**Printed Pages:03** **RAS303**

**PAPER ID**: **9 1 2 1** **Roll No.**

# B. Tech
## (ODD SEMESTER) THEORY EXAMINATION 2017-18
## Elementary Mathematics-III

[Time: 3:00 Hours**]** Total Marks: 70

**Note: 1. Attempt all Sections. If require any missing data; then choose suitably.**
**2. Any special paper specific instruction.**

## SECTION-A

**1. Attempt all questions in brief.** $2\times7=14$

**(a)** Explain Pie chart.

**(b)** The first four moments about mean of a frequency distribution are 0, 2, 4 and 8. Find $\beta_1$ and $\beta_2$.

**(c)** A card is drawn from a well shuffled pack of playing cards. What is the probability that it is either a king or a queen?

**(d)** The mean of a binomial distribution is 30 and standard deviation is 5. Calculate n, p and q with usual notations

**(e)** Define Skewness.

**(f)** Define mutually exclusive events.

**(g)** Discuss the types of quality control.

## SECTION-B

**2. Attempt any three of the following:** $7\times3=21$

(a) (i) Give methods of collecting primary data. (3)

(ii) Represent the following data of by a histogram (4)

| 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)(i) Write classical and empyreal definition of probability. (3)

(ii) An urn contains 5 white and 11 back balls. One ball is drawn at random. Find the probability that it is white. (4)

(c)(i) Prove that correlation coefficient is the geometric mean of two regression coefficients. (3)

(ii) In a partially destroyed laboratory record of an analysis of correlation data, the following results are only legible variance of $x$ = 9.Regression Equation: $8x - 10y + 66 = 0$
$40x - 18y = 214$, Find mean value of $x$ and $y$. (4)

(d)(i) Define hypothesis and its types. (3)

(ii) 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? (4)

(e) (i) Write advantages of statistical quality control. (3)

(ii) In a blade manufacturing factory 1000 blades are examined daily. Draw the *np Chart* for the following data and examine whether the process is under control? (4)

| Date | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No of defective | 9 | 10 | 12 | 8 | 7 | 15 | 10 | 12 | 10 | 8 | 7 | 13 | 14 | 15 | 16 |

## SECTION-C

**3. Attempt any one part of the following:** $7 \times 1 = 7$

**(a)** Calculate mean by direct and shortcut method.

| Mark | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|---|---|---|---|---|---|---|
| No. | 5 | 10 | 25 | 30 | 20 | 10 |

**(b)** Calculate Pearson's coefficient of skewness.

| $X$ | 12.5 | 17.5 | 22.5 | 27.5 | 32.5 | 37.5 | 42.5 | 57.5 |
|---|---|---|---|---|---|---|---|---|
| $F$ | 28 | 42 | 54 | 108 | 129 | 61 | 45 | 33 |

4. **Attempt any one part of the following:** $7 \times 1 = 7$

**(a)** Use Poisson 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.

**(b)** If the variance of the Poisson distribution is 2, find the probability for r = 1, 2, 3, 4. Also find P ($r \geq 4$).

5. **Attempt any one part of the following:** $7 \times 1 = 7$

**(a)** Form the following data obtains the two regression equations.

| $x$ | 6 | 2 | 10 | 4 | 8 |
|---|---|---|---|---|---|
| $y$ | 9 | 11 | 5 | 8 | 7 |

**(b)** Fit the curve $y = ax + b$ to the following data.

| $X$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| $Y$ | 5.43 | 6.28 | 8.23 | 10.32 | 12.63 | 14.86 | 17.27 | 19.51 |

6. **Attempt any one part of the following:** $7 \times 1 = 7$

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

| | Affected | Not Affected |
|---|---|---|
| Inoculated | 12 | 26 |
| Not Inoculated | 16 | 6 |

Calculated $\chi^2$ and discuses effect of vacuum. (5% value of $\chi^2$ for one degree of freedom – 3.84)

**(b)** The life limit of electric bulbs for a random sample of 10 from a large consignment gave the following value.

| Item | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Life in hours | 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 average life limit of bulbs is 4,000 hours?

7. **Attempt any one part of the following:** $7 \times 1 = 7$

**(a)** Write short notes on design and quality control.

**(b)** Three varieties A, B, C of a crop are tested in a completely randomized design with four replications. The plot yields in quintals per acre are as follows:

| | | | |
|---|---|---|---|
| A (8) | B (7) | A (4) | C (2) |
| B (5) | C (5) | C (4) | B (5) |
| A (6) | C (4) | B (10) | A (6) |