MCA - Sem - I CBCS

09/11/2021

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? [05]

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 $E(2X+1)^2$

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

F [10]

ind the Karl pearson's coefficient of correlation between age of husband and age of wife.

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's Theorem.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]

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

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

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. [10]

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

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

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. [10]

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 and Y obtain

(i) Marginaldistributionof X andY

(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

****