Total No. of Questions : 7]

SEAT No. :

P-3376

[Total No. of Pages : 2

[6027]-101

M.C.A. (Management)
IT11 : PROBLEM SOLVING USING C++
(2019 Pattern) (Semester - I)

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

Instructions to the candidates:

   1)   *All Questions carry 10 marks each.*

   2)   *All Questions are compulsory.*

Q1) a)   Write a pseudo code for divide and conquer algorithm for binary search. Search the item 21 in the array A= {11, 5, 7, 8, 14, 19, 20, 21, 29}   **[5]**

     b)   Explain greedy algorithmic Paradigms.   **[5]**

Q2) a)   Explain function with default arguments with example.   **[5]**

     b)   Write a program to explain call by value and call by reference.   **[5]**

<div align="center">OR</div>

     a)   What is difference between member function and friend function? Explain with example.   **[5]**

     b)   Write a C++ program to use of Inline function.   **[5]**

Q3) a)   Write a C++ program to overload [ ] array subscript operator with suitable class.   **[7]**

     b)   Design a string class stringl and overload = = operator for comparison of two strings.   **[3]**

<div align="center">OR</div>

     a)   Design a polar class which describes a point in the plane using polar coordinates radius and angle. Overload + operator to add two objects of polar and cin to read polar object.   **[7]**

     b)   Write rules for operator overloading.   **[3]**

Q4) a)   What is inheritance in C++? What are its types? Explain Multilevel inheritance?   **[7]**

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b) Write difference between C and C++ programming Language. **[3]**

OR

a) Create a base class called shape. Use this class to store double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Use the base class constructor for initializing data members. Add one member function area () to compute and display area of figures. Make area () as a virtual function and redefine it in the derived classes to suit their requirements. Write C++ program to implement run time polymorphism by using virtual function. **[7]**

b) Explain Program Compiling process in C++. **[3]**

Q5) a) What are the naming Rules for identifier. **[3]**

b) Write a program to find GCD and LCM of Given Numbers. **[7]**

OR

a) What is Manipulator? Write a program using setw(), setprecision() and setbase(). **[7]**

b) What is Bitwise operators in C++? **[3]**

Q6) a) What are the Access modifiers in C++? Explain with default modifier.**[8]**

b) Explain Memory Management operators in C++? **[2]**

OR

a) Create the class Time with data members hours and minutes. Write a program that can read values for the two objects. The Time class also contains one friend function add(Time, Time). It required two objects as arguments and return object as result of addition. Use constructor to initialize the Time class objects. **[8]**

b) When scope resolution is used? **[2]**

Q7) a) Write program for Tic Tac Toe. **[8]**

b) What are user-Defined Data Types? **[2]**

OR

a) Write a program for Mouse in Maze problem. **[8]**

b) What is Enumerated data type? **[2]**

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[6027]-102
F.Y.M.C.A. (Management Faculty)
IT-12 : SOFTWARE ENGINEERING USING UML
(2019 Pattern) (Semester-I)

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

Instructions to the candidates:
1) *Q.1 & 7 are compulsory.*
2) *Solve any four from remaining.*
3) *Draw neat & labelled diagram wherever necessary.*

Q1) 'Akash Travels' wants to develop an online system for Ticket Booking, Railway Reservations, International & Domestic Air Tickets can be booked through the website. Credit cards are used for payments. Online ticket cancellation facility will be available with certain rules. Prepare the SRS in IEEE format for an Information system of Ticket Booking. **[20]**

Q2) Draw activity diagram for Accepting Online order and Home delivery of Pizza. **[10]**

Q3) Indian Bank provides fixed deposit (FD) schemes through which people can deposit money for a certain period of time. The bank pays interest for this period and returns money when FD period's over. Interest rate is depending upon the period. The depositor may choose to renew FD and may get loan against deposits. Consider the above case and draw use case diagrams. **[10]**

Q4) What is Agile process model and explain in Details. **[10]**

Q5) Draw sequence diagram for cancelling an item through online shopping system. **[10]**

Q6) Prepare a class diagram for online shopping system. Customer can browse through the product catalogue and add the items to shopping cart. He can proceed to checkout as long as his shopping cart isn't empty. **[10]**

Q7) Write short notes on (any two). **[10]**
   a) Distinguish between SSAD & OOAD.
   b) The Role and skills of system analyst
   c) RUP with all phases.
   d) Functions & Non-functional requirement.

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[6027]-102

F.Y.M.C.A. (Management Faculty)
IT-12 : SOFTWARE ENGINEERING USING UML
(2019 Pattern) (Semester-I)

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

Instructions to the candidates:
    1)   ***Q.1 & 7 are compulsory.***
    2)   ***Solve any four from remaining.***
    3)   ***Draw neat & labelled diagram wherever necessary.***

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    a)   Distinguish between SSAD & OOAD.
    b)   The Role and skills of system analyst
    c)   RUP with all phases.
    d)   Functions & Non-functional requirement.

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[6027]-103

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) TSS is a local commercial bank in Maharashtra. It plans to build a credit card management system to handle large amount of information in efficient way, also to provide the goods services to customer. The system will provide online application form filling to customers, help in generating cards as per the information filled by customer, online Credit card payments, Credit cards transaction checking. Online monthly credit card statement, special offers etc. Design the E-R model and normalized it upto 3NF. **[20]**

Q2) Explain various Advantages of DBMS. **[10]**

Q3) What is XML? Explain structure of XML. **[10]**

Q4) Explain the purpose of checkpoint mechanism. How often should checkpoints be performed. **[10]**

Q5) a) Explain Recovery with concurrent transactions.

b) Consider the following transactions. Give two non-serial schedules that are serializable.

T1	T2
Read (A)	Read (A)
A = A +	A = A – 1000
1000	Write (A) Read (B)
Write (A)	B = B – 1000
Read (C)	Write (B)
C=C- 1000	Read (B)
Write (C)	B = B + 100
	Write (B)

[10]

Q6) How does the process of database backup and recovery address catastrophic failures. **[10]**

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

a) Mobile Database

b) OODBMS Vs ORDBMS

c) NOSQL

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[6027] - 104

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

IT 14 : ESSENTIALS 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 Q6.*
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 & turnaround time by shortest Job First (SJF) non preemptive Scheduling algorithm.   **[5]**

Process	Burst Time	Arrival Time
P1	5	0
P2	3	2
P3	2	4
P4	4	6
P5	1	7

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

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

Q4) Explain any 5 Linux commands with example. **[10]**

Q5) Explain Distributed operating system with example. **[10]**

Q6) Explain Logical and Physical memory allocation with example. **[10]**

Q7) Write short Notes (Any 3) **[15]**

    a)   Mutual Exclusion.

    b)   Features of Mobile operating System.

    c)   Segmentation.

    d)   Shell.

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[6027]-105

M.C.A. (Faculty of Management)

BM - 11 : BUSINESS PROCESS DOMAIN

(2019 Pattern) (Semester - I)

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

Instructions to the candidates:

    1)   *Q1 and Q8 are 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]**

Q2) a) Calculate gratuity of employee who is working for Infosys for 5.7 years and getting basic salary is Rs. 19,000/- month and DA is 20%.

b) Calculate gratuity of employee who is working for TCS for 4.4 years and getting basic salary Rs.17,000/- month and DA is 12,000/- 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. 20,000/-, 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

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[6027]-201
First year 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) Write an algorithm to Insert and Delete an element in an array   **[10]**

Q2) Define stack. Write an algorithm for PUSH and POP operations.   **[10]**

<div align="center">OR</div>

Convert the following Infin expression to Post fin form also show the contents of stackeach step M$N*O-P+Q/R/(S+T)   **[10]**

Q3) What is Queue? Differentiate between circular and Priority Queue   **[10]**

<div align="center">OR</div>

Write an algorithm to reverse the contents of stack using Queue.   **[10]**

Q4) Define Linked List. Explain Dyanamic memory management.   **[10]**

<div align="center">OR</div>

Write an algorithm to Insert a node in to double linked List   **[10]**

Q5) What do you mean by Binary Tree? Explain Binary Tree Representation in Detail.   **[10]**

<div align="center">OR</div>

Construct AVL tree for the following: 69, 83, 71, 50, 39, 76, 10, 83   **[10]**

Q6) Explain Dijkstra's algorithm with suitable example.   **[10]**

<div align="center">OR</div>

Differentiate between BFS and DFS   **[10]**

Q7) Write a short note on (Any two):   **[10]**
   a)   Selection sort
   b)   Application of Queues
   c)   Minimum Spanning Tree

[6027]-202
First Year M.C.A. (Management Faculty)
IT-22 : WEB TECHNOLOGY
(2019 Pattern) (Semester-II)

Time : 3 Hours]   *[Max. Marks : 70*
Instructions to the candidates:
    1)   *All questions are Compulsory.*
    2)   *Figures to right indicate full marks.*

Q1) Write a Javascript program to validate airplane Reservation Form with field **[10]**

    a)   Name of Person

    b)   Age

    c)   Email ID

    d)   Data of Journey

    e)   From & To city Name

Q2) Write CSS script for: **[10]**

    a)   Paragraph with Bold & background yellow

    b)   Div with margins 1.5 px

    c)   Image with caption & bottom

    d)   Table rows with alternate color

    e)   Table with all border different colours

Q3) Write PHP Program to store students details. **[10]**

Q4) Explain JQuery Filters with examples. **[10]**

P.T.O.

Q5) Explain Super Global variables with examples in PHP. **[10]**

Q6) Write a Javascript Program to covert celcius to farewhite and vice a versa.

[10]

Q7) Write a short Notes on any Two **[10]**

    a)   Audio & Video

    b)   Type of CSS

    c)   Session in PHP

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[6027]-203

F.Y. 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 compuslory.*
2) *Solve any 04 questions from remaining.*

Q1) a) Explain in detail HTTP communication process & error codes. **[10]**
 b) For the given class C 192. 168. 14.1 and subnet mask 255. 255. 255. 240 calculate. **[5]**
  i) Total number of subnets.
  ii) Total number of host IPs per subnet.
  iii) First and last subnet work address.
 OR
 Define the subnet mask to be used in class-B addressing to support 29 subnets and also find the number of hosts possible in each subnet. **[5]**

Q2) Explain OSI layers and its functions. **[10]**

Q3) What is DNS? Explain DNS resolution process. **[10]**

Q4) What is Cryptography? Explain symmetric and asymmetric cryptography in detail. **[10]**

Q5) What is routing? Explain in detail distance vector routing protocols. **[10]**

Q6) The received code word is 1100 100 101011. Check if there is error in the code if divisor is 10101.
 OR
 Generate CRC code for the data word 1010001011 using the divisor 11101.**[10]**

Q7) Write short notes (any 3). **[15]**
 a) Define network Topology and their types.
 b) Guided and unguided media.
 c) IPv4 header packet format.
 d) Classful IPv4 addressing.
 e) HDLC protocol.

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First Year 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) *Mention Question and sub-question correctly.*
4) *Use of simple calculator is allowed.*
5) *Statistical table will be provided.*
6) *Figures to the right indicate full marks.*

Q1) a) What is meant by business statistics? Discuss the importance and applications of business statistics in present competitive scenarios. **[7]**

   b) What is sampling? Why we go for sampling? Define the basic statistical laws to reduce sampling error. **[7]**

OR

   c) Define following terms with illustration. **[7]**
      i) Degree of freedom.
      ii) Type I Error.
      iii) Sample & Population.

   d) What do you mean by correlation? How we can find correlation graphically. **[7]**

Q2) a) The following table shows the monthly expenditure of 80 students lunch. **[7]**

Expenditure (Rs.)	No. of students
780-820	2
730-770	6
680-720	7
630-670	12
580-620	18
530-570	13
480-520	9
430-470	7
380-420	4
330-370	2

Calculate mean, standard deviation and coefficient of variation for above data.

P.T.O.

b) The survey of 370 students from commerce faculty and 130 students from science faculty, revealed that 180 students were studying for only C.A. examination, 140 for only costing examination and 801 for both C.A. & costing examination. The rest had offered part-time management courses. Of those studying for costing only 13 were costing, 72 were from commerce faculty amongst which 70 were boys. Amongst those who offered part-time management course, 50 boys were from science faculty and 30 boys and 10 girls from commerce faculty. In all there were 110 boys in science faculty. **[7]**

Present the above information in tabular form. Find the number of students from science faculty studying for part-time management courses.

OR

c) The average daily wages, standard deviation of daily wages and number of workers in two production units A & B are given below. **[7]**

	UnitA	Unit B
No. of workers	75	125
Average daily wages	48.5Rs.	57.5Rs.
Standard Deviation	8.5Rs.	10.0Rs.

i) Which unit is more consistent in daily wages? Why.

ii) Calculate average and standard deviation of all workers in the two units A & B taken together.

d) The median & mode of the following distribution are known to be 27 & 26 respectively find the value of "a" & "b". **[7]**

Value	0-10	10-20	20-30	30-40	40-50
Frequency	3	a	20	12	b

Q3) a) Two independent samples of 8 and 7 items gave the following values.**[7]**

Sample A	9	11	13	11	15	9	12	14
Sample B	10	12	10	14	9	8	10	

Examine whether the difference between the means of two samples differ significantly at 5% level of significance.

b) In a survey of 200 boys, of which 75 were intelligent, 40 had skilled mothers while 85 of the un intelligent boys had unskilled mothers. **[7]**

Do these figures support the hypothesis that skilled mothers have intelligent boys?

OR

c) Machine is intended to fill tins of 16 kg. 10 oil tins are taken at random form an automatic filling machine. The mean weight of 10 tins is 15.8 kg. with standard deviation of 0.5 kg is machine working properly? **[7]**

d) 200 digits are chosen at random from a set of tables. The frequencies of the digits are as follows. **[7]**

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	18	19	23	21	16	25	22	20	21	15

Use Chi square test to assess the correctness of the hypothesis that digits were distributed in equal number in the table from which they were chosen.

Q4) a) Compute the cost of living index of middle-class family from pune of 2023 with respect to 2022. **[7]**

Items	Weights	Prices in Rs.	
		2022	2023
Food	10	400	500
House rent	5	160	240
Clothing	3	80	100
Fuel & lighting	4	100	140
Miscellaneous	5	160	200

b) The following data gives the experience of machines operator and their performance rating as given by number of good parts out of 100 pieces. **[7]**

Debaters	1	2	3	4	5	6	7	8
Marks by A	16	12	18	4	3	10	5	12
Marks by B	87	88	89	68	78	80	75	83

Calculate the regression line of performance ratings on experience & estimate the probable performance of operator has 7 years of experience.

OR

c) From the following data, construct an index for 2020 by taking 2019 as base year by the average of relative method using. **[7]**

i) Arithmetic mean.

ii) Geometric mean for averaged relatives.

Commodity	Prices in 2019 (Rs.)	Prices in 2020 (Rs.)
A	100	140
B	80	120
C	160	180
D	220	240
E	40	40

d) Let X_1, X_2 & X_3 be the height in cms of son, mother & father respectively. The sample gave the following results. **[7]**

Mean of X_1 = 170, mean of X_2 = 160, Mean of X_3 = 168. Standard deviation of X_1 = 2.4, standard deviation of X_2=2.7, standard deviation of X_3= 2.7. r_{12} = 0.28, r_{13}= 0.49, r_{23}=0.51.

Find regression plane of X_1, on X_2 and X_3 and estimate X_1 when X_2 is 162cms & X_3 is 175 cms.

Q5) a) Calculate the trend values by the method of least square from the data given below & estimate the sales for the year 2018. **[7]**

Year	2009	2010	2011	2012	2013
Sales (Rs. Lakhs	12	18	20	23	27

b) Explain the process of finding trend by using moving average method.**[7]**

OR

c) Calculate three years moving average of production values. **[7]**

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	30	36	45	54	75	60	78	90	120	114

d) What do you mean by time series? State the use of time series. **[7]**

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[6027]-205

F.Y.M.C.A. (Management Faculty)
BM-21 : PRINCIPLES AND PRACTICES OF MANAGEMENT & ORGANIZATIONAL BEHAVIOR
(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. **[10]**

a) Identify the stressors in the given case and discuss the type of stress.

b) Suggest suitable stress management strategies.

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 top 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.

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[6027]-301

M.C.A. (Management)
IT31 : JAVA PROGRAMMING
(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:
1) *All questions are compulsory.*
2) *Draw neat diagram wherever necessary.*

Q1) Answer in short (Any five) :   **[10]**

 a) What is package in Java?

 b) Define Inheritance in Java?

 c) What is Exception in Java?

 d) What is Thread in Java?

 e) Explain Interface is Java?

 f) What is Scanner in Java?

Q2) Create thread using any one method.   **[10]**

OR

Explain any 5 string functions in Java.

Q3) What is Array in Java? Explain with example.   **[10]**

OR

Differentiate between Map & Sorted Map.

Q4) Create Login GUI in java using AWT or Swing.   **[10]**

OR

Explain any 2 Listeners with Example.

Q5) Create Java application to register reality show singer. [Assume suitable table structure] **[10]**

<div align="center">OR</div>

Explain any two methods of session tracking in servlet with example.

Q6) Write any two JSP action tags with example. **[10]**

<div align="center">OR</div>

Write essentials steps to perform database connectivity in Java.

Q7) Write short note on (any two) : **[10]**

    a)   MVC

    b)   Default objects in JSP

    c)   RMI

    d)   Connection Pooling

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[6027]-302

Second Year 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) *Question no.1 and 8 are compulsory.*
2) *Solve any 5 questions from Q.No. 2 to 7.*
3) *Figures to the right indicate full marks.*

Q1) Explain various data preprocessing techniques with example. **[10]**

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

Q3) Write Apriori Algorithm and apply it for the following data set to find the list of Frequent Item - sets, if the minimum support count is 30%. **[10]**

TID	List of Items
1	a, b, c
2	b, c, d
3	c, d
4	b, d
5	a, c

Q4) Discuss the K-nearest neighbour classification algorithm with suitable example.**[10]**

Q5) Explain K-means algorithm with example. **[10]**

Q6) Explain the difference between classification and prediction. **[10]**

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

Q8) Write short notes on (any two) **[10]**
     a)   Data warehouse schemas
     b)   Text mining
     c)   Bayesian network
     d)   Knowledge discovery process

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[6027] - 303

Second Year M.C.A. (Mgmt. Faculty)
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 whenever necessary.*

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

  a)   Scope of testing.

  b)   Objectives.

  c)   Risks.

  d)   Strategy.

  e)   Approach.

Q2) a)   Enumerate and explain the SQA activities.   **[8]**

  b)   Define Software Process metrics with an example.   **[2]**

OR

  a)   What is reliability? What are the factors that affect reliability.   **[8]**

  b)   Define Software Product metrics with an example.   **[2]**

Q3) a)   Explain the Phases of testing life cycle.   **[8]**

  b)   Explain stress testing.   **[2]**

OR

  a)   Differentiate between white box and black box testing.   **[8]**

  b)   Explain acceptance testing.   **[2]**

P.T.O.

Q4) A) Solve the following.

a) For the given sample code which of the following test cases will ensure that statement ll 06ll is executed?

> Input number of male rabbits
>
> Input number of female rabbits
>
>   If male rabbits > 0 and female rabbits > 0 then
>
>   Input Do you want to breed (Yes/No)
>
>   If breed = "No"
>
>   Print "keep male and female rabbits apart !"
>
>   Endif
>
>   Endif

i)   male rabbits = 1, female rabbits = 1, breed = 'yes'

ii) male rabbits = 1, female rabbits = 1, breed = 'no'

iii) male rabbits = 1, female rabbits = 2, breed = 'yes'

iv) male rabbits = 1, female rabbits = 0, breed = 'no'

[3]

b) In a examination a candidate has to score minimum of 24 marks in order to clear the exam. The minimum that he can score is 40 marks. Identify the valid Equivalence values if the student clears the exam.

[3]

i)   22, 23, 26

ii) 21, 39, 40

iii) 29, 30, 31

iv) 0, 15, 22

c) Find the cyclomatic complexity of the code   **[2]**

If X=z

THEN statement 2;

END

B) Explain unit testing.   **[2]**

OR

A) Solve the following.

   a) Mention valid collection of equivalence classes for the following.

    Paying with credit cards shall be possible with Visa, Master and Amex cards only. **[3]**

   b) Find the minimum test required for statement coverage.

    order_qty = 0

    Read order_qty

    If order_qty >= 20 then

    Disc = 0.05

    If order_qty >= 100 then

    Disc = 0.1

    Endif

    Endif **[3]**

   c) A name field in software accepts 3 to 25 alpha characters only. Using BVA technique what will be possible number of combinations? **[2]**

    i)   3, 4, 24, 25

    ii) 2, 3, 25, 26

    iii) 2, 3, 24, 25

    iv) 3, 5, 25, 26

B) Explain Integration testing. **[2]**

Q5) Write 4 test cases for testing debit card payment form of the payment module for an e-commerce web application. **[10]**

<div align="center">OR</div>

Write any 4 test cases for testing login functionality of an E-mail application. **[10]**

Q6) a) Explain test design tool and test data preparation tool. **[6]**

b) Enumerate the limitations of Selenium testing tool. **[4]**

OR

a) Explain the process of automation testing. **[6]**

b) What are the testing types supported by Selenium? **[4]**

Q7) Write short notes on **[2×5=10]**

a) Static testing.

b) Alpha testing.

OR

a) Walkthrough.

b) Reliability.

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[6027] - 304

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

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:
1) *Q.1 is compulsory.*
2) *Solve any five questions from Q2. to Q7.*
3) *Q.8 is compulsory.*

Q1) Define cloud computing. Explain cloud service Models and types with examples. **[10]**

Q2) Explain following types of virtualization like server, storage and network.**[10]**

Q3) Explain securing issues and challenges in cloud computing. **[10]**

Q4) Explain difference between cloud computing vs cluster computing vs grid computing. **[10]**

Q5) Explain SaaS and Web services will examples. **[10]**

Q6) Explain streaming issues and inter cloud issues in cloud computing. **[10]**

Q7) Explain cloud service attributes and Quality of services in cloud computing with examples. **[10]**

Q8) Write short Notes (Any 2) **[10]**

   a)   AWS

   b)   NIST Model

   c)   SOA (Service Oriented Architecture)

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P-3389

[6027]-305

S.Y. M.C.A. (Management Faculty)
MT-31 : PROBABILITY AND COMBINATORICS
(2019 Pattern) (Semester - III)

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

Instructions to the candidates :

　　1)　Question No. 1 and 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 three sub-questions out of five :   **[3 × 5 = 15]**

　　a)　A committee of 3 persons is to constituted from a group of 2 men and 3 women. In how many ways this can be done? How many committees would consists of 1 man and 2 women?

　　b)　In how many ways can you put 7 letters into their respective envelops such that exactly 3 go into the right envelope?

　　c)　A juggler has seven red, five green and four blue balls. During his stunt, he accidentally drops a ball & then picks it up. As he continous another ball falls. What is the probability that first ball dropped is blue and second ball is green.

　　d)　Let X be a continous random variable with probability density function

$$f(x) = x^2\left(2x + \frac{3}{2}\right) \quad 0 < x \leq 1$$

$$= 0 \qquad\qquad \text{otherwise}$$

　　　　If y = 2X + 3 find V(*y*).

　　e)　The number of Industrial Injuries per working week in a particular factory is known to follow a poisson distribution with mean 0.5. Find the probability that in a particular week there will be

　　　　i)　no accident

　　　　ii)　less than 2 accidents

　　　　iii)　more than 2 accidents

Q2) a) Find the number of integer solutions to the following

$X_1 + X_2 + X_3 = 28$, so that $3 \le X_1 \le 19, 4 \le X_2 \le 20, 5 \le X_3 \le 21$.**[5]**

b) Prove by combinational arguments **[5]**

i) $\binom{2n}{n} = 2\binom{n}{2} + n^2$

ii) $\sum_{k=0}^{r}\binom{m}{k}\binom{n}{r-k} = \binom{m+n}{r}$

Q3) a) Three persons A, B and C have applied for a job in a private company. The chance of their selection is in the ratio 1:2:4. The probability that A, B and C can introduce changes to improve the profit of the company are 0.8, 0.5 and 0.3 respectively. If change take place, find the probability it is due to B. **[5]**

b) Explain the following terms with examples **[5]**
   i) Random variable
   ii) Sample space
   iii) Events

Q4) a) A discrete random variable X has the following probability distribution. **[5]**

X :	−2	−1	0	1	2	3
P(X) :	0.14	0.16	0.2	0.24	0.18	0.08

Find (i) $P(X > -1)$ (ii) $P(-2 < X \le 2)$ (iii) $P(|X| > 1)$

b) We will assume that smiling times of eight week old baby follows uniform distribution between zero to 23 seconds. Inclusive let X denote smiling time in seconds. Find (i) $P(2 < X < 18)$ (ii) $P(X > 12/X > 8)$ **[5]**

Q5) a) Show that Poisson distribution is a limiting condition of Binomial distribution? State the assumptions related to it. **[5]**

b) A continous random variable X has the following probability distribution function **[5]**

$f(x) = k(1+x) \quad 2 \le x \le 5$
$\quad\quad\quad = 0 \quad\quad\quad \text{otherwise}$

Find (i) K (ii) $P(X < 4)$ (iii) $P(X > 3)$

Q6) a) I roll a die twice and obtain two numbers X_1 - result on first die X_2 = result on second die **[5]**

Find (i) $P(X_2 = 4)$ (ii) $P(X_1 + X_2 = 7)$

(iii) $P(X_1 = 2$ or 3 and $X_2 \geq 4)$.

b) All boys at a military school must run a fixed course as fast as they can as a part of physical examination with mean 29 minutes and standard deviation 2.5 minutes. Find the probability that boy selected at random run a fixed course in (i) less than 25 minutes (ii) between 26 and 30 minutes (iii) greater than 27 minutes. **[5]**

Q7) a) The joint probability mass function of (X, Y) is given by **[5]**

$$f(x, y) = x^2 + \frac{xy}{3} \quad 0 \leq x \leq 1 \quad 0 \leq y \leq 2$$
$$= 0 \qquad\qquad \text{otherwise}$$

Find : i) $P\left(X > \dfrac{1}{3}\right)$ ii) $P\left(X < \dfrac{1}{4}, Y < \dfrac{3}{2}\right)$

b) Scores on a standardized College Entrance Examination (CEE) are normally distributed with mean 510 and standard deviation 60. A selective university considers for admission only applicants with CEE score above 650. Find the percentage of all individuals who took the CEE who meet the university's CEE requirement. **[5]**

Q8) Solve any 3 sub-questions out of 5 : **[3 × 5 = 15]**

a) Determine the number of 5 card combinations out of a deck of 52 cards, if there is exactly one are in 5 cards.

b) A pin consists of 4 digits. What is the probability that any 4 digit pin selected will contain no repeated digits.

c) You can take an examination which contains 10 multiple choice questions. Each question has 4 possible options. Your score is X in the examination which is total number of correct answers. Find the probability of

  i) All correct answers

  ii) All wrong answers

  iii) Exactly 4 correct answers

d) A large software development company employs 100 computer programmers of them 45 are proficient in Java, 30 in C#, 20 in Python, 6 in C# and Java, one in Java and Python, five is C# and python and just one programmer is proficient in all three languages above. Determine the number of computer programmers that are not proficient in any of these three languages.

e) The following table represents the joint probability distribution of discrete variables X & Y.

X \ Y	1	2	3
1	k	2k	3k
2	4k	5k	6k
3	8k	9k	11k

Find :

i) k

ii) Conditional probability distribution X given Y = 1.

iii) Conditional probability distribution of Y given X = 2.

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[6027]-401
Second Year M.C.A.
IT41 : PYTHON PROGRAMMING
(2019 Pattern) (Semester-IV)

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

Instructions to the candidates:
1) *Question No. 1 & 7 are compulsory.*
2) *Solve any four questions from 2 to 6.*
3) *Figures to the right indicate full marks.*

Q1) a)   What is module and package in Python?   **[5]**

    b)   Write a python program to check whether the given number is prime or
         not using function.   **[5]**

Q2) a)   What is List? Explain insert, append, extend and remove function related
         to list along with example.   **[5]**

    b)   Differentiate between list and tuple.   **[5]**

Q3) a)   Explain Supper class with proper example.   **[5]**

    b)   Write a python program to implement area class to calculate area of circle.
                                                                        [5]

Q4) a)   Write a python program to validate email using regular expression.   **[5]**

    b)   Write a python program which will throw exception if the value entered
         by user is less then Zero.   **[5]**

Q5) What is Numpy? How to get values of Numpy arrays at certain index
     position?   **[10]**

Q6) a)   Explain universal array functions.   **[5]**

b)   What is lambda function in python? Explain with example.   **[5]**

Q7) Write a short note on (Any four)   **[4×5=20]**

a)   File Operations

b)   Constructors and Destructors

c)   Creating and searching tables

d)   Multithreading

e)   Matplotlib

[6027]-402

Second Year M.C.A. (Management Faculty)
IT 42 : ESSENTIALS OF ARCHITECTURAL FRAMEWORK
(2019 Pattern) (Semester - IV)

Time : 3 Hours]   *[Max. Marks : 70*
Instructions to the candidates:
   1)   *Q.1 and Q.7 are compuslory.*
   2)   **Solve any 4 questions from remaining.**
   3)   **Draw neat & labelled diagram wherever necessary.**

Q1) a)   Explain the Enterprise Architecture. Goal, Benefits and Methodologies.**[8]**

      b)   Explain banking Industry architecture network.   **[7]**

Q2) Explain the design for Applications security.   **[10]**

Q3) What are quality attributes in software architecture? Demonstrate with suitable examples.   **[10]**

Q4) How to implement solution Architecture in a Frame work?   **[10]**

Q5) Discuss Architectural design and design Pattern.   **[10]**

Q6) Consider the case study of building a software controlled mobile robot. Describe its challenging problems and design consideration with four requirements. Finally give the solution by layered architecture for all the four requirements.   **[10]**

Q7) Write short notes on (Any Three).   **[15]**
    a)   Six Sigma.
    b)   ISO.
    c)   The Capability Maturity Model Integration (CMMI).
    d)   The Department of Defense Architecture Framework (DoDAF).
    e)   The Federal Enterprise Architecture Framework (FEAF).

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[6027]-403

Second Year M.C.A.-II (Management)
IT-43 : 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)   Explain minimax algorithm with appropriate example.   **[10]**

    b)   Differentiate between forward chaining and backward chaining.   **[10]**

Q2) Explain architecture of goal based agent.   **[10]**

                     OR

Explain the various task domain of AI.   **[10]**

Q3) Explain any two Inference rule with appropriate example.   **[10]**

                     OR

What are the three properties of Axiomatic system?   **[10]**

Q4) What is natural language processing? Explain components of NLP.   **[10]**

                     OR

What is expert system? Explain characteristics of expert system.   **[10]**

Q5) Write a short notes on - (any four).   **[20]**
    a)   Inductive learning.
    b)   Types of planning.
    c)   Components of planning system.
    d)   Bayes' Theorem.
    e)   Inference in belief network.

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[6027]-404

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

MT 41 : OPTIMIZATION TECHNIQUES

(2019 Pattern) (Semester-IV)

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

Instructions to the candidates:

1) *Question no 1 is compulsory.*
2) *Attempt any five questions from Q.2 to Q.8.*
3) *Figures to the right indicate full marks.*

Q1) a) The following table gives activities of a project with normal & crush-time? normal & crush cost. The indirect cost per week is Rs. 1000. Find the optimal duration and cost associated with it **[10]**

Activity	Normal Time in weeks	Normal Cost (in Rs.)	Crush time in weeks	Crush cost in Rs.
1-2	8	7,000	5	10,000
1-3	4	6,000	2	8,000
2-4	6	9,000	4	11,500
3-4	7	2,500	5	5,500
4-5	12	10,000	8	16,000
5-6	15	12,000	13	16,000
5-7	7	12,000	6	14,000
6-8	5	10,000	3	14,000
7-8	14	6,000	10	8,400

b) The jobs required to be operated on two machines A and B in the same sequence. Time required for various jobs on both machines are given as follows. Find the sequence of jobs to find optimum clapsed time to complete all jobs. Idle time of Machine A & B. **[10]**

Jobs	1	2	3	4	5	6	7	8
Machine A	13	18	16	15	6	18	13	17
Machine B	9	7	11	10	12	19	15	10

Q2) Solve with two phase simplex method [10]

Max Z = $3x_1 + 4x_2$

Subject to

$2x_1 + 3x_2 \leq 200$

$5x_1 + 4x_2 \geq 100$

$8x_1 + 4x_2 \geq 80$

$x_1, x_2 \geq 0$

Q3) A Computer contain 10,000 resistors. When any one of the resistor fails, it is replaced. The cost of replacing single resistor is Rs. 10 only. If all the risistors are replaced at the same time, the cost per resistor would reduce to Rs. 3.50. The percent surviving by the end of month (t) is as follows. [10]

Month (t)	0	1	2	3	4	5	6
% of surviving by end of month	100	97	90	70	30	15	0

What policy of replacement should be adopted? When replacement should be carried?

Q4) Solve the following assignment problem to minimize the cost. [10]

	Jobs				
Workers	1	2	3	4	5
A	12	30	21	22	15
B	18	33	19	25	31
C	44	25	24	20	28
D	23	31	28	19	24
E	19	32	17	17	18

Q5) A manufacturing company has determined from the analysis of its accounting and production data for a certain part, demand is 9,000 units per annum which is uniformly distributed over the year. Unit cost price of that part is Rs. 3 and ordering cost is Rs. 40 per order. Inventory carrying cost is 9% of the inventory value. The company works for 300 days in a year Lead time is a days. Find **[10]**

    i)   Optimum no. of orders per annum.

    ii)   Economic order quantity.

    iii) Total cost of Economic order quantity.

    iv) Reorder level.

Q6) The person works in the internet cafe for 8 hours a day. The rate of arrival of customers at a internet cafe follows Poisson distribution with average of twenty minutes between one customer and the next. The duration of service is assumed to follow exponential distribution with mean of six minutes. What is the probability that. **[10]**

    i)   Customer at the cafe will have to waith

    ii)   Total time for which person will be idle.

    iii) Average length of queue.

    iv) The owner will install another computer if he is convinced that customer has to wait for atleast ten minutes. What should be the flow of customer to justify an additional computer.

Q7) Solve the following game. Find the optimal strategy of A and B. Value of game. The payoff matrix is as given below. **[10]**

$$
\begin{array}{c}
\text{Player B} \\
\begin{array}{ccccc}
B_1 & B_2 & B_3 & B_4 & B_5
\end{array} \\
\text{Player A} \begin{vmatrix}
9 & 3 & 1 & 8 & 0 \\
6 & 5 & 4 & 6 & 7 \\
6 & 4 & 3 & 3 & 8 \\
6 & 6 & 2 & 7 & 9
\end{vmatrix}
\end{array}
$$

Q8) The Lajwaab Bakery shop keeps stock of a popular brand of cake previous experience indicates the daily demand as given below. **[10]**

Daily demand	0	15	25	35	45	50
Probability	0.01	0.15	0.20	0.50	0.12	0.02

Consider the following sequence of random numbers 21, 27, 47, 54, 60, 39, 84, 91, 75, 20.

Using this sequence simulate the demand for next 10 days. Find out the stock situation if the owner of the bakery shop decides to make 30 cakes every day.

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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 diagrams wherever necessary.*

Q1) Scrum Communication Ltd is a company providing customer and internet banking facilities. Its main customers are some of the biggest banks of Japan. Its employees, who have access to all the financial accounts, personal data and ATM card information of approximate 30 million clients of these banks. You have been deputed as Security Administrator and have been allocated the duty to examine the possible security breaches which might occur. **[10]**

a) What are the different types of threats and vulnerabilities you might identify?

b) What are your suggestions to control these threats?

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

b) Explain Information Security Lifecycle. **[5]**

Q3) Manganga sugar factory decided to computerized their operations by using SMS plugging services for communication with sugarcane farmers. You have been deputed by your software company as information security policy maker for this sugar factory. **[10]**

a) Which security model you will going to suggest and implement

b) What security standards you will going to prose for practicing in above case.

Q4) Explain Business Continuity Plan (BCP) and Disaster Recovery Plan (DRP). **[10]**

Q5) a) Government authority is planning to implement online voting system for all typeselections of their country. You have been deputed as an IT Auditor to identify the possible threats and input control for such system. **[10]**

         i)   Explain physical access control in IS Audit

         ii)   Auditing steps details

    b) Explain IT governance framework ITIL in detail **[10]**

<p align="center">OR</p>

    a) The trading company is implementing e-CRM System for their day todayoperations. You have been asked to conduct technology based audit and suggested to do following types of testing as- **[10]**

         i)   Write vulnerability scanning process

         ii)   Write steps for penetration testing

    b) Explain IT governance framework COBIT in detail. **[10]**

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

    a) Ethical hacking

    b) IT governance maturity model

    c) Key success factors of security audit

    d) Need for security audits in organization

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[6027]-501

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)   *Q.1 and Q.8 are compulsory.*
  2)   *Solve any five from remaining.*
  3)   *Figures to the right indicate full marks.*

Q1) What is digital marketing? How it is different from traditional marketing? **[10]**

Q2) Explain SWOT analysis of business with example.   **[10]**

Q3) Being HR of company, how will you publish and recruit current job opening through linkedln.   **[10]**

Q4) Explain on page optimization using page rank algorithm.   **[10]**

Q5) What is Redirecting of URL? Explain redirecting types for 404, 301, 302.**[10]**

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

Q7) Explain facebook marketing tool with suitable case.   **[10]**

Q8) Write short notes on (any two)   **[10]**
    a)   Google sandbox
    b)   PPC (Pay Per Click)
    c)   Google Analytics

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[6027]-502
T.Y. M.C.A.
IT - 52 : MOBILE APPLICATION DEVELOPMENT
(2019 Pattern) (Semester - V)

Time : 3 Hours]   *[Max. Marks : 70*
Instructions to the candidates:
    1)   *Question No.1 and 7 are compulsory.*
    2)   *Solve any four questions from 2 to 6.*
    3)   *Figures to the righ indicate full marks.*

Q1) Explain Android project folder structure. **[10]**

Q2) What is Activity? Explain activity life cycle in detail. **[10]**

Q3) Write an application to demonstrate options and content menu in Android.**[10]**

Q4) Write an android application using SQLite to create customer (cid, cname, cadd, cmodile) table and insert a record in table and display appropriate message on toast to user. **[10]**

Q5) Demonstrate webview to display a webpage in an android application. **[10]**

Q6) Explain React Native geolocation API with appropriate example. **[10]**

Q7) Write short note on following (Any four) **[20]**
    a)   Dart programming
    b)   Adapter
    c)   Views
    d)   Dalvik Virtual Machine
    e)   Fragment

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[6027]-503

M.C.A. (Management)

IT53 : SOFTWARE PROJECT MANAGEMENT

(2019 Pattern) (Semester - V)

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

Instructions to the candidates:

1) ***All questions are compulsory.***

2) ***Number showing on the right side indicates full marks.***

Q1) Attempt the following (Any 4) :   **[4 × 5 = 20]**

a) What is Scrum in Agile?

b) What are 4 P's of software project explain in brief?

c) Explain Dynamic system development method.

d) Explain any two Agile tools.

e) Benefits of Agile project management.

f) What is test driven development?

Q2) a) Mention the characteristics of software project.   **[5]**

b) List five software project risks and explain the strategies for reducing those risks.   **[5]**

OR

a) Explain major activities covered by software project management.   **[5]**

b) Short note on - COCOMO Model.   **[5]**

Q3) a) Explain SEI capability maturity model (CMM).   **[5]**

b) Explain in brief function point analysis.   **[5]**

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OR

a) List important features of MS-project. **[5]**

b) What is mean by software project? How it differs from other project.**[5]**

Q4) a) Explain value driven development. **[5]**

b) Explain defect management process. **[5]**

OR

a) Explain any two Agile tools in brief. **[5]**

b) What is the user story in Agile. **[5]**

Q5) a) Differentiate between Agile & Scrum. **[5]**

b) Explain product backlog and sprint backlog in brief. **[5]**

OR

a) Explain roles and responsibilities of product owner. **[5]**

b) Write short note on product Road map. **[5]**

Q6) a) What are desirable qualities of product vision. **[5]**

b) Explain any two agile reports. **[5]**

OR

a) Explain planning poker story point estimation technique. **[5]**

b) Explain any two agile project key metrics. **[5]**

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