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Time : 2.5 Hrs.

Marks : 75

Instructions

1. All questions are compulsory.
2. Only simple calculators are allowed.
3. Figures to the right indicate full marks.

Q1. (a) The following data gives marks of 20 students in mathematics (X) and statistics (Y). Then (X, Y) values are expressed as

(7)

(26,28),(24,26),(32,28),(24,32),(37,37),
 (24,26),(34,30), (36,37),(24,30),(28,32)
 (31,34),(27,32),(28,22),(33,38),(25,28),
 (22,24),(34,23),(26,25),(36,24),(34,32)

- (i) Prepare bivariate frequency distribution using class intervals 20-25, 25-30, For both X and Y. Also write marginal frequency distributions of X and Y
- (b) Find mean and mode from the following distribution. Also plot histogram and locate the mode graphically.

(8)

Diameter of metal rings (in cm)	No. of metal rings
4-8	13
8-12	17
12-16	25
16-20	15
20-24	10
24-28	20

OR

Q1. (p) Find Q_1 , Q_2 and Q_3 for the following data. Also draw less than ogive curve And find the number of persons having weight less than 35 kg. (8)

Weight (kg) :	20-30	30-40	40-50	50-60	60-70	70-80
No. of children	6	11	12	15	20	10

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(q) Give any two merits and demerits of arithmetic mean (7)

Find the missing frequency if arithmetic mean of the following data is 50

Time(in min.)	0-20	20-40	40-60	60-80	80-100
No. of employees	6	-----	45	29	11

Q(2)(a) Sale of products of two companies C1 and C2 for last some days are given as below – (8)

No. of days	No. of products sold C1	No. of products sold C2
5-7	10	10
7-9	8	20
9-11	10	6
11-13	12	4

Which company shows more variability in sale ?

(b) Find combined mean , combined variance and combined standard deviation for Gr. A and Gr. B taken together (7)

	Group A	Group B	Group A and B together
No. of items	50	50	-----
Average wages(Rs.)	100	150	-----
Standard deviation	10	15	----

OR

Q(2) (p) Find coefficient of range for the following data. Also find Variance and standard deviation . Also find coefficient of variation. (8)

Marks	10-12	12-14	14-16	16-18	18-20
No. of students	3	11	16	12	5

(q) There are two groups of items . The first group has 100 items with mean 45 and Variance 49. If the combined group has 250 items with mean 51 and variance 130, Find the mean and the standard deviation of the second group. (7)

Q(3)(a) Explain Seasonal variations in time series
Find 4 – yearly moving averages for the following data (7)

Year	No. of tons of grains
2001	150
2002	156
2003	180
2004	170
2005	160
2006	154
2007	178
2008	190
2009	220
2010	200

(b)(i) What is correlation between two variables? (8)
Find correlation coefficient between demand(X) And price (Y) from the following data

X (in units)	25	21	12	14	20
Y(in Rs.)	10	14	12	20	14

OR

Q(3)(p) Explain irregular variations in time series.
Find 3-yearly moving averages from the following data (7)

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Year	Annual Export (in '00 tons)
1995	450
1996	480
1997	430
1998	460
1999	510
2000	530
2001	500
2002	520
2003	540
2004	550

(q) (i) What is strong positive correlation between two variables X and Y? (8)

Find regression lines of Profit (Y) on sales (X) from the following data. Also Estimate Y when X = 60

$$\sum x = 420, \sum y = 1922, \sum xy = 84,541, \sum x^2 = 18,228, n = 10$$

Q(4) (a) Define Certain event with example (7)

3 cards are drawn randomly from a pack of well shuffled 52 playing cards.

Find the probability that-

- (i) One is black card and two are red cards
- (ii) All the 3 are Heart cards

(b) From the following data, find Laspeyres, Paasche's and Fishers' Index Number. Also find Value index number (8)

Commodity	2008		2012	
	Price	Quantity	Price	Quantity
A	45	10	52	15
B	20	50	25	30
C	15	30	30	30
D	10	20	15	25

OR

Q(4) (p) Give mathematical definition of probability. (7)

Two dice are rolled. Find the probability that -

- (i) the points on both the dice are even
- (ii) the sum of the two points is 4

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- (q) Define Kelly's index number
Find Dorbish -Bowley's index number . (8)

Commodity	2002		2005	
	Price	Quantity	Price	Quantity
Rice	18	40	28	30
Wheat	10	20	15	30
Pulses	40	20	60	25
others	30	30	35	40

- Q(5)(a) Two regression lines of X on Y and Y on X are given as
 $4x - 5y + 33 = 0$ and $20x - 9y - 107 = 0$ (8)

Find \bar{X} and \bar{Y}

- (ii) A and B are the two events on sample space S such that
 $P(A) = 0.5$, $P(B) = 0.7$ And $P(A \cup B) = 0.8$.
Find $P(A \cap B)$, $P(A')$, $P(B')$

- (b) An Automobile company has three alternatives for launching new vehicle (7)
Type A, Type B and Type C. Profit gain from the three products is not exactly known but it depends upon market conditions as Good, Average and Excellent which has respective probabilities as 0.3, 0.5 and 0.2. The resultant pay-off matrix is give as -

Market condition	Pay-off		
	A	B	C
Good(0.3)	120	400	300
Average(0.5)	160	150	320
Excellent(0.2)	450	500	250

Draw Decision Tree and suggest the best decision based on EMV.

OR

Q(5)

- (p)(i) Define independent events. (8)
If A and B are the two events such that, $P(A) = 2/9$, $P(B) = 6/9$,
 $P(A \cup B) = 60/81$, Find $P(A \cap B)$, $P(A')$, $P(B')$ Examine whether A and B are Independent events.

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(ii) Three fair coins are tossed simultaneously . Find the probability –

- (a) Getting exactly two heads
- (b) Getting no tails

(q) ABC Finance company has 4 alternatives of investments Shares, Bonds, Gold and Mutual Fund . The returns from each investment will depend upon condition of the share market which is classified as Good and Bad with respective probabilities 0.70 and 0.30 . Draw decision tree and find the best alternative using EMV (7)

Altrnatives	Pay-off	
	Good (0.70)	Bad (0.30)
Shares	3000	4000
Bond	1600	1500
Gold	5500	7500
MF	6000	-2000