**

OR

Q2) a) Compare C & C++ platforms. **[6]**

b) Define comment. Why is it important to write comments in programs? **[5]**

Q3) a) Explain the concept of looping statements with example. **[6]**

b) Create a class staff having fields: Staff_id, name, salary. Write a menu driven program for : **[6]**

i) To accept the data

ii) To display the data

OR

Q4) a) Describe with examples Inline function and static data member. **[6]**

b) Write a program to print factorial of given number using special functions constructor & destructor. **[6]**

Q5) a) Write a program to overload binary operators '>' and '<' to compare two strings. **[6]**

b) Explain the types of polymorphism with example. **[6]**

P.T.O.

OR

Q6) a) Differentiate between multiple and multilevel inheritance in C++? **[6]**

b) Write a program to overload increment and decrement operator. **[6]**

Q7) a) Explain the use of Friend Function with example. **[6]**

b) What is Dynamic Binding? **[5]**

OR

Q8) a) What is the use of this pointer? **[5]**

b) Explain the concept of Virtual Function. **[6]**

Q9) a) Why templates are used in C++? How many types of templates are there in C++? **[6]**

b) Write a Program to find Largest among two numbers using function template. **[6]**

OR

Q10) a) Explain how exception handling mechanism can be used for debugging a program. **[6]**

b) What is generic programming? How is it implemented in C++? **[6]**

Q11) a) Discuss the various forms of get() function supported by the input stream. How are they used? **[6]**

b) What is a file mode? Describe the various file mode options available. **[6]**

OR

Q12) a) What is input stream and output stream? Explain various methods to open a file. **[6]**

b) Write a program to read a list containing item name, item code, and cost interactively and produce a three column output as shown below. **[6]**

Item Name	Item Code	Cost
Database	1006	550.95
Java Programming	905	99.70

Total No. of Questions : 12]

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P3192

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

PRINCIPLES OF PROGRAMMING (Under Engineering)

(2019 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) What are the 6 steps of problem solving? Explain in detail with example? **[6]**

b) Explain software development process in detail. **[6]**

OR

Q2) a) What is an algorithm? What are the advantages of writing an algorithm? **[6]**

b) What is the difference between internal documentation and external documentation? **[6]**

Q3) a) Discuss selection and iterative structures in detail. **[6]**

b) Explain Type checking, Type Conversion and Type compatibility. **[6]**

OR

Q4) a) Explain User-defined types and abstract data types. **[6]**

b) Explain the two types of parameters. How do they differ? **[6]**

Q5) a) Explain the top down and bottom up approach. **[6]**

b) Explain the difference between local and global variables. **[5]**

OR

Q6) a) Explain cohesion and coupling in detail. **[6]**

b) Write a program which uses a recursive algorithm. Explain how Subroutines are generated? **[5]**

P.T.O.

Q7) a) Give similarities and dissimilarity between algorithm and flowchart. **[6]**

b) Write down the algorithm for exchange of values of two variables without using third variable. **[5]**

OR

Q8) a) List and explain factors included in implementation of an algorithm with example. **[6]**

b) Write an algorithm to find a missing number. Find frequency count of each step. **[5]**

Q9) a) Explain "Big oh", "Omega" and "Theta" notations with example. **[6]**

b) What is meant by frequency count of an algorithm? Explain with example. **[6]**

OR

Q10) a) Explain three different ways of analysis of algorithm and which one is best? **[6]**

b) Describe in brief time and space complexity of an algorithm. Explain with example. **[6]**

Q11) a) Write short note on Table Look up technique and Pointer technique. **[6]**

b) Explain selection sort algorithm with example. **[6]**

OR

Q12) a) What is data processing? Explain business data processing. **[6]**

b) Design an algorithm for reverse of number with array technique. **[6]**

Total No. of Questions : 12]

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

MANAGEMENT THEORY AND PRACTICES

(2019 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.***
3) ***Assume suitable data, if necessary.***

Q1) a) What is planning? Explain the steps involved in planning. **[6]**

b) Explain evolution of management in detail. **[6]**

OR

Q2) a) Define strategic planning. Explain steps involved in strategic planning. **[6]**

b) Explain functions of management. **[6]**

Q3) a) What do you understand by Organization Chart? Explain the basis of departmentalization. **[6]**

b) Explain Line Organization with a diagram. **[6]**

OR

Q4) a) What is MBO? Explain steps involved in MBO. **[6]**

b) Explain Matrix Organization Structure with eg. **[6]**

Q5) a) Explain Fiedler's contingency model. **[6]**

b) Explain importance of Leadership in an organization. **[5]**

OR

Q6) a) What is a Group? How does diversity of a group affect its performance? **[6]**

b) What is the purpose to form a team? **[5]**

P.T.O.

Q7) a) What do you mean by Quality? What is Total Quality management? **[6]**

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

i) Six sigma

ii) Theory of X, Y, Z

OR

Q8) a) Explain Conflict management in detail with its strategies. **[8]**

b) What are the steps in Business Process Re-engineering? **[4]**

Q9) a) What is Supply Chain Management? Which skills do you think an employee needs to be successful in Supply Chain Management? **[6]**

b) Explain the application of MIS in academics. **[6]**

OR

Q10) a) Explain the challenges and trends in Customer Relationship Management. **[6]**

b) Write short note on ERP. **[6]**

Q11) a) Differentiate decision making under certainty, uncertainty and under Risk. **[6]**

b) Write short note on-Herbert Simpson's Model. **[5]**

OR

Q12) a) Differentiate Programmable Decisions and Non programmable Decisions. **[6]**

b) Describe Decision making tools. Also specify when to use specific tool. **[5]**

Total No. of Questions : 12]

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F.Y. MCA (Engineering)

PROBABILITY & STATISTICS

(2019 Pattern) (Semester - II) (310910)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Figures to the right indicate full Marks.***
2) ***Assume suitable data, if necessary.***
3) ***Use of probability table, electronic pocket calculator is allowed.***

Q1) a) From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 man are there on the committee. In how many ways can it be done? **[6]**

b) What is Bayes Theorem? Write a Bayes Theorem - Statement, Bayes Theorem formula for Events. **[6]**

OR

Q2) a) Given that E and F are events such that P(E) = 0.5, P(F) = 0.4 and $P(E \cap F) = 0.3$, then what will be the value of P(F|E)? **[6]**

b) List and Explain Axioms of Probability Every Data Scientist Should Know? **[6]**

Q3) a) Explain Corelation Coefficient types, Formulas with Examples. **[6]**

b) What are the types of population in statistics? Explain With Example. **[6]**

OR

Q4) a) Lets say we have below heights of presons. **[6]**

heights - [168, 170, 150, 160, 182, 140, 175, 191, 152,150] Calculate Mean, Median, Mode, Variance and Standard Deviation.

b) What are the sampling methods or Sampling Techniques? Explain in Detail. **[6]**

Q5) a) How do you find the expected value and standard deviation of a geometric random variable? Explain formula and Steps to find the expected value. **[6]**

b) What are the three types of random variables? Explain in Detail. **[5]**

P.T.O.

OR

Q6) a) Find the mean and variance of X? **[6]**

x	0	1	2	3	4
F(x)	1/9	2/9	3/9	2/9	1/9

b) What is the Cumulative Distribution Function? Explain Formula for CDF of a discrete random variable. **[5]**

Q7) a) Explain the difference between Probability mass functions (pmf) and Cumulative distribution function for Continuous Random Variable. **[6]**

b) In a popular shopping center, the waiting time for an ABSA ATM machine is found to be uniformly distributed between 1 and 5 minutes. What is the probability of waiting between 2 and 3 minutes to use the ATM? **[6]**

OR

Q8) a) What is the marginal probability density? How do you calculate marginal pdf? Explain Formula and Steps. **[6]**

b) Heights of college women have a distribution that can be approximated by a normal curve with a mean of 65 inches and a standard deviation equal to 3 inches. About what proportion of college women are between 65 and 67 inches tall? **[6]**

Q9) a) What is the difference between a chi-square test for goodness-of-fit and a chi-square test for homogeneity? Explain in Detail. **[6]**

b) what are the steps of hypothesis testing? Explain Five Steps in Hypothesis Testing. **[6]**

OR

Q10) a) What is the p value of the test? How do we calculate p value for two tailed tests? **[6]**

b) Write a note r * c Test for Independence Explain in Detail. **[6]**

Q11) a) What is the need of statistical quality control? Expalin its Limitations and Applications. **[6]**

b) Why are the X bar and R chart used together? Explain R Chart in Detail. **[5]**

OR

Q12) a) The length of time, in hours it takes an "over 40" group of people to play one soccer match is normally distributed with a mean of 2 hours and a standard deviation of 0.5 hours. A sample of size n = 50 is drawn randomly from the population Find the probability that the sample mean is between 1.8 hours and 2.3 hours. **[6]**

b) What is acceptance sampling? What are its advantages and disadvantages? Explain. **[5]**

Total No. of Questions : 12]

SEAT No. :

P3195

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First Year M.C.A (Engineering)

SYSTEMS PROGRAMMING & OPERATING SYSTEM (SPOS)

(2019 Pattern) (Semester - II) (310911)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) What are the features of assembly language? **[6]**

b) What are the different components of system software? **[6]**

OR

Q2) a) Explain structure of assembler. **[6]**

b) Distinguish between system software and application software. **[6]**

Q3) a) What are the phases of compiler? **[6]**

b) Explain Compile and Go loader. **[6]**

OR

Q4) a) What is difference between static and dynamic binding. **[6]**

b) What do you mean by program relocation. **[6]**

Q5) a) Consider the following set of process with CPU burst time given in milliseconds **[6]**

Process	Burst Time	Arrival Time
P1	5	1
P2	3	0
P3	2	2
P4	4	3
P5	8	2

Illustrate the execution of these process using FCFS and preemptive SJF. Calculate average turn around time and average waiting time.

b) Draw life cycle of process with neat diagram. **[5]**

P.T.O.

OR

Q6) a) Distinguish Process and Thread. **[6]**

b) Consider the following set of processes with CPU burst time given in milliseconds : **[5]**

Process	Burst Time	Arrival Time	Priority
P1	8	0	4
P2	6	1	6
P3	7	3	3
P4	9	3	1(Highest)

Illustrate evaluation of these process using non-preemptive SJF and priority preemptive CPU scheduling algorithm. Also calculate average waiting time.

Q7) a) What is the meaning of the term race condition? Describe the requirement of solution to the critical section problem. **[6]**

b) Explain the strategies to deal with deadlock prevention. **[5]**

OR

Q8) a) Write a note on - Consumer & Producer Problem of IPC. **[6]**

b) Explain the Critical Section Criteria with example. **[5]**

Q9) a) Differentiate - Contiguous & Non-contiguous Memory Allocation. **[6]**

b) Explain with example - Best Fit, Worst Fit & First Fit. **[6]**

OR

Q10) a) Explain with example Belady's Anomaly. **[6]**

b) Differentiate - Paging & Segmentation. **[6]**

Q11) a) Write a note on Disk Structure. **[6]**

b) Explain SSTF when track request - 95, 180, 34, 119, 11, 123, 62, 64. Starting from Track no. 50. **[6]**

OR

Q12) a) Differentiate SCAN and CSCAN with example. **[6]**

b) Explain with example any three File Allocation Methods. **[6]**

Total No. of Questions : 12]

SEAT No. :

P6584

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

DATABASE MANAGEMENT SYSTEM

(2019 Pattern) (Semester - II) (310912)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Attempt Q1or Q2, Q3 or Q4, Q5or Q6, Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***All questions are compulsory.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume Suitable data if necessary.***

Q1) a) Explain: ACID property in database **[6]**

b) Write difference between DBMS and File Processing System. **[6]**

OR

Q2) a) Explain instances and schema in DBMS. **[6]**

b) Discuss different layers of data abstraction. **[6]**

Q3) a) Draw an ER diagram for a company needs to store information about employees (identified by ssn, with salary and phone as attributes), departments (identified by dno, with dname and budget as attributes), and children of employees (with name and age as attributes). Employees work in departments, each department is managed by an employee, a child must be identified uniquely by name when the parent (who is an employee; assume that only one parent works for the company) is known. We are not interested in information about a child once the parent leaves the company. **[6]**

b) Explain Specialization with example. **[6]**

OR

P.T.O.

Q4) a) Explain the features of EER model with an example. **[6]**

b) Describe the use of Super key and composite key in database design. **[6]**

Q5) a) Explain Codd's rule. **[6]**

b) Explain with example strong and weak entities. **[5]**

OR

Q6) a) State and Explain all the DDL and DML statements with syntax and examples. **[6]**

b) Explain Indexing in database with example. **[5]**

Q7) What is joins in SQL? Explain types of joins with suitable example. **[12]**

OR

Q8) a) What is trigger? Explain types of triggers with example. **[6]**

b) Write a short note on stored procedure, describe with an example. **[6]**

Q9) a) What is the need of normalization? Explain 2NF in detail. **[6]**

b) What is Lossy and Lossless decomposition? Explain with example. **[6]**

OR

Q10) Normalize following relation up to 3NF with proper explanation and draw ERD {cstno, custname, prodno, proddesc, qty_ordered, custaddress, date_ordered, order_descr, qty_available, price_per_unit, total_cost} **[12]**

Q11) Explain Hbase Architecture. **[11]**

OR

Q12) a) What are the advantages of NoSQL over SQL. **[5]**

b) Give the Hbase commands for: Adding new values, reading values and updating values. **[6]**

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Total No. of Questions : 12]

SEAT No. : ____

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F.Y. MCA (Engineering)

JAVA PROGRAMMING

(2019 Pattern) (Semester - II) (310913)

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

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full Marks.***
3) ***Assume suitable data, if necessary.***

Q1) a) What is the difference between JDK, JRE, and JVM? **[6]**

b) List out the tabular difference between object oriented and object based programming in Java. **[6]**

OR

Q2) a) Demonstrate the use of one dimensional and multidimensional array. **[6]**

b) Write note on Wrapper classes and Annotations. **[6]**

Q3) a) Describe the usage of Defining class, Methods, Creating objects and Accessing Class members in details. **[6]**

b) Illustrate the use of static methods and Finalize Methods. **[6]**

OR

Q4) a) Differentiate between Method overloading and Method Overriding with suitable example. **[6]**

b) What is Java API Packages? Write a note on how to create package and interface in details. **[6]**

Q5) a) Write a program which shows the usage of multi threading in details. **[6]**

b) Explain the Life cycle of a thread. **[5]**

OR

Q6) a) What is exception handling? Write Syntax of exception handling in Java. **[6]**

b) Can we create our own exception in Java? Justify your answer with suitable example. **[5]**

P.T.O.

Q7) a) How do you write a graphics program in Java? **[6]**

b) Which are the two sets of Java API graphics programming? **[6]**

OR

Q8) a) How do you show a bar chart in Java? **[6]**

b) Write a program to show the animation of line using graphics programming. **[6]**

Q9) a) What are the basic methods in File class? **[6]**

b) How do you write to a file using File Writer class? **[6]**

OR

Q10) a) What is the use of Buffered Writer and BufferedReader classes in Java? **[6]**

b) How do you read and write bytes in Java? **[6]**

Q11) a) What is J2EE? Why to use J2EE? **[6]**

b) Explain the J2EE Architecture in details. **[5]**

OR

Q12) a) List out the 4 types of JDBC drivers. Which JDBC driver is fastest and used more commonly. **[6]**

b) Write down the steps for connecting to a database with JDBC. **[5]**

Total No. of Questions : 12]

SEAT No. : ____

P3197

[Total No. of Pages : 2

[5873]-210

First Year M.C.A. (Engineering)

COMPUTER ORGANIZATION

(2019 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 indicate full marks.***
3) ***Assume suitable data, if necessary.***

Q1) a) What is utility program? List out some of the task commonly performed by utility program. **[6]**

b) Explain the following gates with example - NAND, XOR, XNOR. **[6]**

OR

Q2) a) Convert the following : **[6]**

i) $(6751)_8 = ?_2$ ii) $(939)_{10} = ?_8$

iii) $(F6B)_{16} = ?_2$ iv) $(D4A)_{16} = ?_{10}$

b) Explain De-Morgan's Theorem and duality theorem. **[6]**

Q3) a) Explain Basic Operational Concepts with the help of instruction - Add LOCA, R0. **[5]**

b) Explain use of Bus in execution of instruction. **[6]**

OR

Q4) a) Explain the arithmetic and logical unit in brief. **[6]**

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

Q5) a) Explain the memory types and their use :- PROM, EPROM, EEPROM. **[6]**

b) Explain the use of Cache Memory in execution of instruction. **[6]**

OR

Q6) a) Explain the cache concept in Pentium V architecture. **[6]**

b) Draw a diagram of Memory Hierarchy with functionality. **[6]**

P.T.O.

Q7) a) Write a note on various registers used in 8086. **[6]**

b) How is the interrupt get handled? **[6]**

OR

Q8) a) Write a note on - Instruction Cycle & Execution Cycle. **[6]**

b) Compare 8085 & 8086 Architecture. **[6]**

Q9) a) Explain the term CISC & RISC. **[5]**

b) Explain the term - Pipelining. **[6]**

OR

Q10) a) What is timing diagram? Explain any instruction with this. **[6]**

b) Explain the superscalar concept in brief. **[5]**

Q11) a) Explain working of parallel processing with block diagram. **[6]**

b) Explain multiprocessor organization in brief. **[6]**

OR

Q12) a) Write a note on Cluster Architecture. **[6]**

b) Compare the characteristics of SIMD and MIMD. **[6]**

Total No. of Questions : 12]

SEAT No. :

P6585

[Total No. of Pages : 2

[5873]-211

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

WEB PROGRAMMING

(2019 Pattern) (Semester - III) (410901)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) Explain following elements in the context of HTM with an example : **[6]**

i) Table

ii) List

iii) JSON

b) Explain structure of HTML document in detail. (with example). **[6]**

OR

Q2) a) What is CSS? Explain its types in detail. **[6]**

b) Explain following terms in detail : **[6]**

i) XML

ii) DTD

Q3) a) What is Java Script? Explain its use and features in detail. **[6]**

b) Explain concept of an Array in Java Script with an example. **[6]**

OR

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

b) Explain Concept of Control Statements with an example. **[6]**

P.T.O.

Q5) a) Draw and explain servlet life cycle. **[6]**

b) How to create JSP form , write JDBC connectivity steps. **[5]**

OR

Q6) a) Draw and explain JSP life cycle. **[6]**

b) Write a servlet program, consider any suitable case study for it. **[5]**

Q7) a) What are cookies? What is the disadvantages of it in PHP? **[6]**

b) What is AJAX? Explain AJAX model and how it works? **[6]**

OR

Q8) a) Write short note on Associative array in PHP. **[6]**

b) Explain about Ajax client server architecture. **[6]**

Q9) a) What are the modules in Angular JS explain with example. **[6]**

b) What is Struts Framework? Explain the architecture of struts framework with suitable diagram. **[6]**

OR

Q10) a) What are the Directives? How to create and use custom directives in Angular JS. **[6]**

b) What is the difference between the Forward Action and the Include Action in the struts. **[6]**

Q11) a) Write short note on : **[6]**

i) Session Bean

ii) Message Driven Bean

iii) Entity Bean

b) What is spring? What are the benefits of spring? **[5]**

OR

Q12) a) Write short note on : **[6]**

i) Bootstrap

ii) JSF

iii) Spring

b) Explain in details SOAP and REST. **[5]**

⌘⌘⌘

Total No. of Questions : 12]

SEAT No. :

P3198

[Total No. of Pages : 4

[5873]-212

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

BANKING AND FINANCE

(2019 Pattern) (Semester - III) (410902)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) Explain the types of accounts that one can open in a bank branch. **[6]**

b) Explain the function of Reserve Bank of India. **[6]**

OR

Q2) a) Discuss regulatory authorities for banking in India. **[6]**

b) Explain the saving Deposit scheme in detail. **[6]**

Q3) a) Differentiate between RTGS and NEFT. **[6]**

b) Explain online and offline transactions in a bank branch. **[6]**

OR

Q4) a) Explain Electronic Clearing Service. **[6]**

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

i) Cheques

ii) Demand Draft

Q5) a) Explain concept of Core Banking System. **[6]**

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

i) POS banking

ii) Mobile Banking

OR

Q6) a) Differentiate between Net Banking and Mobile Banking. **[6]**

b) Explain ATM system and its working in detail. **[5]**

P.T.O.

Q7) a) Journalize the following transactions in the books of Anand General Merchants. **[8]**

2019 April

1 Mr. Anand started the business with cash of ₹ 60,000.

5 Purchased goods for cash ₹ 30,000.

7 Sold goods of ₹ 10,000 to Suresh.

10 Purchased Furniture from Mr. Govind on credit ₹ 30,000.

15 Paid for Rent ₹ 3,000 and paid by debit card.

21 Purchased goods from Urmila on credit ₹ 70,000.

27 Paid for Transport ₹ 1,000 to United Transport.

30 Paid to Urmila ₹ 20,000 on behalf of Sharmila.

b) Explain 3 rules for book keeping with example. **[4]**

OR

Q8) Following are the closing ledger balances of Deepak & Co. Prepare Trading Account and Profit & Loss Account for the year ended 31st March 2019 and Balance sheet as of that date. **[12]**

Ledger Balances of Mr. Deepak and Co. as of 31st March, 2019

Particulars	**Amount (₹)**	**Particulars**	**Amount (₹)**
Bank	30,000	Capital	1,20,000
Bills Payable	7,500	Insurance Premium	18,000
Furniture	19,500	(1.1.2019 to 31.12.2019)	
Commission Received	3,000	Salaries	30,000
Stock (1.4.2018)	27,000	Bank Loan	30,000
Building	37,500	Sundry expenses	7,500
Wages	7,500	Interest paid	1,500
Creditors	37,500	Machinery	25,500
Bad Debts	4,500	Sales	96,000
R.D.D. (old)	3,000	Purchases	42,000
Sales Returns	1,500	Debtors	31,500
		Purchases returns	3,000
		Cash in hand	16,500

Adjustments :

1. Closing stock was valued at ₹ 60,000
2. An amount of ₹ 3,000 is still to be received on account of commission.
3. Provision for discount on debtors and Provision for discount on Creditors are to be created 2% and 3% respectively.
4. Amount of Furniture is to reduce by ₹ 4,500 and Building by 10%.
5. Outstanding expenses Salaries ₹ 4,500 and Wages ₹ 1,500.

Q9) a) Write a note on Elements of Cost. **[6]**

b) Differentiate between Cost Sheet and Cost Account. **[6]**

OR

Q10) a) The following Trading and Profit and Loss Account of Fantasy Ltd. for the year 31/3/2000 is given below : **[6]**

Particulars	**Rs.**	**Particulars**	**Rs.**
To Opening Stock	76,250	By Sales	5,00,000
To Purchases	3,15,250	By Closing stock	98,500
To Carriage and Freight	2,000		
To Wages	5,000		
To Gross Profit b/d	2,00,000		
	5,98,500		5,98,500
To Administration expenses	1,01,000	By Gross Profit b/d	2,00,000
To Selling and Dist. expenses	12,000	By Non-operating incomes:	
To Non-operating expenses	2,000	By Interest on Securities	1,500
To Financial Expenses	7,000	By Dividend on shares	3,750
To Net Profit c/d	84,000	By Profit on sale of shares	750
	2,06,000		2,06,000

Calculate :

1. Gross Profit Ratio
2. Expenses Ratio
3. Operating Ratio
4. Net Profit Ratio
5. Operating (Net) Profit Ratio
6. Stock Turnover Ratio.

b) Explain in detail classification of Overheads with example. **[6]**

Q11) a) What is working capital? Explain types of working capital? **[6]**

b) Explain estimation of working capital requirement. **[5]**

OR

Q12) a) What are the factors affecting working capital requirement? **[6]**

b) Write a note on needs of working capital. **[5]**

Total No. of Questions : 12]

SEAT No. :

P3199

[Total No. of Pages : 2

[5873]-213

S.Y. MCA (Engineering)

COMPUTER NETWORKS

(2019 Pattern) (Semester - III) (410903)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherever necessary.***
2) ***Figures to the right indicate full Marks.***
3) ***Assume suitable data, if necessary.***

Q1) a) Explain design issues for Layers. **[6]**

b) What are various network Devices. **[6]**

OR

Q2) a) Explain Manchester and Differential manchester Encodings with an example. **[6]**

b) Explain Frequency Hopping (FHSS) and Direct Sequence (DSSS). **[6]**

Q3) a) Define the terms Error Control and Flow Control. **[6]**

b) Explain sliding Window Protocol. **[6]**

OR

Q4) a) Explain Stop and Wait Protocol. **[6]**

b) Explain Hamming Codes with an example. **[6]**

Q5) a) Explain pure and slotted ALOHA. **[6]**

b) Explain WDMA. **[5]**

OR

Q6) a) Explain Fast Ethernet, Gigabit Ethernet. **[6]**

b) Explain IEEE 802.15. **[5]**

P.T.O.

Q7) a) Write difference between IPV4 and IPV6. **[6]**

b) Explain the services provided by network layer. Explain any congestion control algorithm in detail. **[6]**

OR

Q8) a) Explain the following terms : **[6]**

i) RIP

ii) Mobile IP

iii) AODV

b) What is switching? Write difference between packet switching and circuit switching. **[6]**

Q9) a) Write difference between TCP and UDP. **[6]**

b) Explain RTP and SCTP protocols. **[6]**

OR

Q10) a) Explain TCP timer management & TCP congestion control in detail. **[6]**

b) Write the difference between integrated services and differentiated services. **[6]**

Q11) a) Explain how electronics mail works and list out the services offered by SMTP. **[6]**

b) Write difference between peer to peer and client server paradigm. Explain DHCP protocol in detail. **[5]**

OR

Q12) a) How domain Name System converts DNS to IP address write in detail. **[6]**

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

i) HTTP ii) SMTP iii) DNS

iv) TFTP v) MIME

Total No. of Questions : 12]

SEAT No. : ____

P3200

[Total No. of Pages : 2

[5873] - 214

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

PYTHON PROGRAMMING

(2019 Pattern) (410904) (Semester - III)

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 are the key features of Python? **[6]**

b) Describe the process of compilation and linking in Python. **[6]**

OR

Q2) a) What are the common built-in data types in Python? **[6]**

b) What are comments and how can you add comments in Python? **[6]**

Q3) a) List out the different types of decision flow control statements in Python? Give example of each. **[6]**

b) Summarizes the uses of Break, Continue and pass statement in Python with suitable example. **[6]**

OR

Q4) a) Write a program in Python to produce Star triangle. **[6]**

b) Explain the following functions in reference to Tuple in Python. **[6]**

i) len( ).

ii) count( ).

P.T.O.

Q5) a) Define a function that accepts a number and returns whether the number is even or odd. **[6]**

b) How do you pass a command line argument to a function in Python? **[5]**

OR

Q6) a) Count the number of characters (character frequency) in a string. **[6]**

b) Find the index of the first occurrence of a substring in a string. **[5]**

Q7) a) Differentiate between List and Tuple in Python with example. **[6]**

b) Explain how to create dictionary in Python? Explain any 2 operation on dictionary with example and Python code. **[6]**

OR

Q8) a) What is the difference between a Python tuple and a dictionary. **[6]**

b) Explain use of SET in Python. How to declared it and used it in program. Explain Frozen sets also. **[6]**

Q9) a) Where to use files in programming? Explain file creation and read, write operations in Python. **[6]**

b) Explain operations on binary files in Python? Modes of opening file. **[6]**

OR

Q10) a) Explain different types of files in Python with example of its creation. **[6]**

b) What are regular expressions in Python with example? Which method in Python supports regular expressions? Explain any 3 examples of it. **[6]**

Q11) a) How are classes and objects created in Python? **[6]**

b) What is encapsulation and example in Python? **[5]**

OR

Q12) a) Explain Multithreading in Python. **[6]**

b) What is Polymorphism and in Python how to achieve it? **[5]**

Total No. of Questions : 12]

SEAT No. : ____

P3201

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

MANAGEMENT INFORMATION SYSTEM

(2019 Pattern) (Semester - III) (410905)

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) How MIS organization within the company? **[6]**

b) Explain Decision support systems of MIS. **[6]**

OR

Q2) a) What is MIS? Explain in brief. **[6]**

b) Explain Managers view of Information systems. **[6]**

Q3) a) What are the different factors that affect forms of business organization? **[6]**

b) Write note on Information System in the Enterprise. **[6]**

OR

Q4) a) Introduce Enterprise applications. **[6]**

b) Differentiate Integrating functions and business processes. **[6]**

Q5) a) Explain Evolution of an information system. **[6]**

b) Write note on decision making and MIS. **[5]**

OR

P.T.O.

Q6) a) How MIS as a technique for making programmed decisions applicable in organisation? **[6]**

b) Explain Basic information systems. **[5]**

Q7) a) Differentiate Strategic and Project planning for MIS. **[6]**

b) What is General business planning? **[6]**

OR

Q8) a) Explain Strategic and Project planning for MIS. **[6]**

b) Explain appropriate MIS responses. **[6]**

Q9) a) Explain the role of Management Information Systems (MIS) in the academic. **[6]**

b) Explain in detail Transaction Processing Systems as an application of Management Information Systems. **[6]**

Q10) a) Write short note on Supply Chain Management (SCM). **[6]**

b) List the application of MIS. **[6]**

Q11) a) Write a difference between Open System and Closed System. **[6]**

b) Explain Implementation, evaluation and maintenance of MIS. **[5]**

OR

Q12) a) Write short note on-Detailed system design and Implementation. **[6]**

b) How maintain the system. **[5]**

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

P3202 **[Total No. of Pages : 2**

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S.Y. M.C.A. (Engineering) (Semester - IV)

SOFTWARE ENGINEERING & PROJECT MANAGEMENT

(2019 Pattern) (410912)

Time : 3 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) Define : **[8]**

i) Nature of Software.

ii) Software Process.

iii) Software Engineering Practice.

iv) Software Myths.

b) Explain Incremental Model. **[4]**

OR

Q2) a) Explain Agile Method. **[6]**

b) Explain Agile Tools-JIRA & Kanban. **[6]**

Q3) a) Explain User & System Requirements Engineering. **[6]**

b) Explain the Requirements Engineering Types & Metrics. **[6]**

OR

Q4) a) Explain the Requirements Specification. **[6]**

b) Explain the Requirements Elicitation & Analysis. **[6]**

P.T.O.

Q5) a) Explain Agile Development? Agile Manifesto, Agility & Cost of Change. **[6]**

b) Explain Agile Principles. **[5]**

OR

Q6) a) Explain Extreme Programming XP value, Process. **[6]**

b) Explain SCRUM. **[5]**

Q7) a) Draw the diagram and explain McCall's quality factors that affect the software quality. **[6]**

b) What do you mean by software metric? Describe its advantages. **[6]**

OR

Q8) a) What is the purpose of software Maintenance? Explain the maintenance metrics. **[6]**

b) Explain metrics for source code. **[6]**

Q9) a) Explain Work breakdown structure and Gantt chart with example. **[6]**

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

OR

Q10) a) Explain why the process of project planning is iterative and why a plan must be continually reviewed during a software project. **[6]**

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

Q11) a) What is Software configuration management (SCM)? Explain the change control mechanism in software configuration management. **[6]**

b) What is the necessity of risk monitoring? What is its impact on overall development? **[5]**

OR

Q12) a) Explain why a high-quality software process should lead to high-quality software products. Discuss possible problems with this system of quality management. **[6]**

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

Total No. of Questions : 12]

SEAT No. : ____

P3203

[Total No. of Pages : 2

[5873] - 217

S.Y. M.C.A. (Engineering) (Semester - IV)

MOBILE COMPUTING

(2019 Pattern) (410913)

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 Source Encoding, Channel Encoding and Modulation with one example. **[6]**

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

OR

Q2) a) What are the advantages of Wireless Networks? Classify different wireless networks based on their range. **[6]**

b) As the signal travels the distance its power becomes weaker-Justify, also explain various wireless communication problems. **[6]**

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

b) Explain Mobility Databases. **[6]**

OR

Q4) a) Explain Wireless multiple access protocols. **[6]**

b) What is adaptive clustering for mobile wireless networks. **[6]**

P.T.O.

Q5) a) Explain WAP Architecture. **[6]**

b) Explain WML. **[5]**

OR

Q6) a) Explain TCP over wireless. **[6]**

b) Explain Mobile IP. **[5]**

Q7) a) Explain GSM Architecture. **[6]**

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

OR

Q8) a) Compare the features mobile O.S : windows and android. **[6]**

b) Explain about UI Layout of android. State the types of layout. Explain in brief two of them. **[6]**

Q9) a) Explain file structure in android O.S. **[6]**

b) Explain the location based services. **[6]**

OR

Q10) a) Explain GSM : Architecture and Protocols. **[6]**

b) Location Update Procedure in GSM. **[6]**

Q11) a) Write a short note on Bluetooth. How it can access in android? **[6]**

b) Explain in brief Peer to peer to communication. **[5]**

OR

Q12) a) Explain mobile agent based architecture. **[6]**

b) Explain Android Hardware in details. **[5]**

Total No. of Questions : 12]

SEAT No. : ____

P3204

[Total No. of Pages : 2

[5873] - 218

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

DATA SCIENCE WITH R

(2019 Pattern) (Semester - IV) (410914)

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) Write short note on Big data. **[6]**

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

OR

Q2) a) Define Big Data and Data Science. Write short note on Data Science Process Overview. **[6]**

b) Explain the terms Data preparation, Data exploration, Data modeling. **[6]**

Q3) a) What is R? Explain its Features. **[6]**

b) What are the different data types/objectives in R? **[6]**

OR

Q4) a) How can one perform decision making in R? Explain with example. **[6]**

b) What is the difference between data frame and a matrix in R? **[6]**

P.T.O.

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

b) Explain Naïve Bayes classifier with algorithm. **[5]**

OR

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

b) Where Regression methods are applied? How it plays important role in data analysis? **[5]**

Q7) a) Give examples of using Clustering to solve real life problems. **[6]**

b) What is the difference between a multiclass problem and multilabel problem? **[6]**

OR

Q8) a) Compare hierarchical clustering and k-means clustering. **[6]**

b) What is outlier detection? How clustering can be applied for outlier detection? **[6]**

Q9) a) What is association rules? Explain with example. **[6]**

b) What is the algorithm for association rule? Explain with example. **[6]**

OR

Q10) a) What is FP growth algorithm explain in detail? **[6]**

b) How do you calculate association rule? Explain with example confidence and support calculation. **[6]**

Q11) a) What are different types of R-charts? Explain with syntax. **[6]**

b) List out at least 5 libraries in R that can be used for data visualization. Explain 3 of them briefly. **[5]**

OR

Q12) a) What is scatter plot? Explain with an example of how to create one scatter plot using R libraries? **[6]**

b) How to make multiple plots on to a single page layout in R? Explain with an example.

Give examples of using Clustering to solve real life problems. **[5]**

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

P3205 **[Total No. of Pages : 2**

[5873] - 219

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

OBJECT ORIENTED MODELING & DESIGN

(2019 Pattern) (Semester - IV) (410915)

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 basic building blocks of UML in detail. **[6]**

b) What is procedural and object oriented software design. **[6]**

OR

Q2) a) Explain 4 + 1 view architecture in detail. **[6]**

b) Distinguish between architecture and design. **[6]**

Q3) a) What are the four adornments that apply to associations? **[6]**

b) Explain types of relationships used in a class diagram. **[6]**

OR

Q4) a) What is an object diagram? Explain with example. **[6]**

b) By considering suitable assumptions, draw a class diagram for online shopping system. **[6]**

P.T.O.

Q5) a) Write a short note on package diagram. **[6]**

b) Explain deployment diagrams purpose in OO designing. **[5]**

OR

Q6) a) Comment on UML in web Applications. **[6]**

b) What is component diagram? Where to use it? **[5]**

Q7) a) Write note on communication diagram. **[6]**

b) Draw a timing diagram for ATM System. **[6]**

OR

Q8) a) What are Communication diagrams? What are the notations used for communication diagram? **[6]**

b) Draw sequence diagram for Transaction Management System. Make suitable assumption. **[6]**

Q9) a) Differentiate Service oriented Architecture and Component based Architecture. **[6]**

b) What do you understand by architectural design of a system? **[6]**

OR

Q10) a) What is real time software architecture? **[6]**

b) Describe object oriented software architecture. **[6]**

Q11) a) Explain singleton and factory design model. **[6]**

b) Describe observer design pattern. **[5]**

OR

Q12) a) What is iterator design pattern? **[6]**

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

Total No. of Questions : 12]

SEAT No. : ____

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S.Y. M.C.A. (Engineering) (Semester - IV)

ARTIFICIAL INTELLIGENCE

(2019 Pattern) (410916A) (Elective - I)

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) Define Artificial Intelligence. Explain the Typical Applications of AI. **[6]**

b) What are Intelligent Agents? Explain the Characteristics of Intelligent Agents with the help of suitable diagram. **[5]**

OR

Q2) a) Explain Typical Intelligent Agents. **[6]**

b) Comment on Problem Solving Approach to Typical AI problem. **[5]**

Q3) a) Explain iterative deepening depth first search (DFID) and justify its parameters based on time complexity, space complexity. **[6]**

b) Explain A* Search algorithm with the help of example. **[6]**

OR

Q4) a) Differentiate between uninformed and informed search methods. **[6]**

b) Explain Hill climbing algorithm. Explain Local maxima, Global Maxima and Plateau for an example. **[6]**

P.T.O.

Q5) a) Represent the following sentences into formulas in predicate logic **[6]**

i) John likes all kinds of food.

ii) Apples are food.

iii) Chicken are food.

iv) Anything anyone eats and isn't killed by is food.

v) Bill eats peanuts and is still alive.

vi) Sue eats everything Bill eats.

b) Explain the difference between Procedural vs. Declarative Knowledge. **[6]**

OR

Q6) a) Explain different Facets of Knowledge with examples. **[6]**

b) Write short note on Matching & Control Knowledge. **[6]**

Q7) a) What are the steps involved in solving an NLP problem? **[6]**

b) Compare Supervised, Unsupervised and Reinforcement learning. **[6]**

OR

Q8) a) List the components of Natural Language Processing. **[6]**

b) Explain the stages in Natural Language Processing. **[6]**

Q9) a) What is feedforward and feedback in Artificial Neural network model? **[6]**

b) Explain Biological Neural Network and Artificial Neural network. **[6]**

OR

Q10) a) What is the use of Artificial Neural Network? How can we help artificial neurons in learning? **[6]**

b) What is concept of back propagation for ANN? How error is back propagated? Explain with example. **[6]**

Q11) a) What is the difference between rote learning and meaningful learning? **[6]**

b) What is learning by taking advice in AI? Explain with example. **[5]**

OR

Q12) a) What is supervised learning. Explain with example. **[6]**

b) Write a note on architecture of expert system in artificial intelligence. **[5]**

Total No. of Questions : 12]

SEAT No. :

P3207

[Total No. of Pages : 2

[5873]-222

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

INFORMATION SECURITY

(2019 Pattern) (Semester - IV) (Elective - I) (410916B)

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) Describe Security Policy. **[6]**

b) What are the various threats and vulnerabilities in network model? **[6]**

OR

Q2) a) Write short note on Security and Privacy. **[6]**

b) Explain the Threats and Vulnerability. **[6]**

Q3) a) Describe Data Encryption Standard (DES). **[6]**

b) Discuss block ciphers and methods of block cipher. **[6]**

OR

Q4) a) Write short note on Triple DES. **[6]**

b) Explain limitations of stenography. **[6]**

Q5) a) Explain RSA algorithm in detail. **[6]**

b) Write short note on Kerberos and Cryptography. **[5]**

OR

P.T.O.

Q6) a) Explain Message digest and Kerberos in detail. **[6]**

b) Write short note on Authentication Protocol. **[5]**

Q7) a) Explain IPSec protocols and operations. **[6]**

b) Describe SSL protocol stack in detail. **[6]**

OR

Q8) a) What is the alert protocol in SSL? Explain various alert messages of Alert Protocol in detail. **[6]**

b) Explain electronic mail security. **[6]**

Q9) a) What is a firewall? Explain any one firewalls with example in detail. **[6]**

b) Explain types of IDS in detail. **[6]**

OR

Q10) a) What is Password Management? Explain limitations and challenges. **[6]**

b) What are Trusted Systems in Network Security? Explain Trusted Systems based on different level of security. **[6]**

Q11) a) What is Personally Identifiable Information (PII)? Explain Sensitive vs. Non-Sensitive Personally Identifiable Information. **[6]**

b) Write short note on Cyber stalking and cybercrime. **[5]**

OR

Q12) a) What is the Information Technology Act, 2000? Explain in detail how it is works as data protection laws in India. **[6]**

b) Explain information protection laws in Indian perspective. **[5]**

Total No. of Questions : 12]

SEAT No. :

P3208

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

ANIMATION & GAMING

(2019 Pattern) (Elective - I) (Semester - IV) (410916)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Attempt 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) ***All questions are compulsory.***
4) ***Figures to the right indicate full marks.***

Q1) a) Explain DDA Algorithm of line drawing. **[6]**

b) Explain cathode ray tube (CRT) in detail. **[6]**

OR

Q2) a) Explain Bresenham's circle generation algorithm. **[6]**

b) Explain Shadow mask technique in color CRT monitors. **[6]**

Q3) Explain Animation and different Techniques of animation. **[12]**

OR

Q4) a) Explain principles of Animation. **[7]**

b) Explain uses of Animation. **[5]**

Q5) a) Explain various steps in developing Animation character. **[6]**

b) What are the qualities of good animation character? **[5]**

OR

P.T.O.

Q6) a) Explain essentials of good animation character. **[6]**

b) Explain various steps in developing animation character. **[5]**

Q7) a) Explain Game Architecture in detail. **[6]**

b) What is game? Explain 3D game software architecture. **[6]**

OR

Q8) a) Explain Game development life cycle. **[6]**

b) What is Game Theory? Explain role of graphics in game programming. **[6]**

Q9) a) Explain different types of computer games. **[6]**

b) State and explain different object-oriented concepts in java. **[6]**

OR

Q10) a) What are advantages of writing Game in Java? **[6]**

b) What are prerequisites to run java on system? Explain basic JDK tools in Java. **[6]**

Q11) a) Explain structure of simple game in java. **[5]**

b) Explain actor class and its methods. **[6]**

OR

Q12) a) Which are different state controls in java. **[6]**

b) Explain concept of collision detection. **[5]**

Total No. of Questions : 12]

SEAT No. :

P3209

[Total No. of Pages : 2

[5873]-224

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

INTERNET OF THINGS

(2019 Pattern) (Semester - IV) (Elective-I) (410916D)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

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

Q1) a) Explain the functional layers and capabilities of an IoT solution with a neat diagram. **[6]**

b) Define IoT. Identify and explain in detail about IoT. **[6]**

OR

Q2) a) Explain the physical and logical design of IoT in detail. **[6]**

b) Illustrate the various IoT communication APIs. **[6]**

Q3) a) Explain the generic M2M System Solution with a neat diagram. **[6]**

b) Explain the various emerging IoT applications. **[6]**

OR

Q4) a) Describe M2M value chain with a neat diagram. **[6]**

b) Explain various trends in Information and Communication Technologies. **[6]**

Q5) a) What is the need of Network? And explain in detail the LAN and WAN. **[6]**

b) Discuss in detail about the Aggregation/bus layer. **[5]**

P.T.O.

OR

Q6) a) Explain LoRa WAN standard and alliance MAC Layer and Security. **[6]**

b) What are basic components of sensor network? **[5]**

Q7) a) Write a note on zigbee architecture in IoT. **[6]**

b) Explain SCADA and RFID Protocols. **[6]**

OR

Q8) a) Explain the issues with IoT Standardization. **[6]**

b) Write a note on Unified Data Standards. **[6]**

Q9) a) What is FP7 Project? Explain contribution from FP7 Projects in IoT. **[6]**

b) What are the main types of data aggregation being used in the IoT? **[6]**

OR

Q10) a) Explain Smartie approach for IoT. **[6]**

b) What are the major privacy and security issues in IoT? **[6]**

Q11) a) How IoT can be used in home automation system? **[6]**

b) How IoT is transforming manufacturing? Explain future factory concepts in IoT. **[5]**

OR

Q12) a) What are surveillance applications in IoT? **[6]**

b) How to use IoT for Smart Parking Solution Development? **[5]**

Total No. of Questions : 12]

SEAT No. :

P3216

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

DATA MINING AND BUSINESS INTELLIGENCE

(2019 Pattern) (Semester - V) (510901)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

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

Q1) a) Why is data mining important? List out and explain any three real time applications of data mining. **[6]**

b) List out and Explain in detail Data Mining Techniques and How Businesses Use them. **[6]**

OR

Q2) a) List out and explain Qualitative and Quantitative Data Attributes in Data Mining. **[6]**

b) List out and explain in detail types of similarity and dissimilarity measures used in data mining. **[6]**

Q3) a) Why is Data preprocessing important? List out the quality parameters of data and explain Major Tasks in Data Preprocessing in detail. **[6]**

b) List out and explain in detail. What are the three types of cluster sampling? **[6]**

OR

P.T.O.

Q4) a) List and explain any six methods of Data Transformation in Data Mining. **[6]**

b) What is a histogram how to create the histogram for the given data, different types of the histogram and the difference between the histogram and bar graph in detail. **[6]**

Q5) a) Consider an example with following set of transactions **[6]**

TID	Items bought
T1	A,B,C
T2	A,B,C,D,E
T3	A,C,D
T4	A,C,D,E
T5	A,B,C,D

Find the frequent itemsets using Apriori algorithm. Consider 40% support.

b) Explain the following terms : **[5]**

i) Constraint based rule mining

ii) Closed and maximal frequent itemsets

OR

Q6) a) What is the process of generating association rules from frequent Itemsets described with an example? **[6]**

b) What market basket analysis gives two examples of this application in business? **[5]**

Q7) a) Explain Extract, Transform and load. **[6]**

b) What are the warehouse components? Explain with diagram. **[6]**

OR

Q8) a) Write a short note on OLAP. **[6]**

b) Explain the importance of data mining in BI. **[6]**

Q9) a) Elaborate the parameters for selecting a BI architecture for B2B model. **[6]**

b) What are data marts? Explain with an example. **[6]**

OR

Q10) a) Explain the types of OLAP? Which type of OLAP could be used for e-commerce business and Why? **[6]**

b) What do you mean by Operational Data store? **[6]**

Q11) Enumerate any 4 Business Intelligence tools and mention their pros and cons. **[11]**

OR

Q12) Explain the features of Tableau with its advantages and disadvantages. **[11]**

Total No. of Questions : 12]

SEAT No. :

P3211

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

CLOUD COMPUTING

(2019 Pattern) (Semester - V) (510902)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

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

Q1) a) What are the characteristics of Cloud Computing? **[6]**

b) Draw and explain Cloud Computing Architecture. **[6]**

OR

Q2) a) Explain the types of Cloud in detail. **[6]**

b) List out the Cloud service comparisons of any 3 IaaS. **[6]**

Q3) a) Write note on Database as a service (DBaaS) **[6]**

b) What are the components of Cloud Computing? **[6]**

OR

Q4) a) Write short note on different Cloud storage providers. **[6]**

b) Write short note on platform as a service (PaaS). **[6]**

Q5) a) Explain Open Virtualization Format? **[6]**

b) Explain Types of Hypervisor. **[5]**

OR

P.T.O.

Q6) a) Write a note on Solution Stacks: LAMP and LAPP. **[6]**

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

i) CPU virtualization

ii) Memory virtualization

Q7) a) What are the objectives of resource management in cloud computing & how inter cloud resource management is helpful to the users what seervices it provides? **[6]**

b) What types of applications can run in the cloud? Explain examples of applications that use the cloud? **[6]**

OR

Q8) a) What is resource management also explain resource provisioning and resource scheduling? **[6]**

b) What is AWS (Amazon Web Services) and how does it work? **[6]**

Q9) a) What are the various cloud security mechanism? Explain any one in detail with diagram. **[6]**

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

OR

Q10) a) Explain with suitable diagram Hardened Virtual Server Images. **[6]**

b) What are the six components of PKI? **[6]**

Q11) a) What is the future of cloud computing? **[6]**

b) Explain Cloud with Operating System. **[5]**

OR

Q12) a) Explain Cloud with Internet of Thing. **[6]**

b) Describe in detail Home based Cloud Computing. **[5]**

Total No. of Questions : 12]

SEAT No. :

P3212

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Third Year M.C.A (Engineering)

SOFTWARE TESTING AND QUALITY ASSURANCE

(2019 Pattern) (Semester - V) (510903)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates :

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

Q1) a) Write short note on CMM. **[6]**

b) Define QA and QC. Explain components of Software Quality Assurance System. **[6]**

OR

Q2) a) Write note on Six-Sigma. **[6]**

b) Explain Defect Removal Effectiveness. **[6]**

Q3) a) Explain testing Life cycle. **[6]**

b) Explain the concept of verification and validation. **[6]**

OR

Q4) a) Explain the components of test plan. **[6]**

b) What is test case? Explain with example. **[6]**

Q5) a) What is cyclomatic complexity? Explain with example. **[6]**

b) Write note on Mutation testing. **[5]**

P.T.O.

OR

Q6) a) Explain Boundary Value Analysis and Equivalence partitioning with example. **[6]**

b) Write note on Domain Testing. **[5]**

Q7) a) What is specification based testing? Explain in detail. **[6]**

b) Write a short note on i) System Testing ii) Acceptance Testing **[6]**

OR

Q8) a) What is usability testing? Explain with one example. **[6]**

b) Write a short note on i) GUI Testing ii) Validation Testing **[6]**

Q9) a) Differentiate between manual testing and automated testing. **[6]**

b) Explain various skills needed for software test automation. **[6]**

OR

Q10) a) Explain major requirements for a test tool. **[6]**

b) Write a short note on design & architecture for automation. **[6]**

Q11) a) What is Selenium? Explain its history in brief. **[6]**

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

OR

Q12) a) Explain selenium test design considerations. **[6]**

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

Total No. of Questions : 12]

SEAT No. :

P3213

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T.Y. M.C.A. (Engineering)
OPERATIONS RESEARCH
(2019 Pattern) (Semester - V) (510904)

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.***

SECTION - I

Q1) a) What is Linear Programming Problem? Explain methods to solve it. **[6]**

b) Calcualte the maximal and minimal value of $z = 5x + 3y$ for the following constraints. **[6]**

$x + 2y \leq 14$

$3x - y \geq 0$

$x - y \leq 2$

OR

Q2) a) Give difference between primal and dual in linear programming problem. **[6]**

b) Find dual from primal conversion **[6]**

Min $z = x_1 - 3x_2 - 2x_3$

subject to

$3x_1 - x_2 + 2x_3 <= 7$

$2x_1 - 4x_2 >= 12$

$-4x_1 + 3x_2 + 8x_3 = 10$

and $x_1, x_2 >= 0$ and x_3 unrestricted in sign

P.T.O.

Q3) a) Explain transportation problem with example. **[6]**

b) Obtain an initial basic feasible solution to the following transportation problem by north west corner method. **[6]**

	D	E	F	C	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Required	200	225	275	250	

OR

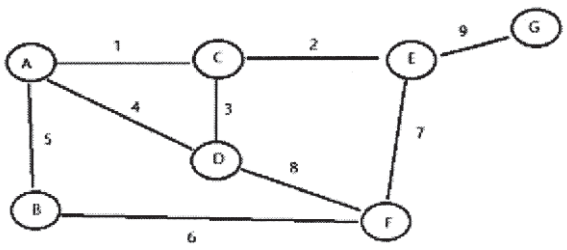
Q4) a) What is Assignment Problem? Explain method to solve it. **[6]**

b) Solve the following assignment problem. Cell values represent cost of assigning job A, B, C and D to the machines I, II, III and IV. **[6]**

		Machines			
		I	II	III	IV
Jobs	A	10	12	19	11
	B	5	10	7	8
	C	12	14	13	11
	D	8	15	11	9

Q5) a) What is Minimum spanning tree? Explain two algorithms to find it. **[6]**

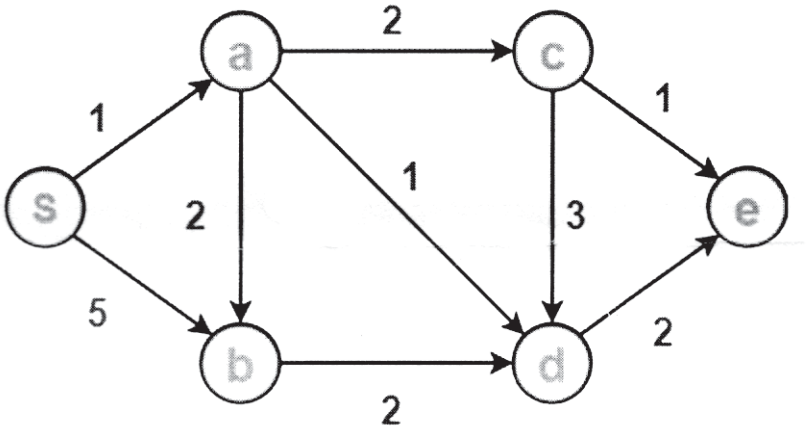
b) Find MST using Kruskal's Algorithm **[5]**



OR

Q6) a) How to implement Dijkstra's Algorithm explain. **[6]**

b) Using Dijkstra's Algorithm, find the shortest distance from source vertex 'S' to remaining vertices in the following graph - **[5]**



Also, write the order in which the vertices are visited.

SECTION - II

Q7) a) From the information given below draw network diagram, determine critical path and compute total floats and free floats **[8]**

Activity	Immediate predecessors(s)	Duration (Months)
A	-	2
B	-	6
C	-	4
D	B	3
E	A	6
F	A	8
G	B	3
H	C, D	7
I	C, D	2
J	E	5
K	F, G, H	4
L	F, G, H	3
M	I	13
N	J, K	7

b) Explain following terms **[4]**

i) Forward and backward pass

ii) Dummy Activity

OR

Q8) a) From the table given below find project duration and draw a network diagram and find critical path of network **[8]**

Activity	Time Estimates (Days)		
	Optimistic	Most likely	Pessimistic
1 - 2	2	5	10
1 - 3	8	10	12
2 - 4	6	12	15
3 - 4	3	7	10
3 - 5	4	8	12
4 - 5	7	10	14
5 - 6	5	8	13
3 - 6	4	7	10

b) Write the difference between CPM and PERT. **[4]**

Q9) a) From the following pay off matrix find **[8]**

i) Maximax

ii) Maximin

iii) Minimax regret strategies

	Economy		
Alternatives	Growing	Stable	Declining
Bonds	40	45	5
Stocks	70	30	-13
Mutual Funds	53	45	-5

Also suggest the best strategy for the investor.

b) Explain Analytic Hierarchy Process **[4]**

OR

Q10) a) A dairy firm wants to determine the quantity of butter it should produce to meet the demand. Past records have shown the following demand patterns **[9]**

Quantity Required (Kg)	No. of days demand occurred
15	6
20	14
25	20
30	80
35	40
40	30
50	10

The stock levels are restricted to the range 15 to 50 kg due to inadequate storing facilities.

Butter costs Rs. 40 per kg and is sold at Rs. 50 per kg.

i) Construct a conditional profit table.

ii) Determine the action alternative associated with the maximization of expected profit.

iii) Determine EVPI.

b) Write a note on decision making under Uncertainty. **[3]**

Q11) a) Write a note on Monte Carlo Simulation. **[4]**

b) A milk dairy records sale of 1-liter packets during 100 days are as follows : **[7]**

Demand	8	9	10	11	12	13	14	15	16	17
No. of Days	5	9	10	15	13	8	11	14	8	7

Using the following random no. simulate the demand for the first 5 days:

[23, 64, 18, 96, 71, 46, 54, 8, 11, 81, 75, 39, 28, 43, 52]

OR

Q12) a) What is simulation? Write merits and demerits of it. **[5]**

b) Explain in brief generation of Random numbers. Generate three random numbers based on multiplicative congruential method using b = 17, c = 111, m = 103, seed = 7. **[6]**

▽▽▽▽

Total No. of Questions : 12]

SEAT No. :

P3214

[Total No. of Pages : 2

[5873]-229

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

MACHINE LEARNING

(2019 Pattern) (Semester - V) (510905A) (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) What is Machine Learning? Explain types of machine learning. **[6]**

b) State any four applications where machine learning is used? **[6]**

OR

Q2) a) What is the need of Dimensionality Reduction in machine learning? How PCA is used for dimensionality reduction? **[6]**

b) Differentiate supervised and unsupervised machine learning. **[6]**

Q3) a) Explain SVM algorithm in detail. **[6]**

b) What is cross validation? **[6]**

OR

Q4) a) What are support vector in SVM? **[6]**

b) What is SVM in machine learning? What are the classification methods that SVM can handle? **[6]**

Q5) a) What do you mean by linear regression? With suitable example, describe how linear regression is used to predict the output for test example/input sample. **[6]**

b) Explain the bias-variance trade-off. **[5]**

P.T.O.

OR

Q6) a) State the assumptions in a linear regression model. **[6]**

b) What do you understand by regularization? **[5]**

Q7) a) Explain nearest neighbor classification in machine learning. **[6]**

b) Differentiate between k means and k medoids algorithms. **[6]**

OR

Q8) a) Explain Apriori algorithm in machine learning with example. **[6]**

b) Write a note on Hierarchical clustering. **[6]**

Q9) a) Write a note on Naive Bayes Classifier. **[6]**

b) Explain Discriminative Learning with Maximum Likelihood with respect to machine learning. **[6]**

OR

Q10) a) Explain Expectation-Maximization methods in ML. **[6]**

b) Write a note on Normal Distribution and its Geometric Interpretation. **[6]**

Q11) a) Write a note on Reinforcement Learning. **[6]**

b) Write a note on Feed Forward Neural Networks. **[5]**

OR

Q12) a) Write a note on Bagging, Randomization and Boosting. **[6]**

b) Explain Sigmoid, Tanh and ReLU Neurons. **[5]**

Total No. of Questions : 12]

SEAT No. :

P3215

[Total No. of Pages : 2

[5873]-230

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

BIG DATA ANALYTICS

(2019 Pattern) (Semester - V) (Elective - II) (510905B)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) Distinguish between Data Science and Business Intelligence? **[6]**

b) Explain characteristics of Big data? **[6]**

OR

Q2) a) Explain challenges of Big Data? **[6]**

b) Explain any 3 applications of Big Data? **[6]**

Q3) a) Differentiate between Supervised learning and Unsupervised learning. **[6]**

b) Explain Time series analysis with example. **[6]**

OR

Q4) a) List the categories of Clustering methods. **[6]**

b) What is Association rule? **[6]**

Q5) a) Explain Content-based filtering in detail. **[6]**

b) Define Social networks and Social Networking mining. **[5]**

OR

Q6) a) Explain Collaborative filtering in detail. **[6]**

b) Why is a “community” in a Social Network Graphs. Explain any one algorithm for finding communities in a Social Graph. **[5]**

Q7) a) Write a short note on any three tools used for data visualization. **[6]**

b) Discuss different types of data visualization techniques? Why visualization is more important? **[6]**

P.T.O.

OR

Q8) a) What are the challenges in visualizing big data and how to overcome them? **[6]**

b) Explain analytical techniques used in Big data visualization. **[6]**

Q9) a) Why is Hadoop used for big data analysis? Explain different features of Hadoop. **[6]**

b) Explain briefly about Hadoop Architecture. **[6]**

OR

Q10) a) Explain Hadoop Eco system with diagram. **[6]**

b) Explain how do we move data in and out of Hadoop. **[6]**

Q11) a) Explain the role of following components in Hadoop system. **[6]**

- Name node.
- Secondary name node.
- Data node.

b) Write about HDFS administration, Monitoring and maintenance. **[5]**

OR

Q12) a) What is the role of driver code, Mapper code and reducer code in a map reduce model with suitable example? **[6]**

b) Explain any 5 Hadoop shell commands. **[5]**

□□□

Total No. of Questions : 12]

SEAT No. :

P3216

[Total No. of Pages : 2

[5873]-231

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

BLOCKCHAIN TECHNOLOGY

(2019 Pattern) (Semester - V) (Elective - II) (510905C)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) How Blockchain is Revolutionizing the Traditional Business Network? Explain with example? **[6]**

b) Explain design principle of blockchain. **[6]**

OR

Q2) a) Explain abstract model for blockchain. **[6]**

b) How PoW works? Explain with diagram. **[6]**

Q3) a) What is hashing? Explain signature schemes, encryption schemes in detail. **[6]**

b) What is SHA 256 Hash? Explain it with example. **[6]**

OR

Q4) a) What is encryption? What is its role in Blockchain? **[6]**

b) Explain elliptic curve cryptography in detail? **[6]**

Q5) a) Describe the use of Bitcoin scripting language. **[6]**

b) What are Merkle trees? How important are Merkle trees in Blockchains? **[5]**

OR

Q6) a) What are the alternatives to Bitcoin consensus? **[5]**

b) Explain the difference between Proof-of-Work and Proof-of-Stake. **[6]**

Q7) a) What is Smart contracts? List some applications of Smart Contracts. **[6]**

P.T.O.

b) Explain any 3 applications of Ethereum. **[6]**

OR

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

b) Explain steps of Smart Contracts Development from a business perspective. **[6]**

Q9) a) List and explain any 3 popular Cryptocurriences. **[6]**

b) How does Bitcoin use in Blockchain? **[6]**

OR

Q10) a) List any 3 cryptographic algorithms. **[6]**

b) Explain crypto wallet. **[6]**

Q11) a) What are different types of Blockchain. **[6]**

b) Explain a real life use case where a block chain is being used. **[5]**

OR

Q12) a) Explain 51% attack. **[6]**

b) Write short note on SNARK. **[5]**

□□□

Total No. of Questions : 12]

SEAT No. :

P7016

[Total No. of Pages : 3

[5873]-301

First Year M.C.A. (Engineering)

DISCRETE MATHEMATICS AND STATISTICS

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

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Neat diagrams must be drawn wherver necessary.***
2) ***Figures to the right indicates full marks.***
3) ***Assume suitable data if necessary.***

Q1) a) How many integers between 1 -1000. **[6]**

i) How many of them are not divisible by 3, nor by 5, nor 7?

ii) How many are not divisible by 5 and 7 but divisible by 3?

b) Using Venn diagram prove or disprove. **[6]**

i) $A \oplus (B \oplus C) = (A \oplus B) \oplus C$

ii) $A \cap B \cap C = A - [(A - B) \cup (A - C)]$

OR

Q2 a) Write the following statement in symbolic forms: **[6]**

i) Indians will win the world-cup if their balling improves.

ii) If you know Java Programming and PHP then you will get a job.

iii) Ram will score good marks in the exam if and only if Ram studies hard.

iv) If either Anil takes mathematics or Aparna takes Biology, then Deepa will take Chemistry.

v) Some students are intelligent, but not hardworking.

vi) Each integer is either even or odd.

b) Find the truth table of following: **[6]**

i) $(p \vee \sim q) \rightarrow q$.

ii) $\sim(p \vee q) \leftrightarrow (p \wedge q)$

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, 1),(3, 3),(4, 4)}

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

b) Function f, g, h are defined on a set X={1,2,3}, f = {1(1,2),(2,3),(3,1)}, g = {(1, 2),(2,1),(3,3)}, h = {(1, 1),(2,2),(3,1)} find f∘g, g∘f, f∘g∘h, f∘h∘g. **[6]**

OR

P.T.O.

Q4 a) Let A = {2, 3, 4, 5, 6} and let R1 , R2 be relations on A such that R1 = {$(a,b)|a–b = 2$} and R2={$(a,b)|a$ +1= b or $a = 2b$} **[6]**

Find the composite relations.

i) R1R2.

ii) R2R1.

iii) R1R2R1.

iv) $R1^2$.

v) R1R22.

b) Let $f(x) = 2x + 3$, $g(x) = 3x + 4$, $h(x) = 4x$ for x € R, where R= set of all real numbers. Find g∘f, f∘g, f∘h, h∘f, g∘h. **[6]**

Q5 a) Two dice are rolled. What is the probability that the sum of the faces will not exceed 7? Given that at least one face shows a 4. **[6]**

b) When a certain defective die is tossed, the numbers from 1 to 6 will appear with the following probabilities: **[5]**

P(1)=2/18, P(2)=3/18, P(3)=4/18, P(4)=3/18, P(5)=4/18, P(6)=2/18.

Find the probability that.

i) an odd number in top.

ii) a prime number is on top.

iii) a number less than 5 is on top.

iv) a number greater than 3 is on top.

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 then will be children. **[6]**

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

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?

Q7) a) List and Explain Axioms of Probability Every Data scientist Should Know? **[6]**

b) One of two boxes contains 4 red balls and 2 green balls and the second box contains 4 green and two red balls. By design, the probabilities of selecting box 1 or box 2 at random are 1/3 for box 1 and 2/3 for box 2. A box is selected at random and a ball is selected at ranodm from it **[6]**

i) Given that the ball selected is red, what is the probability it was selected from the first box?

ii) Given that the ball selected is red, what is the probability it was selected from second box?

OR

Q8) a) In how many different ways can the letters of the word. **[6]**

i) 'LEADING' be arranged in such a way that the vowels always come together.

ii) CORPORATION' be arranged so that the vowels always come together?

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. **[6]**

Q9) a) What are the sampling methods or Sampling Techniques? Explain 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) Explain the Types of Regression and their properties in detail. **[6]**

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

Q11)a) Find the expectation of a random variabable X? use the following data.**[6]**

x	0	1	2	3
$f(x)$	1/6	2/6	2/6	1/6

b) What are the steps of hypothesis testing? Explain Five Steps in Hypothesis Testing. **[5]**

OR

Q12)a) 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.

b) What are the three types of random variables? Expalin in detail. **[5]**

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Total No. of Questions : 12]

SEAT No. :

P7017

[Total No. of Pages : 2

[5873]-302

First Year M.C.A. (Engineering)

DATA STRUCTURES AND ALGORITHMS

(2020 Pattern) (Semester - I) (310902)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) Explain any one Linear & Non Linear Data structure. **[6]**

b) Explain the term complexity of Algorithm. **[6]**

OR

Q2) a) Explain the Triplet representation of Sparce Matrix. **[6]**

b) Explain the term Divide and Conquer for algorithm design. **[6]**

Q3) a) Write a C program to create a simple linked list with 3 modes. **[6]**

b) Explain with example insertion of a node. **[6]**

OR

Q4) a) Explain the reverse operation of linked list. **[6]**

b) Write a note on implementation of Circular Linked List. **[6]**

Q5) a) Write a C program to test stack full and stack empty conditions. **[6]**

b) Write a note on - Applications of Queue as a Data Structure. **[5]**

OR

Q6) a) Explain the code for insertion and deletion from Stack. **[6]**

b) Write a C program to implement Circular Queue. **[5]**

P.T.O.

Q7) a) Can you tell how linear data structures differ from non-linear data structures? **[6]**

b) What is a tree? What are the applications of trees? **[5]**

OR

Q8) a) How to implement a tree concept in data structure using C language? **[6]**

b) Write down the Applications of binary tree in details. **[5]**

Q9) a) Explain the scenarios where you can use Graph concept with suitable example. **[6]**

b) Differentiate depth first search and breadth first search technique in detail. **[6]**

OR

Q10)a) What is spanning tree explain spanning tree in detail with example? **[6]**

b) Demonstrate the use of Dikjtra's Single source shortest path. **[6]**

Q11)a) Which searching technique is best in data structure? Why? **[6]**

b) List out the types of sorting available in Data Structures. **[6]**

OR

Q12)a) What is the purpose of quick sort and advantage? **[6]**

b) Write a program to implement bubble sort concept. **[6]**

Total No. of Questions : 12]

SEAT No. : [ ]

P7007

[Total No. of Pages : 2

[5873]-303

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

Q1) a) Explain terms - Polymorphism, Inheritance, Abstraction. **[6]**

b) Describe the Need of header files in Object-Oriented Programming. **[5]**

OR

Q2) a) State advantages of C++ over C. **[6]**

b) Define comment. Why is it important to write comments in programs? **[5]**

Q3) a) Explain the concept of looping statements with example. **[6]**

b) Create a class staff having fields : Staff_id, name, salary. Write a menu driven program for: (i) To accept the data (ii) To display the data. **[6]**

OR

Q4) a) What is the use of Inline function? Explain with example. **[6]**

b) Write a program to print factorial of given number using special functions constructor & destructor. **[6]**

Q5) a) Write a program to overload binary operators '>' and '<' to compare two strings. **[6]**

b) Explain the types of polymorphism with example. **[6]**

OR

Q6) a) Differentiate between multiple and multilevel inheritance in C++? **[6]**

b) Write a program to overload increment and decrement operator. **[6]**

P.T.O.

Q7) a) What is Friend Class? Explain with example. **[6]**

b) What is Dynamic Binding? **[5]**

OR

Q8) a) What is the use of this pointer? **[5]**

b) Explain the concept of Virtual Function. **[6]**

Q9) a) Why templates are used in C++? How many types of templates are there in C++? **[6]**

b) Write a program to find Largest among two numbers using function template. **[6]**

OR

Q10) a) Write a program to handle exception for "divide by zero". **[6]**

b) What is generic programming? How is it implemented in C++? **[6]**

Q11) a) Discuss the various forms of get( ) function supported by the input stream. How are they used? **[6]**

b) What is a file mode? Describe the various file mode options available. **[6]**

OR

Q12) a) What is input stream and output stream? Explain various methods to open a file. **[6]**

b) Write a program to read a list containing item name, item code, and cost interactively and produce a three column output as shown below. **[6]**

Item Name	Item Code	Cost
Database	1006	550.95
Java Programming	905	99.70

Total No. of Questions :12]

SEAT No. :

P7018

[Total No. of Pages : 2

[5873]-304
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) Write note on Clean room software engineering. **[6]**

b) Explain personal & Team process Model. **[6]**

OR

Q2) a) Explain all levels of CMM. **[6]**

b) Explain the concept of verification and validation. **[6]**

Q3) a) How to prioritize software requirements based on Knao Analysis. **[6]**

b) Explain the use of Use case diagram in Requirement Engineering. **[6]**

OR

Q4) a) Explain class diagram with example. **[6]**

b) Draw state diagram for ATM operations. **[6]**

Q5) a) Write short note on following. **[6]**

i) Pair programming

ii) Test Driven Development

b) Explain Agile methodology for project development? **[5]**

OR

P.T.O.

Q6) a) Write the manifesto for agile software development. **[6]**

b) Explain SCRUM - process flow and scrum roles. **[5]**

Q7) a) Explain the Project Initiation & Projrect Scope Management. **[6]**

b) Explain the Project Estimation & Project Scheduling. **[6]**

OR

Q8) a) Explain the Program Evaluation & Review Technique(PERT) with examples. **[6]**

b) Explain planning Cost Management & types of Cost Estimates. **[6]**

Q9) a) Explain the Project Monitoring & Project Control. **[6]**

b) Explain in brief the Importance of Project Quality Management. **[6]**

OR

Q10)a) Explain the Risk Analysis & Risk Management? **[6]**

b) Explain in brief software Configuaration Management? **[6]**

Q11)a) Define **[6]**

i) Project Leadership.

ii) Leadership Styles.

b) Explain the Approaches to Leadership. **[5]**

OR

Q12)a) Define **[6]**

i) Ethical Leadership.

ii) Ethical Dilemmas.

b) Explain Code of Ethics & Professional Practices. **[5]**

Total No. of Questions : 12]

SEAT No. :

P7263

[Total No. of Pages :2

[5873] - 305A
First Year M.C.A. (Engineering)
INFORMATION SYSTEM AND ENGINEERING ECONOMICS
(2020 Pattern) (Semester - I) (310905)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Anaswer 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 inidcate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) What is the role of Information systems with respect to Indian Railways. **[6]**

b) Define Management and explain the features of Management. **[6]**

OR

Q2) a) Explain Role of Information system in an Educational organization. **[6]**

b) Write short note on: Memorandum of Association (MOA) and Articles of Association (AOA). **[6]**

Q3) a) What do you mean Leveraging Information Systems? **[6]**

b) Write a short note on ICT for Development E-Governance. **[6]**

OR

Q4) a) Explain the concept of Business process Integration along with its types in details. **[6]**

b) Explain knowledge management system? **[6]**

Q5) a) Define MIS, Explain Role of MIS, Structure of MIS based on management activity and functions. **[6]**

b) Write a short note on - Supply Chain Management (SCM). **[5]**

OR

Q6) a) What is Customer Relationship Management? Explain the challenges in Customer Relationship Management. **[6]**

b) Explain Structure of MIS based on Social activity? **[5]**

P.T.O.

Q7) Define **[12]**

i) Open Systems,

ii) Closed systems,

iii) Decision making under certainty,

iv) Decision making under uncertainty

OR

Q8) Explain Decision Types? **[12]**

Q9) a) Explain the various Accounting Concept & Conventions. **[6]**

b) What is financial Accounting & What are the terms used in Accounting? **[6]**

OR

Q10)a) Give Classification of Accounts. State the rules used to Journalize the entry. **[6]**

b) Draw a layout 3 column Cash Book. Explain in brief the importance of maintaining Cash Book Separately. **[6]**

Q11)a) Explain the importance of ratio Analysis in brief. **[6]**

b) What are different overhead costs? Explain in brief. **[5]**

OR

Q12) Explain the Element of Cost. **[11]**

Total No. of Questions : 12]

SEAT No. :

P7008

[Total No. of Pages : 3

[5873]-306

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

DATA BASE MANAGEMENT SYSTEM

(2020 Pattern) (Semester- II) (310912)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) Explain the difference between file systems and DBMS. **[6]**

b) What is DDL and DML statements and explain with example. **[6]**

OR

Q2) a) A bank has many branches, the bank has many customers. A customer can open many different kinds of accounts with the bank. Any customer of the bank can take a loan from the bank. All branches can give loans. Bank has also installed automatic teller machines, from which a customer can withdraw from his/her bank. Draw an ER diagram for the bank. **[6]**

b) Explain the concept of view of data. **[6]**

Q3) a) Solve the following queries by using tables EMP & DEPT. **[6]**

EMP (Empno, Ename, Job, Mgr, Hiredate, Sal, Comm, Deptno)

DEPT (Deptno, Dname, Location)

i) Display the details of all employees who report to BLAKE.

ii) Find out department in which no employee is working.

iii) Find out in which century JAMES joined.

iv) Display the department name which has more than 3 employees in it.

v) Find out details of employees where commission is greater than 7% of salary.

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

OR

P.T.O.

Q4) a) Solve the following queries by creating tables with proper constraints. **[6]**

STUDENT (Membership_No., Name, Course)

BOOK (Book_ID, Category, Title, Author, Price, Status)

BOOK_STATUS (Book_ID, Membership_No., Issue_Date, Return_Date, Fine_Charger, Fine_Paid)

i) Display the books under the category "Networking" currently available in library.

ii) Find the member who has paid maximum fine.

iii) Display all book details which are returned today.

b) Write an explicit cursor which will display employee number and name of all employees make use of the EMP table. **[6]**

EMP (Empno,Ename,Job,Mgr,Hiredate,Sal,Comm,Deptno)

Q5) a) What are constraints? Explain different types of constraints in detail. **[6]**

b) Explain any 5 CODD's rules in detail. **[5]**

OR

Q6) a) What is normalization? Explain all types of normalization. **[6]**

b) State the features of good relational design. **[5]**

Q7) a) Explain the concept of timestamping with proper example. **[6]**

b) Explain transaction management. **[5]**

OR

Q8) a) Explain concept of cascaded rollbacks. **[8]**

b) Explain Shadow Paging. **[3]**

Q9) a) Explain Parallel databases with its types. **[6]**

b) Write a short note on Speed up and scale up. **[6]**

OR

Q10) a) Explain Data server architecture. **[8]**

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

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

b) Explain working of different nodes in HDFS. **[6]**

OR

Q12) a) Explain CRUD operation in Mango DB. **[6]**

b) Explain the concept of Indexing in Mango DB. **[6]**

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Total No. of Questions : 12]

SEAT No. :

P7009

[Total No. of Pages : 2

[5873]-307

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

COMPUTER NETWORK

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

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1)	a)	Explain LAN, MAN, WAN,	**[6]**
	b)	Write short note on Frequency Hopping and Hierarchical topology.	**[6]**
		OR	
Q2	a)	Explain TCP/IP model.	**[6]**
	b)	Explain bridges, switches and routers in detail with diagram.	**[6]**
Q3	a)	Explain Error control and Flow Control in detail.	**[6]**
	b)	Explain stop and wait protocol with suitable example.	**[6]**
		OR	
Q4	a)	Explain sliding window protocol with suitable example.	**[6]**
	b)	Write short note on PPP and HDLC.	**[6]**
Q5	a)	Explain Pure and Slotted ALOHA.	**[6]**
	b)	Describe about CSMA/CD in detail.	**[5]**
		OR	
Q6	a)	Explain in detail Fast Ethernet, Gigabit Ethernet.	**[6]**
	b)	Explain static and dynamic channel allocation.	**[5]**
Q7)	a)	Differentiate between IPv4 and IPv6 addressing.	**[6]**
	b)	Explain Congestion control and QoS.	**[6]**
		OR	
Q8)	a)	Explain Distance Vector and Link state routing protocol.	**[6]**
	b)	Write short note on BGP and NAT.	**[6]**

P.T.O.

Q9) a) Describe Transport Layer Services. **[6]**

b) Explain RTP and SCTP. **[6]**

OR

Q10)a) Discuss in detail about TCP Congestion Control. **[6]**

b) Differentiate between TCP and UDP. **[6]**

Q11)a) Explain DNS with suitable example. **[6]**

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

OR

Q12)a) Explain SMTP and POP3 protocol. **[6]**

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

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Total No. of Questions : 12]

SEAT No. : ____

P7010

[Total No. of Pages : 2

[5873]-308

First Year M.C.A. (Under Engg.)

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) The Java programming language is named JAVA. Why? Explain the Java Terminology and main features of Java in Detail. **[6]**

b) What is final is a keyword in java? Write a Program for Using final with inheritance in Java. **[6]**

OR

Q2) a) List out and explain in Detail types of package in java with Example. **[6]**

b) State the major reasons why an exception Occurs? how Does JVM Handle an Exception explain with java code. **[6]**

Q3) a) What is Thread in Java? Explain Differences between "extending" and implementing" Threads with Example in java. **[6]**

b) List out any six important classes in Java. io package explain with examples. **[6]**

OR

Q4) a) What is Java- Random Accessfile? Explain Constructor and Methods of Random Acess File. **[6]**

b) What is Java Buffered Writer Class? Write a Class declaration, Class constructors and Class methods of Buffered Writer Class. **[6]**

Q5) a) What is Applet? Explain Life cycle of an applet in Detail with Diagram. **[6]**

b) What is an appletviewer in Java? How to create you own Applet Viewer Explain with basic packages of java. **[5]**

OR

Q6) a) Write a program in JAVA AWT in which have shown an awt component button by setting its placement and window frame size. **[6]**

b) Write a Difference between AWT and Swing in Detail with Example. **[5]**

P.T.O.

Q7) a) Expalin JDBC in detail with its definition, use, types, advantages, applications, History. **[6]**

b) Write in detail steps that are used in JDBC, to connect any JAVA application with any relational database. **[6]**

OR

Q8) a) Explain components of JDBC along with implementation. **[6]**

b) What is connection pooling? Where it is used? & how it is created? **[6]**

Q9) a) Explain Sockets, port, Proxy servers in the context of JAVA Programming. **[6]**

b) In JAVA Implementing TCP/IP based Server and Client. **[6]**

OR

Q10)a) Explain Datagram packet, Datagram server and client. **[6]**

b) Explain java.net-networking classes and interfaces **[6]**

Q11)a) Explain Servlet Life cycle in detail with the help of diagram. **[6]**

b) Explain any four JSP Tags with an example. **[5]**

OR

Q12)a) Explain JSP life cycle in detail. **[6]**

b) Explain HTTP Get Request and HTTP Post Request methods. **[5]**

Total No. of Questions : 12]

SEAT No. : ____

P7011

[Total No. of Pages : 3

[5873]-309

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

OPERATING SYSTEMS

(2020 Pattern) (Semester - II) (310915)

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) Describe development of operating system leading to modern operating system. **[6]**

b) Explain virtual machines in detail. **[6]**

OR

Q2) a) What are the functions of operating system? **[6]**

b) Write a short note on 'Shell as a scripting language'. **[6]**

Q3) a) Consider the following set of process with CPU burst time given in milliseconds. **[6]**

Process	Burst Time	Arrival Time
P1	5	1
P2	3	0
P3	2	2
P4	4	3
P5	8	2

Illustrate the execution of these process using FCFS and preemptive SJF. Calculate average turn around time and average waiting time.

b) Draw life cycle of process with neat diagram. **[2]**

c) Distinguish Process and Thread. **[4]**

OR

P.T.O.

Q4) a) Consider the following set of processes with CPU burst time given in milliseconds. **[6]**

Process	Burst Time	Arrival Time	Priority
P1	8	0	4
P2	6	1	6
P3	7	3	3
P4	9	3	1 (Highest)

Illustrate evaluation of these process using non-preemptive SJF and priority preemptive CPU scheduling algorithm. Also calculate average waiting time and turn around time.

b) Define the difference between preemptive and non-preemptive scheduling. **[2]**

c) What are the CPU scheduling criteria? **[4]**

Q5) a) What is the meaning of the term race condition? Describe the requirement of solution to the critical section problem. **[6]**

b) Explain the strategies to deal with deadlock prevention. **[5]**

OR

Q6) a) Explain producer - consumer problem in detail. **[5]**

b) Consider given snapshot of system. A system has 5 processes (P0, P1, P2, P3, P4) and 3 types of resources (A, B, C). Answer the following questions using Banker's algorithm. **[6]**

i) What is the content of need matrix?

ii) Is the system in a safe state? If yes, give safe sequence.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	2	3	2	9	7	5	3	3	2
P1	4	0	0	5	2	2			
P2	5	0	4	11	0	4			
P3	4	3	3	4	4	4			
P4	2	2	4	6	5	5			

Q7) a) Differentiate - Contiguous & Non- contiguous Memory Allocation. **[6]**

b) Explain with example - Best Fit, Worst Fit & First Fit. **[6]**

OR

Q8) a) Explain with example Belady's Anomaly. **[6]**

b) Differentiate - Paging & Segmentation. **[6]**

Q9) a) Write a note on Disk Structure. **[6]**

b) Explain SSTF when track request - 95, 180, 34, 119, 11, 123, 62, 64. Starting from Track no. 50. **[6]**

OR

Q10) a) Differentiate SCAN and CSCAN with example. **[6]**

b) Explain with example any three Files Allocation Methods. **[6]**

Q11) a) Explain the 6 stages of Linux Booting Process. **[6]**

b) Write a note on types of Processes in LINUX. **[5]**

OR

Q12) a) Explain the functions of Kernel in Linux. **[6]**

b) Write a note on File System in LINUX OS. **[5]**

Total No. of Questions : 12]

SEAT No. : ____

P7012

[Total No. of Pages : 2

[5873]-311
F.Y.M.C.A (Engineering)
MOBILE COMPUTING
(2020 Pattern) (Semester-II) (310916) (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 WAP in detail. **[6]**

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

OR

Q2) a) Explain Types of Handoff. **[6]**

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

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

b) Write in brief Wireless networking. **[6]**

OR

Q4) a) Explain mobility Databases. **[6]**

b) What is MAC issues in detail. **[6]**

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

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

OR

Q6) a) Write in brief adaptive clustering for mobile wireless networks. **[6]**

b) Explain Mobile data management issues. **[5]**

Q7) a) Explain J2 ME. **[6]**

b) Explain Palm OS. **[6]**

OR

P.T.O.

Q8) a) Compare the features mobile os: windows and android. **[6]**

b) Explain about UI Layout of android. State the types of layout. Explain in brief two of them. **[6]**

Q9) a) Explain file structure in android OS. **[6]**

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

OR

Q10)a) Write note on Android Application. **[6]**

b) Explain retrieval and sharing : File system in android. **[6]**

Q11)a) Explain GTalk Service. **[6]**

b) Explain in brief SQLite database. **[5]**

OR

Q12)a) Explain Manage network and Wi-Fi connections. **[6]**

b) Explain Android Hardware in details. **[5]**

Total No. of Questions : 12]

SEAT No. : ____

P7013

[Total No. of Pages : 2

[5873]-312
F.Y.M.C.A. (Engineering)
ARTIFICIAL INTELLIGENCE (310916 B)
(2020 Pattern) (Semester-II) (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 in detail types of Artificial Intelligence. **[6]**

b) What are the applications of artificial intelligence? **[6]**

OR

Q2) a) Define Intelligent Agent. What are the characteristics of Intelligent Agent? **[6]**

b) How does AI work? Why is artificial intelligence important? What are the advantages and disadvantages of artificial intelligence? **[6]**

Q3) a) Explain any two uninformed search strategies. **[6]**

b) What are the advantages of breadth first search and depth first search methods? **[6]**

OR

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

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

Q5) a) Distinguish Statistical and probabilistic reasoning. **[6]**

b) What is quantification in AI? What are the 2 types of quantification? **[5]**

OR

Q6) a) Explain TMS (Truth Maintenance System) **[6]**

b) What are the properties for knowledge representation system? **[5]**

P.T.O.

Q7) a) What is the Role of Planning in Artificial Intelligence? Explain Types of planning in detail. **[6]**

b) What is Non Linear planning? Explain constraint posting in detail. **[6]**

OR

Q8) a) Write difference between search and planning in AI. **[6]**

b) Explain hierarchical planning in detail. **[6]**

Q9) a) What is Artificial Neural network? Explain its component in detail. **[6]**

b) Explain Feedforward neural networks in detail. **[6]**

OR

Q10)a) What is working backpropogation algorithm. Explain it in detail. **[6]**

b) Explain various applications of neural network. **[6]**

Q11)a) What is expert system? Explain components of expert system in detail. **[6]**

b) Explain utilization and functionality of expert system. **[5]**

OR

Q12)a) Explain the architecture of Expert systems. **[6]**

b) Explain the steps required for building expert system. **[5]**

Total No. of Questions : 12]

SEAT No. :

P7014

[Total No. of Pages : 2

[5873]-313

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 indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) What is cyber security? Why it is important? **[6]**

b) Write a short note on cyber security fundamentals. **[6]**

OR

Q2) a) What is security policy? What is need of security policy? **[6]**

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

i) Cyber warfare

ii) Cyber Espionage.

Q3) a) What is vulnerability in cyber security? Give few examples of it. **[6]**

b) What is firewall? Explain types of it. **[6]**

OR

Q4) a) Explain Intrusion detection system in detail. **[6]**

b) Write a short note on cryptography. **[6]**

Q5) a) What is malware? How anti malware software works? **[6]**

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

OR

Q6) a) What is NIDS? Explain **[6]**

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

P.T.O.

Q7) a) Explain Symmetric Key algorithm. **[6]**

b) Write short note on Digital Signature. **[6]**

OR

Q8) a) Write short note on Cryptography and Firewalls. **[6]**

b) Explain VPN security protocols in detail. **[6]**

Q9) a) Explain Cyber Security regulations. **[6]**

b) Explain Roles of International law. **[6]**

OR

Q10) a) Describe Cyber security standards. **[6]**

b) Discuss Cyber security policy 2013. **[6]**

Q11) a) Explain Cyber forensics in detail. **[6]**

b) Explain Investigating Information-hiding in cyber forensics. **[5]**

OR

Q12) a) Explain Tracing Internet access and Tracing memory in real-time. **[6]**

b) How to Validating E-mail header information in cyber forensics. **[5]**

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Total No. of Questions : 12]

SEAT No. :

P7015

[Total No. of Pages : 2

[5873]-314

F.Y. MCA (Engineering)

BLOCK CHAIN

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

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) Discuss Byzantine General problem concept with example. **[6]**

b) Explain in detail Digital Signature in blockchain. **[6]**

OR

Q2) a) Explain in details about Hadoop Distributed File System with example. **[6]**

b) Explain secure Hash algorithm and Distributed Hash tables. **[6]**

Q3) a) Briefly discuss what are the different types of Block chains? **[6]**

b) Explain with example Distributed Consensus. **[6]**

OR

Q4) a) List several differences between a public and a private blockchain. **[6]**

b) Identify two major properties of a blockchain network. **[6]**

Q5) a) Explain in detail about Sybil attack with scenarios. **[6]**

b) Explain with example Nakamoto Consensus. **[5]**

OR

Q6) a) Describe the process of PoW. **[6]**

b) Explain Proof-of-work v/s Proof-of-stake protocol. **[5]**

P.T.O.

Q7) a) Define the three major characteristics of money that bitcoin possesses. **[6]**

b) Explain with example Smart Contracts. **[6]**

OR

Q8) a) Explain and Difference between Bit coin block chain and Ethereum Block chain? **[6]**

b) Explain whether sidechains need to be interoperable. **[6]**

Q9) a) What is the double-spending problem and how it is addressed by blockchain technology? **[6]**

b) Describe how blockchain is helpful for e-commerce. **[6]**

OR

Q10) a) Explain in detail types of cryptocurrency. **[6]**

b) List various Block chain applications. Explain block chain application in Health care. **[6]**

Q11) a) What is HyperLedger explain with example. **[6]**

b) Discuss the benefits of Hyperledger. **[5]**

OR

Q12) a) Explain the architecture of Hyper Ledger. **[6]**

b) Explain the relationship between HyperLedger and Blockchain. **[5]**

Total No. of Questions : 12]

SEAT No. : ____

P3217

[Total No. of Pages : 2

[5873]-316
S.Y. M.C.A. (Engineering)
DATA SCIENCE
(2020 Pattern) (Semester - III) (410901)

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

Instructions to the candidates:

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

Q1) a) What is data science? Explain the need of Data Science? **[6]**

b) Differentiate between structured vs. Unstructured Data, Quantiative vs. Categorical data. **[6]**

OR

Q2) a) Write a short note on Big data. **[6]**

b) Explain data science process in detail? **[6]**

Q3) a) What are different Data preprocessing Techniques? Explain the importance of Data preprocessing. **[6]**

b) List any 3 Advantages and 3 Disadvantages of Data Warehouse? **[6]**

OR

Q4) a) What is a Data warehouse? What is the need of a Data warehouse? **[6]**

b) Explain applications of Data warehouses? **[6]**

Q5) a) Explain Naive bayes classifier with algorithm? **[6]**

b) Where regression methods are applied? How does it play an important role in data analysis? **[5]**

OR

P.T.O.

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

b) Explain working of Nearest Neighbor classifier with suitable examples. **[5]**

Q7) a) What is the association rule? What are the applications of association rule mining? **[6]**

b) Define FP growth what are the advantages of FP growth over Apriori Algorithm. **[6]**

OR

Q8) a) What is the purpose of the Apriori algorithm? Explain steps of Apriori algorithm. **[6]**

b) Explain eclat algorithm. **[6]**

Q9) a) Explain evaluation methods for clustering algorithm. **[6]**

b) With reference to Hierarchical Clustering, explain the issue of connectivity constraints. **[6]**

OR

Q10) a) Explain partitioning clustering in detail. **[6]**

b) Explain various Applications of Clustering. **[6]**

Q11) a) Explain techniques of Data Visualization. **[6]**

b) What are the challenges for visualizing data? **[5]**

OR

Q12) a) What is Data Visualization? Explain benefits of Data Visualization. **[6]**

b) Explain types of data visualization. **[5]**

Total No. of Questions : 12]

SEAT No. :

P3218

[Total No. of Pages : 2

[5873]-317

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

WEB TECHNOLOGIES

(2020 Pattern) (Semester - III) (410902)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

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

Q1) a) Differentiate between HTML and HTML 5. **[6]**

b) Define CSS. How it can be used in designing a web page? Explain with a suitable example. **[6]**

OR

Q2) a) Write a code in HTML 5 to design a web page of a career counselling firm. **[6]**

b) Write short notes on i) Web Servers ii) CSS Selectors **[6]**

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

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

OR

Q4) a) What are the features of XML? Explain. Also Explain its applications. **[6]**

b) Write a code in XML for online book store. **[6]**

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

b) Explain properties and methods of Java script. **[5]**

P.T.O.

OR

Q6) a) What are the advantages and draw backs of JavaScript? How it can be used in developing a web page? **[6]**

b) Write a code in JavaScript to validate the fields of a web page having user Registration. **[5]**

Q7) a) Explain the features of AngularJS with the help of a diagram. **[6]**

b) Explain following terms in the context of AngularJS: **[6]**

i) Tables

ii) Forms

OR

Q8) a) Explain AngularJS modules with an example. **[6]**

b) Explain MVC Architecture in detail. **[6]**

Q9) a) Explain object oriented programming (at least 3 features) in PHP. **[6]**

b) Explain Array with suitable example in the context of PHP. **[6]**

OR

Q10) a) Explain file Handling in detail in PHP. **[6]**

b) Explain any 3 library functions of Array manipulation. **[6]**

Q11) a) Explain ASP.NET life cycle in detail. **[6]**

b) Explain Active-X control with respect to ASP.NET. **[5]**

OR

Q12) a) Explain the framework of microsoft ASP.NET? **[6]**

b) Explain managed and Unmanaged code in ASP.NET. **[5]**

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Total No. of Questions : 12]

SEAT No. : [ ]

P3219

[Total No. of Pages : 2

[5873]-318
S.Y. M.C.A. (Engineering)
CLOUD COMPUTING
(2020 Pattern) (Semester - III) (410903)

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

Instructions to the candidates:

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

Q1) a) Explain Cloud Computing Architecture? **[6]**

b) Explain the Advantages and Disadvantages of Cloud Computing? **[6]**

OR

Q2) a) Explain in brief Utility Computing in Cloud Computing. **[6]**

b) Explain the Cloud Types? **[6]**

Q3) Explain the Cloud Computing Services. **[12]**

OR

Q4) Write in brief Comparison of various cloud computing providers/Software's. **[12]**

Q5) a) Explain the Implementation Levels of Virtualization? **[5]**

b) Explain the Virtualization Structures/Tools and Mechanisms? **[6]**

OR

Q6) a) Explain the Virtualization for Data-Center Automation? **[5]**

b) Explain the Standards for Application Developers? **[6]**

P.T.O.

Q7) Explain the Inter Cloud Resource Management? **[12]**

OR

Q8) a) Explain the Google Cloud Applications? **[6]**

b) Explain the Cloud Applications (Social Networking, E-mail, Office Services)? **[6]**

Q9) a) Explain the Encryption in Cloud Security? **[6]**

b) Explain the Hashing in Cloud Security? **[6]**

OR

Q10) a) Explain the Identity and Access Management (IAM) in Cloud Security? **[6]**

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

Q11) a) Commit: "How the Cloud Will Change Operating Systems". **[5]**

b) Explain the Intelligent Fabrics in Cloud Computing. **[6]**

OR

Q12) a) Write in brief about Future of Cloud-Based Smart Devices. **[6]**

b) Explain the Home-Based Cloud Computing? **[5]**

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Total No. of Questions : 12]

SEAT No. : ____

P3220

[Total No. of Pages : 2

[5873]-320

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 indicate full marks.***
3) ***Assume Suitable data if necessary.***

Q1) a) Define the following terms: **[6]**

i) Software Quality ii) Quality Assurance

iii) Quality Control iv) Software Quality Assurance

v) Product Quality vi) Process Quality

b) What are the Components of the Software Quality Assurance System. **[6]**

OR

Q2) a) Describe Quality Assurance Models in details. **[6]**

b) Write a note on Software Quality Assurance Trends. **[6]**

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

b) Write down any 6 test cases for ATM system. **[6]**

OR

Q4) a) List out the steps are implemented in defect management process. **[6]**

b) Illustrate any 6 most important components in test plan. **[6]**

Q5) a) What are the impacts caused by failure in white box testing? **[6]**

b) List out the key characteristics of white box testing techniques in details. **[5]**

OR

Q6) a) Which testing is done using black box methodology? **[6]**

P.T.O.

b) What is black box testing? Explain the types of Black Box Testing. **[5]**

Q7) a) What is integration Testing? Explain Types of Integration testing. **[6]**

b) Write note on Testing Object oriented Software. **[6]**

OR

Q8) a) Explain Usability and accessibility testing. **[6]**

b) Write note on Database Testing. **[6]**

Q9) a) What is software test automation? What are the skills required for it. **[6]**

b) Difference between manual testing and automated testing. **[6]**

OR

Q10) a) What are Challenges in Automation Tracking the Bug. **[6]**

b) Write note on Cypress automation Tool. **[6]**

Q11) a) What is Selenium? Explain Selenium IDE. **[6]**

b) Write note on Selenium WebDriver. **[5]**

OR

Q12) a) Explain Selenium Grid. **[6]**

b) Write note on Selenium RC. **[5]**

□□□

Total No. of Questions : 12]

SEAT No. :

P3221

[Total No. of Pages : 2

[5873]-321

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

BIG DATA ANALYTICS

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

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

Instructions to the candidates:

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

Q1) a) Define what is Big Data? Explain the process of Evolution of Big data from data. **[6]**

b) Explain how processing of Big data become challenging? **[6]**

OR

Q2) a) Explain Data analytic lifecycle? **[6]**

b) What is the difference between data life cycle and data analysis process? **[6]**

Q3) a) What is Cluster Analysis? What are the requirements of cluster analysis? **[6]**

b) Define k-means clustering? Discuss it's uses and applications of it. **[6]**

OR

Q4) a) What is Association rule mining? Define support and confidence in Association rule mining. **[6]**

b) Explain working of Apriori algorithm? Is Apriori supervised or unsupervised? **[6]**

Q5) a) What are Recommenders? What is Dimensionality Reduction? List out the types of Recommender Systems? **[6]**

b) List out the problems on using Recommendation systems. **[5]**

P.T.O.

OR

Q6) a) What type of graph is social network? How does social media uses graph analysis? **[6]**

b) How does clustering of social network graph works? **[5]**

Q7) a) What is big data visualization? What are the challenges in big data visualization? **[6]**

b) What are the two basic types of data visualization? What are the techniques used for visual data representation? **[6]**

OR

Q8) a) What are data visualization tools? And What is the best visualization tool? **[6]**

b) What is big data analytic techniques? What are the challenges in big data visualization? **[6]**

Q9) a) What is Hadoop? Explain with Architecture? **[6]**

b) How does Hadoop works? What are the advantages of Hadoop. **[6]**

OR

Q10) a) What is Hadoop ecosystem? **[6]**

b) Hadoop HDFS Shell Commands? **[6]**

Q11) a) What is HDFS storage? How files are stored in Hadoop? **[6]**

b) What are the 4 important configuration files in Hadoop? **[5]**

OR

Q12) a) What is Job Tracker? What is the role of job tracker and task tracker in MapReduce? **[6]**

b) What is Hadoop cluster configuration? How MapReduce works explain with example? **[5]**

□□□

Total No. of Questions : 12]

SEAT No. : ____

P3222

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[5873]-322

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

MACHINE LEARNING

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

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

Instructions to the candidates:

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

Q1) a) What is supervised machine learning? Explain it in detail. **[6]**

b) What is Machine Learning? Explain Applications of Machine learning. **[6]**

OR

Q2) a) What is the need of dimensionality Reduction in machine learning? How PCA is used for dimensionality reduction? **[6]**

b) What is cross validation? Explain True and False & positive and negative class. **[6]**

Q3) a) What is the Classification Algorithm? What is the need of classification algorithm in Machine learning? Explain types of classification. **[6]**

b) Explain Decision Tree classification algorithm in detail. **[6]**

OR

Q4) a) Why Support vector machines are called as Kernel Machines? Using Gaussian Kernel, describe how non-linear decision boundaries are obtained in SVM. **[6]**

b) Explain with suitable example to predict whether a student will pass or not using Support vector machine. **[6]**

Q5) a) What is over fitting in machine learning? What are the different methods to overcome the over fitting problem. Describe in brief. **[6]**

b) What is the significance of Support Vector Machine Classifier Model with example. **[5]**

P.T.O.

OR

Q6) a) What do you mean by linear regression? With suitable example, describe how linear regression is used to predict the output for test example/ input sample. **[6]**

b) Explain Errors in Machine Learning? Explain Bias and Variance in Machine Learning? Write ways to reduce high bias and high variance in Machine learning. **[5]**

Q7) a) Explain the basic decision tree learning algorithm. **[6]**

b) Illustrate K-means clustering algorithm with example. **[6]**

OR

Q8) a) Compare K-means clustering with Hierarchical clustering techniques. **[6]**

b) Explain K-nearest learning algorithm with example. **[6]**

Q9) a) Explain the features of Bayesian learning methods. **[6]**

b) Explain the probabilistic models with hidden variables. **[6]**

OR

Q10) a) Discuss about the Normal distribution and its Geometric interpretations? **[6]**

b) Write about Probabilistic models for categorical data. **[6]**

Q11) a) What is Ensemble modeling? Discuss about Bagging and Boosting. **[6]**

b) Why is Deep Learning? Explain any 2 applications of Deep learning. **[5]**

OR

Q12) a) Explain the difference between Deep and Shallow networks. **[6]**

b) Discuss in detail about representation of Neural networks. **[5]**

□□□

Total No. of Questions : 12]

SEAT No. : ____

P3830

[Total No. of Pages : 2

[5873]-323

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

Object Oriented Analysis & Design

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

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 4 + 1 view architecture in detail. **[6]**

b) What is UML? Explain role of UML in OO designing. **[6]**

OR

Q2) a) Explain basic building blocks of UML in detail. **[6]**

b) Write a short note on Unified Process. **[6]**

Q3) a) Explain types of relationships used in a class diagram. **[6]**

b) What are the four adornments that apply to associations? **[6]**

OR

Q4) a) What is an object diagram? Explain with example. **[6]**

b) By considering suitable assumptions, draw a class diagram for online shopping system. **[6]**

Q5) a) What is component diagram? Where to use it? **[6]**

b) Explain deployment diagrams purpose in OO designing. **[5]**

OR

Q6) a) Comment on UML in Web Applications. **[6]**

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

P.T.O.

Q7) a) Draw sequence diagram for internet banking transaction. Make suitable assumptions. **[6]**

b) Write note on communication diagram. **[6]**

OR

Q8) a) Write note on state machine diagram. **[6]**

b) Discuss interaction occurrences and fragments in sequence diagram with suitable example. **[6]**

Q9) a) Describe Architectural Design Pattern in brief. **[6]**

b) Differentiate Service Oriented Architecture and Component based Architecture. **[6]**

OR

Q10) a) What is client server architecture. **[6]**

b) Explain the impact of real time system architecture. **[6]**

Q11) a) What are the difference between a static class and a singleton class? **[6]**

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

OR

Q12) a) What are the types of design patterns? **[6]**

b) Describe observer design pattern. **[5]**

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Total No. of Questions : 12]

SEAT No. : ____

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

INTERNET OF THINGS

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

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

Instructions to the candidates:

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

Q1)	a)	What is IoT & write the characteristics of IoT?	**[6]**
	b)	Differentiate physical design of IoT, Logical design of IoT?	**[6]**
		OR	
Q2)	a)	Explain the Functional blocks of IoT?	**[6]**
	b)	Explain the Communication models & API of IoT.	**[6]**
Q3)	a)	Explain the Software define Network in M2M.	**[6]**
	b)	Explain the Network Function Virtualization in M2M.	**[6]**
		OR	
Q4)	a)	What is Machine to Machine also write its key features.	**[6]**
	b)	Write the Difference between IoT and M2M.	**[6]**
Q5)	a)	What is Wireless medium access issues in IoT.	**[6]**
	b)	What is MAC protocol survey in IoT.	**[5]**
		OR	
Q6)	a)	What is Sensor deployment & Node discovery in IoT.	**[6]**
	b)	What is Data aggregation & dissemination in IoT.	**[5]**
Q7)	a)	Differentiate between M2M and WSN protocols.	**[6]**
	b)	Explain the concept of protocol standardization.	**[6]**

P.T.O.

OR

Q8) a) Differentiate between SCADA and RFID protocols. **[6]**

b) Explain Zigbee architecture in detail. **[6]**

Q9) a) Explain smartie approach of IoT. **[6]**

b) Write short note on smart cities via data aggregation. **[6]**

OR

Q10) a) Explain BACNet protocol in details. **[6]**

b) Explain security, privacy, and trust in IoT-data platforms for smart cities. **[6]**

Q11) a) Explain future factory concepts of IoT. **[6]**

b) Explain use IoT enabled systems in health sector. **[5]**

OR

Q12) a) How home automation can be carried out with IoT. **[6]**

b) Explain IoT based smart parking system. **[5]**

□□□