

Total No. of Questions : 7]

SEAT No. :

PE-1942

[Total No. of Pages : 2

[6554]-1

M.C.A. (Management Faculty)

**IT-11 : PROBLEM SOLVING USING C++
(2019 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

- Q1)** a) Write an algorithm to print multiples of 5 numbers. [5]
b) Explain Divide and conquer algorithmic Paradigms. [5]

- Q2)** a) Write a C++ program to find the n Fibonacci numbers using inline function. [5]
b) What is copy constructor. [5]

OR

- a) Write a function to demonstrate default argument. [5]
b) Write a program to demonstrate call by address and call by reference?[5]
- Q3)** a) Write a program to overload the operator minus operator to subtract two distance (km,m) objects and return a new distance object. [7]
b) Write a program to count vowels in given String. [3]

OR

- a) Write a program to overload <and > for student(rollno,name,age) object compare their age and return True and false. [7]
b) Write a program to compare two strings. [3]

P.T.O.

- Q4)** a) Create class mobile with data members and derive Smartmobile from mobile and add additional features and member functions. [7]
b) Explain linking process in C++ [3]

OR

- a) What is run time polymorphism ? Explain how we can achieve it in C++ with example. [7]
b) Explain structure in C++. [3]

- Q5)** a) Write a program to use new operator. [7]
b) Write a program to use if else statement. [3]

OR

- a) Explain setw, setfill and setbase manipulators in C++. [7]
b) What is continue and break statements in C++ [3]

- Q6)** a) What is const member function explain with example. [7]
b) What is scope resolution operator in C++. [3]

OR

- a) Explain nested class with example [7]
b) Explain type cast? [3]

- Q7)** a) Write a algorithm for Mouse in a maze. [7]
b) Write short note on goto statement. [3]

OR

- a) Write an application for tic tac toe. [7]
b) Write a short note on Pointer to Members. [3]



Total No. of Questions : 8]

SEAT No. :

PE-1943

[Total No. of Pages : 2

[6554]-2

M.C.A. (Management)

IT 12 : SOFTWARE ENGINEERING USING UML

(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 & Q.7 are compulsory.*
- 2) *Solve any four of the remaining questions.*
- 3) *Draw neat & labelled diagram wherever necessary.*

Q1) EasyBus wants to create an online system for Bus Ticket Booking across multiple cities. Customers can book tickets for both local and long-distance routes. The website will offer seat selection, online payment through credit cards and digital wallets, and an option to view booking history. Additionally, the system will allow users to cancel their tickets online within a specific time frame, with partial or full refunds based on cancellation policies. Prepare the Software Requirements Specification (SRS) document in IEEE format for the EasyBus Ticket Booking System. **[20]**

Q2) Draw an activity diagram for ordering and delivering medicines from an online pharmacy. The process involves selecting prescribed or over-the-counter medicines, uploading prescriptions if needed, confirming the order, making payment, and tracking the delivery status until it arrives at the customer's door. **[10]**

Q3) Unity Bank offers Recurring Deposit (RD) schemes where customers deposit a fixed amount every month for a specified period. At the end of the RD term, the bank pays the principal amount along with accumulated interest. Interest rates depend on the term length. Customers may choose to renew their RD or take a loan against it. Create a use case diagram illustrating the key functions available in using the recurring deposit scheme offered by the bank. **[10]**

P.T.O.

- Q4)** Draw a sequence diagram for cancelling a subscription service (e.g., streaming, software, or magazine subscription) through an online portal. The user navigates to their subscription details, selects the cancel option, and confirms. The system updates the subscription status, calculates any refund if applicable, and sends a cancellation confirmation to the user. **[10]**
- Q5)** Lakeview Municipality is implementing an online system to accept complaints about public services like water supply, waste management and street lighting. Design a complaint form layout to capture the issue type, location, and citizen contact details for follow-up. **[10]**
- Q6)** Design a class diagram for an Online Bookstore system. Customers can browse through the book catalog, view details such as author and genre, and add books to their shopping cart. They can proceed to checkout if their cart contains items, where they'll complete the purchase. **[10]**
- Q7)** Describe the Rational Unified Process (RUP) and outline each of its phases. **[10]**
- Q8)** Write a short note on: (Any two) **[10]**
- a) Any five Agile principles
 - b) Prototyping Model
 - c) Web Engineering



Total No. of Questions : 7]

SEAT No. :

PE-1944

[Total No. of Pages : 2

[6554]-3

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

IT 13: DATABASE MANAGEMENT SYSTEM

(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) Question no. 1 is compulsory.
- 2) Solve any 5 questions from remaining.

Q1) The owners of a small computer repair shop would like to keep track of the repair jobs for computers they repair, the items used for each repair job, the labor costs for each repair job, the repairmen performing each repair job and the total cost of each repair job.

When customers bring their computers in to be repaired, they make a deposit on the repair job and are given a date to return and uplift their computer. Repairmen then perform repairs on the customers' computers based on the repair job and detail the labor costs and the items used for each repair job.

When customers return, they pay the total cost of the repair job less the deposit, collect a receipt for their payment, and uplift the repaired computer using this payment receipt. Construct the ERD and normalize the database upto 3 NF. [20]

Q2) Explain Views and schema in DBMS with suitable example. [10]

Q3) Discuss XML Document Schema with example. [10]

Q4) How Deadlocks is detected and resolved in DBMS? [10]

P.T.O.

Q5) a) Explain the Deferred Update with suitable example.

b) Explain the Concurrency control suitable example. **[10]**

Q6) Discuss Remote backup system **[10]**

Q7) Write a short note (any 2) **[10]**

a) ACID.

b) XML

c) Need of NOSQL database



Total No. of Questions : 7]

SEAT No. :

PE-1945

[Total No. of Pages : 2

[6554]-4

M.C.A. (Management)

**IT-14 : ESSENTIAL OF OPERATING SYSTEM
(2019 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 & Q. 7 are compulsory*
- 2) *Solve any four questions from Q2 to Q.6.*
- 3) *Draw neat diagram wherever necessary.*

Q1) a) What is a Deadlock? Explain Deadlock Detection and Avoidance technique. **[10]**

- b) Consider the following set of processes. Draw Gantt chart. Calculate average waiting time and turnaround time by Shortest Job First (SJF) non preemptive scheduling algorithm. **[10]**

Process	Burst Time	Arrival Time
P ₁	5	0
P ₂	3	2
P ₃	2	4
P ₄	4	6
P ₅	1	7

Q2) Explain Paging technique in memory management. **[10]**

OR

Explain Demand Paging Technique.

Q3) What is Kernel? Explain importance of Kernel in Operating System. **[10]**

OR

Explain any five Linux commands with example.

Q4) Explain Multiprocessor Operating system with some examples. **[10]**

OR

What is multiprocessor OS? Explain OS Design issues.

P.T.O.

Q5) Explain Distributed Operating System with example. **[10]**

OR

Explain Mobile Operating System with architecture.

Q6) Explain file structure and file permission in Linux with suitable. **[10]**

OR

Explain Linux Utilities with example.

Q7) Write Short Notes (Any 2) : **[10]**

- a) Mutual Exclusion
- b) Features of Mobile Operating System
- c) Segmentation
- d) Shell



Total No. of Questions : 8]

SEAT No. :

PE-1946

[Total No. of Pages : 2

[6554]-5

MCA (Management)

BM-11: BUSINESS PROCESS DOMAIN

(2019 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *Q.1 and Q. 8 is Compulsory.*
- 2) *Attempt any FOUR from remaining.*
- 3) *Use of simple calculator is allowed.*

Q1) On the global personal computer map, Acer emerged from obscurity to become the third largest PC company only behind Dell and HP. But the company wasn't a smash hit over night. Staying true to its South Asian culture, the company worked up the ladder, rather silently, and building brick-by brick. On its way up, the company worked out many hurdles—ranging from branding problems to facing near boycott from the then stalwarts in the business—and gradually overtook much bigger and older companies. The long standing chairman Stan Shih put up a workman-like effort solving one problem after the other and steering the company in one of the most competitive industries. All the way through, he stuck to the basics of the business, focusing on quality, quantity and low costs. Acer's Asian counterpart, Lenovo, made its mark in the global PC market with a bang by taking over IBM's PC business. From then on, the rivalry between the two Asian giants caught the attention of industry as well as academia. The industry is tracking them for remaking the global PC industry dynamics by challenging the western companies that have practically invented and built the industry over decades. The academia is observing the theoretical and strategical underpinnings and are scripting the journey of these two global giants from the developing world.

- a) You have been asked to suggest market segmentations strategy for this business case. **[10]**
- b) Suggest any four market mix tactics for this business. **[10]**

P.T.O.

- Q2)** a) Calculate gratuity of employee who is working for Infosys for 5.7 years and getting basic salary is Rs.19000/- month and DA is 20%
b) Calculate gratuity of employee who is working for TCS for 4.4 years and getting basic salary Rs.17000/- month and DA is 12000/-month.
c) Calculate gross salary of the employee for the month of January,2019 and cumulative gross salary of month of November,2019 working on payroll of Basic Rs.20000/-, DA=60%, HRA=40% and Allowances= 22%
[10]
- Q3)** What is e-commerce? Explain any three business models of e-commerce.[10]
- Q4)** List and Explain different modes of transportation. [10]
- Q5)** What is SCM? Explain need of SCM in business. [10]
- Q6)** Develop CRM implementation strategy for Hotel industry. [10]
- Q7)** Explain Digital Payments – NEFT, RTGS, IMPS, BHIM, UPI [10]
- Q8)** Write short note on the following(any Two) [10]
a) Leave types
b) Loan types
c) Insurance types



Total No. of Questions : 7]

SEAT No. :

PE-1947

[Total No. of Pages : 2

[6554]-11

M.C.A. (Management)

**IT-21 : DATA STRUCTURE AND ALGORITHM
(2019 Pattern) (Semester - II)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) What is sparse matrix? Write an algorithm to perform addition of sparse matrix. Accept sparse matrix elements an input from user. **[10]**

Q2) a) Convert the following infix expression into postfix form. Show the content of stack at each step in tabular form. **[10]**

$(A + B) * C - \Delta / E \wedge F.$

OR

b) Write an algorithm to reverse the content of string by using stack. Accept string value as input from user. **[10]**

Q3) a) Write an algorithm to perform insert & delete operations on elements of queue. **[10]**

OR

b) Write an algorithm to perform insert & delete operations on elements of priority queue. **[10]**

Q4) a) Explain linked list. Write an algorithm to perform insert & delete element in linked list. **[10]**

OR

b) Write an algorithm to insert a node in to doubly linked list. **[10]**

P.T.O.

Q5) a) Draw a Binary search tree for following. Also write preorder, inorder & postorder traversal. **[10]**

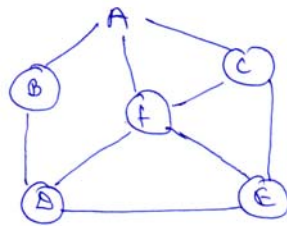
8, 15, 1, 19, 16, 4, 25, 12, 23, 20, 17

OR

b) Draw an AVL tree for the following : **[10]**

Nanded, Pokhran, Pune, Revasa, Solapur, Jamkhed, Amravati, Parner, Mumbai, Yavatmal.

Q6) a) Generate BFS, DFS for node A, adjacency matrix, adjacency list for the following graph. **[10]**



OR

b) Explain Dijkstra's algorithm with suitable example. **[10]**

Q7) Write short note on (Any Two) : **[10]**

- a) Threaded Binary Tree
- b) Quick sort
- c) Kruskal's Algorithm.



Total No. of Questions : 7]

SEAT No. :

PE-1948

[Total No. of Pages : 2

[6554]-12

F.Y. M.C.A. (Management)
IT-22 : WEB TECHNOLOGIES
(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Write a program to validate Railway reservation form with field: **[10]**

- a) Name
- b) Mobile no
- c) Age
- d) From to (not similar)
- e) Date of Journey

Q2) Explain JQuery-Filters and selectors with examples. **[10]**

OR

Explain Audio & Video tags with properties with suitable example.

Q3) Write CSS properties and apply it on any HTML page : **[10]**

- a) Image with 50% capacity
- b) Text with super script
- c) Font with size 10 & color - Red
- d) Set margin 25 pixle
- e) Paragraph with color blue

OR

Explain different types of CSS with suitable example of each type.

Q4) Explain Event object in Java script with example. **[10]**

OR

Explain string object in Java script with example.

P.T.O.

Q5) Explain what is JQuery with their prominent features? Explain why JQuery is used. **[10]**

OR

Explain the different methods related to manipulating the Elements in HTML page.

Q6) Write a PHP Program to insert the values in Employee Form. **[10]**

OR

Explain PHP session handling with suitable example.

Q7) Short Notes on Any Two : **[10]**

- a) SVG in HTML
- b) Animation in JQuery
- c) Error Handling in PHP
- d) Table in HTML



Total No. of Questions : 5]

SEAT No. :

PE-1949

[Total No. of Pages : 4

[6554]-13

M.C.A. (Management Faculty)
MT-21 : BUSINESS STATISTICS
(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Solve sub questions 'a' & 'b' or 'c' & 'd' from each question.*
- 3) *Metnion questions and sub questions correctly.*
- 4) *Use of simple calculator is allowed.*
- 5) *Statistical Tables will be provided.*
- 6) *Figures to the right indicate full marks.*

Q1) a) Define statistics. Illustrate various applications of statistics. [7]

b) Explain the various uses of Chi-square test in testing of hypothesis. [7]

OR

c) What is sampling? Define the need of sampling? Write the procedure to carry out stratified random sampling. [7]

d) What do you mean by measure of central tendency? Write the use of various measures of central tendency with illustration. [7]

Q2) a) Find median marks obtained by the students in a certain examination. The distribution of marks is as given below : [7]

Marks (more then)	0	15	30	45	60	75	90	105
Number of Students	152	140	117	85	55	31	14	0

b) Calculate coefficient of variation from the following data : [7]

Age	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
No of persons	14	28	33	30	20	15	13	7

OR

P.T.O.

- c) Marks of two groups are given below. Find which group is more consistent in getting marks. [7]

Marks of Group I	23	11	19	26	35	46	53	18	36
Marks of Group II	31	18	21	31	48	40	18	23	30

- d) Find Harmonic Mean for the following frequency distribution. [7]

Class	0-10	10-20	20-30	30-40	40-50
Frequency	9	13	19	14	8

- Q3)** a) A sample of 16 students were given a diagnostic test before studying a particular module and then again after completing the module. Check whether teaching leads to improvement in students knowledge. [7]

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Pre module Score	18	21	16	22	19	24	17	21	23	18	14	16	16	19	18	20
Post module Score	22	25	17	24	16	29	20	23	19	20	15	15	18	26	18	24

- b) A random sample of 400 people were surveyed and each person was asked to report the highest education level they obtained. The survey is summarized in the below table can you conclude that Gender and Education level are dependent. [7]

Sex	Education level			
	High School	Bachelors	Masters	Ph.D.
Female	65	58	47	41
Male	35	44	53	57

OR

- c) Statistics students believe that average score of the first statistics test is 65. A statistics instructor thinks the average score is higher than 65. Sample of 12 students marks is collected the score are 65, 65, 70, 67, 66, 63, 62, 68, 72, 71, 68 and 63. Test whether instructor's assumption is correct? [7]
- d) The research scholar was interested in the relationship between the placement of students in the statistics department of a certain university. The following table gives information of number of placed students and their C.G.P.A. [7]

	C.G.P.A				
	10-9	9-8	8-7	7-6	Below 6
Number of Placed Students	25	32	17	9	7

Check whether placed students are in the proportion 2 : 3 : 2 : 1 : 1 of CGPA categories.

- Q4)** a) Construct a Fisher's ideal index from the following data. [7]

Commodity	2012		2013	
	p0	q0	p1	q1
A	10	40	12	45
B	11	50	11	52
C	14	30	17	30
D	8	28	10	29
E	12	15	13	20

- b) Find the coefficient of correlation between Marks in Economics and Marks in Statistics [7]

Marks in Economics	25	28	35	32	31	36	29	38	34	32
Marks in Statistics	43	46	49	41	36	32	31	30	33	39

OR

c) Calculate Price index number by [7]

- i) Laspeyre's method ii) Paasche's method

Commodity	2020		2021	
	Price	quantity	Price	quantity
A	20	8	40	6
B	50	10	60	5
C	40	15	50	10
D	20	20	20	15

d) Find the two lines of regression and estimate weekly sale when test score is 95. [7]

Salesman	A	B	C	D	E	F	G	H	I
Test score	50	62	53	64	85	56	81	47	78
Weekly sales	33	64	45	58	67	39	72	51	60

Q5) a) Fit a straight line trend by the method of least squares and estimate the production in the year 2010. [7]

Year	2000	2001	2002	2003	2004	2005	2006
Production in tonnes	28	30	33	31	35	34	37

b) What do you mean by time series? State the various components of time series. [7]

OR

c) The data given below is of tourists arrival (in lakh) during 1997 to 2005 in India. Estimate the trend using. [7]

- i) 4 years moving average ii) 3 years moving average

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Tourist arrival in lakh	18	20	23	25	24	28	30	34	32

d) Define the following terms with illustration : [7]

- i) Power of the test
ii) Type I error
iii) Statistic and parameter



Total No. of Questions : 7]

SEAT No. :

PE-1950

[Total No. of Pages : 2

[6554]-14
M.C.A. (Management)
IT-23: ESSENTIALS OF NETWORKING
(2019 Pattern) (Semester - II)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *Q.1 and Q.7 are compulsory.*
- 2) *Solve any four questions from Q.2 to Q.6.*
- 3) *Figures to right indicate full marks.*
- 4) *Draw neat diagrams wherever necessary.*

Q1) a) What is Network Security—? Explain Active and Passive attacks. **[10]**

b) For the given class C, 200.160.100.5 and subnet mask 255.255.255.224. Calculate **[5]**

- i) Total Number of Subnets
- ii) Total Number of Host IP per subnet
- iii) First and Last subnet address.

OR

b) Define the subnet mask to be used in Class B addressing to support 28 subnets and also find the number of hosts possible in each subnet. **[5]**

Q2) Compare the OSI Model vs TCP/IP model in detail. **[10]**

Q3) What is DNS? Explain DNS Query message and Response message in detail. **[10]**

Q4) What is Cryptography? What are the different types of Cryptography? **[10]**

Q5) Why routing tables are used? Explain BGP routing protocol. **[10]**

Q6) Generate CRC code for the data word 1010101010 using the divisor 11010. **[10]**

OR

Generate a Hamming code with binary value 1010101010 using an even parity. **[10]**

Q7) Write short note (any 3) **[15]**

- a) ATM
- b) Hardware Architecture
- c) Flow and Error Control
- d) TCP connections
- e) FTP



Total No. of Questions : 6]

SEAT No. :

PE-1951

[Total No. of Pages : 2

[6554]-15

M.C.A. (Management)

**BM21: PRINCIPLES AND PRACTICES OF MANAGEMENT &
ORGANIZATIONAL BEHAVIOUR
(2019 Pattern) (Semester - II)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Johnson, 50, is driver of a petrol tanker. He earns Rs. 50,000 a year and lives with his wife in Calcutta. He has two adult children who have left home.

He says life has become increasingly difficult for manual workers over the years because all of the fun has gone out of work.

‘It is all about getting a pound of flesh from human beings. Businesses are all about profit and people feel much more stressed because of that. Years ago, most big organizations would have a social club, a football team, a pipe band. But that has all stopped. It is just work, work, work and no play.’

A ‘blame culture’ and the increasing use of short-term contracts have, says Johnson, created a climate of fear and insecurity. ‘You can work all year doing an excellent job and no one will say anything, then you do one thing wrong and you’ll be crucified.’

He says long shift patterns, boredom, working in isolation and the excess of health and safety regulations that have to be adhered to also create immense pressure. His wife always says to him that he should learn to switch on when he starts work and switch off the minute he leaves. But somehow he was not able to do so. His work pressure increases when he starts thinking about his sons who are not with him for any kind of support at this age.

If you have to help Johnson answer the following questions.

- a) Identify the stressors in the given case and discuss the type of stress.
- b) Suggest suitable stress management strategies.

[10]

P.T.O.

Q2) What do you mean by a social transaction? Explain ego state and Johari window in the light of Transactional Analysis. **[10]**

Q3) “Mr. Soham is a very happy employee of Horizon who is always ready to accept challenges and will dedicate his time and energy whole heartedly for accomplishing the given task.” In the light of given scenario, guess the right motivational theory applicable to Mr. Soham and justify the same. **[10]**

Q4) Define Team. Explain Types of Teams. **[10]**

Q5) Explain decision making processes. Add a note on types of Decisions. **[10]**

Q6) Write short notes on any 4 out of the following. **[20]**

- a) Contribution of Peter Drucker
- b) System Approach of management
- c) Organizing process
- d) Skills of managers
- e) Levels of organizational culture



Total No. of Questions : 7]

SEAT No. :

PE1952

[Total No. of Pages : 2

[6554]-21

S.Y. M.C.A. (Management)
IT-31: JAVA PROGRAMMING
(2019 Pattern) (Semester-III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw the neat diagrams wherever necessary.*

Q1) Answer in short (Any 5)

[10]

- a) What are inner classes?
- b) What is Exception Handling?
- c) What is abstract class?
- d) What is garbage collection?
- e) Explain packages in Java.
- f) What is polymorphism?

Q2) Explain Thread Lifecycle with suitable diagram.

[10]

OR

Explain final, finally & finalize with suitable example.

Q3) Explain ArrayList in collection framework with suitable example.

[10]

OR

Store list of authors & their book in Tree map and display the list in descending order of authors name.

P.T.O.

Q4) Write an applet to move a ball from Left to right **[10]**

OR

Explain any 2 Layouts with suitable example.

Q5) Write a JDBC code to display List of employees according to their department. **[10]**

OR

Explain servlet life cycle with suitable diagram

Q6) Explain JSP-action tags with suitable example. **[10]**

OR

Explain JDBC drivers

Q7) Write short notes on: (Any 2) **[10]**

- a) Marshalling & unmarshalling
- b) UDP
- c) MVC
- d) Steps of creating RMI application.



Total No. of Questions : 8]

SEAT No. :

PE1953

[Total No. of Pages : 2

[6554]-22

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

IT 32 : DATA WAREHOUSING & DATA MINING

(2019 Pattern) (Semester-III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Q.1 & Q.8 are compulsory.
- 2) Solve any Five questions from Q.2 to Q.7.
- 3) Figures to the right indicate full marks.

Q1) What is data preprocessing and Explain various tasks involved in data preprocessing. [10]

Q2) Explain Data warehouse architecture in detail. [10]

Q3) A database has four transactions. Let Minimum Support = 60% and Minimum Confidence = 80%. [10]

TID	Date	Items-bought
100	10/12/21	{K, A, B, D}
200	10/12/21	{D,A,C,E,B}
300	10/11/21	{C,A,B,E}
400	10/22/21	{B, A, D}

- a) Find all frequent items using FP-growth algorithm.
- b) List all of the strong association rules with support S and confidence
- c) Matching the following metarule where x is a variable representing customers & item i denotes variables representing items (e.g, "A", "B" etc.) $V \times E$ transactions, $\text{buys}(X, \text{item } 1) \wedge \text{buys}(X, \text{item } 2) \Rightarrow \text{buys}(X, \text{item } 3)$ [S, C].

Q4) What is classification and explain Support Vector Machines (SVM) with example. [10]

P.T.O.

Q5) Discuss the K- nearest neighbor classification algorithm with suitable example. [10]

Q6) What is Bayesian Classification? Write an example and applications of it. [10]

Q7) What is clustering? Explain various methods of clustering. [10]

Q8) Write short notes on (Any two): [10]

- a) Web Mining
- b) Difference between OLAP and OLTP.
- c) Temporal and spatial data mining.
- d) Applications of data mining.



Total No. of Questions :7]

SEAT No. :

PE1954

[Total No. of Pages : 2

[6554]-23

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

IT-33 : TESTING AND QUALITY ASSURANCE

(2019 Pattern) (Semester-III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Draw neat diagrams wherever necessary.*

Q1) Write a test plan for the following sections of IEEE 829 test plan template for an online banking application. **[10]**

- a) Scope of testing.
- b) Objectives.
- c) Risks.
- d) Strategy.
- e) Approach.

Q2) “Software Quality Control (SQC) is a subset of Software Quality Assurance (SQA)”. Justify **[10]**

OR

Explain the metrics used to assess and measure Reliability. **[10]**

Q3) Describe any two review types in detail **[10]**

OR

Describe the role of Static Analysis tool in Testing **[10]**

Q4) Explain User Acceptance testing, its types and benefits. **[10]**

OR

Describe white-box testing and discuss branch and path coverage techniques. **[10]**

P.T.O.

Q5) a) Using Boundary Value Analysis technique, write valid & invalid test case for a High-Level Security code input field which should accept exactly eight digits. [5]

b) Explain Sanity testing. [5]

OR

c) A system requires that an email address follow the format username@domain.com, where the username can be alphanumeric and the domain can contain only letters. Using Equivalence Partitioning, define valid and invalid test cases for this email input requirement. [5]

d) Explain Performance testing. [5]

Q6) Mention the factors to be considered in selecting a testing tool in an organisation. [10]

OR

What is CAST? Describe any 4 types. [10]

Q7) Write short notes on [any two] [10]

- a) Unit Testing
- b) ISO 9126 Quality Characteristics
- c) Selenium
- d) Beta Testing



Total No. of Questions : 8]

SEAT No. :

PE-1955

[Total No. of Pages : 1

[6554]-24

M.C.A. (Management Faculty)
IT - 34 : CLOUD COMPUTING
(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.1 & Q.8 are compulsory.*
- 2) *Solve any five from remaining.*
- 3) *Draw neat & labelled diagram wherever necessary.*

- Q1)** Define cloud computing. Explain the cloud service models in details. **[10]**
- Q2)** What is Virtual Machine? Explain the type of the Virtualization? **[10]**
- Q3)** Explain the Difference between Saas and Pass? **[10]**
- Q4)** What is SOA? Explain Advantages of using SOA? **[10]**
- Q5)** Explain the term cloud computing and cluster computing? **[10]**
- Q6)** What are the cloud computing security challenges? **[10]**
- Q7)** Explain the data migration in cloud strategies & process? **[10]**
- Q8)** Write short notes: (Any two) **[10]**
- a) Docker Containers
 - b) Web Services : SOAP
 - c) Public Cloud



Total No. of Questions : 8]

SEAT No. :

PE1956

[Total No. of Pages : 4

[6554]-25

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

MT - 31 : PROBABILITY AND COMBINATORICS

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No. 1 & Question No. 8 are compulsory.
- 2) Solve any four questions from question no. 2 to question no.7.
- 3) Figures to the right indicate full marks.
- 4) Use of non-programmable calculator and statistical table is allowed.

Q1) Solve any 3 sub questions out of 5.

[3×5=15]

- a) 6 persons are seated on 6 chairs in a straight line. Find the probability that two specific persons are not seated next to each other.
- b) If a pair of dice is thrown, find the probability sum of digits on both dies is
 - i) 10 or 12
 - ii) multiple of 6
- c) A random variable X has the following probability distribution as follows.

X	-3	-2	-1	0	1	2	3
P(X)	0.02	0.1	0.24	0.16	0.22	0.18	0.08

Find

- i) $E(X)$
- ii) $P(X < 2)$
- iii) $P(-2 \leq X < 2)$
- d) Among 80 students in a class, 45 passed in Java programming and 22 failed in statistics. If 32 students passed in both the subjects, How many students failed in both subjects.

P.T.O.

- e) A continuous random variable X has the following probability distribution function

$$f(x) = \begin{cases} k(x + 2) & 3 \leq x \leq 6 \\ 0 & \text{otherwise} \end{cases}$$

Find

- i) k
- ii) $P(X < 5)$

- Q2) a)** There are 5 green and 7 red balls. Two balls are selected one by one without replacement. Find the probability that first ball is green and second red. [5]

- b) A manufacturer produces light bulbs that are packed into boxes of 100. If quality control studies indicate that 0.5% of the light bulb produced are defective. What is the probability that boxes will contain [5]

- i) no defective
- ii) Z or more defectives

- Q3) a)** Let E and F be the events of a experiment such that $P(E) = \frac{3}{10}$
 $P(F) = \frac{1}{2}$ $P\left(\frac{F}{E}\right) = \frac{2}{5}$. [5]

Find

- i) $P(E \cap F)$
 - ii) $P(E \cup F)$
 - iii) $P\left(\frac{E}{F}\right)$
- b) Three persons apply for the post of manager in a company. The probability of their selection is 25%, 30% and 45% respectively. The probability three persons A, B & C will introduce new scheme in the company are 0.6, 0.45 and 0.7 respectively. New scheme is introduced find the probability C introduced the scheme. [5]

Q4) a) For the following bivariate probability distribution of X and Y. **[5]**

Y \ X	1	2	3	4	5	6
0	0	0	$\frac{1}{32}$	$\frac{2}{32}$	$\frac{2}{32}$	$\frac{3}{32}$
1	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
2	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{64}$	$\frac{1}{64}$	0	$\frac{1}{32}$

Find

- i) $P(X \leq 1, Y = 2)$
 - ii) $P(X \leq 1)$
 - iii) $P(Y < 4)$
- b) Calculate the variance if the probability density function of X is given as

$$f(x) = \begin{cases} \frac{3+2x}{18} & Z \leq X \leq 4 \\ 0 & \text{otherwise} \end{cases} \quad [5]$$

Q5) a) A random variable X is defined as the difference of outcomes on two dices, when a pair of dice is thrown. Find Expected value of X. **[5]**

b) $X \sim U(2, 8)$ calculate if X is continuous random variable **[5]**

- i) $P(X > 4)$
- ii) $P(X < 5)$
- iii) $P(3 < X < 7)$

Q6) a) If X follows binomial distribution with mean 3 and variance 1.5 Find $P(X = 3)$. **[5]**

b) If 3% of electronic units manufactured by a company are defective. Find the probability that in a sample of 200 units **[5]**

- i) less than 2 bulbs are defective
- ii) no defective

Q7) a) A monthly balance on the bank account of a credit card holder is assumed to be normally distributed with mean Rs. 5000 and standard deviation of Rs. 1,000. Find the proportion of card holders with balance. [5]

i) Over Rs. 6500

ii) Between Rs. 4000 and Rs. 6000

b) Prove the following by using combination arguments [5]

i)
$$\binom{zn}{n} = \binom{n}{0}^2 + \binom{n}{1}^2 + \dots + \binom{n}{n}^2$$

ii)
$$\binom{m+n}{r} = \binom{m}{0}\binom{n}{r} + \binom{m}{1}\binom{n}{r-1} + \dots + \binom{m}{r}\binom{n}{0}$$

Q8) Solve any 3 sub questions out of 5. [3×5=15]

a) Find the coefficient of $x^6 y^8 z^{10}$ in the expansion of $(2x^3 - 3y^2 - 5z)^{16}$. [5]

b) Find how many numbers between 1 ? 1500 both inclusive are divisible by either 2 or 3 or 5 or 7. [5]

c) If X is a discrete random variable whose probability mass function is given as $P(X = xi) = k(i + 2)$ $i = 1, 2, 3, 4, 5$ [5]
 $= 0$ otherwise

Find

i) k

ii) $P(X \leq 4 / X \geq 2)$

d) Find the number of integer solution of the equation $x_1 + x_2 + x_3 = 18$ subject to the condition $4 \leq x_1 \leq 9, 7 \leq x_2 \leq 14, 10 \leq x_3 \leq 24$. [5]

e) 10 gentlemen check their coats at the gatekeeper while entering a hall. The gatekeeper mixes the tokens and return the coats at random. In how many ways gentlemen will get their coats such that exactly 4 of them get their correct coats. [5]

x x x

Total No. of Questions : 7]

SEAT No. :

PE1957

[Total No. of Pages : 2

[6554]-31

Second Year M.C.A. (Management)

IT41 : PYTHON PROGRAMMING

(2019 Pattern) (Semester-IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q.No. 1 & 7 are compulsory.*
- 2) *Solve any four questions from 2 to 6.*

Q1) a) Write a program to check given input is perfect number or not. [5]

b) Explain Decorators & Generators in Python. [5]

Q2) a) What is inheritance? Explain single & multilevel with suitable example.[5]

b) Write a program to validate web URL using regular expression. [5]

Q3) a) How to handle exception in Python? [5]

b) Explain multithreading in Python with example. [5]

Q4) a) Plot a single horizontal line using matplotlib. [5]

b) How to make numpy array read only. [5]

Q5) a) What is package in Python? Illustrate with example. [5]

b) Explain static method with example. [5]

P.T.O.

Q6) a) Explain any five built-in function for string. [5]

b) Write a program to check given number is positive or negative. [5]

Q7) Write short note (any four). [20]

a) readlines() readline()

b) Constructors

c) Super class

d) SQL Database connection using Python.

e) Thread synchronizing



Total No. of Questions :6]

SEAT No. :

PE1958

[Total No. of Pages : 2

[6554]-32

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

BM41: INFORMATION SYSTEM AND SECURITY AUDIT

(2019 Pattern) (Semester-IV)

Time :3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory*
- 2) *Draw neat labeled diagram wherever necessary*

Q1) Scrum collaboration Ltd. is a firm providing customer and internet banking services to its main customers. Its employee , who have access to all the financial accounts, personal data and debit card information of all clients of these banks. You have been appointed as Information securityManager and asked to asses the possible security breaches which might occurs. **[10]**

- a) What are the types of threats you might identify?
- b) What are Your suggestions to control these threats?

Q2) a) Write steps for developing ISMS **[5]**

b) Explain Information security life cycle **[5]**

Q3) Win-Win textile mill decided to computerise their operations by using internet and SMS plugging services for communicating with cotton harvesting farmers. You have been deputed your software company as Information Security policy makes for this textile mill **[10]**

- a) What security standards you will going to propose for this case.
- b) Which security polices you will design for this case.

Q4) What is Information security controls? Explain various information security controls. **[10]**

P.T.O.

Q5) a) Govt. of India Planning to implement online voting system for all types of elections of our country. You have been appointed as an IT auditor to identify the possible threats and input control for such system. [10]

i) Write key success factors for this system security audit

ii) Explain IS audit process for this case.

b) Explain IT governance maturity model. [10]

OR

a) Adinath trading company is implementing ERP system for their day to day operation. You have been asked to conduct technology based audit and asked to do following types of testing. [10]

i) Write steps for penetration testing.

ii) Write Vulnerability scanning process. [10]

b) Explain Database security challenges.

Q6) Write short note on (Any two) [2×5=10]

a) Database security

b) Ethical Hacking

c) Need of security Audits in organisations.

d) COBIT



[6554]-33

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

MT-41 : OPTIMIZATION TECHNIQUES

(2019 Pattern) (Semester-IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

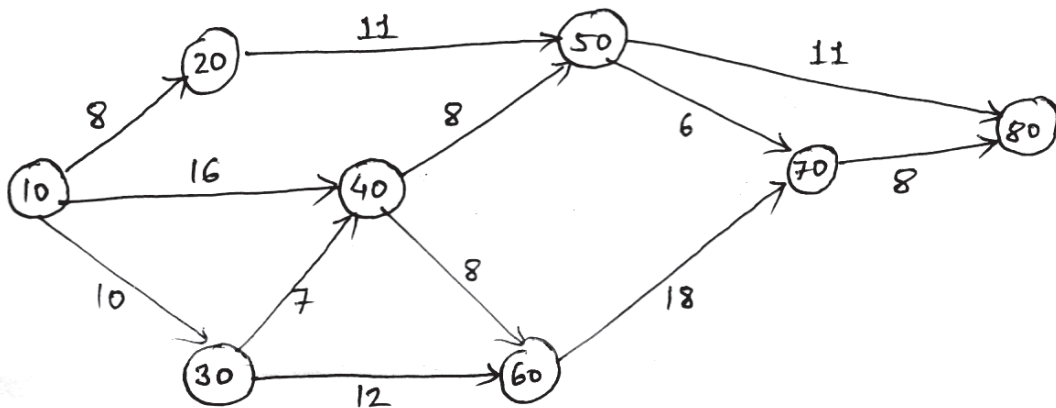
- 1) Question 1 is compulsory.
- 2) Attempt any five from remaining.
- 3) Figures to the right indicate full marks.

Q1) a) A company has four jobs. The following matrix shows the cost of assigning each job [10]

Jobs	Machines			
	M ₁	M ₂	M ₃	M ₄
	Manufacturing cost (₹)			
W ₁	40	50	60	65
W ₂	30	38	46	48
W ₃	25	33	41	43
W ₄	39	45	51	59

How should the tasks be assigned to the machines to minimize total cost?

- b) The network shown the activity time in Days are given along the arrows. Calculate the slacks for the events and determine the critical path. Put the calculations in tabular form [10]



- Q2)** Two persons X and Y work on a two-station assembly line. The distribution of activity times at their stations are **[10]**

Time in seconds	Time frequency for X	Time frequency for Y
10	3	2
20	7	3
30	10	6
40	15	8
50	35	12
60	18	9
70	8	7
80	4	3

- Simulate operation of the line for eight items
 - Assuming Y must wait until X completes the first item before starting work, will have to wait to process any of the other eight times?
- Q3)** A readymade garments manufacturer has to process 7 items through two stages of production viz cutting and sewing. The time taken for each of these items at the different stages are given below **[10]**

Item	1	2	3	4	5	6	7
Cutting	5	7	3	4	6	7	12
Sewing	2	6	7	5	9	5	8

Find

- Optimum order
 - Total elapsed time
 - Idle time for cutting and sewing
- Q4)** A self-service store employs one cashier at its counter. Nine customers arrive on an average every five minutes while the cashier can serve 10 customers in five minutes. Assuming poisson distribution for arrival rate and exponential distribution for service rate, Find, **[10]**
- Average number of customers in the system
 - Average number of customers in queue or average queue length
 - Average time a customer spends in the system
 - Average time a customer waits before being served

- Q5)** A firm is considering replacement of machine, whose cost price is ₹ 12,200 and the scrap value ₹ 200. The running (maintenance & operating) cost are found from experience to be as follows. **[10]**

Year	1	2	3	4	5	6	7	8
Running cost (₹)	200	500	800	1200	1800	2500	3200	4000

When should the machine be replaced?

- Q6)** Solve the following 2×2 games without saddle point. **[10]**

		Player B	
		B_1	B_2
Player A	A_1	-4	6
	A_2	2	-3

- Q7)** a) Indicate the difference between decision making under risk and uncertainty in decision theory **[10]**
- b) Explain the terms (any two)
- Action space
 - State of nature
 - Payoff table

- Q8)** Use two-Phase method to solve the LPP. **[10]**

$$\text{Minimize } Z = x_1 + x_2$$

Subject to constraints

$$2x_1 + x_2 \geq 4$$

$$x_1 + 7x_2 \geq 7$$

$$x_1, x_2 \geq 0$$



Total No. of Questions : 7]

SEAT No. :

PE-1960

[Total No. of Pages : 2

[6554]-34

M.C.A. (Management)

**IT 42: ESSENTIALS OF ARCHITECTURAL FRAMEWORK
(2019 Pattern) (Semester - IV)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *Q.1 & Q.7 are compulsory.*
- 2) *Solve any four from remaining.*
- 3) *Draw neat labelled diagram wherever necessary.*

Q1) a) Define enterprise architecture and explain the objectives of enterprise architecture. **[8]**

b) Explain web application development framework. **[7]**

Q2) What are the various architecture patterns and styles. Explain in detail. **[10]**

Q3) Explain the design for application security. **[10]**

Q4) What is framework? Explain architectural framework for enterprise transformation. **[10]**

Q5) Explain six sigma (6σ) and lean. **[10]**

Q6) If you are developing an application that allow users to print the statements in various formats while keeping the application isolated from the details of formatting. Explain strategy pattern for implementation. **[10]**

P.T.O.

Q7) Write short notes on any three :

[3 × 5 = 15]

- a) Business process framework (eTOM)
- b) Treasury Enterprise Architecture Framework (TEAF)
- c) Capability Maturity Model Integration (CMMI)
- d) Devops
- e) Difference between Treasury and Federal enterprise architectural framework.



Total No. of Questions : 5]

SEAT No. :

PE1961

[Total No. of Pages : 2

[6554]-35

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

**IT 43-405 : KNOWLEDGE REPRESENTATION & ARTIFICIAL
INTELLIGENCE**

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) a) What is Intelligent Agent? Explain the Model based reflex agents. **[10]**

b) What is Artificial Intelligence? Discuss the main branches of AI. **[10]**

Q2) a) Explain properties of good Knowledge based system. **[10]**

OR

b) Why Knowledge representation is important? Explain any two knowledge representation techniques.

Q3) a) Explain minimax algorithm with appropriate example. **[10]**

OR

b) State whether the following expression(X) is a Tautology, Contradiction or the Contingency with help of the truth table.

$$X : (P \rightarrow Q) \vee \sim ((P \rightarrow Q) \wedge (Q \rightarrow R))$$

P.T.O.

Q4) a) What is difference between forward and backward chaining? **[10]**

OR

b) Explain the different types of planning.

Q5) Write a short note on (Any four) **[20]**

- a) Proposition Logic.
- b) NLP.
- c) Semantic network.
- d) Inference in belief network.
- e) Breadth First Search.

x x x

Total No. of Questions : 8]

SEAT No. :

PE1962

[Total No. of Pages : 1

[6554]-41

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

IT - 51 : SOCIAL MEDIA AND DIGITAL MARKETING

(2019 Pattern) (Semester - V)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Questions 1 & 8 are compulsory.*
- 2) Solve any 5 questions from remaining.*
- 3) Figures to the right indicate full marks.*

Q1) Assume that a startup organization wants to promote their business on social media. Suggest suitable plan and tool with benefits of it. **[10]**

Q2) Explain in details the type & roles of social media in marketing. **[10]**

Q3) Explain on page optimization using page rank algorithm. **[10]**

Q4) How Digital Marketing is different than Traditional Marketing with respect to Return on Investment (ROI)? **[10]**

Q5) Discuss branding strategies of social media. **[10]**

Q6) Explain the tool used for search engine marketing. **[10]**

Q7) Explain PPC (Pay Per Click) Technique and Google Ad Words in Search Engine Marketing (SEM)? **[10]**

Q8) Write short note on (Any two) **[10]**

- a) Google Analytics
- b) Facebook Marketing
- c) Free Classifieds

x x x

Total No. of Questions : 7]

SEAT No. :

PE1963

[Total No. of Pages : 1

[6554]-42

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

IT - 52 : MOBILE APPLICATION DEVELOPMENT

(2019 Pattern) (Semester - V)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Questions 1 & 7 are compulsory.*
- 2) Solve any four questions from 2 to 6.*
- 3) Figures to the right indicate full marks.*

Q1) Explain Android Architecture in detail with the help of diagram. [10]

Q2) What in views & view groups? Explain it by using suitable example. [10]

Q3) What is Menus? Explain its different types. Design an android application by using one type of Menu. [10]

Q4) Design an android application for “Blood Donation camp Registration”. Write an android code to store & retrieve registration details by using SQ Lite. (Assume suitable table structure) [10]

Q5) What is webview? Design an android application that accepts a web URL address as input from user & displays the corresponding web page. [10]

Q6) Design an android application to turn on & off bluetooth & Wi-fi. [10]

Q7) Write short notes : (Any four) [20]

- a) React Native Geolocation
- b) Flutter Architecture
- c) Intents
- d) Adapters
- e) Web services

x x x

Total No. of Questions :6]

SEAT No. :

[Total No. of Pages : 2

PE1964

[6554]-43

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

IT- 53: SOFTWARE PROJECT MANAGEMENT

(2019 Pattern) (Semester-V)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory*
- 2) Figures to the right indicate full marks.*

Q1) Attempt the following questions (any four)

[4×5=20]

- a) Explain the value driven development
- b) Explain the estimation with MS- Project
- c) Explain Sprint in Agile Project management
- d) Explain the product road map in the Agile project management
- e) Explain Linear project management process
- f) Write short note on-Sprint Burndown chart.

Q2) a) What is project management? Explain project management

[5]

b) Explain various risks in project management

[5]

OR

a) Explain in brief role of project manager

[5]

b) Explain the Phases of project management life cycle

[5]

Q3) a) What is cost estimation in the project management

[5]

b) Explain different methods of project cost estimation

[5]

OR

a) Explain SEI CMM

[5]

b) What is function point? Explain FPA

[5]

P.T.O.

- Q4)** a) Explain user story in Agile [5]
b) Explain any two Agile estimation techniques [5]

OR

- a) Explain key components of Agile project management [5]
b) Explain the term minimum viable product [MVP] [5]

- Q5)** a) Explain role of SCRUM master in Agile [5]
b) Explain in brief role of an Agile team [5]

OR

- a) Explain in brief dynamic system development method [5]
b) Write short note on - Kaban/ Agile board [5]

- Q6)** a) What is Product Prioritization in Agile [5]
b) Write short note on - plan product releases [5]

OR

- a) What is velocity? Explain [5]
b) Explain the project objectives in agile project management. [5]

