Printed Pages : 2 **Roll No.** | | | | | | | | | | | **EAS402**

B. TECH.
THEORY EXAMINATION (SEM–IV) 2016-17
STATISTICAL TECHNIQUES

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION-A

1 **Attempt all parts of this question:** $2\times10=20$

a) What is the mean of the following numbers; 10, 39, 71, 39, 76, 38, 25

b) Write the types of two dimensional diagrams.

c) Write the mean and variance of the Poisson distribution.

d) A single coin is tossed 5 times. What is the probability of getting at least one head?

e) Define multiple regression.

f) Write short note on non-parametric tests.

g) What do you understand by hypothesis?

h) Define Chi square test.

i) Write short notes on design of experiment.

j) Write the applications of completely random design.

SECTION-B

2 **Attempt any three parts of this question.** $10\times3=30$

(a) Represent the following data of by a histogram

Marks	No of Student	Marks	No of Student
0-10	8	60-70	52
10-20	12	70-80	40
20-30	22	80-90	30
40-50	40	90-100	5
50-60	60	-	-

(b) Fit a Poisson distribution to the following data and calculate theoretical frequencies.

Deaths	0	1	2	3	4
Frequencies	122	260	15	2	1

(c) Calculate coefficient of Correlation, r_{12} :

Case	x_1	x_2	Case	x_3	x_4
A	10	9	E	12	11
B	6	4	F	13	13
C	9	6	G	13	13
D	10	9	H	9	4

(d) In following data was obtained in an experiment on immunization of castle from tuberculosis

	Affected	Not Affected
Inoculated	12	26
Not Inoculated	16	6

Calculate χ^2 and discuss effect of vacuum. (5% value of χ^2 for one degree of freedom – 3.84)

(e) Analysis the following results of a Latin square experiment:

Column → Row ↓	1	2	3	4
1	A (12)	D (20)	C (16)	B (10)
2	D (18)	A (14)	B (11)	C (14)
3	B (12)	C (15)	D (19)	A (13)
4	C (16)	B (11)	A (15)	D (20)

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

SECTION-C

Attempt all questions of this section. Attempt any two parts from each question. $10 \times 5 = 50$

3. (a) Distinguish between primary and secondary data.

(b) Calculate arithmetic mean by direct and shortcut method.

Mark	20	30	40	50	60	70
No.	8	12	20	10	6	4

(c) The first four central moment of distribution are 0, 2.5, 0.7 and 18.75. Comment on the Skewness and Kurtosis of the distribution.

4. (a) Write classical and empirical definition of probability.

(b) Explain theorem of total probability and multiplication law of probability.

(c) Use Passion distribution find the probability that the ace of spades will be drawn from a pack of well shuffled card at least one in 104 consecutive trials.

5. (a) Show that correlation coefficient is the geometric mean of two regression coefficients.

(b)From the following data find out Karl Pearson's coefficient of correlation:

Measurement	10	11	12	13	14	15
Frequency	2	4	10	8	5	1

(c) Find the angle between two regression lines. Explain its significance.

6. (a) Explain types of errors in testing of hypothesis.

(b) If the expectation is that 3% of men of exact age 70 year will die within a year and out of a group of 1000 such men 36 die within the year. Can this group be regarded as a random sample of such men?

(c) Define χ^2 test and degree of freedom.

7. (a) Write advantages and disadvantages of Latin square design.

(b) Three varieties A, B, C of a crop are tested in a completely randomized design with four replications. The plot yields in kilograms are also indicated therein. Analyse the experimental yield and state your conclusions. [5% value of F for $n_1 = 2, n_2 = 9$ is 2.286.

A (6)	B (5)	A (8)	C (9)
B (8)	C (4)	C (6)	B (9)
A (7)	C (6)	B (10)	A (6)

(c) How many replication are required when an observed difference of 10% of the mean will be regarded as significant at 5% level; given that the true standard error per unit is 12% of the mean of experiment and further given that $t = 1.96$ for being significance at 5% level of significance.