

Total No. of Questions : 12]

SEAT No. :

P778

[Total No. of Pages : 4

[6006]-11

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 side indicate full marks.*
- 3) *Assume Suitable data if necessary.*

Q1) a) Out of a total of 130 students, 60 are wearing hats, 51 are wearing scarves, and 30 are wearing both hats and scarves.

Out of 54 students who are wearing sweaters, 26 are wearing hats, 21 are wearing scarves, and 12 are wearing both hats and scarves. Everyone wearing neither a hat nor a scarf is wearing gloves. **[6]**

- i) How many students are wearing gloves?
- ii) How many students not wearing a sweater are wearing hats but not scarves?
- iii) How many students not wearing a sweater are wearing neither hat nor a scarf?

b) Prove the following statement by mathematical induction. **[6]**

$$P(n) : (1^3 + 2^3 + \dots + n^3) = n^2 (n+1)^2 / 4$$

OR

Q2) a) 100 Sportsmen were asked whether they play which game : cricket, Hockey, Football. The results are: **[6]**

45 play cricket , 38 play Hockey, 21 play Football, 18 play Cricket and Hockey, 9 play Cricket and Football, 4 play Football and Hockey and 23 play none of these.

Draw a venn diagram that will show the results of the survey and determine the number of sportsmen who play:

- i) Exactly one of the games
- ii) Exactly two of the games

b) Prove the following expressions using venn diagram. **[6]**

i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

ii) $(A \cap B)' = A' \cup B'$

P.T.O.

- Q3) a)** Explain the following Terms with Example. [6]
- i) Injective Function
 - ii) Bijective Function
 - iii) Surjective Function.
- b) Given a relation $R = \{(1, 2), (2, 3), (3, 4), (2, 1)\}$ on $A = \{1, 2, 3, 4\}$. Find the transitive closure of R by Warshall's algorithm. [6]

OR

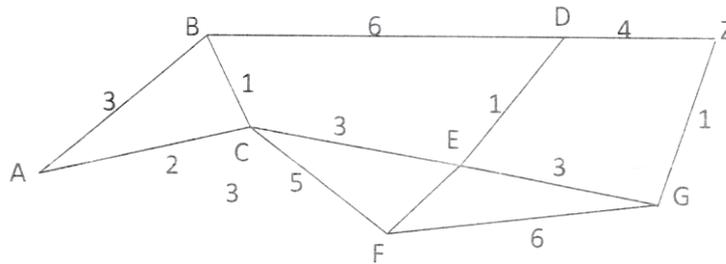
- Q4) a)** if $x = \{1, 2, 3, \dots, 7\}$ and $R = \{(x, y) \mid x - y \text{ is divisible by } 3\}$. Show that R is an equivalence relation. Draw the digraph of R . [6]
- b) Let $f(x) = 2x + 3$, $g(x) = 3x + 4$, $h(x) = 4x$ for $x \in \mathbb{R}$, where \mathbb{R} = set of all real numbers. Find gof , fog , foh , hof , goh , hog . [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. [5]
- b) A box contains 6 white balls. Find the number of ways, 4 balls can be drawn from the box if [6]
- i) two must be white
 - ii) all of them must have the same colour

OR

- Q6) a)** How many arrangements of the word **INSTRUCTOR** are there in which there are exactly two consonants between successive pairs of vowels? [6]
- b) i) Suppose repetitions are not permitted, then how many 4 digit numbers can be formed from the six digits 1,2,3,5,7,8?
- ii) How many such a numbers are less than 4000?
 - iii) How many numbers in (i) are even?
 - iv) How many numbers in (ii) are odd?
 - v) How many of the numbers in (i) contain both the digits 3 and 5? [5]

- Q7) a)** Find Shortest path between A-Z for the given graph; using Dijkstra's algorithm. **[6]**



- b) Define the following terms: **[6]**
- i) Edge connectivity
 - ii) Isomorphic Graph
 - iii) Complete Graph

OR

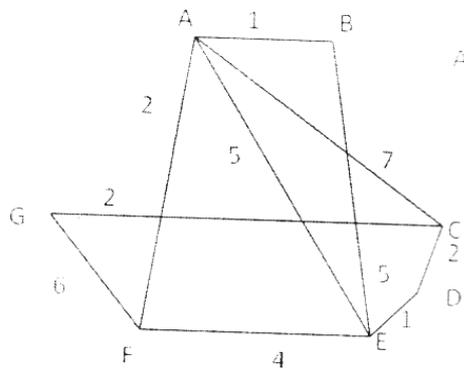
- Q8) a)** Define Directed Graph with suitable example. **[6]**
- b) Determine the number of regions defined by a connected graph with 6 nodes and 10 edges. Draw the graph. **[6]**

- Q9) a)** A tree has $2n$ vertices of degree 1, $3n$ vertices of degree 2 and n vertices of degree 3. Determine the number of vertices and edges in the tree. **[6]**
- b) Explain Prim's Algorithm with example. **[6]**

OR

- Q10) a)** Define **[6]**
- i) Full Binary Tree
 - ii) Rooted Tree
 - iii) Center of tree
 - iv) Fundamental cut set

- b) Give the stepwise construction of minimum spanning tree for the following graph using Kruskal's algorithm. [6]



- Q11)a) Explain the following terms with examples [6]

- i) Ring
- ii) Integral Domain
- iii) Field.

- b) Let $R = \{0, 60, 120, 180, 240, 300\}$ and $*$ = binary operation so that for a and b in R , $a * b$ is overall angular rotation corresponding to successive rotation by a and by b . Show $(R, *)$ is a group. [5]

OR

- Q12)a) Explain the following terms. [6]

- i) Monoids
- ii) Sub-group
- iii) Group codes.

- b) Consider the set $A = \{1, 3, 5, 7, 9, \dots\}$ i.e. a set of odd positive integers. Determine whether A is closed under : [5]

- i) Addition
- ii) Multiplication



Total No. of Questions : 12]

SEAT No. :

P-779

[Total No. of Pages : 2

[6006]-12
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 side indicate full marks.*
- 3) *Assume Suitable data if necessary.*

- Q1)** a) Explain data structure with different types of it? [6]
b) What is a sparse matrix? How it is represented in triplet format. [6]

OR

- Q2)** a) What are two dimensional arrays? Explain row major and column major representation of array storage. [6]
b) Differentiate between linear and non linear data structures. [6]

- Q3)** a) Explain Linked List as Abstract Data Type with diagram? [6]
b) Explain delete operation in doubly linked list with diagram? [6]

OR

- Q4)** a) Explain Linked List types with diagram. [6]
b) Explain insert operations in singly linked list with diagram? [6]

- Q5)** a) How stacks are represented using sequential organization? Which one is better? Explain with examples. [6]
b) How stacks are useful to implement using recursion process? Explain with application [5]

OR

P.T.O.

- Q6)** a) How to perform infix to pre fixed expression conversion using stacks? [6]
b) Write short notes on : [5]
i) Multiple stacks
ii) Eight queens problem

- Q7)** a) How to define Queues Using Arrays? What are limitations of singular queue? [6]
b) Give detail explanation of Array implementation of priority queue? What are applications of priority queue? [6]

OR

- Q8)** a) Explain Circular Queue with example? [6]
b) Explain queue implementation using linked list? Explain with diagram en-queue and de-queue operations? [6]

- Q9)** a) Differentiate between trees and graph data structure? [6]
b) How tree traversing takes place? Explain all 3 tree traversing techniques? [6]

OR

- Q10)**a) How to represent graph using adjacency matrix and adjacency list?[6]
b) Explain graph traversing methods with pseudo code. [6]

- Q11)**a) Apply binary search on following data and show step by step working 12, 15, 17, 21,26,36,39,45,48,54,59,64. To search key 15 in it. [6]
b) Compare Bubble sort, Insertion sort and Selection sort techniques.[5]

OR

- Q12)**a) Write Quick sort algorithm and explain with example. [6]
b) How sentinel search algorithm works? Discuss the limitations of linear search? [5]



Total No. of Questions : 12]

SEAT No. :

P-780

[Total No. of Pages : 2

[6006]-13

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

OBJECT ORIENTED PROGRAMMING

(2019 Pattern) (Semester - I) (310903)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Neat diagram must be drawn wherever necessary.*
- 2) *Figure to the right indicates full marks.*

Q1) a) Explain - Need of Object Oriented Programming. [6]

b) Explain the structure of Bottom up approach. [6]

OR

Q2) a) Write down the Syntax and Structure of C++ Programming language. [6]

b) Define comment. Why is it important to write comments in programs? [6]

Q3) a) Write the various operators with example used in C++. [5]

b) Write a C++ program to explain Constructor and destructor. [6]

OR

Q4) a) Describe with examples Inline function and static data member. [5]

b) Write a C++ program to explain the term Array of objects. [6]

Q5) a) Explain the term class in inherited Publicly, Privately and Protectedly. [6]

b) Write a note on overloading and overriding with example. [6]

OR

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

b) We know that a private member of a base class is not inheritable. Is it anyway possible for the objects of a derived class to access the private members of the base class? If yes, how? Remember, the base class cannot be modified. [6]

P.T.O.

Q7) a) Demonstrate with suitable example the use of polymorphism with a Friend function. [6]

b) What is virtual function? Why do we need virtual functions? [5]

OR

Q8) a) Illustrate the concept of dynamic binding with suitable example. [5]

b) Explain the concept of this pointer. [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) Write a structure of template 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) Write a note on - seekg(), tellg(), seekp(), tellp(). [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. :

P781

[6006]-14

[Total No. of Pages : 2

F.Y. M.C.A. (Engineering)
PRINCIPLES OF PROGRAMMING
(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) Explain software development process in detail. **[6]**

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

OR

Q2) a) What is the difference between internal documentation and external documentation. **[6]**

b) What is an algorithm? What are the advantages of writing an Algorithm
[6]

Q3) a) Explain User-defined types and abstract data types. **[6]**

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

OR

Q4) a) Discuss selection and iterative structures in detail. **[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) What is efficiency of an algorithm with example? [6]
b) Write algorithm for Generating Prime numbers? [6]

OR

- Q8)** a) Write algorithm for generating Pascal triangle? [6]
b) State the Difference Between Procedural and Non-procedural Language? [6]

- Q9)** a) How to calculated complexity of algorithm? Explain with example. [6]
b) Write notes on. [6]
i) Big O notation
ii) Ω notation
iii) Φ notation

OR

- Q10)**a) Write algorithm of linear search and calculate best, worst and average case complexity of it? [6]
b) Write notes about time complexity? [6]

What is the time complexity of following code:

```
int a = 0, i = N;  
while (i > 0)  
{  
a+=i;  
i/=2;  
}
```

- Q11)**a) How array data structure is useful in sequential storage? Explain any 3 applications of array data structure? [6]
b) Explain step by step bubble sort working? [5]

OR

- Q12)**a) How binary search is superior to linear search technique? Discuss limitations of Binary search. [6]
b) Write notes on Database management system. [5]



Total No. of Questions : 12]

SEAT No. :

P-782

[Total No. Of Pages : 2

[6006]-15
F.Y.M.C.A. Engineering
MANAGEMENT THEORY AND PRACTICES
(Semester-I) (2019 Pattern) (310905)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

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

Q1) a) What are various skills of manager? [6]

b) Discuss contribution of Henry Fayol to the management science. [6]

OR

Q2) a) Define management. Explain different functions of management. [6]

b) Discuss contribution of F.W. Taylor to the development of management.[6]

Q3) a) Explain the difference between formal and informal organisation. [6]

b) Draw block diagram and explain Matrix and Project structure of organisation. [6]

OR

Q4) a) Differentiate between MOA and AOA in detail [6]

b) Draw block diagram and explain Line and Staff organisation. [6]

P.T.O

- Q5)* a) Explain Hersey and Blanchard theory. [6]
b) Explain importance of leadership in an organization. [5]

OR

- Q6)* a) Explain Black and Moutan's theory. [6]
b) What is Group? Explain the types of group. [5]

- Q7)* a) Explain TQM & discuss its techniques [6]
b) Explain in detail motivation theory X,Y & Z. [6]

OR

- Q8)* a) Define motivation & discuss the process of motivation in brief. [6]
b) Write short notes on Re-engineering Empowerment. [6]

- Q9)* a) Describe the role of MIS in academic structure. [6]
b) Explain supply chain management in brief. [6]

OR

- Q10)* a) Explain the role of MIS in Personal management. [6]
b) Discuss different activities function of MIS in brief. [6]

- Q11)* a) Explain decision making in detail. [6]
b) Write short notes on:
i) Open system
ii) Closed system [5]

OR

- Q12)* a) Discuss Herbert Simpson model in detail. [6]
b) Explain different types of decision making. [5]



Total No. of Questions : 12]

SEAT No. :

P-783

[Total No. of Pages : 3

[6006]-16

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

PROBABILITY AND STATISTICS

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

- Q1)** a) Define probability and explain the concept of sample space and event. [6]
- b) A pair of dice is thrown find the probability of getting the sum. [6]
- i) More than nine
 - ii) Multiple of 3
 - iii) Divisible by 3 or 4

OR

- Q2)** a) State and prove Bayes' Theorem. [6]
- b) From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there on the committee. In how many ways can it be done? [6]
- Q3)** a) What is sampling explain the types of sampling. [6]
- b) Below data gives the information of heights of persons calculate mean, median, mode, variance and standard deviation.
heights = [168, 170, 150, 160, 182, 140, 175, 191, 152, 150] [6]

OR

- Q4)** a) Write a note on regression and there methods. [6]
- b) What are the types of population in statistics? Explain with example. [6]

P.T.O.

- Q5)** a) Write a note on Geometric Distribution. [5]
 b) A die is thrown 3 times. If getting a 6 is considered as success find the probability of atleast 2 success. [6]

OR

- Q6)** a) Write a note on Binomial Distribution. [5]
 b) Find p for a Binomial variate X if $n = 6$ and $9P(X = 4) = P(X = 2)$. [6]

- Q7)** a) The p.d.f of a continuous random variable X is given by [6]
 $f(x) = kx, \quad 2 \leq x \leq 4$
 i) Find k
 ii) $P[2 \leq x \leq 3]$
 iii) $P[x \geq 3]$

- b) Prove : $\text{COV}[X, Y] = E[XY] - \{E[X] * E[Y]\}$. [6]

OR

- Q8)** a) A joint probability distribution of a pair of random variables is given by the following table [6]

Y/X	1	2	3
1	0.1	0.1	0.2
2	0.2	0.3	0.1

Find :

- i) Conditional distribution of X given $Y = 1$
 ii) $P[(X + Y) < 4]$
 iii) Marginal Distribution of X
 iv) Conditional Distribution of Y given $X = 2$
 b) What is continuous random variable and probability density? [6]
- Q9)** a) What is significance testing? How does it differ from hypothesis testing? [6]
 b) Explain r*c test for independence. [6]

OR

- Q10) a)** Explain the terms : **[6]**
- i) Interval estimate
 - ii) Unbiased estimate
 - iii) Efficient estimate
 - iv) Confidence limit
- b) What is P value of test? How do we compute P value for two tailed test? **[6]**

- Q11) a)** Kinder Land Child Care uses a c-chart to monitor the number of customer complaints per week. Complaints have been recorded over the past 20 weeks. Develop a control chart with three-sigma control limits using the following data : **[5]**

Week	Number of Complaints	Week	Number of Complaints
1	0	11	4
2	3	12	3
3	4	13	1
4	1	14	1
5	0	15	1
6	0	16	0
7	3	17	2
8	1	18	1
9	1	19	2
10	0	20	2
Total			30

- b) What is control chart? Name the types of control charts and explain them in brief. **[6]**

OR

- Q12) a)** Explain Statistical Quality Control with its advantages and limitations. **[6]**
- b) Explain r*c test for independence. **[5]**



Total No. of Questions : 12]

SEAT No. :

P784

[Total No. of Pages : 3

[6006]-17

F.Y.M.C.A. (Semester - II)

ENGINEERING

System Programming & Operating System

(2019 Pattern) (310911)

Time : 3 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 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]

P.T.O.

- 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]

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]

x x x

Total No. of Questions : 12]

SEAT No. :

P785

[Total No. of Pages : 2

[6006]-18

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 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) *Use of electronic pocket calculator is allowed.*
- 5) *Assume Suitable data if necessary.*

- Q1)** a) Explain components of DBMS along with its Architecture. [6]
b) Write difference between DBMS and File Processing System [6]

OR

- Q2)** a) Explain database Schema with example. [6]
b) Discuss different layers of data abstraction. [6]

- Q3)** 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. [8]
b) Explain with example strong and weak entities. [4]

OR

- Q4)** a) Solve the following queries by using tables EMP & DEPT. [8]
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) What are constraints? Explain Different types of constraints in detail?[4]

P.T.O.

Q5) a) Choose a database application of your choice. Design a schema and apply different types of constraint on Schema. [8]

b) Explain Indexing in database with example. [3]

OR

Q6) a) State and Explain all the DDL statements with syntax and examples. [8]

b) Describe the use of Super key in database design. [3]

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) Explain difference between stored procedure and function with example. [6]

Q9) a) What is the need of normalization? Explain 3NF 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) Write short note on :Non Relational Database system. [6]



Total No. of Questions : 12]

SEAT No. :

P786

[Total No. of Pages : 2

[6006]-19

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

JAVA PROGRAMMING

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

Q1) a) Explain features of java. [6]

b) What is the use of Data types? Explain Different data types in Java. [6]

OR

Q2) a) What is an array? How to create one Dimensional array with example.[6]

b) What is String? Explain different string methods with example. [6]

Q3) a) What is Method Overloading? Write a program in Java which calculate area of circle, triangle and rectangle with the help of method overloading. [6]

b) What is Static variable? Explain static methods with the help of example. [6]

OR

Q4) a) What is Interface? How to create interface with in java. Write a program to read and print employee information using interface. [6]

b) Write a program that create package with name maths operation it contain one interface called operation and that implements by a class called math. Interface contains add, sub, multiply, div etc abstracts method. [6]

Q5) a) What is thread in Java? Explain life cycle of thread with example. [6]

b) What is exception handling in java? How to handle exception in java?[5]

OR

Q6) a) Create user define exception minimum balance & use it in a bank operation program. [6]

b) Explain the following terms: [5]

- i) Interthread communication
- ii) Thread synchronization
- iii) Thread priority

P.T.O.

Q7) a) What is Applet? Write down steps to create simple applet & Draw simple geometry shapes in Applet. [6]

b) Why do we need swing in java? Explain any 3 swing packages in java. [6]

OR

Q8) a) Write a program using applet to draw oval and rectangle within triangle. [6]

b) What is java layout manager? Explain any two layout manager with example. [6]

Q9) a) Explain various stream classes in java. [6]

b) Accept name of the file from the user. Open this file and display its contents on the screen. Use file character stream. [6]

OR

Q10)a) What is interactive input and output in java. [6]

b) Explain methods of Print Writer class. How to append a text in a file.[6]

Q11)a) Explain J2EE Architecture. [6]

b) Explain SQL Exception and it's method with example. [5]

OR

Q12)a) What is JDBC? Write steps to connect any java application with the database in java using JDBC. [6]

b) Write a java program to create an application which will perform following operation on student data. (using JDBC). [5]

i) Insert

ii) delete



Total No. of Questions : 12]

SEAT No. :

P-787

[Total No. of Pages : 2

[6006]-20

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

COMPUTER ORGANIZATION

(310914) (2019 Pattern) (Semester - 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) Explain Binary, Octal, Decimal & Hexadecimal number System. [8]
b) Prove De Morgan's Theorem. [4]

OR

- Q2)** a) Explain AND, OR, NAND, NOR Gate with truth table. [4]
b) Convert the following: [8]
i) $(10010)_2 = (?)_{16}$
ii) $(658)_{10} = (?)_8$
iii) $(757)_8 = (?)_2$
iv) $(7AE4)_{16} = (?)_{10}$
v) $(547)_8 = (?)_{16}$

- Q3)** a) Explain Multiplexer and De-multiplexer in Detail. [6]
b) What is full-adder? Explain in detail. [6]

OR

- Q4)** a) Explain Half Adder with truth table. [6]
b) Differentiate between Combinational and Sequential Logic? [6]

P.T.O.

- Q5)** Write short note on: [4]
- a) EEPROM
 - b) EPROM
 - c) ROM
 - d) RAM
 - e) Explain DMA interfacing with processor. [7]
- OR
- Q6)** a) Differentiate with SDRAM and DRAM. [4]
b) Explain the Cache Memory. Why it is needed? [7]
- Q7)** a) Explain Instruction fetch and Execution cycle in detail. [8]
b) Differentiate between RISC and CISC. [4]
- OR
- Q8)** a) Explain any three types of address modes with example. [8]
b) What is CPU bus? Explain its types. [4]
- Q9)** a) Explain the SuperScalar microprocessor. [7]
b) Explain - Super Scalar concept. [4]
- OR
- Q10)** a) Explain Pentium Architecture with Diagram. [5]
b) Explain the components of Microprocessor. [6]
- Q11)** a) Explain the Cluster Architecture. [6]
b) Write Short note on: [6]
 - i) SISD
 - ii) SIMD
- OR
- Q12)** a) Write Short note on: [5]
 - i) MIMD
 - ii) MISD
b) Explain the parallel processing in multiprocessor organization. [7]

x x x

Total No. of Questions : 12]

SEAT No. :

P-1410

[Total No. of Pages : 2

[6006]-21

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 side indicate full marks.*
- 3) *Assume Suitable data if necessary.*

Q1) a) What is HTML? What is the importance of using HTML for web related applications? [6]

b) Write short note on XML style Sheet and Namespaces. [6]

OR

Q2) a) Write short note on HTML Text Formatting Tags, with example. [6]

b) Explain the use of XML with CSS and DTD. [6]

Q3) a) Explain event handling in JavaScript with the help of example [6]

b) Explain the concept of DOM with all objects and their important properties and methods in JavaScript. [6]

OR

Q4) a) Explain Alert, Confirm and prompt dialog boxes in JavaScript with suitable example. [6]

b) How HTML elements are used in jQuery with example. [6]

Q5) a) Explain the life cycle of Servlet. Also write not on doGet() and doPost(). [6]

b) Explain the features of implicit objects in JSP. Describe any 4 types of implicit objects. [5]

P.T.O.

OR

- Q6)** a) What is servlet? What is the use of Servlet? How servlet is loaded?[6]
b) Write short note on Expression, Declaration, and Scriptlet in JSP. [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 Angula JS. [6]
b) What is the difference between the ForwardAction and the IncludeAction 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. :

P-788

[Total No. of Pages : 3

[6006]-22

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 side indicate full marks.
- 3) Assume Suitable data if necessary.

Q1) a) Differentiate between RTGS and NEFT. [6]

b) Differentiate between Net Banking and Mobile Banking. [6]

OR

Q2) a) Explain online and offline transactions in a bank branch. [6]

b) Explain the Loan disbursement scheme in detail. [6]

Q3) a) Explain the function of Reserve Bank of India. [6]

b) What is the role of Nabard? [6]

OR

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

b) Write Short notes working of Linked accounts. [6]

Q5) a) Explain concept of security used in Core Banking System. [6]

b) Write short notes on : [5]

i) Smart card ECS

ii) Intra Banking

OR

P.T.O.

- Q6)** a) What do you mean by Cheques explain all types of cheques? [6]
 b) Explain ATM system and its working in detail. [5]
- Q7)** a) Differentiate between Book Keeping and Accounting. [6]
 b) Explain in detail Journal and ledger format. [6]

OR

Q8) Prepare Balance Sheet from the following information

XYZ Traders Trial Balance as at 31st Mar 2016

[12]

A/c Head	Dr. (Rs.)	Cr. (Rs.)
Capital		2,50,000
Cash in Hand	40,000	
Cash at Bank	30,000	
Closing Stock	20,000	
Fixed Assets	1,80,000	
Bills Receivable	21,000	
Bills Payable		2,000
Sundry Debtor	52,000	
Sundry Creditor		25,000
Liabilities for expenses		10,000
Drawings	12,000	
Investments	15,000	
P&L A/c		70,000
Bank Overdraft		13,000
Total	3,70,000	3,70,000

- Q9)** From the following information relating to XYZ Ltd. you are required to find out.
- a) Contribution per unit.
 b) P/V Ratio.
 c) BEP(units and in rupees).
 d) What will be the selling price per unit if BEP down to 25,000 units?
 Fixed expenses Rs. 1,50,000/-, selling price per unit Rs.15, variable cost per unit Rs. 10. [12]

OR

Q10)a) Explain the importance of ratio Analysis in brief. [6]

b) What are different overhead costs? Explain in brief. [6]

Q11)a) Explain Operating (Working Capital) Cycle. [6]

b) Explain the importance of Working Capital. [5]

OR

Q12) Explain the various factors affecting the Working Capital requirement. [11]



Total No. of Questions : 12]

SEAT No. :

P-789

[Total No. of Pages : 2

[6006]-23

S.Y. M.C.A. (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 Ad-hoc Network & OSI Model. [6]

b) Explain TCP/IP Mode. [6]

OR

Q2) a) Explain Manchester and Differential Manchester Encodings. [6]

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

Q3) a) Explain Service to Network layer. [6]

b) Explain Sliding Window Protocol & Types. [6]

OR

Q4) a) Explain Error Control & Flow Control. And Differentiate them. [8]

b) Define PPP & HDLC. [4]

Q5) a) Explain Channel Allocation: Static and Dynamic. [6]

b) Explain Multiple Access Protocols. [5]

OR

Q6) a) Explain IEEE 802.3 Standards and Frame Formats. [6]

b) Explain IEEE 802.15 & IEEE 803.16. [5]

P.T.O.

- Q7)** a) Write a note on Network Layer Services. [6]
b) Explain Switching techniques. [6]

OR

- Q8)** a) Differentiate between IPv4 and IPv6. [6]
b) Write a note on NAT, CIDR, ICMP protocols. [6]

- Q9)** a) Explain Flow control and buffering in Transport layer. [6]
b) Write a note on TCP and UDP for Wireless network. [6]

OR

- Q10)** a) Write a note on TCP Timer management, TCP Congestion Control. [6]
b) Explain Connection establishment, Connection release in Transport layer. [6]

- Q11)** a) Explain any three Application Layer Protocols. [6]
b) Differentiate between Client Server and Peer to Peer Paradigm. [5]

OR

- Q12)** a) Explain how Communication using TCP and UDP take place in Application layer? [6]
b) Write a note on Dynamic Host Control Protocol (DHCP). [5]



Total No. of Questions : 12]

SEAT No. :

P790

[6006]- 24

[Total No. of Pages : 2

S.Y. M.C.A (Engineering)
PYTHON PROGRAMMING
(2019 Pattern) (Semester - III) (410904)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

Q1) a) Write a Python program to find area of circle by using constant variable. [6]

b) Describe the features and applications of python Programming. [6]

OR

Q2) a) What are different types of operators in python explain each with example. [6]

b) Are indentations important in python? Justify. [6]

Q3) a) Write a Python program to get the largest number from a list. [6]

b) Explain break, continue, pass and else statement with example. [6]

OR

Q4) a) Write a Python program to get the 4th element from last in a tuple. [6]

b) List out the difference between list and dictionary in python. [6]

Q5) a) What are commonly used modules in python explain any one module in details. [6]

b) Write a note on string slicing along with examples. [5]

OR

Q6) a) What is list write down all built in functions associated with list? [6]

b) Write a note on command line arguments. [5]

Q7) a) Explain different data types in Python with example. [6]

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

OR

P.T.O.

Q8) a) What is a tuple data in python? Write a Python program to create a tuple of numbers and print one item. [6]

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

Q9) a) How the file handlings take care in Python programming? Explain different file handling modes? [6]

b) Explain operations on binary files in python? Write a Python program to modify the content of binary file? [6]

OR

Q10)a) With proper example state various file types in python. Also write its creation functions? [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) Define a Class in Python? Create employee class with name, age, position, and the year they started working. [6]

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

OR

Q12)a) Explain Multi-threading in Python? [6]

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



Total No. of Questions : 12]

SEAT No. :

P-791

[Total No. Of Pages : 2

[6006]-25
S.Y.M.C.A. (Engineering)
Management Information System
(Semester-III) (2019 Pattern) (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) What is the purpose of an MIS? [6]**
- b) What are the different types of MIS? [6]

OR

- Q2) a) What are the levels of decision making in MIS? [6]**
- b) What is the purpose of MIS [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]

P. T. O

- Q5)** a) Explain Evolution of an information system. [6]
b) Write note on decision making and MIS [5]

OR

- 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]

OR

- Q10)** a) What strategies do you follow to successfully apply management information systems to a business? [6]
b) Describe some common challenges in the MIS implementation. [6]

- Q11)** a) Write a difference between Open System and Closed System. [6]
b) How MIS useful in Organisation? [5]

OR

- Q12)** a) Write short note on-Detailed system design and Implementation. [6]
b) Explain Implementation, evaluation and maintenance of MIS [5]



Total No. of Questions : 12]

SEAT No. :

P-1411

[Total No. of Pages : 2

[6006]-26

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

**SOFTWARE ENGINEERING & PROJECT
MANAGEMENT**

(2019 Pattern) (Semester - IV) (410912)

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) Define : [6]

- i) Software Process.
- ii) Software Engineering Practice
- iii) Software Myths.

b) Explain Personal and Team Process Models. [6]

OR

Q2) a) Explain tools DevOps and JIRA. [6]

b) Explain Extreme Programming Practices. [6]

Q3) a) Explain Functional and Nonfunctional requirements. [6]

b) Explain User and System requirements. [6]

OR

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

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

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

b) Explain SCRUM - process flow and scrum roles. [5]

OR

P.T.O.

- Q6)** a) Explain Extreme Programming XP value, Process. [6]
b) Write note on pair programming in Agile. [5]

- Q7)** a) What is software metric? Give its classification. [6]
b) Define software testing metrics. Explain importance of it. [6]

OR

- Q8)** a) Explain LOC metric in detail. [6]
b) Write a short note on FP metric. [6]

- Q9)** a) Define WBS. Explain with example. [6]
b) Differentiate between PERT chart and GANTT chart. [6]

OR

- Q10)** a) What is project Scheduling? Explain any one scheduling technique in detail. [6]
b) What is cost estimate? Give tools and techniques used for the same. [6]

- Q11)** a) Explain project quality management tools in detail. [6]
b) What is SCM in software engineering? Explain its need. [5]

OR

- Q12)** a) Explain common types of project risk in detail. [6]
b) Write a short note on Forward Engineering. [5]



Total No. of Questions : 12]

SEAT No. :

P792

[Total No. of Pages : 2

[6006]-27

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

MOBILE COMPUTING

(2019Pattern) (Semester-IV) (410913)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Questions 1 or 2, 3 or 4, 5 or 6, 7 or 8, 9 or 10, & 11 or 12.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data if necessary.*

Q1) a) Explain the concept of HLR and VLR with suitable diagram. **[6]**

b) Explain the value added services of GSM. **[6]**

OR

Q2) a) What is cellular network? Explain with suitable diagram. **[8]**

b) What are the different mobile phone technologies? Compare the 1G, 2G, 2.5G, & 3G. **[4]**

Q3) a) Explain the Bluetooth architecture with suitable diagram. **[6]**

b) Explain the WAP architecture with suitable diagram. **[6]**

OR

Q4) a) What are different MAC issues. **[6]**

b) Explain mobility in wireless LAN. **[6]**

Q5) a) Explain the CODA file system. **[6]**

b) Write short notes on disconnected operations. **[5]**

OR

Q6) a) Explain the different data management issues. **[6]**

b) Write short notes on data replication. **[5]**

Q7) a) What is Android OS? Explain the architecture of android. **[6]**

b) Explain the different features of Android. **[6]**

OR

P.T.O.

- Q8)** a) What are the different user interface layouts of Android? Explain each in short. [6]
b) What are the different steps of creating views? Explain in short. [6]

- Q9)** a) Explain in details about location based service? [6]
b) What is Adapter? Explain with Example. [6]

OR

- Q10)**a) Explain the file system structure of Android. [6]
b) Explain the different file management tool in android? [6]

- Q11)**a) Write a program for sending and receiving data message on Android.[6]
b) Explain how binding and making connections with database in android[5]

OR

- Q12)**a) Write a program for sending Email on Android OS. [6]
b) Explain how mobile instant messaging works. [5]



Total No. of Questions : 12]

SEAT No. :

P793

[Total No. of Pages : 2

[6006]-28

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

DATA SCIENCE WITH R

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

Time : 2½ Hours]

[Max. Marks : 75

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 Data Science? Explain Need of Data Science? [6]

b) Explain the Role of Data Scientist for successful analytic project? [6]

OR

Q2) a) Write short note on Big data. [6]

b) Explain Data science process in detail? [6]

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

b) What are the different data types/objects 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]

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]

P.T.O.

- Q7)** a) What is Clustering in Data Science? What are different types of clustering? Applications of Clustering explain in brief. [6]
b) Explain in detail partitional Clustering algorithms (any two). [6]

OR

- Q8)** a) Explain K-means Clustering Algorithm in detail. [6]
b) What is the difference between DBSCAN and K-means. [6]

- Q9)** a) How do you apply an Apriori algorithm to a dataset? [6]
b) What is Frequent Pattern Mining and How Does it Support Business Analysis? [6]

OR

- Q10)** a) Explain Association rules in detail along with effectiveness. [6]
b) What is ECLAT? Explain its working and advantages over apriori algorithm. [6]

- Q11)** a) What is 'R' Tool in data science? What its use also explain its features in detail. [6]
b) How to plot a graph in R? [5]

OR

- Q12)** a) What are different packages and graphics can be used in R? [6]
b) How to plot Pie chart in 'R' tool explain with an example along with all formatting parameters of pie chart in 'R'. [5]



Total No. of Questions : 12]

SEAT No. :

P794

[Total No. of Pages : 2

[6006]-29

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

OBJECT ORIENTED MODELING AND DESIGN

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

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 procedural and object oriented software design methods in detail. [6]

b) Differentiate requirement and analysis. [6]

OR

Q2) a) How requirements are transferred to design? [6]

b) Explain the design view in 4 + 1 view architecture. [6]

Q3) a) Explain the following Adornment on association: Association Names, Qualified Association, Association Classes, N-ary Association. [6]

b) Give reverse and forward engineering of a Class diagram. [6]

OR

Q4) a) Explain Realization and Dependency relationship with example. [6]

b) Draw an Object diagram for Hotel Management System. [6]

Q5) a) How deployment diagram will be useful to distributed client and server system? [6]

b) Draw package diagram for College Admission System. [5]

OR

Q6) a) Describe component diagram. Give three types of components. [5]

b) How UML is useful in embedded systems? [6]

Q7) a) Draw sequence diagram for the following scenario: [6]

i) Search the phone number in directory.

ii) Dial the number and place the call.

b) What are Communication diagrams? What are the notations used for communication diagram. [6]

OR

P.T.O.

- Q8)** a) Explain Partitions and Regions with respect to Activity diagram. [6]
b) Draw a timing diagram for ATM System. [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. :

P-795

[Total No. of Pages : 3

[6006]-30

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

ARTIFICIAL INTELLIGENCE

(410916A) (2019 Pattern) (Semester - IV)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

Q1) a) What is artificial intelligence (AI)? How does AI work? Why is artificial intelligence important? What are the advantages and disadvantages of artificial intelligence? [6]

b) Explain Problem Solving in AI. [6]

OR

Q2) a) Explain in detail types of Artificial Intelligence. [6]

b) Discuss and explain in detail applications of AI in real world. [6]

Q3) a) Explain Depth Bounded DFS. [6]

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

OR

Q4) a) Explain Hill Climbing Algorithm in Artificial Intelligence. [6]

b) Explain any one optimal search algorithm in detail. [6]

P.T.O.

- Q5)** a) What are the differences between forward reasoning and backward reasoning in AI? [6]
- b) What is Logic Programming? How to solve any problem using logic programming? [5]

OR

- Q6)** a) What is knowledge representation and What are types of knowledge?[6]
- b) Explain in detail Pattern Matching in AI. [5]

- Q7)** a) What is Supervised Learning? Explain with a Neat Diagram how it works.[6]
- b) What are the various unsupervised learning algorithms? Which are the best unsupervised learning algorithms that explain in detail how it is Best? [6]

OR

- Q8)** a) Explain in detail Different types of machine translation in NLP. [6]
- b) Explain in detail five phases of NLP involve in Machine Learning. [6]

- Q9)** a) Explain in detail Types of Boltzmann Machines with Example. [6]
- b) List out the ANN applications and Explain any Two applications in detail.[6]

OR

- Q10)**a) What is the Error Back propagation Learning Algorithm? How does Error Back propagation Work? Explain in detail. [6]
- b) Explain the Neural networks Terms in detail. [6]
- i) AI
- ii) DL
- iii) Gradient Descent

Q11)a) What are the advantages and disadvantages of rote learning? Explain in detail. [6]

b) What are the main components of the expert system? Explain Four main components of the expert system in detail. [5]

OR

Q12)a) List out some popular unsupervised learning algorithms explain any two algorithms in detail. [6]

b) What is learning by taking advice? How is 'learning from examples' different from explanation based learning discussed in detail? [5]

x x x

Total No. of Questions : 12]

SEAT No. :

P796

[Total No. of Pages : 2

[6006]-31

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

INFORMATION SECURITY

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *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 diagram must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data if necessary.*

Q1) a) Write short note on security and privacy. **[6]**

b) Explain operational model of network security. **[6]**

OR

Q2) a) Explain the various threats and vulnerabilities in network model. **[6]**

b) What are the different terminologies used in network model. **[6]**

Q3) a) Explain symmetric and Asymmetric Encryption with example. **[6]**

b) Explain cryptography and substitution ciphers. **[6]**

OR

Q4) a) Explain AES algorithm with example. **[6]**

b) What are stenography applications and limitations? **[6]**

Q5) a) Describe working of RSA algorithm. **[6]**

b) How digital signature is implemented. **[5]**

OR

Q6) a) Explain working of Deffie -Hellman key Exchange. **[6]**

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

Q7) a) What are the key components of internet mail architecture? **[6]**

b) Explain pretty good privacy. **[6]**

OR

Q8) a) Differentiate between IPV4 and IPV6. **[6]**

b) Explain different services provided by the SSL record protocol. **[6]**

P.T.O.

- Q9)** a) What is a firewall? Explain its design principles and types with example. [6]
b) Describe types of IDS. [6]

OR

- Q10)** a) Define Intrusion. Explain Intrusion detection system with neat diagram. [6]
b) What are the Benefits and limitations of firewall? [6]

- Q11)** a) Explain personally identifiable information (PII) [6]
b) Write a short note on cyber stalking. [5]

OR

- Q12)** a) Describe cybercrime with Indian perspective. [6]
b) What is PII confidentiality safeguards? [5]



Total No. of Questions : 12]

SEAT No. :

P797

[Total No. of Pages : 2

[6006]-32

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

ANIMATION AND GAMING

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

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

Q1) a) Write the difference between random and raster display? [6]

b) Explain scan line polygon filling algorithm. [6]

OR

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

b) Write applications of computer Graphics. [6]

Q3) a) Describe basics principles of animation. [6]

b) Write a note on types of animation. [6]

OR

Q4) a) What is Animation? Explain uses of animation. [6]

b) Describe techniques of animation. [6]

Q5) a) Explain guidelines for character designing in animation. [6]

b) Explain principles of Design in Animation. [5]

OR

Q6) a) Describe essentials & qualities of good animation characters. [6]

b) Write a note on Anatomy & Body language in animation. [5]

Q7) a) Write a note on game design, explain game design process. [6]

b) Explain types of games. [6]

OR

Q8) a) Explain gaming platforms in game design. [6]

b) What is game development? Explain types of Games. [6]

P.T.O.

- Q9)** a) Write a note on game programming-Languages and Architecture. [6]
b) What is game development? Explain game development life cycle. [6]

OR

- Q10)**a) Explain Game GUI. [6]
b) Write a note on Game AI? Explain game API. [6]

- Q11)**a) Explain current java game development. [6]
b) Explain basic game structure. [5]

OR

- Q12)**a) Write a note on blocks v/s non blocking loops. [6]
b) Write a note on rendering. [5]



Total No. of Questions : 12]

SEAT No. :

P798

[Total No. of Pages : 2

[6006]-33

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

INTERNET OF THINGS

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

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 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) Explain design challenges in IoT. [6]

b) Write a short note on development challenges in IoT. [6]

OR

Q8) a) Explain various security problems with IoT devices in detail. [6]

b) Comment on lack of regulation about IoT. [6]

P.T.O.

- Q9) a)** Explain best practices for securing IoT devices. [6]
b) Explain IoT threats organization must address. [6]

OR

- Q10)a)** Give an overview of privacy challenges organizations can face regarding IoT. [6]
b) Write a short note on privacy in IoT. [6]

- Q11)a)** Explain impact of IoT on industry automation. [6]
b) What is IoT cloud? Explain few most popular cloud platforms for IoT development. [5]

OR

- Q12)a)** What is smart grid? How it is enabled by IoT? [6]
b) Give benefits of amazon IoT platform. [5]



Total No. of Questions : 12]

SEAT No. :

P799

[Total No. of Pages : 2

[6006]-34

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

DATA MINING & 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 side 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

- 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) What are the types of main discretization techniques in data mining? Explain in detail. [6]
- b) Consider the following dataset and find out frequent itemsets and generate association rules for them (I) minimum support count is 2. (II) minimum confidence is 60%. [6]

P.T.O.

TID	Items
T1	I1, I2, I5
T2	I2, I4
T3	I2, I3
T4	I1, I2, I4
T5	I1, I3
T6	I2, I3
T7	I1, I3
T8	I1, I2, I3, I5
T9	I1, I2, I3

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? [6]

- Q7)** a) What is classification and prediction explain with an example? [6]
b) Which classification algorithm is best for prediction and analysis in data mining? [5]

OR

- Q8)** a) Which neural network is used for prediction? [6]
b) What is rule-based classification give an example? [5]

- Q9)** a) What is clustering and outlier analysis in data mining? [6]
b) What is K means and K-Medoids? [5]

OR

- Q10)**a) What are outlier detection methods? [6]
b) What is agglomerative and divisive hierarchical clustering? [5]

- Q11)**a) What is the application of data mining in business intelligence? [6]
b) What are the four components of business intelligence? [6]

OR

- Q12)**a) What are the key features of business intelligence functionality? [6]
b) What are data mining applications in retail & telecom industry? [6]

✱ ✱ ✱

Total No. of Questions : 12]

SEAT No. :

P-800

[Total No. of Pages : 2

[6006]-35

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 side 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

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

b) Explain the following. [5]

- i) CPU virtualization
- ii) Memory virtualization

P.T.O.

Q7) a) What are the objectives of resource management in cloud computing & How inter cloud resource management is helpful to the users what services 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 mechanisms? 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. :

P-801

[Total No. of Pages : 3

[6006]-36

T.Y. 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 diagram must be drawn wherever necessary.*
- 2) *Figure to the right indicates full marks.*
- 3) *Assume suitable data if necessary.*

- Q1)** a) Describe defect removal effectiveness. [6]
- b) What is Software Quality Assurance? Explain various activities of SQA. [6]

OR

- Q2)** a) What is product quality? Compare product quality and process quality. [6]
- b) Differentiate Quality Control and Quality Assurance with example. [6]

- Q3)** a) What are the components of Test Plan? Explain test environment and test deliverables in detail. [6]
- b) Differentiate verification and validation. [6]

OR

- Q4)** a) Describe testing life cycle in details. [6]
- b) What is test case? Write test cases for pin change service and withdraw amount from ATM system. [6]

P.T.O.

- Q5)** a) Explain Graph based testing with example. [6]
b) Write an equivalence partition test case and boundary value analysis test case for following example. [5]

A program calculates LIC premium as follows :

- i) Base premium for all ages is 0.50
ii) based on age group additional monthly premium has to be paid

Age group	Additional premium
Under 35	1
35 to 59	2
Above 60	3

OR

- Q6)** a) Draw control flow graph for the program to check whether given number is odd or even. Calculate cyclomatic complexity of the same program. [6]
b) Explain Mutation testing with example. [5]

- Q7)** a) Write a note on : [6]
i) Integration testing
ii) System testing
iii) Acceptance testing
b) What are the different types of Performance Testing? [6]

OR

- Q8)** a) Explain Accessibility testing and its importance in the present scenario. [6]
b) Describe the following terms in details : [6]
Object Oriented Testing, Web Based Applications Testing and Database Testing

- Q9)** a) What is Automation testing? List out Some automation testing tools. [6]
b) What are different design patterns in automation? Which architecture is use for automation testing? [6]

OR

- Q10)** a) List out the Challenges in Automation Tracking the Bug in any application. [6]
b) Write down any 6 difference between manual testing and automated testing. [6]

- Q11)** a) What is Selenium and what is composed of? [6]
b) How will you find an element using Selenium? [5]

OR

- Q12)** a) List out the test types that are supported by Selenium? [6]
b) What factors will you consider for giving an estimate for an automation project? [5]



Total No. of Questions: 12]

SEAT No. :

P802

[6006]-37

[Total No. of Pages :5

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) Solve the following linear programming problem by using Graphical method. **[7]**

$$\text{Max } Z = 2 X_1 + X_2$$

Subject to

$$X_1 + 2X_2 \leq 10$$

$$X_1 + X_2 \leq 6$$

$$X_1 - X_2 \leq 2$$

$$X_1 - 2X_2 \leq 1$$

$$X_1, X_2 \geq 0$$

b) Find the dual of following primal. **[5]**

$$\text{Max } Z = 3X_1 + 5 X_2$$

Subject to

$$2 X_1 + 6X_2 \leq 50$$

$$3X_1 + 2X_2 \leq 35$$

$$5 X_1 - 3 X_2 \leq 10$$

$$X_2 \leq 20$$

$$X_1, X_2, \geq 0$$

OR

P.T.O.

Q2) a) Solve the following linear programming problem using Big M simplex method. [10]

$$\text{Min } Z = 60X + 80 Y$$

Subject to

$$X \leq 400$$

$$Y \geq 200$$

$$X + Y = 500$$

$$X, Y > 0$$

b) Define the term feasible solution and optimal solution. [2]

Q3) a) Solve the following assignment problem. [8]

Jobs	Machines				
	A	B	C	D	E
1	11	17	8	16	20
2	9	7	12	6	15
3	13	16	15	12	16
4	21	24	17	28	26
5	14	10	12	11	13

b) What is Degeneracy in Transportation model? Explain. [4]

OR

Q4) Solve the following Transportation problem to find IBFS by [12]

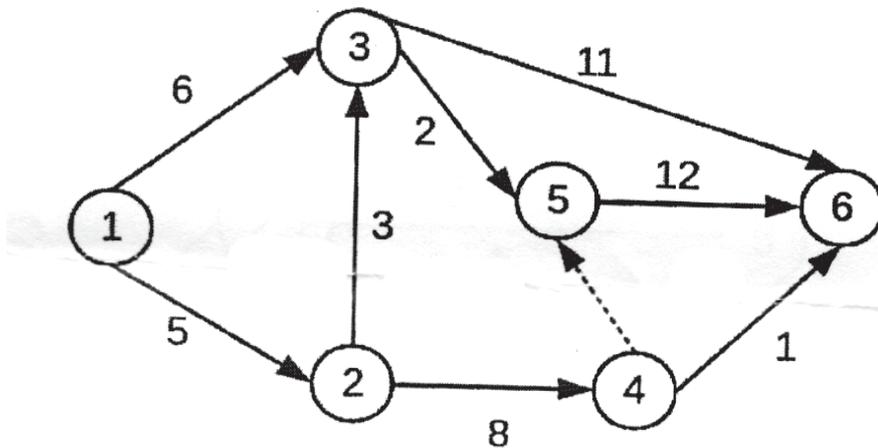
i) North west corner method

ii) VAM

iii) Least cost method

Sources	D1	D2	D3	D4	D5	Supply
\Destination						
S1	2	11	10	3	7	4
S2	1	4	7	2	1	8
S3	3	9	4	8	12	9
Demand	3	3	4	5	6	21

- Q5) a) Determine the critical path for the following project network using forward and backward pass. [8]



- b) Write short note on PERT. [3]

OR

- Q6) a) In a factory there are seven jobs to perform, each of which should go through two machines A and B. The processing times (in hours) for the jobs are as given below. [8]

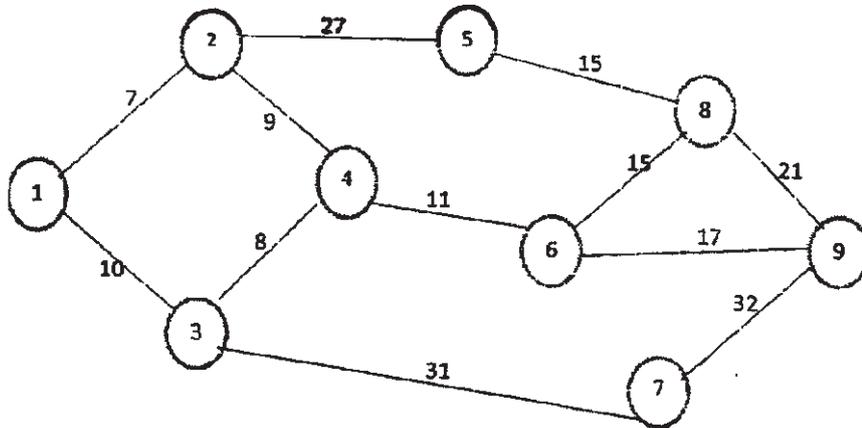
Determine the sequence of the jobs that will minimize the total elapsed time and also idle time of machines.

Machines	Jobs						
	1	2	3	4	5	6	7
A	3	12	15	6	10	11	9
B	8	10	10	6	12	1	3

- b) Write short note on PERT. [3]

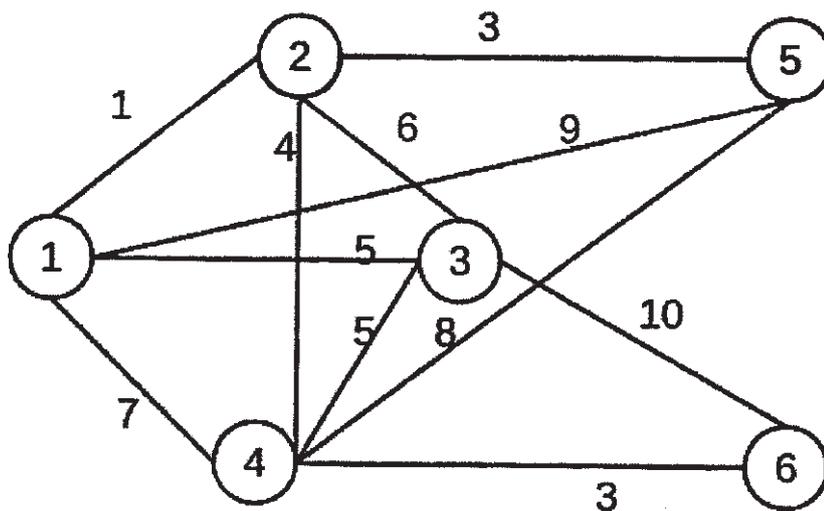
SECTION-II

- Q7) a) Write algorithm of shortest path model by Flyod. [5]
b) Find the shortest distance between node 1 to node 9 by using Dijkstra's algorithm for the given Distance network. [7]



OR

- Q8) a) Write short note on Goal Programming. [5]
b) Draw the minimum spanning tree and calculate shortest distance. [7]



Q9) Estimated levels of scales (units)

[12]

Strategies	N1	N2	N3
S1	7,00,000	3,00,000	1,50,000
S2	5,00,000	4,50,000	0
S3	3,00,000	3,00,000	3,00,000

Which strategy should be concern executive choose the basis of

- i) Maximin
- ii) Minimax
- iii) Maximax
- iv) Laplace

OR

Q10)a) What is Decision Making Under Risk. Explain Expected value criterion.

[6]

b) Explain Decision Making under Certainty using AHP.

[6]

Q11)a) Explain the three most common methods for collecting observations in simulation.

[7]

b) What are radom numbers? Why they are called pseudo random

[4]

OR

Q12)a) What are merits and demerits of simulation?

[4]

b) A bakery keeps stock of popular brand of cake. Previous experience shows that the daily demand pattern for the item with associated probabilities is given below.

[7]

Daily Demand	0	10	20	30	40	50
Probability	0.01	0.20	0.15	0.50	0.12	0.02

Use the following sequence of random numbers to simulate the demand for next 10 days. Also the average demand per day.

Random no. : 25 39 65 76 12 05 73 89 19



Total No. of Questions : 12]

SEAT No. :

P-803

[Total No. Of Pages : 2

[6006]-38
T.Y.M.C.A. (Engineering)
Machine Learning
(2019 Pattern) (Semester-V) (510905A)

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]

P.T.O

- 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]

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 Nearest Neighbor Classification algorithm. [6]
b) Explain different Distance based clustering algorithms with an example. [6]

OR

- Q8)** a) Explain Tree Based Models. [8]
b) What are Impurity Measures? [4]
Q9) a) Explain Naive Bayes classification. [8]
b) Explain Normal Distribution. [4]

OR

- Q10)** a) Define Gaussian Mixtures. [6]
b) Define the terms Conditional Probability, Joint Probability, Probability Density function. [6]
Q11) a) Explain Ensemble learning. [6]
b) Explain Reinforcement Learning. [5]

OR

- Q12)** a) Explain Feed Forward Neural Networks. [6]
b) Explain Sigmoid, Tanh and ReLU Neurons. [5]

Total No. of Questions : 12]

SEAT No. :

P-804

[Total No. Of Pages : 2

[6006]-39
T.Y.M.C.A. (Engg.)
Big Data Analytics (Elective - II)
(Semester-V) (510905B) (2019 Pattern)

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 best practices in Big Data analytics? Explain with example. **[6]**

b) Examine in detail the trends and technology in big data. **[6]**

OR

Q2) a) Discuss the use of Big Data Analytics in Business with suitable real world example. **[6]**

b) Short note on Business Intelligence. **[6]**

Q3) a) Write short note on support vector machine? **[6]**

b) Outline the reasons to choose and cautions in k-means analysis. **[6]**

OR

Q4) a) Explain in details in which application k-means clustering can be used? **[6]**

b) Explain Apriori algorithms for frequent item set using candidate generation? **[6]**

P. T. O

- Q5)** a) Define following terms related to recommendation system: [6]
i) Support ii) Confidence iii) Frequent item sets [5]
b) Short note on social network graphs.

OR

- Q6)** a) Write 3 applications of association rules? [6]
b) Short note on direct discovery of communities. [5]

- Q7)** a) What do you mean by graph data visualization? Explain in details.[6]
b) What are the main software and hardware components required for computer graphics? [6]

OR

- Q8)** a) What are some common issues encounter when working with large amounts of data for visualization? How to overcome it? [6]
b) What is bar graph and pie chart? Differentiate between these two? Explain when to use a bar graph over a pie chart? [6]

- Q9)** a) Generalize the list of tools related to Hadoop? [6]
b) Define HDFS. Explain HDFS detail. [6]

OR

- Q10)** a) Highlight the features of Hadoop and explain the functionalities of Hadoop cluster? [6]
b) Describe briefly about Hadoop input and output and write a note on data integrity? [6]

- Q11)** a) Explain the complexity theory for Map-Reduce? What is reducer size and replication rate? [6]
b) How does Hadoop work? Explain with diagram. [5]

OR

- Q12)** a) Summarize briefly on
Feature of MapR distribution [6]
b) Explain the architecture for MapReduce system [5]



Total No. of Questions : 12]

SEAT No. :

P-805

[Total No. Of Pages : 2

[6006]-40

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

BLOCKCHAIN TECHNOLOGY

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

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 blockchain? Explain basic architecture of blockchain. [6]
b) Explain design principle of blockchain. [6]

OR

- Q2)** a) How PoW works? Explain with diagram. [6]
b) Explain consensus algorithm in detail [6]

- Q3)** a) What is SHA256 Hash? Explain it with example. [6]
b) Explain elliptic curve cryptography in detail. [6]

OR

- Q4)** a) What is Hyperledger? Explain Public and Private ledger. [6]
b) What is hashing? Explain signature schemes, encryption schemes in detail. [6]

P. T. O

Q5) a) What is Bitcoin? How bitcoin works. What are basic components of bitcoin? [6]

b) How to Choose Bitcoin Wallet? How does Merkle trees work? [5]

OR

Q6) a) What is Bitcoin blockchain? What are its challenges. [6]

b) What is the use of Bitcoin scripting language? Explain its use and advantages. [5]

Q7) a) What is Smart Contracts? List some applications of smart contracts. [6]

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 describe any 3 popular Cryptocurrencies. [6]

b) How does Bitcoin use Blockchain. [6]

OR

Q10) a) Describe any two application of cryptocurrency. [6]

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

Q11) a) What is hyperledger fabric? [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. :

P-3355

[Total No. of Pages : 3

[6006]-42

F.Y. 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 wherever necessary.
- 2) Figures to the right side indicate full marks.
- 3) Assume suitable data, if necessary.

Q1) a) Among 50 students in a class, 26 got an A in the first examination and 21 got an A in the second examination. If 17 students did not get an A in either examination, how many students got an A in both examinations? [6]

b) For the universe of all integers, let $P(x)$, $Q(x)$, $R(x)$, $S(x)$ and $T(x)$ be the following statements : [6]

$P(x)$: $x > 0$

$Q(x)$: x is even

$R(x)$: x is a perfect square

$S(x)$: x is divisible by 4

$T(x)$: x is divisible by 5

Write the following statement in symbolic form.

- i) At least one integer is even
- ii) There exists a positive integer that is even
- iii) If x is even, then x is not divisible by 5
- iv) No even integer is divisible by 5

OR

Q2) a) Out of integers 1 to 1000. [6]

i) How many are not divisible by 3 nor by 7?

ii) How many are not divisible by 5 & 7 but divisible by 3?

b) By mathematical induction prove that, [6]

$$P(n): 1 + 4 + 7 + \dots + (3n - 2) = \frac{n(3n - 1)}{2}$$

P.T.O.

Q3) a) Given a relation $R = \{(a, b), (a, c), (a, e), (b, a), (b, c), (c, a), (c, b), (d, a), (e, d)\}$ on $A = \{a, b, c, d, e\}$. Find the transitive closure of R by Wars hall's algorithm. [6]

b) Let $f(x) = x + 2$, $g(x) = x - 2$ and $h(x) = 3x$ for $x \in \mathbb{R}$, where \mathbb{R} is set of real numbers. Find gof , fog , fof , gog . [6]

OR

Q4) a) Prove that the relation R "a – b is divisible by 5" for all a & b which are belongs to set of + ve integers is an equivalence relation. [6]

b) Let $A = \{1, 2, 3, 4\}$ and Let

$R = \{(1, 1), (1, 2), (1, 3), (2, 1), (2, 2), (3, 1), (2, 3), (3, 2), (3, 3), (4, 4)\}$.

Show that R is an equivalence relation and determine the equivalence classes and hence find the rank of R . [6]

Q5) a) i) Suppose that repetitions are not permitted, then how many 4 digit numbers can be form the six digits 1, 2, 3, 5, 7, 8?

ii) How many such numbers are less than 4000?

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

b) A and B are members of a club with a membership of 30. In how many ways can a committee of 10 be formed if [5]

i) A must be included in the committee?

ii) A or B should be included but not both?

OR

Q6) a) Find the number of ways a person can distribute Rs.601 as pocket money to his three sons, so that no son should receive more than the combined total of the other two. (Assume no fraction of a rupee is allowed). [6]

b) Six different Mathematics books, four different Discrete Structures books and three different Computer Science books are to be arranged on a shelf. How many different arrangements are possible if [5]

i) The books in each subject must all be together?

ii) Only the Discrete Structures books must be together?

- Q7)** a) 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]
b) Define : i) Probability ii) Sample space iii) Event [6]

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

- Q9)** a) List the properties and types of regression. [6]
b) Describe sampling techniques in detail. [6]

OR

- Q10)** a) Explain Correlation Coefficient Types, Formulas with Examples. [6]
b) Find the variance and standard deviation for the following data: 57, 64, 43, 67, 49, 59, 44,47, 61, 59. [6]

- Q11)** a) Your basketball team is playing a series of 5 games against your opponent. The winner is those who wins more games (out of 5). Let assume that your team is much more skilled and has 75% chances of winning. It means there is a 25% chance of losing. What is the probability of your team get 3 wins? [6]
b) Explain Geometric Distribution in detail. [5]

OR

- Q12)** a) A fair coin is tossed twice. Let X be the number of heads that are observed.
i) Construct the probability distribution of X
ii) Find the probability that at least one head is observed. [6]
b) Describe hypothesis testing in detail. [5]



Total No. of Questions : 12]

SEAT No. :

P3356

[6006]-43

[Total No. of Pages : 2

First Year M.C.A. (Engg.)
DATA STRUCTURES & 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) *Figures to the right side indicate full marks.*
- 3) *Assume suitable data if necessary.*

Q1) a) Explain Divide and Conquer algorithm strategy with suitable example. [6]

b) What is a sparse matrix? How it is represented in triplet format? [6]

OR

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

b) Discuss about algorithm complexity in terms of space and time. [6]

Q3) a) Explain Linked List as Abstract Data Type with diagram. [6]

b) Explain insert operations in doubly linked list with diagram. [6]

OR

Q4) a) Explain Linked List ADT with diagram. [6]

b) How circular list are advantageous than singly linked list? Explain working of circular linked list with diagram. [6]

Q5) a) How stacks are represented using sequential organization? Which one is better? Explain with examples. [6]

b) How stacks are useful to implement using recursion process? Explain with application. [5]

OR

P.T.O.

- Q6)** a) Write short note on : [6]
i) Queue
ii) Circular Queue
iii) Dequeue
- b) What is priority queue? Explain its array implementation? [5]
- 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 Dijkstra'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. :

P3357

[6006]-44

[Total No. of Pages : 2

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

**OBJECT ORIENTED PROGRAMMING
(2020 Pattern) (Semester - I) (310903)**

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 diagram must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

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 : [6]

i) To accept the data

ii) To display the data

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

P.T.O.

- Q6)** a) Differentiate between multiple and multilevel inheritance in C++? [6]
b) Write a program to overload increment and decrement operator. [6]
- Q7)** a) State the difference between overloading and overriding function. [6]
b) What is dynamic binding concept? How it is useful in OOP? [6]
- OR
- Q8)** a) What is the use of friend function in programming? What is difference in a friend function and member function? [6]
b) With suitable example explain working of virtual function and destructor? [6]
- Q9)** a) Write a program to find out square of number using function template?[6]
b) Explain the use of throw.... catchtry in respect to exception handling mechanism? [6]
- OR
- Q10)a)** Write a program to handle invalid email id entry error. [6]
b) Explain four kinds of relationships between classes and their friends when templates are involved? [6]
- Q11)a)** Explain with syntax and example working of put(), seekp(), tellp(), seekg() and tellg () and write () functions [6]
b) State the difference between early binding and late binding? [5]
- OR
- Q12)a)** Write a C++ program to open text file and store students' records (name, roll, no, address,percentage) in it. [6]
b) Explain different input/ output objects of stream library? [5]



Total No. of Questions : 12]

SEAT No. :

P3358

[6006]-45

[Total No. of Pages : 2

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

Q1) a) Explain CMM in detail. [6]

b) Explain Personal & Team Process Model. [6]

OR

Q2) a) Explain Clean room software engineering. [6]

b) Define SQA. 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 Work breakdown structure and Gantt chart with example. [6]
b) What are the various factors for estimating software cost? [6]

OR

- Q8)** a) Explain CPM and PERT with example. [6]
b) What is Project Scheduling? What are the basic principles of project scheduling? [6]
- Q9)** a) What are the different categories of Risk? Explain risk management process in detail. [6]
b) What is the need for software quality? Explain six sigma quality control technique. [6]

OR

- Q10)**a) What is software configuration management? Explain the change control mechanism in SCM. [6]
b) What is the necessity of risk monitoring? What is its impact on overall development? [6]

- Q11)**a) Explain various leadership styles. [6]
b) What are the codes of ethics for software development? [5]

OR

- Q12)**a) What are the ethical issues in the software development? [6]
b) What is ethical leadership? How do you bring ethical leadership to your organization? [5]



Total No. of Questions : 12]

SEAT No. :

P-3359

[Total No. of Pages : 3

[6006]-46

F.Y. 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) *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 Role of Information system in organization with suitable example. **[6]**

b) Define Management, Briefly explain any six features of Management. **[6]**

OR

Q2) a) What are the main functions of Management? Discuss them in the order of their importance to an Organization. **[6]**

b) Write short note on : Memorandum of Association (MOA) and Articles of Association (AOA). **[6]**

Q3) a) Explain knowledge management system? **[6]**

b) Write a short note on ICT for Development E-Governance. **[6]**

OR

Q4) a) Briefly Explain Project Management. **[6]**

b) What do you mean Leveraging Information Systems? **[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

P.T.O.

- 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]

- Q7)** a) Differentiate Decision making under certainty & Decision making under uncertainty. [6]
b) Explain Structured decisions & unstructured decisions. [5]

OR

- Q8)** a) Explain Programmable decisions, Non programmable Decisions? [6]
b) Explain the Decision making tools (any 2). [5]

- Q9)** a) Explain Scope and objectives Financial Accounting. [6]
b) Explain the Concepts and Conventions in accounting. [6]

OR

Q10) Mr. Nirmal has the following transactions in the month of April. Write Journal Entries for the transactions. [12]

- 10th April : Commenced business with a capital of 1,00,000
11th April : Purchased goods from Veeru for 20,000
13th April : Purchased Goods for Cash 15,000
14th April : Purchased Goods from Abhiram for cash 9,000
16th April : Bought Goods from Shyam on credit 12,000
17th April : Sold goods worth 15,000 to Tarun
19th April : Sold goods for cash 20,000
20th April : Sold goods to Utsav for cash 6,000
21st April : Sold goods to Pranav on credit 17,000
22nd April : Returned goods to Veeru 3,000
23rd April : Goods returned from Tarun 1,000
25th April : Goods taken by the proprietor for personal use 1,000
26th April : Bought Land for 50,000
27th April : Purchased machinery for cash 45,000
28th April : Bought computer from Intel Computers for 25,000
28th April : Cash sales 15,000
29th April : Cash purchases 22,000
30th April : Bought furniture for proprietor's residence and paid cash 10,000

Q11) Pepsi Company produces a single article. Following cost data is given about its product:- [12]

Selling price per unit Rs.40

Marginal cost per unit Rs.24

Fixed cost per annum Rs. 16000

Calculate :

- a) P/V ratio
- b) Break even sales
- c) Sales to earn a profit of Rs. 2,000
- d) Profit at sales of Rs. 60,000.

OR

Q12)a) From the following information's find out : [6]

- i) P/V Ratio
- ii) Sales &
- iii) Margin of Safety

Fixed Cost = Rs.40, 000

Profit = Rs. 20,000

B.E.P. = Rs. 80,000

b) Explain advantages and limitations Ratio Analysis. [6]



Total No. of Questions : 12]

SEAT No. :

P-3360

[Total No. of Pages : 2

[6006]-47

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

DATA BASE MANAGEMENT SYSTEM

(310912) (2020 Pattern) (Semester - 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) Explain components of DBMS along with its Architecture. [8]
b) Explain database Schema with example. [4]

OR

- Q2) a) Write difference between DBMS and File Processing System. [6]
b) Explain different layers of data abstraction. [6]

- Q3) a) Explain all DDL commands with example. [6]
b) 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]

OR

- Q4) a) Explain all types of constraints with suitable example. [6]
b) The company is organized into departments. Each department has a unique name and number and a particular employee who manages the department. A department may have several locations. A department controls a no. of projects, each of which has a unique name and number, single location. One employee can work in only one department at one time. One employee will manage one department. One employee can work on more than one project. Design an ER Diagram. [6]

P.T.O.

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

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

OR

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

b) State and explain. [5]

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

b) Explain the need of concurrency control in transaction management. [5]

OR

Q8) a) Explain two types of Log based protocol. [8]

b) Explain Lock compatibility matrix. [3]

Q9) a) Explain DBMS system architecture. [6]

b) What are the advantages and disadvantages of Distributed Database System? [6]

OR

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

x x x

Total No. of Questions : 12]

SEAT No. :

P3361

[Total No. of Pages : 2

[6006]-48

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 side indicate full marks.*
- 3) *Assume suitable data if necessary.*

Q1) a) Explain LAN, MAN, WAN. [6]

b) Describe Frequency Hopping and Hierarchical topology. [6]

OR

Q2) a) Explain with diagram TCP/IP model. [6]

b) Explain bridges, switches and routers in detail with diagram. [6]

Q3) a) Discuss 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) Write short not on Fast Ethernet and Gigabit Ethernet. [6]

b) Explain static and dynamic channel allocation. [5]

Q7) a) Differentiate between IPv4 and IPv6 addressing. [6]

b) Explain Mobile IP and routing in MANAET. [6]

OR

P.T.O.

- Q8)** a) Explain Distance Vector and Link state routing protocol. [6]
b) Write short note on BGP and NAT. [6]

- 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) Write short note on SMTP and POP3 protocol. [6]
b) Explain DHCP in detail. [5]



Total No. of Questions : 12]

SEAT No. :

P-3362

[Total No. of Pages : 2

[6006]-49

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

JAVA PROGRAMMING

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

- Q1) a) Explain the concept of multiple inheritances in java. [6]
b) Write a program in Java to handle exception with finally block. [6]

OR

- Q2) a) Write down the difference between throw and throws keywords in Java.[6]
b) Explain the concept of static Members and member function of Java.[6]

- Q3) a) Explain the thread life cycle in detail. [6]
b) Explain java.io package. Write any 2 methods from Buffered Input Stream,
Buffered Writer classes. [6]

OR

- Q4) a) Write a note on - Random Access File Class. [6]
b) Explain the concept of Byte stream and character stream. [6]

- Q5) a) Write any 6 basic components of AWT. [6]
b) What is an use of applet viewer in Java? How to create your own Applet program. [5]

OR

- Q6) a) Write a short note on applet Life Cycle. [6]
b) Illustrate different types of containers in AWT. [5]

P.T.O.

- Q7)** a) Define JDBC driver. Explain the concept of JDBC classes in details. [6]
b) Write down the step to establish the JDBC connection in Java with suitable example. [6]

OR

- Q8)** a) Illustrate the popular interfaces of JDBC API. [6]
b) Write a program to retrieve Contents of a Table Using JDBC connection.[6]

- Q9)** a) Write a note on Java Networking concept. [6]
b) What is class URL? What is the difference between URL and URL connections. [6]

OR

- Q10)**a) What is Datagram socket? How does the Datagram work? [6]
b) Describe any 3 Classes of java.net Package [6]

- Q11)**a) Illustrate the use of Life cycle of Servlet. [6]
b) Discuss the various components of architecture of JSP. [5]

OR

- Q12)**a) List out the tabular difference between Servlet and JSP. [6]
b) What is Servlet in Java? How does a Servlet Request flow? [5]

x x x

Total No. of Questions : 12]

SEAT No. :

P-3363

[Total No. Of Pages : 2

[6006]-50
F.Y. M.C.A. (Engineering)
OPERATING SYSTEM
(2020 Pattern) (Semester-II) (310915)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

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

Q1) a) What is an operating system and why do we need it? Describe the two main goal operating system. **[6]**

b) What is kernel? Explain its main function. What relationship with operating system? **[6]**

OR

Q2) a) Write a short note on evolution of operating system. **[6]**

b) Describe virtual machine in detail. **[6]**

Q3) a) What is a thread? Define User Level Thread and Kernel Level Thread. **[6]**

b) Explain Concept of Multithreading in detail. **[6]**

OR

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

b) Explain scheduling criteria in detail. **[6]**

P.T.O

- Q5)** a) List the requirements of Mutual Exclusion. [6]
b) Write a semaphore solution for readers-writers problem. [5]

OR

- Q6)** a) What is the difference among deadlock avoidance, detection and prevention? [6]
b) Explain monitor in brief. [5]

- Q7)** a) Compare single contiguous allocation and partitioned memory allocation. [6]
b) Explain the concepts — memory fragmentation and memory compaction. [6]

OR

- Q8)** a) Write short note on Virtual memory management. [6]
b) What is segmented memory management? [6]

- Q9)** a) Explain Disk structure with suitable diagram. [6]
b) Explain the concept of segmentation. What is paged segmentation? [6]

OR

- Q10)** a) Explain SCAN algorithm with example. [6]
b) Why demand paging approach is preferred over segmentation. Explain. [6]

- Q11)** a) Explain any 6 shell commands with example. [6]
b) Explain salient features of Linux. [5]

OR

- Q12)** a) Explain basic elements or components of Linux [6]
b) What is Kernel? Explain its functions. [5]



Total No. of Questions : 12]

SEAT No. :

P-4255

[Total No. of Pages : 2

[6006]-51

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

ELective - II : MOBILE COMPUTING

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

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

b) Explain Source Encoding, Channel Encoding and Modulation with one example. [6]

OR

Q2) a) What are the main disadvantages of Mobile Computing? [6]

b) Explain the GSM System Protocol Architecture. [6]

Q3) 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]

OR

Q4) a) Explain WAP Architecture. [6]

b) Explain WAP protocol stack. [6]

Q5) a) Explain issues of mobile data management. [6]

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

OR

P.T.O.

- Q6)** a) What is data replication for mobile computers. [6]
b) Explain Disconnected operations in mobile data management. [5]

- Q7)** a) Differentiate between Palm O.S and Android O.S. [6]
b) Why Develop for Android? [6]

OR

- Q8)** a) Explain Android development in detail. [6]
b) Architecture of Android. [6]

- Q9)** a) Explain file structure in android O.S. [6]
b) Explain the location-based services. [6]

OR

- Q10)** a) Explain Android Application: Introducing Intents, Adapters, Introducing Dialogs. [6]
b) What is J2ME? [6]

- Q11)** a) Write a short note on Wi-Fi. How it can access in android? [6]
b) Explain in brief Peer to peer to communication. [5]

OR

- Q12)** a) Explain Testing Methodologies for Mobile Applications. [6]
b) Explain GTalk Service using, binding & Making connection. [5]



Total No. of Questions : 12]

SEAT No. :

P3364

[6006] - 52

[Total No. of Pages : 2

F.Y. M.C.A. (ENGINEERING)
ARTIFICIAL INTELLIGENCE
(2020 Pattern) (Semester - II) (Elective - I) (310916 B)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

- Q1) a)** What is Artificial Intelligence and describe its applications. [6]
b) Explain Intelligent Agents in detail. [6]

OR

- Q2) a)** How the components of agent programs work in AI? [6]
b) Explain in detail types of Artificial Intelligence. [6]

- Q3) a)** How does bidirectional search work in AI? [6]
b) What is depth limited search? Explain with an example. [6]

OR

- Q4) a)** What are the conditions for optimality in A* search? [6]
b) Explain A* algorithm along with example. [6]

- Q5) a)** What is knowledge representation and What are types of knowledge? [6]
b) What are predicates in artificial intelligence? How predicate logic is used in AI? [5]

OR

- Q6) a)** Explain TMS(truth maintenance system). [6]
b) What is quantification in AI? What are the 2 types of quantification? [5]

P.T.O.

- Q7)** a) Explain in detail Search Vs planning in AI. [6]
b) Explain Hierarchical Planning. [6]

OR

- Q8)** a) What is Forward Planning? [6]
b) Write a short note on non linear planning. [6]

- Q9)** a) Explain Neural Networks. [6]
b) What are the Issues related to Neuaral computation. [6]

OR

- Q10)**a) Explain The basic components of ANN. [6]
b) Describe Feedforward Networks in AI. [6]

- Q11)**a) Explain Architecture of Expert system. [6]
b) Explain components of expert system in AI. [5]

OR

- Q12)**a) What are the steps to build expert system. [6]
b) Explain Utilization and Functionality in expert system of AI. [5]



Total No. of Questions : 12]

SEAT No. :

P3365

[Total No. of Pages : 2

[6006] - 53

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

CYBER SECURITY

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

- Q1)** a) 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

P.T.O.

- Q6)** a) What is NIDS? Explain. [6]
b) Write a short note on Ethical Hacking. [5]

- 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]



Total No. of Questions : 12]

SEAT No. :

P-3366

[Total No. Of Pages : 2

[6006]-54
F.Y. M.C.A.
(Elective - I) Block Chain
(2020 Pattern) (Semester-II) (310916D)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *Attempt all questions.*
- 2) *Figures to the right side indicate full marks.*
- 3) *Assume Suitable data if necessary.*

Q1) a) Explain Byzantine general problem with example. **[6]**

b) What is importance of Digital signature in blockchain. **[6]**

OR

Q2) a) Explain Hadoop distributed system. **[6]**

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

Q3) a) What is distributed consensus. **[6]**

b) What are different types of blockchains. **[6]**

OR

Q4) a) Differentiate between public & private blockchain. **[6]**

b) Mention properties of blockchain network. **[6]**

Q5) a) Explain how Nakamoto consensus be used in blockchain. **[6]**

b) Explain proof of stake vs proof of work with example. **[5]**

P. T. O

OR

- Q6)** a) Explain energy efficiency of blockchain technologies. [6]
b) Explain sybil attacks with scenario. [5]

- Q7)** a) Write a short note on smart contracts. [6]
b) What is the safety algorithm used in cryptocurrency? [6]

OR

- Q8)** a) What is Ethereum? Explain its features. [6]
b) Explain whether sidechains need to be interoperable. [6]

- Q9)** a) What is double spending problem, how is it resolved? [6]
b) Explain blockchain in banking sector. [6]

OR

- Q10)** a) Explain in detail types of cryptocurrency. [6]
b) Explain blockchain application in retail industry. [6]

- Q11)** What is Hyperledger. List and explain the advantages. [11]

OR

- Q12)** Explain architecture of Hyperledger and relationship between hyperledger and blockchain. [11]



Total No. of Questions : 12]

SEAT No. :

P-3367

[Total No. of Pages : 2

[6006]-61

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 side indicate full marks.

- Q1)** a) Explain different data science Roles. [6]
b) Differentiate between Qualitative Vs Quantitative Data and Big Data Vs. Little Data. [6]

OR

- Q2)** a) What is Data science? Explain purpose of data science. [6]
b) Explain Data science process in detail? [6]

- Q3)** a) What is Data Warehouse? Explain Benefits of Data Warehouse? [6]
b) What is Data preprocessing? What are different Data Preprocessing Techniques? [6]

OR

- Q4)** a) Explain steps in data preprocessing. [6]
b) Explain Characteristics of Data warehouse? [6]

- Q5)** a) Explain working of Nearest Neighbor classifier with suitable example. [6]
b) What is Naïve Bayes Classifier? Why it is called Naïve Bayes? [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]

P.T.O.

- Q7)** a) What is Association rule? What are the Applications of Association rule mining? [6]
b) What is the purpose of Apriori algorithm? Explain steps of Apriori algorithm. [6]

OR

- Q8)** a) Define FP growth What are the advantages of FP growth over Apriori Algorithm. [6]
b) Explain Eclat algorithm. [6]

- Q9)** a) What is KMeans Clustering? Explain the steps of KMeans Clustering.[6]
b) Differentiate hierarchical clustering and K-Means Clustering. [6]

OR

- Q10)** a) Explain DBScan Algorithm for Density based Clustering. [6]
b) Explain Applications of clustering. [6]

- Q11)** a) What is Data Visualization? Explain benefits of Data Visualization. [6]
b) Explain techniques of Data Visualization. [5]

OR

- Q12)** a) What are the challenges for visualizing data? [6]
b) Explain Types of data visualization. [5]



Total No. of Questions : 12]

SEAT No. :

P3368

[6006]-62

[Total No. of Pages : 2

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 side indicate full marks.*
- 3) *Assume suitable data if necessary.*

Q1) a) Explain Structure of HTML Document along with an example. **[6]**

b) What is CSS? How we insert CSS into an HTML document? **[6]**
OR

Q2) a) Explain any 6 text editing tags in HTML with an example. **[6]**

b) What is website? Explain website planning and design issues. **[6]**

Q3) a) Explain XML DTD with an example. **[6]**

b) What is a difference between XML and HTML? **[6]**
OR

Q4) a) Draw and explain in detail XML components. **[6]**

b) What are the features of XML, Explain. **[6]**

Q5) a) What are the different control structures used in JavaScript, explain any 2 in detail. **[6]**

b) Explain Array in JavaScript. **[5]**
OR

Q6) a) Explain JavaScript Math properties. **[6]**

b) Explain functions in JavaScript. **[5]**

P.T.O.

- Q7)** a) Elaborate AngularJS directives, AngularJS: Expression in detail. [6]
b) Design and Implement Timer Application using angularJS, HTML, CSS.[6]
OR
- Q8)** a) Describe AngularJS features and components. [6]
b) Explain Tables in AngularJS with an example. [6]
- Q9)** a) What is PHP? What is a need, use of PHP? Enlist features of it and explain in short. [6]
b) Explain Cookies and sessions in PHP. [6]
OR
- Q10)**a) Write a PHP Script for login authentication. Design an HTML form which takes username and password from user and validate against stored username and password in file. [6]
b) Elaborate PHP operators with an example. [6]
- Q11)**a) What are the different components of ASP.NET, explain in detail with the help of diagram. [6]
b) Explain Event Handling in ASP.NET. [5]
OR
- Q12)**a) Explain ASP.NET server side objects and controls. [6]
b) Explain page creation in ASP.NET. [5]



Total No. of Questions : 12]

SEAT No. :

P3369

[6006]-63

[Total No. of Pages : 2

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

CLOUD COMPUTING

(2020 Pattern) (Semester - III) (410903)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

Q1) a) Explain Cloud Computing 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]

Q7) Explain the Inter Cloud Resource Management? [12]

OR

P.T.O.

- 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]



Total No. of Questions : 12]

SEAT No. :

P3370

[Total No. of Pages : 2

[6006]-64

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 side indicate full marks.*
- 3) *Assume suitable data if necessary.*

Q1) a) What is Big Data? How big data is different from traditional data? [6]

b) List out different challenges of Big Data. [6]

OR

Q2) a) Explain in brief Big data technologies? [6]

b) How big data analytics helps business growth in current era? Explain with suitable example. [6]

Q3) a) Briefly describe SVM - Support Vector Machine technique. [6]

b) Discuss Analysis of Variance (ANOVA) of correlation indicators of linear relationship. [6]

OR

Q4) a) Differentiate between supervise and unsupervised learning algorithm?[6]

b) Discuss Time Series analysis with example. [6]

Q5) a) Explain Content based recommendations? [6]

b) Write a short note on social network graphs. [5]

OR

Q6) a) Explain use of recommendation system in online marketing? [6]

b) Short note on direct discovery of communities in social networking?[5]

Q7) a) What is data modeling and what is the need for it. [6]

b) How to deploy a Big Data Model? Mention the key steps involved. [6]

OR

Q8) a) Explain Conventional data visualization tools. [6]

b) What do you mean by “The science of data visualization”? [6]

P.T.O.

- Q9)** a) Explain in detail about HIVE. [6]
b) Briefly discuss about Map Reduce and YARN. [6]

OR

- Q10)** a) What is Map Reduce Programming Model? How to apply Map Reduce Analysis on social media data like twitter? [6]
b) Discuss about How E-Commerce is Using Big Data to Improve Business in detail. [6]

- Q11)** a) Explain the Storage Unit In Hadoop (HDFS)? [6]
b) Mention different features of HDFS? [5]

OR

- Q12)** a) What are the Limitations of Hadoop 1.0? [6]
b) Explain file handling Hadoop shell commands. [5]



Total No. of Questions : 12]

SEAT No. :

P-3371

[Total No. Of Pages : 2

[6006]-65
S.Y.MCA (Engineering)
Machine Learning
(2020 Pattern) (Semester-III) (410904B)

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? What is the need of it? Explain four examples of machine learning in detail? [6]
- b) Compare Supervised and Unsupervised machine learning. [6]

OR

- Q2)** a) In Machine learning, what is need of dimensionality reduction? Describe factor analysis along with its application. [6]
- b) Write a note on Principal Component Analysis [6]
- Q3)** a) Differentiate between linear SVM and non-linear SVM. [6]
- b) Explain Kernel methods for non-linearity. [6]

OR

- Q4)** a) Write a note on Multiclass classification. [6]
- b) What are the support vectors and margins? Explain soft SVM and hard SVM. [6]

P.T.O

Q5) a) What is Overfitting and Underfitting in machine learning model? Explain with an example. [6]

b) How Ridge Regression help for regularizing linear models? [5]

OR

Q6) a) Explain the Lasso, and Ridge types of regression [6]

b) Elaborate Bias Variance dilemma. [5]

Q7) a) What is the difference between K-means clustering algorithm and the K nearest neighbors KNN classification? [6]

b) Write a note on hierarchical clustering [6]

OR

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

b) Explain nearest neighbor classification in machine learning. [6]

Q9) a) What are the characteristics of a normal distribution? [6]

b) Write a note on Naïve Bayes Classifier. [6]

OR

Q10) a) Explain Expectation —Maximization methods in ML [6]

b) Explain Discriminative Learning with Maximum Likelihood with respect to Machine Learning [6]

Q11) a) What is ensemble learning? Explain types of ensemble learning?[6]

b) What is bagging and boosting in random forest? [5]

OR

Q12) a) Write a note on Reinforcement Learning. [6]

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



Total No. of Questions : 12]

SEAT No. :

P-3372

[Total No. of Pages : 2

[6006]-66

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

OBJECT ORIENTED ANALYSIS AND DESIGN
(Elective - II) (2020 Pattern) (Semester - III) (410904 C)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

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

Q1) a) Draw Use case diagram for hospital Management system. [6]

b) Explain in details on Unified Modeling Language. [6]

OR

Q2) a) Explain the various components used in use case diagram with example. [6]

b) Discuss on requirement and analysis in software development. [6]

Q3) a) Draw advanced class diagram for Library management system. [6]

b) Explain generalization, aggregation, association with example. [6]

OR

Q4) a) Draw class diagram for online ticket booking system. [6]

b) Explain association name, class types and methods in detail with example. [6]

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

b) Explain the commercial applications of Unified Modeling Language. [5]

OR

P.T.O.

- Q6)** a) Describe deployment diagram in detail. [6]
b) Write short note on package diagram. [5]

- Q7)** a) What are the essential elements of an interaction diagram? [6]
b) What is the purpose of timing diagram? Explain elements used in timing diagram. [6]

OR

- Q8)** a) Compare between state machine diagram and activity diagram. [6]
b) Why it is important to have knowledge on timing diagram when programming? [6]

- Q9)** a) What are the 5 stages of architectural design process? [6]
b) Write a short note on Service oriented Architecture. [6]

OR

- Q10)** a) Explain object oriented software architecture & Client server Architecture. [6]
b) What are the 5 principles of architecture? [6]

- Q11)** a) Explain the singleton design pattern with example. [6]
b) What is the main purpose of the Adapter design pattern? [5]

OR

- Q12)** a) Describe the 4 main types of pattern used in design? [6]
b) Write a short note on Behavioral design pattern. [5]



Total No. of Questions : 12]

SEAT No. :

P-3373

[Total No. Of Pages : 2

[6006]-67
S.Y.M.C.A. (Engineering)
Internet of Things
(2020 Pattern) (Semester-III) (410904D)

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 Application Domain and Characteristic of Embedded System? **[6]**

b) Explain physical and logical design of IoT, **[6]**

OR

Q2) a) Explain the Real time systems and Real time scheduling **[6]**

b) Define communication protocols in IoT? **[6]**

Q3) a) What is the difference between M2M and IoT explain with examples? **[6]**

b) Commit “Anemerging industrial structure for IoT” **[6]**

OR

Q4) a) Describe M2M to IoT architecture. **[6]**

b) What is global information monopolies. **[6]**

P.T.O

- Q5)** a) What are different layers of IoT reference model? [6]
b) What is deployment and operational view of reference architecture? [5]

OR

- Q6)** a) What does functional view of IoT reference architecture describe?[6]
b) What is difference between IoT reference model and reference architecture? [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 JoT? [6]
b) How To Use IoT For Smart Parking Solution Development? [5]



Total No. of Questions : 12]

SEAT No. :

P-3374

[Total No. Of Pages : 2

[6006]-69

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

SOFTWARE TESTING & QUALITY ASSURANCE

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

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

- Q1)** a) Describe 7Quality Control Tools in detail. [6]
- b) Explain CMMI — software quality model in detail. [6]

OR

- Q2)** a) What is clean room software engineering? Explain in detail. [6]
- b) Write a short note on: [6]
- i) Six Sigma ii) Total Quality Management

- Q3)** a) Define software testing. Explain testing life cycle in detail. [6]
- b) What is test plan? What should be included into it? [6]

OR

- Q4)** a) Explain defect classes in detail. [6]
- b) What is Test case? Write down any real life example of test case.[6]

P.T.O

- Q5)* a) Explain Mutation Testing with example. [6]
b) Discuss with suitable example the concept of Boundary Value analysis. [5]

OR

- Q6)* a) Write a short note on positive and negative testing. [6]
b) Illustrate the concept of Equivalence partitioning in detail. [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 in detail. [6]
b) Write note on Selenium RC. [5]

