5436

Register Number:

Name of the Candidate:

B.Sc. DEGREE EXAMINATION, May 2015

(MATHEMATICS WITH COMPUTER APPLICATIONS)

(THIRD YEAR)

(PART – III)

720: MATHEMATICAL STATISTICS

Time: Three hours   Maximum: 100 marks

Answer any FIVE Full questions   **(5 × 20 = 100)**

1. a) State and prove addition Theorem on probabilities.

   b) State and prove Multiplication theorem on probabilities.

   c) State and prove Baye's theorem.

   d) A random variables 'x' has the following probability distribution.

X	0	1	2	3	4	5	6	7	8
P(x)	a	3a	5a	7a	9a	11a	13a	15a	17a

   i) Find the value of (a)

   ii) Find p(x<3), p(x $\geq$ 3)

2. a) Fit a straight line to the following data.

X	1	2	3	4	6	8
Y	2.4	3	3.6	4	5	6

   b) Describe the method of fitting the following curves.
   i) $Y=ae^{bx}$
   ii) $Y=ax^b$

3. a)   X :   14   19   24   21   26   22   15   20   19
             Y :   31   36   48   37   50   45   33   41   39

   Calculate the correlation co-efficient between the x and y.

   b) Define rank correlation and derive $r = 1 - \dfrac{6\Sigma d^2}{n(n^2 - 1)}$

4. a) State chief characteristics of normal distribution

   b) Show that the rectangular distribution.

   $f(x) = \frac{1}{2a} - a < x < a$ the m.g.f about origin is $\frac{1}{at}$ (sinhat). Also show that moments of even order are given by $\mu 2n = \frac{a^{2n}}{(2n+1)}$

5. a) Explain the test procedure to list the population proportion.

   b) Derive the student's t-distribution.

   c) In one sample of 8 observations, the sum of the squares of deviations of the sample values form the sample mean was 84.4 and in the other sample of 10 observations it was 102.6. Test wheather this difference is significant at 5% level, given that 5% point of for n_1=7 and n_2=9 dof if 3-29.

6. a) Explain methods of Estimation.

   b) From the following table, estimate the number of students who obtained marks b/w 40 and 45.

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

7. a) Setup an analysis of variance table for one-way classification.

   b) Show that fisher's ideal index satisfies both T.R. and F.R tests, using the following data commonly.

Commodity	1990		1992	
	P	Q	P	Q
A	6	50	10	56
B	2	100	2	120
C	4	60	6	60
D	10	30	12	24
E	8	40	12	36

8. a) **Explain :** i) Secular trend

   ii) Seasonal variations

   iii) cyclical Fluctuations

   b) Sate and derive Lagrange's interpolation formula.

9. a) Interpolate Y when x=12.

X	10	15	25
Y	90	215	615

   b) Interpolate the value of Y when x=0 using Lagrange's formula:

X	-1	-2	2	4
Y	-1	-9	11	69

10. a) For a normal distribution prove that

   Q:D;M,D;S;D::10:12:15

   b) Explain non-random sampling.

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