MCA / SEM-I / Choice Base / R 2020-21 / AUG 2023

Time: 3HRS **Max. Marks: 80**

N.B.: 1) Question No.1 is **compulsory.**

2) Attempt any **three** from the remaining **five** questions.

3) Figures to the right indicate full marks

4) Scientific calculator is allowed.

Q.1 A) Find Spearman's rank correlation for the following data [05]

Marks in MFCS	37	46	49	48	47	45	35
Marks in SPM	37	32	36	34	33	35	40

B) The following table shows the distribution of digits in numbers chosen at random from telephone directory. Digit and its frequency is as follows. [05]

Digit	0	1	2	3	4	5	6	7	8	9
Freq.	1026	1107	997	966	1075	933	1107	972	964	853

Test whether the digits may be taken to occur equally frequently in the directory. (given for 9 degrees of freedom at 5% level of significance, the table value of χ^2 is 16.92)

C) A box contains 15 chips where 5 are defective. If the random samples of 3 chips are drawn, what is the probability that exactly two are defective? [05]

D) It is know that 5% of the books bound at a bindery have defective bindings. Find the probability that 2 out of 100 books bound by this bindery will have defective bindings. [05]

Q.2 A) The following data gives the number of car accidents in the city during a random time period. Calculate Bowley's coefficient of skewness for the following distribution [10]

Class	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	7	9	16	22	14	12	3

B) The joint PDF of a two dimensional random variable (x, y) is given by [10]

$$f(x,y) = \begin{matrix} 2 \\ 0 \end{matrix} \Big\} \quad \begin{matrix} 0 < x < 1, \quad 0 < y < x \\ otherwise \end{matrix}$$

(i) Find the marginal and conditional density functions of X and Y
(ii) Find the conditional density function of Y|X and X|Y
(iii) Check for independence of X and Y

Q.3 A) The art competition has entries from three painters Radha, Meera and Sana. [10]

(i) Radha put in 15 paintings, 4% of her works have won first prize.
(ii) Meera put in 5 paintings, 6% of her works have won first prize.
(iii) Sana put in 10 paintings, 3% of her works have won first prize.

What is the probability (chance) that Radha will win first prize?

B) The following data represents 10 students marks in statistics (X) and probability (Y). [10]
Find Karl Pearson's coefficient of correlation for the following data.

X	56	55	58	58	57	56	60	54	59	57
Y	68	67	67	70	65	68	70	66	68	66

Q.4 A) Given the following what is bivariate probability distribution of X and Y obtain [10]
(i) Marginal distribution of X and Y
(ii) The conditional distribution of X given Y = 2

Y \ X	-1	0	1
0	1/15	2/15	1/15
1	3/15	2/15	1/15
2	2/15	1/15	2/15

B) Find a cubic least square fit for the following data. [10]

x_i	-3	-2	-1	0	1	2	3
y_i	7.5	3	0.5	1	3	6	14

Q.5 A) In a manufacturing process of a certain component, two types of defect are likely to occur with respective probabilities 0.05 and 0.1 What is the probability that a randomly chosen component (i) Does not have either kind of defects? (ii) Is defective? (iii) How one kind of defect, given that it is found to be defective? [10]

B) A certain injection administrated to 12 patients resulted in the following changes of blood pressure 5, 2, 8, -1, 3, 0, 6, -2, 1, 5, 0, 4 Can it be concluded that the injection will be in general accompanied by an increase in blood pressure ? [the value of t_α at 5% level of significance for 11 degrees of freedom is 2.201] [10]

Q.6 A) From the following data on age of employee, calculate the Karl Pearson's coefficient of skewness [10]

Age (years)	20-25	25-30	30-35	35-40	40-45	45-50	50-55
No. of employees	8	12	20	25	15	12	8

B) For a certain type of computers, the length of time between charges of the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. John owns one of these computers and wants to know the probability that the length of time will be between 50 and 70 hours. [10]
The relevant extract of the Area table is given below:

z	0	0.5	0.75	1.00	1.33	1.5	1.57
Area	0.5	0.6915	0.7734	0.8413	0.9082	0.9332	0.9418

****

Paper / Subject Code: 70622 / Advance Java

MCA/SEM I/Choice Base/R 2020-21/Aug 2023

Total Marks: 80

(3 Hours)

N.B. : 1) Question No.1 is **compulsory.**
2) Attempt any **THREE** from the remaining questions.
3) Figures to the right indicate full marks.

Q1.	**(a)**	Explain AspectOriented Programming with Spring.	**[5]**
	(b)	Explain Wild Cards and its types.	**[5]**
	(c)	What is POJO Programming model explain with suitable example?	**[5]**
	(d)	Explain Custom tags in JSP.	**[5]**
Q2.	**(a)**	What is directives? Explain different types of directives in JSP.	**[10]**
	(b)	What is Collections? Explain any two interfaces with its all operations.	**[10]**
Q3.	**(a)**	Explain Spring Boot RESTful WebService with example.	**[10]**
	(b)	Explain implicit objects in JSP.	**[10]**
Q4.	**(a)**	What is Lambda Expression? Explain syntax and use of Lambda expressions with a suitable program.	**[10]**
	(b)	Explain Spring Framework with suitable diagram.	**[10]**
Q5.	**(a)**	Explain Data Access operations with JdbcTemplate Class.	**[10]**
	(b)	Explain Dependency Injection with Spring via Constructor Injection with suitable example.	**[10]**
Q6.	**(a)**	Define PointCut Designators by annotation with example.	**[10]**
	(b)	Explain JSP architecture with suitable diagram.	**[10]**

****

MCA/SEM-I/ Choice Base/ R.2020-21 /AUG.2023

(3 Hours) **Total Marks: 80**

N.B. :1) Question No.1 is **compulsory.**
2) Attempt any **THREE** from the remaining questions.
3) Figures to the right indicate full marks.

Q1. Write a short note on:

(a) Star and Snowflake schema. **[5]**
(b) Data preprocessing **[5]**
(c) Differentiate between ORDBMS and OODBMS **[5]**
(d) Text Retrieval Methods **[5]**

Q2. (a) Explain Distributed database architecture **[10]**

(b) Explain the KDD process in detail. **[10]**

Q3. (a) Differentiate the following, **[10]**
1. Agglomerative and Divisive clustering
2. OLAP Vs Data Mining

(b) Apply Apriori algorithm to the following data set to find out strong association rule with Support= 50% and Confidence=60%. **[10]**

Transaction ID	Items
100	Dairymilk, Chips, cold drink, Juice
200	Dairymilk , Chips , cold drink
300	Dairymilk , Biscuits, Mayonnaise
400	Dairymilk , cold drink , Biscuits

Q4. (a) Explain Data warehouse architecture in detail. **[10]**

(b) Why clustering is an unsupervised technique? Explain K-means algorithm. **[10]**

Q5. (a) Explain the following, **[10]**
1. Web mining
2. Bayesian classification

(b) Explain the Decision tree used in classification. Explain ID3 algorithm with a suitable example. **[10]**

Q6. (a) What is the Abstract Data type. Explain with suitable example. **[10]**
(b) Explain Data reduction techniques. **[10]**

****

Paper / Subject Code: 70624 / Software Project Management

MCA | sem-I | C-2020 | July - 2023

(3 Hours) Total Marks: 80

Note: 1) Question No.1 is compulsory.
2) Attempt any THREE from the remaining questions.
3) Figures to the right indicate full marks.

1. (a) Discuss Stakeholder Management. 5
   (b) What are the various methods of project implementation? Explain. 5
   (c) Explain FTR. 5
   (d) Assume a database system for an office automation project is to be developed. Project complexity is organic. The system mainly consists of following 4 modules: Data entry 0.6 KLOC, Data update 0.6 KLOC, Query 0.8 KLOC, Report generator 1.0 KLOC, System size 3.0 KLOC. Cost drivers are complexity: high (1.15), storage: high (1.06), experience: low (1.07), programming capability: low (1.17). Calculate the efforts, development time staff size and productivity.(Assume the constants a1= 2.4, b1=1.05, c1=2.5 and d1=0.38). 5

2. (a) Discuss Project Framework in detail. 10
   (b) Discuss the various tools used for Quality control. 10

3. (a) What is Requirement Elicitation? Explain various methods used in it. 10
   (b) Discuss various leadership styles. 10

4. (a) Discuss Spiral Model with its advantages and disadvantages. 10
   (b)The following table indicates the task for completing a software project activities and estimated duration for each task. Find CPM, Early Start, Early Finish, Last start, Late Finish and Slag time. Also, draw Network diagram for the same. 10

Task	Description	Duration	Predecessor
T1	Requirement Specification	1	-
T2	Design	2	T1
T3	Code generate interface	2	T2
T4	Code sequence interface	5	T2
T5	Code user interface path	3	T2
T6	Code control process path	1	T2
T7	Integrated and tests	6	T3, T4, T5, T6
T8	User manual	3	T7

5. (a) Discuss the process used for developing the Business case. 10
   (b) Explain any two UML diagrams. 10

6. (a) Discuss the various steps involved in Risk Management. 10
   (b) What is SRS? Why it is important to develop SRS. 10