Paper / Subject Code: 70621 / Mathematical Foundation for Computer Science I

MCA | Sem I | C - 2020 | FEB 2023 | SH - 2022

Time: 3 Hours **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) The number of scooter accidents per month in a certain town were as follows: 12, 8, 20, 2, 14, 10, 15, 6, 9, 4 Are these frequencies in agreement with the belief that accident conditions were the same during this 10 month period? [Given the table value of χ^2 at 5% level of significance for 9 degrees of freedom is 16.919] **05**

(b) Find the probability that in 5 tossings, a perfect coin turns up head at least 3 times in succession. **05**

(c) Let X be a random variable for which E(X)=10 and V(X)=25. Find the values of a and b such that Y= aX-b has expectation zero and variance 1. **05**

(d) Find the Spearman's Rank Correlation coefficient for the following data **05**

Marks in MFCS1	35	47	23	6	17	10	43	9	28
Marks in Ad.Java	30	46	33	4	23	8	48	12	31

Q.2 (a) In a bolt factory, machines A, B, C manufacture respectively 25%, 35% and 40% of the total. Of their output 5,4,2 percent are known to be defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by (i) Machine A (II) Machine B or C **10**

(b) Calculate karl Pearson's coefficient of skewness for bursting pressure **10**

Bursting pressure(in lb)	20-25	25-30	30-35	35-40	40-45	45-50	50-55
No. of bags	8	12	20	25	15	12	8

Q. 3 (a) Following data represents assets of a multinational company in crores of rupees during year 1981-1990. **10**

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Asset	60	69	81	86	78	93	102	107	100	109

Find the regression of asset on year. Estimate the asset for the year 1992. Also find Karl Pearson's Coefficient of correlation.

(b) In order to make a survey of the buying habits, two markets A and B are chosen at two different part of city. 400 women shoppers are chosen at random in market A. Their average daily expenditure on food is found to be Rs. 250 with a standard deviation of Rs. 40. The figures are Rs. 220 and Rs. 55 respectively in the market B where also 400 women shoppers are chosen at random. Test at 1% level of significance (2.58) whether the average daily food expenditures of two populations of shoppers are equal. **10**

Q. 4 (a) The joint probability density function of a two dimensional random variable (X,Y) is given by **10**

$$f(x,y)=2,\quad 0<x<1,\quad 0<y<x\ .$$

(i)Find the marginal density function of X and Y.
(ii)Find the conditional density functions of y on x and x on y
(iii) Check for independence of X and Y

(b) A radio shop sells ,on an average 200 radios per day with a standard deviation of 50 radios . After an extensive advertising campaign, the management will compute the average sales for the next 25 days to see weather an improvement has occurred. Assume that the daily sales of radios is normally distributed. **10**
(i)Write down the null and alternative hypothesis.
(ii) test the hypothesis at 5% level of significance if X mean = 216.
(III) How large must X mean be in order that the null hypothesis is rejected at 5% level of significance.
(5% level of significance is 1.645)

Q. 5 (a) Compute the quadratic regression equation of following data **10**

X	-3	-2	-1	0	1	2	3
Y	7.5	3	0.5	1	3	6	14

(b) For the following bivariate probability distribution of X and Y, find **10**
(i) P(X<=1, Y=2) (ii) P(X<=1) (III) P(Y=3) (iv) P(Y<=3), (V) P(X<3,Y<=4)

Q. 6 (a) The mean and standard deviation of the wages of 6000workers engaged in a factory are Rs. 1200 and Rs. 400 respectively. Assuming the distribution to be normal estimate: **10**
(i) Percentage of workers getting wages above Rs. 1600
(ii) Number of workers getting wages between Rs. 600 and Rs.900
(iii) Number of workers getting wages between Rs. 1100 and Rs. 1500
Tee relevant extract of the Area table from Z=0 to Z=z is given below:

Z	0.25	.5	.6	.75	1.00	1.25	1.5
Area	0.0987	0.1915	0.2257	0.2734	0.3413	0.3944	0.4332

(b) An urn contains four tickets marked with numbers 112, 121,211,222 and one ticket is drawn at random. Let A_i= (i=1,2,3) be the event that i^{th} digit of the number of the ticket drawn is 1.Discuss the independence of the events A_1, A_2 and A_3. **10**

Paper / Subject Code: 70622 / Advance Java

• MCA | Sem-1 | CR-2020-21 | Feb-2023 | SH-2022.

(3 Hours) [Total Marks: 80]

N.B. : (1) Question No.1 is Compulsory

(2) Attempt any Three Question between Question No.2 to 6

Q 1. A) Write a Short note on following **(Attempt Any Four).** **[20]**

1. Explain 9 JSP Implicit Objects.
2. What is Constructor Injection? Implement with suitable example.
3. Difference between ArrayList and Vector and give an example on both of them?
4. Explain Map interface and using HashMap print the elements in name-pair in forward and reverse direction.
5. Explain Scripting tags in JSP with suitable syntax and example.

Q 2. A) Explain spring framework with its Core module and suitable diagram.. **[10]**

B) What is Lambda Expression? Write code on it using Lambda expression as an Object. **[10]**

Q 3. A) What is Circular Dependency Injection in Spring? Write the code on Circular Dependency using Annotations approach. **[10]**

B) Explain Types of Wildcards with example. **[10]**

Q 4. A) What is Java Bean Class? Write Java Bean class on counter increments and instantiate and display its value using JSP Standard action. **[10]**

B) Explain session management in JSP with its types. And write code on Cookie management. **[10]**

Q 5. A) Explain spring AOP in details and its advices. **[10]**

B) What is Spring autowire injection and its types with explanation and syntax **[10]**

Q 6. A) What is REST API web services? Explain with example **[10]**

B) Explain Data Access operations with JdbcTemplate and Spring. **[10]**

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MCA / SEM-I / C-2020 / MAR-2023 / SH-2022

Paper / Subject Code: 70623 / Advanced Databased Management System

(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) Abstract Data types [5]
(b) Regression Analysis [5]
(c) Text Retrieval method [5]
(d) Hierarchical clustering [5]

Q2. (a) Explain parallel database architecture [10]
(b) Explain Data Preprocessing in detail [10]

Q3. (a) Differentiate following, [10]
1. OLAP Vs OLTP
2. Star flake, snowflake and fact constellation Schema
(b) Apply Apriori algorithm to the following data set to find out strong association rule with Support= 50% and Confidence=70%. [10]

Transaction ID	Items
100	Fan, Tubelights, LED bulb , tape
200	Fan, Tubelights , LED bulb
300	Fan , Screws , capacitor
400	Fan , LED bulb , Screws
500	Tubelights , LED bulb , Screws

Q4. (a) Explain the KDD process in detail. [10]
(b) Explain the Decision tree used in classification. Compare ID3, C4.5, CART classification algorithms [10]

Q5. (a) Explain Data warehouse architecture in detail. [10]
(b) Generates the cluster using Euclidian distance for the given dataset using K-means clustering. (k=2). Consider X1 and X2 as seeds/centroids for two clusters respectively. [10]

Item	Wt	Ht
X 1	1	2
X 2	1	1
X 3	2	3
X 4	3	4

Q6. (a) Write a short note on [10]
1. Bayes theorem
2. K-nearest neighbor classification
(b) Explain the following, [10]
1. Associative classification
2. Web mining

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Paper / Subject Code: 70624 / Software Project Management

MCA / SEM-I / C-2020 / MAR-2023 / SH-2022

Time: 3 HRS

Max. Marks: 80

Question 1 is compulsory.

Attempt any three questions from Q.2 to Q. 6. Each question carries equal marks.

Q.1 a The following table indicates the various tasks involved in developing any product, the corresponding activities and the estimated duration (in days) for each task . **5**

Sr. No.	Task	Duration	Predecessor
1	Product idea brainstorming	10	-
2	Evaluate ideas	10	1
3	Market evaluation	10	2
4	Analysis	30	2,3
5	Prototype and marketing	90	4
6	Market testing	30	5
7	Prepare for launch	40	5,6

Show the **activity network diagram, critical path.**

b **Calculate Early finish, late finish and slack time** for each activity for project mentioned in Q.1 a. **5**

c Define project. Explain project life cycle **5**

d Draw the use case diagram for restaurant billing process. **5**

Q.2 a Explain incremental model in detail **10**

b A project size of 250 KLOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Calculate the Effort, development time, average staff size, and productivity of the project. . (a1 = 3.0, a2 = 1.12, b1 = 2.5, b2 = 0.35) **10**

Q 3 a Define requirements engineering. Explain any two requirements elicitation techniques. **10**

Q.3 b Explain any two techniques used for software quality control with suitable example. **10**

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Q. 4 a Consider the ERP application project with following features: **10**

i. The application has 5 screens with 2 views with 9 tables. (Complexity = 2)

ii. The application has 3 reports of 3 sections with 9 tables. ((Complexity = 5)

iii. The application has 3 3GL components. (Complexity = 10)

There is 30% reuse of object points.

The developers' experience and capability is HIGH in similar environment. Calculate the object point count, NOP, effort to develop such project. (PROD=25)

Q4 b Explain difference between: **10**

a) Incremental model and spiral model

b) Activity network diagram and WBS

Q. 5 a Explain project procurement management. **10**

b Consider a project with the following functional units: Number of user inputs = 40, Number of user outputs = 30, Number of user enquiries = 35, Number of user files = 08, Number of external interfaces = 03, Assume all complexity adjustment factors and weighting factors are average. Compute the function points for the project. **Constants:** complexity adjustment factors with average scale = 3, User Inputs (average = 4), user outputs (average = 5), user enquiries (average = 4), user files (average = 10), external interfaces (average= 7) 10 marks **10**

Q. 6 a Explain Formal Technical Review. State how it helps to improve quality of software development. **10**

b Explain feasibility analysis in detail. **10**