MCA / Sem-I / R-2020-21 / SH - 2023 / 2 Years

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

Time:3HRS

Max.Marks:80

N.B.:1) QuestionNo.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) While Calculating coefficient of Correlation between two variables X and Y from 25 Pairs of Observations the following results were obtained: - [05]

$\sum x^2 = 650$ $\sum y^2 = 460$ $\sum x = 125$ $\sum y = 100$ $\sum xy = 508$

It was discovered later that that two data pairs were wrongly typed as (6,14) and (9,6) Instead of the correct values (8,12) and (6,8). Obtain correct value of correlation Coefficient.

B) A die is thrown twice and the sum of the number appearing is to be 6. What is the Probability that number 4 has appeared at least once?

C) Let X be a random variable with following Probability distribution [05]

X	-3	6	9
P(X)	1/6	½	1/3

Find E(X), $E(X^2)$ and using laws of Expectation evaluate $E(2X+1)^2$. [05]

D)A box has 75 good IC chips and 25 defective IC chips. If 12 chips are selected at random, find the probability that at least 1 chip is defective.[05]

Q.2 A) The age of husband and wives in seven couples were as follows [10]

Age of husband	45	44	50	53	66	30	48
Age of wife	42	40	41	42	56	30	43

Find the Karl pearson's coefficient of correlation between age of husband and age of wife. [10]

B) Find the Spearman's rank correlation of the following Data.

Marks in MFCS1	64	50	44	42	56	65	59
Marks in SPM	80	60	37	51	30	75	44

Q.3 A) State and prove Baye'sTheorem.Bag I contains 3 red and 4 black balls while Another bag II contains 5 red and 6 black balls. One ball is drawn at random From one of the bags and it is found red. Find the Probability that it was drawn From bagII. [10]

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B) A continuous random variable has the Probability distribution: - [10]

$$f(x) = k(2-x) \quad 0 \le x < 2$$
$$= kx(x-2) \quad 2 \le x < 3$$
$$= 0 \quad \text{otherwise}$$

Find k and median of the distribution.

Q.4 A) Calculate Bowley's coefficient of skewness for the following distribution. [10]

Class	30-35	35-40	40-45	45-50	50-55	55-60
Frequency	5	10	30	35	15	5

B) Fit a leastsquareparabola of the form $Y=a0+a1x+a2x^2$ forthe followingdata.

x_i	1.2	1.8	3.1	4.9	5.7	7.1	8.6	9.8
y_i	4.5	5.9	7.0	7.8	7.2	6.8	4.5	2.7

[10]

Q.5 A) 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]

There levant 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

[10]

B) The following table gives the number of accidents in a city during a week. Find whether the accidents are uniformly distributed over a week.

Day	SUN	MON	TUE	WED	THU	FRI	SAT
No. of accidents	13	15	9	11	12	10	14

[Given 6 degrees of freedom at 5% level of significance the table value of χ^2 is12.59]

Q.6 A) Among the digits 3,4,5,6,7 first digit is chosen then second digit is chosen from the remaining four.find the probability that an odd digit will be selected:- [10]

a)As first digit b) as second digit c) as both digits.

B) Given the following what is bivariate probability distribution of X andY obtain

(i) MarginaldistributionofXandY

(ii) Theconditional distributionof X given Y=2

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

[10]

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Paper / Subject Code: 70622 / Advance Java

Time:3Hrs **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.	(a)	Explain JSP Architecture with Block Diagram	[5]
	(b)	Explain JSP implicit object with syntax.	[5]
	(c)	What is SpringIoC and Dependency Injection.	[5]
	(d)	Explain JdbcTemplate class with configuration file syntax.	[5]
Q2.	(a)	What is Dependency Injection in Spring and its types. Write the code on Setter Injection using Annotations approach.	[10]
	(b)	Why do we need Generic? Explain with example of how Generic make a program more flexible.	[10]
Q3.	(a)	Explain Spring Boot RESTfulWebService with example.	[10]
	(b)	Explain in details Map interface and its sub types with its all operation with proper syntax and example	[10]
Q4.	(a)	what is Lambda Expression? Explain syntax and use of Lambda expressions with a suitable program.	[10]
	(b)	What is Bean Autowiring and its types of mode.	[10]
Q5.	(a)	Explain Collection Framework in Java. Gives example on sorting of array using ArrayList and Vector.	[10]
	(b)	Explain Aspect Orineted Programming in Spring and explain different types of advices use in it..	[10]
Q6.	(a)	Enlist all JSP standard actions with syntax and write Login page program using JSP standard action with proper credentials validation.	[10]
	(b)	Explain Map hierarchy. Explain any two operations with example.	[10]

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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. Write a short note on the following.

(a) Web Mining [5]

(b) Decision tree [5]

(c) OLAP operations [5]

(d) ADT [5]

Q2. (a) What is distributed databases? Explain types of Distributed Database architecture. [10]

(b) Define Data warehouse. Explain ETL process in detail. [10]

Q3. (a) Differentiate the following [10]

1. OODBMS v/s ORDBMS

2. OLAP Vs OLTP

(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
101	Sharpner , Tubelights, Fan, tape
201	Sharpner , Tubelights , Fan
301	Sharpner , Screws , capacitor
401	Sharpner , Fan , Screws
501	Tubelights , Fan , Screws

Q4. (a) Explain all phases involved in KDD process. [10]

(b) Define and explain Bayesian and Naïve Bayesian classification. [10]

Q5. (a) Define Data Mining. Explain Data preprocessing techniques used in Data mining process. [10]

[1

(b) Generates the cluster using Euclidian distance for the given dataset using K-means clustering. (k=2). Consider T1 and T2 as seeds/centroids for two clusters respectively.

Item	Wt	Ht
T 1	1	2
T 2	1	1
T 3	3	4
T 4	2	3
T 5	2	4

Q6. (a) Define Clustering. Describe Hierarchical clustering in detail. [10

(b) Explain the following, [10
1. Associative classification.
2. Text Retrieval Methods

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Paper / Subject Code: 70624 / Software Project Management

MCA - Sem. I (2Hrs) - Jan - 2024 - (SH-2023)

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

1) Question 1 is compulsory.
2) Attempt any three questions from Q.2 to Q. 6. Each question carries equal marks

Q.1 Write short notes on any 4
a) Mc Calls quality Model 5
b) Role of Project Manager 5
c) Data Flow Diagram 5
d) Work Breakdown Structure 5
e) Leadership styles 5
f) Systems view of Project Management. 5

Q. 2 a) What is spiral model explain in detail. Write down its advantages. 10
b) Define quality. Explain pareto analysis in detail. 10

Q.3 a) Consider a project with following functional units. 10
Number of user Inputs = 80
Number of user outputs = 60
Number of user enquiries = 55
Number of user files = 10
Number of external interfaces =5
Assume all complexity adjustment factors and weighing factors are average.
Compute the function points for the project. (Assume weighing factors as 4, 5, 4, 10 & 7 respectively)

b) Define project. Explain project management framework in detail. 10

Q.4 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. Show the activity network diagram and critical path. 10

Task	Description	Duration	Predecessor
A	Problem definition	10	-
B	Requirement gathering	20	A
C	Design	10	B
D	Coding	10	B,C
E	Quality Checking	5	D
F	Support	6	E
G	Implementation	10	E,F

b) Explain project implementation plan in detail.. 10

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Q.5 a) What is FTR and why it is required? **10**

b) What are different Risk analysis and assessment technique. Explain any one technique in detail. **10**

Q.6 a) Write short notes on **10**
i) COCOMO Model
ii) Staffing level estimation

b) What are different requirement elicitation techniques? Explain in detail. **10**
