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Register Number:

Name of the Candidate:

B.Sc. DEGREE EXAMINATION, May 2015

(MATHEMATICS)

(THIRD YEAR)

(PART-III)

760. MATHEMATICAL STATISTICS

Time: Three hours Maximum: 100 marks

SECTION -A **(5 × 20 = 100)**

Answer any FIVE questions.

1. Random samples drawn from two towns gave the following data relating to the heights of adult males:

	Town A	**Town B**
Mean height in inches	67.42	67.25
Standard deviation	2.58	2.50
Number in sample	1000	1200

i) Is the difference between the means significant?

ii) Is the difference between the standard deviations significant?

2. The following is the statistics showing the lives in hours of four batches of electric bulbs sold in different shops. Perform an analysis of variance and state your conclusion.

Batches	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8
A	1600	1610	1650	1680	1700	1720	1800	-
B	1580	1640	1640	1700	1750	-	-	-
C	1460	1550	1600	1620	1640	1660	1740	1820
D	1510	1520	1530	1570	1600	1680	-	-

3. a) Compute the seasonal variation indices for the following data:

Quarter	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**
I	3.5	3.5	3.5	4.0	4.1	4.2
II	3.9	4.1	3.9	4.6	4.4	4.6
III	3.4	3.7	3.7	3.8	4.2	4.3
IV	3.6	4.8	4.0	4.5	4.5	4.7

b) From the following data of the whole sale price of rice for the 5 years, construct the index numbers taking (i) 1987 as the base (ii) 1990 as the base:

Year	1987	1988	1989	1990	1991	1992
Price of rice per kg.	5.00	6.00	6.50	7.00	7.50	8.00

4. a) A random sample of 10 boys have the I.Qs. 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these date support the assumption that the mean I.Q. of population is 100?

(OR)

b) The heights of six randomly chosen sailors are in inches: 63, 65, 68, 69, 71, and 72. Those of 10 randomly chosen soldiers are 61,62,65,66,69,69,70,71,72 and 73. Discuss the light that these data throw on the suggestion that sailors are on the average taller than soldiers.

5. Fit a curve of the form $y = ax^2 + bx + c$ to the following data.

Year(x)	2001	2002	2003	2004	2005	2006	2007
Production in tons	201	263	314	395	427	504	612

Also estimate the production (in tons) in the year 2014.

6. a) Find the rank correlation coefficient for the following data.

x	10	12	18	18	15	40
y	12	18	25	25	50	25

b) Calculate the correlation coefficient for the following data.

x	10	12	18	24	23	27	24	26	22	19
y	13	18	12	25	30	10	13	20	15	16

7. a) Apply Lagrange's formula to find U_2 from the data $U_0=2$; $U_1=5$; $U_3=29$; $U_4=-19$

b) With usual notation, prove that $E^{-1}=1-\Delta$ and $\Delta \circ E = E \circ \Delta$

8. a) If two dice are rolled, write the event A of getting the sum 7 and the event B of getting the same number on the two dice. Also assigning uniform probability $\frac{1}{36}$ to each sample point, find (i) P(A) (ii)P(B) (iii) $P(A \cap B)$ and $P(A \cup B)$.

   b) If A and B are two disjoint events, prove that $P(A)+P(B)=P(A \cup B)$

9. a) The mean and variance of a binomial variate X are 16 and 8 respectively. Find i) P(X=0) ii) P(X=1) iii) $P(X \geq 2)$.

   b) If X is a Poisson variate with P(X=1)=P(X=2). Find P(X=4).

10. If X is normally distributed with mean 12 and standard deviation 4, find

    i) $P(X \geq 20)$

    ii) $P(X \leq 20)$

    iii) $P(0 \leq X \leq 12)$

    iv) Find x' such that $P(X> x')=0.24$

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