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

June 4, 2024   10:30 am - 01:30 pm   1T00161 - MCA (Sem-I) (R-2020-21) (2 Year Course) / 70621 - Mathematical Foundation for Computer Science I   QP CODE: 10055662

Time: 3 Hours   **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) For a moderately skewed frequency distribution of retail prices for men's shoes it is found that mean price is Rs. 20 and median price is 17. If the coefficient of variation is 20% Find the pearson coefficient of skewness of the distribution.   (05)

   B) Find the Karl Pearson's coefficient of correlation for the data.   (05)

X	1	2	3
Y	6	5	10

   C) The number of hardware failures system in a week of operation has the following Probability mass function.   (05)

No. of Failures	0	1	2	3	4	5	6
Probability	0.18	0.28	0.25	0.18	0.06	0.04	0.01

   Find $E(X)$ and $E(X^2)$.

   D) A box with 15 integrated chips contains 5 defective. If a random sample of three chips is drawn, what is the probability that all three are defective.   (05)

Q.2   A)   Calculate the Bowley's coefficient of skewness.   (10)

Class	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Frequency	2	5	7	13	21	16	8	3

   B) Marks obtained by 9 students in OS and DS are given below.   (10)

OS	35	47	23	6	17	10	43	9	28
DS	30	46	33	4	23	8	48	12	31

Compute the ranks in two subjects and coefficient of correlation of ranks.

Q.3   A) Compute the Quadratic regression equation of following data check its best fitness.   (10)

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

   B)   A die is thrown twice and the sum of the numbers appearing is to be 6.What is the Probability that the number 4 appeared at least once.   (10)

Q.4   A)   State and Prove Baye's theorem. Bag A contains 3 red and 4 black balls anotherBag B contains 5 red and 6 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the Probability that it is drawn from Bag B.

                                                                                                        (10)

X525YAD3D05X525YAD3D05X525YAD3D05X525YAD3D05

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. (10)

Q.5 A) A manufacturer produces light bulbs that are packed into boxes of 100.if quality control studies indicate that 0.5 % of the light bulbs produced are defective, what percentage of the boxes will contain. (10)

a) No defective.
b) 2 or more defective.

B) The average height of 16 students is 170 cm with a standard deviation of 10 cm. test at 5 % level (10)

of significance whether the average height of the population is 172 cm

[Given 6 degrees of freedom at 5% level of significance 15 degree of freedom the table value of is 2.131] (10)

Q.6 A) A bag contains 19 tickets numbered from 1 to 19. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will show even numbers. (10)

B) Given the following, what is bivariate probability distribution of X and Y ? obtain
(i) Marginal distribution of X and Y
(ii) The conditional distribution of X given Y=2

(10)

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

****