(31)

MCA-Sem-I Choice Based 23/05/17

Q.P. Code :04436

[Time: 3 Hours] [Marks:80]

Please check whether you have got the right question paper.

N.B:
1. Question No. 1 is compulsory
2. Attempt any three question of remaining
3. Assume any necessary data but justify the same
4. Figure on the right indicate the full marks
5. Use of scientific calculator is allowed

Q.1 a) Find the median wage of the following distribution 05

Roll no.	0-20	20-40	40-60	60-80	80-100
Marks	5	8	15	16	6

b) The age of people in an old age home is : 05

57 61 57 57 58 57 61 54 68 51 49 64 50 48 65 52 56 46 54 49 50 47 55 54 42 51 56 55 51 54 51 60 62 43 55 56 61 52 69 64

Make a stem and leaf plot of the data.

i) How many people are 51 years old?

ii) What age is the youngest and the oldest person?

iii) How many people are 40-49 years old?

c) What is the probability that four A's come consecutively in the arrangement of the letters in word "MAHARASHTRA"? 05

d) An urn contains 7 white and 3 red balls. Two balls are drawn together at random from the urn. Compute the probability that neither of them is white. Find also the probability of getting one white and one red. Hence compute the expected number of white balls drawn. 05

Q.2 a) Two dice are rolled. Let X denotes the random variable which counts the total number of points on the upturned faces. Construct a table giving the non- zero values of the probability mass function. 05

b) If a continuous random variable has pdf 05

$f(x) = k(2-x),\ 0 \leq x < 2$

$= kx(x-2),\ 2 \leq x < 3$

$= 0$ otherwise

Find k.

c) Calculate mean deviation from mean for the following : 05

Experience in months	0	1	2	3	4	5	6	7	8	9
No. of members	15	46	91	162	110	95	82	26	13	2

d) Find the coefficient of variation of frequency distribution given that its men is 120, mode is 123 and Karl Person's coefficient of skewness is - 0.3. 05

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Q.3 a) Box A contains 5 red marbles and 3 blue marbles and Box B contains 3 red and 2 blue. A marble is drawn at random from each box — 05

- Find the probability that both marbles are red
- Find the probability that one is red and other is blue

b) Let variable X have the distribution P(X=0) = P(X=2)=p, P(X=1)=1-2p for $0 \leq p \leq \frac{1}{2}$. — 05

For what p is the Var(X) a maximum?

c) Find the regression line of y on x for the following data — 05

X	1	2	3	4	5
Y	2	5	3	8	7

d) A : 35 47 23 6 17 10 43 9 28 — 05
Y : 30 46 33 4 23 8 48 12 31
Compute their ranks in the two subjects and the Spearman Rank correlation coefficient

Q.4 a) Two discrete random variables X and Y have joint p.m.f. given by the following table — 05

X/Y	1	2	3
1	1/12	1/6	1/12
2	1/6	1/12	1/4
3	1/12	1/12	0

Compute the probability of each of the following events
1) $X \leq 1.5$ 2) X is odd 3) Y is odd given that X is odd.

b) Let X be random variable with following probability distribution. — 05

x	-3	6	9
P (X=x)	1/6	1/2	1/3

Find $E(2x+1)^2$

c) Find the mode of the following distribution — 05

Size (x)	1	2	3	4	5	6	7	8	9	10	11	12
Frequency (f)	3	8	15	23	35	40	32	28	20	45	6	6

d) The first of the two samples has 100 items with mean 25 and S.D 3. If the whole group has 250 items with mean 15.6 and S.D $(13.44)^{\frac{1}{2}}$ find the S.D. of the second group. — 05

Q.5 a) For a group of 200 candidates the mean and standard deviation of scores were found to be 40 and 15 respectively. Later on it was discovered that the scores 43 and 35 were misread as 34 and 53 respectively. Find the corrected mean and standard deviation of the corrected figures. — 05

b) What is the chance that a leap year selected at random will contain 53 Sundays? — 05

c) Calculate Bowley's coefficient of skewness for the following — 05

Marks	0-10	10-20	20-30	30-40	40-50
Student	5	7	20	12	6

TURN OVER

d) For 8 observations the following results were calculated $\sum x = 59$, $\sum y = 40$, $\sum x^2 = 524$, $\sum y^2 = 256$, $\sum xy = 344$ find the regression equations y on x. 05

Q.6 a) The joint density function of the two dimensional random variable (X,Y) Is given by 05

$$f_{xy}(x,y) = \frac{x^3y^3}{16}, \quad 0 \le x \le 2, \quad 0 \le y \le 2$$
$$= 0 \qquad \text{otherwise}$$

Find the marginal densities of X and Y.
Also find the cumulative distribution functions of X and Y.

b) Prove that E(aX+b)=aE(X)+b and V(aX+ b) =a^2 V(X). 05

c) Give N=2500, (A)=420, (AB)=85, and (B)=670. Find the missing values. 05

d) The mean weekly sales of soap bars in department stores was 146.3 bars per store. After an advertising campaign the mean weekly sales in 22 stores for a typical week increases to 153.7 and showed a standard deviation of 17.2. Was the advertising campaign successful? 05
(Given: The table value of t for 21 d.f. at 5% significant level is 1.72)

Q.7 a) Prove that with example that three events may be pair wise independent but need not to be mutually independent. 05

b) There are three boxes. Box I contains 1 white 2 red and 3 black balls. Box II contains 2 white 3 red and 1 black balls Box III contains 3 white 1 red and 2 black balls. A box is chosen at random. If the balls drawn are first red and second white, what is the probability that they come from Box II? 05

c) Test the consistency of the following data with the symbols having their usual meaning 05
N=1000, (A) =600, (B) =500, (AB)=50

d) The observed and expected frequencies in tossing a die 120 times are given below. Test the hypothesis that the die is fair. (Use level of significance=0.05, and critical value for 5 d.f. is 11.1) 05

Die face	1	2	3	4	5	6
Observed frequencies	25	17	15	23	24	16