Printed Pages: 6 16 NBT-301

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

Paper ID : 154301 Roll No. | | | | | | | | | |

B.Tech.

(SEM. III) THEORY EXAMINATION, 2015-16

ELEMENTARY MATHEMATICS-III

[Time:3 hours] [Total Marks:100]

Section-A

Q.1 Attempt all parts. All parts carry equal marks. Write answer of each question in short. (2×10=20)

(a) Draw bar diagram to represent the following data:

Years	1959	1960	1961	1962	1963
Wheat in Quantity	200	350	450	550	600

(b) Define Binomial distribution.

(c) Find out the arithmetic mean of the following data:
25, 30, 21, 55, 47, 10, 15, 17, 45, 35

(d) Define statistical quality control.

(e) Define skewness and Kurtosis.

(f) What is the probability that a leap year selected at random will have 53 Sunday?

(g) Explain parametric & non-parametric test.

(h) In a binomial distribution, the mean and S.D. are 12 and 2 respectively, find n and p.

(i) What do you mean by internal and external data?

(j) Write down the Empirical relation and find out the mean, if mode=64.2 and median= 66.33.

Section-B

Attempt any five questions from this section. (10×5=50)

Q.2 In a partially destroyed laboratory record of an analysis of a correlation data, the following results only are legible:

Variance of x=9

Regression equation: 8x-10y+66=0, 40x-18y=214

To find out

(i) the mean values of x and y

(ii) the standard deviations of y.

Q3. (i) Define Sign test.

(ii) Find the regression equations and coefficient of correlation from the given data:

$$\Sigma x = 60, \Sigma x^2 = 4160, \Sigma y = 40, \Sigma y^2 = 1720, \Sigma xy = 1150, N = 10$$

Q4. Obtain regression plane by using multiple linear regression of the following data:

x	1	2	3	4
y	12	18	24	30
z	0	1	2	3

Q5. The height of 6 randomly chosen sailors in inches is 63,65,68,69,71 and 72. Those of 9 randomly chosen soldiers are 61,62,65,66,69,70,71,72,73. Test whether the sailors are on the average taler than soldiers. (Given $t_{13,\ 0.05} = 1.77$)

Q6. 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

Q7. The following table gives the classification of 100 workers according to sex and nature of work. Test whether nature of work is independent of the sex of worker.

Give that $X^2_{0.05}(1) = 3.841$

	Skilled	Unskilled	Total
Male	40	20	60
Female	10	30	40
Total	50	50	100

Q8. What is Latin square Design? Under what conditions can this Design be used? Discuss briefly the advantages and disadvantages of Latin square Design.

Q9. What do you understand by two way analysis of variants? State by suitable example the methodology carrying out analysis of variants.

Section-C

Note: Attempt any two questions from this section.(15×2=30)

Q10. (i) A company wants to test whether its three salesman A,B and C have the same selling ability. Their records of sales (in Rs. '000) during various weeks of the last month are given in the following table:

Salesman	1st Week	2nd Week	3rd Week	4th Week
A	16	21	18	25
B	22	20	15	26
C	25	24	16	20

Prepare an analysis of variance table and test the hypothesis that the mean sales per week of all salesmen are equal.($F_{0.05}(2,9)=4.25$)

(ii) Fit a Poisson distribution to the following set of observations, and calculate the theoretical frequencies.

Deaths	0	1	2	3	4
Frequency	122	60	15	2	1

Q11. (i) The lifetme of electric bulbs for a random sample of 10 from a large consignment gave the following data:

Item	1	2	3	4	5	6	7	8	9	10
Life (hr)	4.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6

Can we accept the hypothesis that the average lifetime of bulb is 4 hours? (At 5% level of significance value of t-statistic for 9 degree of freedom is 2.26)

(ii) Two line of regression equations are given by x+2y-5=0 & 2x+3y-8=0 and variance of x=12. Calculate (i) the mean of x and y (ii) variance of y (iii) the correlation coefficient.

Q12. (i) Define rank correlation coefficients. Obtain the rank correlation coefficient for the following data:

x	68	64	75	50	64	80	75	40	55	64
y	62	58	58	45	81	60	68	48	50	70

(ii) The data of defective of 10 sample of size 50 each are given below:

Sample no.	1	2	3	4	5	6	7	8	9	10
No. of defectives	4	2	3	3	4	4	4	2	3	1

Construct p-chart and give your comment.

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