

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1232

Roll No.

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**B.Tech.**

(SEM. III) ODD SEMESTER THEORY  
EXAMINATION 2013-14

**STATISTICAL TECHNIQUES (MATHEMATICS—III)***Time : 3 Hours**Total Marks : 100*

**Note :-** Attempt all questions. Provide the statistical tables which are required to student.

**SECTION—A**

1. Attempt all parts of this question. Each part carries 2 marks.

**(2×10=20)**

- (a) Draw a Histogram from the following data :

Class	0-9	10-19	20-29	30-39	40-49
F	2	10	16	27	26

- (b) If the mean of the following series is 30, find out missing value of the following data :  
25, 30, 21, X, 47, 10, 15, 17, 45, 35.
- (c) From a pack of cards, one is drawn at random. Find the probability of getting a King.
- (d) Define Normal Distribution.
- (e) Calculate first four central moment of raw moments given as  $-1.9, 181, -970, 98500$ .

- (f) Find the coefficient of correlation if two regression lines are :  $5x - y = 22$  and  $64x - 45y = 24$ .
- (g) Define non parametric test.
- (h) Explain one way analysis of variance.
- (i) Write the applications of completely randomized design.
- (j) Write LCL, CL and UCL of R-Chart.

### SECTION-B

2. Attempt any three parts of this question : (3×10=30)

- (a) Calculate the mean, median and mode for the data given below :

Marks	0-5	5-10	10-15	15-20	20-25	25-30
No. of Students	4	6	8	12	7	2

- (b) Fit a binomial distribution to the following frequency data :

x	0	1	2	3	4
f	29	61	45	10	3

- (c) Find rank correlation for the following data :

X	56	42	72	36	63	47	55	49	38	42	68	60
Y	147	125	160	118	149	128	150	145	115	140	152	155

- (d) To test the effectiveness of inoculation against cholera, the following table was obtained :

	Attacked	Not attacked	Total
Inoculated	30	160	190
Not Inoculated	140	460	600
Total	170	620	790

- (e) Four varieties A, B, C and D of crop are tested in randomized block design with four blocks I, II, III and IV. Analyse the experimental yield and state your conclusion :

I	A (5)	C (13)	D (7)	B (11)
II	B (12)	A (6)	D (8)	C (13)
III	D (7)	C (15)	A (6)	B (12)
IV	C (14)	A (8)	B (13)	D (9)

The letters A, B, C and D denote the treatments and the figures in brackets denote the observation.

### SECTION-C

- Note :- Attempt any two parts from each question of this Section : (5×2×5=50)

3. (a) What do you understand by classification of data ? What are its objectives ?
- (b) Draw the Ogives and hence estimate the median of the following data :

Class	0-9	10-19	20-29	30-39	40-49	50-60
Frequency	8	32	142	216	240	143

- (c) For frequency distribution :

Values	10-20	20-30	30-40	40-50	50-60
Frequency	20	19	31	21	10

Compute first four moments about the mean of distribution.

4. (a) Define multiplication law of probability. A and B appear in an interview for vacancies in the same post. The probability of A's selection is  $\frac{1}{7}$  and that of B's selection is  $\frac{1}{5}$ . What is the probability that both of them will be selected ?
- (b) Define Poisson distribution. Also write its mean and variance.

- (c) Assume mean height of soldiers to be 68.22 inches with a variance of 10.8 inches square. How many soldiers in regiment of 1000 would you expect to be over 6 feet tall, given that the area under the standard normal curve between  $x = 0$  and  $x = 0.35$  is 0.1368 and between  $x = 0$  and  $x = 1.15$  is 0.3746.

5. (a) Define Mann-Whitney U-test.  
 (b) Find the regression equations and coefficient of correlation from the given data :

$$\sum x = 60, \sum x^2 = 4160, \sum y = 40, \sum y^2 = 1720,$$

$$\sum xy = 1150, N = 10$$

- (c) Find the coefficient of correlation for the following data :

X	1	3	5	6	8	10
Y	8	12	15	18	18	20

6. (a) Define Fisher's *f*-test. Discuss its application.  
 (b) Explain two way analysis of variance.  
 (c) Sample of sizes 10 and 14 were taken from two normal population with standard deviation 3.5 and 5.2. The sample means were found to be 20.3 and 18.6. Test whether the means of the two populations are the same at 5% level of significance.
7. (a) Define Design of experiment.  
 (b) Write advantages and disadvantages of Latin square design.  
 (c) The number of defectives found in inspection of 4 lots of 25 items each is given below. Draw the *p*-Chart for the following data and examine whether the process is under control :

Lot	1	2	3	4
No of defective	9	10	12	8