2019

Part – II

STATISTICS

(Honours)

Paper – IVC

(Practical)

Full Marks – 50

Time : 4 Hours

The figures in the right hand margin indicate marks.
Candidates are required to give their answers in
their own words as far as practicable.
Answer **all** questions.

1. The combined heights (in cm) of 11 pairs of brothers and sisters are given below :

Pair No.	Combined Height (in cm)
1	3.56
2	3.35
3	3.33
4	3.30
5	3.43
6	3.38
7	3.48
8	3.43
9	3.51
10	3.15
11	3.23

P.T.O.

The average heights (in m)	Brother	Sister
	1.75	1.63
S.d of heights (in m.)	0.658	0.0645

(a) Find the correlation co-efficient of heights between brothers and sisters. 6

(b) Estimate the height of a sister whose brother's height is 1.78m. 4

2. The table below given the scores on Statistics, Mathematics and Physics of 15 students in the annual examination.

S. No.	1	2	3	4	5	6	7	8	9	10
Scores in Statistics	55	60	75	72	64	67	75	45	47	68
Scores in Maths	52	65	70	78	65	58	80	55	57	64
Scores in Physics	60	55	65	62	63	50	65	55	55	57

S. No.	11	12	13	14	15
Scores in Statistics	30	45	55	57	65
Scores in Maths	35	47	60	64	70
Scores in Physics	40	49	62	45	50

Obtain a linear prediction formula for the scores on Statistics in terms of the scores on Mathematics and Physics. 5

3. The result of a survey regarding radio listener's preference for different types of music are given in the following table, with listeners classified by age group. 5

Age Group

Type of music preferred	19 – 25	26 – 35	above 35
Devotional music	80	60	9
Foreign music	210	325	44
Indifferent	16	45	132

Calculate any two measures of association and comment on whether preference for type of music is influenced by age or not.

4. Let the random vector $x = (x_1, x_2, x_3)'$ have trivariate normal distribution with mean vector $\mu = (1, 1, 1)'$ and dispersion matrix.

$$\sum = \begin{pmatrix} 0.6 & 0.3 & 0.3 \\ 0.3 & 0.6 & 0.3 \\ 0.3 & 0.3 & 0.6 \end{pmatrix}$$

(a) Find the distribution of the random vector

$$y = px \text{ where } P = \begin{pmatrix} 1 & -1 & 0 \\ 2 & 3 & 1 \\ 3 & 2 & 2 \end{pmatrix}$$

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(b) a 3×3 matrix C such that Disp $(y) = I_3$ where $y = cx$.

3

(c) the conditional distribution of x_1 given (x_2, x_3).

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5. Lifetime of an electric bulb manufactured by a certain company is assumed to be exponentially distributed with mean 200 hours. What is the probability that

(i) a bulb will get extinct before 100 hours ? 2

(ii) a bulb will function more than 150 hours ? 2

If a sample of 400 bulbs is bought, how many are expected to be in each of the above two groups (i) and (ii) ? 3+3

6. Practical Note Book and Viva voce. 5+5

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