

Roll No.

Total No. of Sections : 3

Total No. of Printed Pages : 6

Code No. : BC-391

Online Annual Examination, 2022

B.C.A. Part III

Paper I

STATISTICAL ANALYSIS

Time : Three Hours]

[Maximum Marks : 50

Note : Section 'A', containing 10 very short answer type questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.

Section 'A'

Answer the following very short answer type questions in one or two sentences. 1×10=10

1. Write definition of permutation.
2. Write expansion of $(a + b)^4$.
3. Write formula of median in continuous series.

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4. Write formula of standard deviation.
5. Write definition of conditional probability.
6. Write formula of Binomial distribution.
7. Write formula of regression line of X on Y.
8. Write definition of Chi-square (χ^2).
9. Write definition of student- t .
10. Write degree of freedom for student- t .

Section 'B'

Answer the following short answer type questions with word limit 150-200. 3×5=15

1. Find the value of n such that ${}^n P_5 = 42 {}^n P_3$, $n > 4$.

Or

Expand $\left(x^2 + \frac{3}{x}\right)^4$, $x \neq 0$.

2. Calculate the mean by short-cut method :

| | | | | | | | | | |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Height (cm) | 219 | 216 | 213 | 210 | 207 | 204 | 201 | 198 | 195 |
| No. of Person | 2 | 4 | 6 | 10 | 11 | 7 | 5 | 4 | 1 |

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Or

Find the mode of the following :

| Marks | No. of Students |
|-------|-----------------|
| 1-5 | 7 |
| 6-10 | 10 |
| 11-15 | 16 |
| 16-20 | 32 |
| 21-25 | 24 |
| 26-30 | 18 |
| 31-35 | 10 |
| 36-40 | 5 |
| 41-45 | 1 |

3. Show that $E(ax + by) = aE(x) + bE(y)$ where a and b are constant.

Or

Show that for Poisson's distribution with mean m :

$$\mu_{r+1} = m r \mu_{r-1} + m \frac{d\mu_r}{dm}$$

where
$$\mu_r = \sum_{x=0}^{\infty} (x-m)^r \frac{e^{-m} m^x}{x!}$$

4. Find coefficient of correlation of the following table :

| | | | | | | |
|-----|----|----|----|----|----|----|
| x | 10 | 14 | 18 | 22 | 26 | 30 |
| y | 18 | 12 | 24 | 6 | 30 | 36 |

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Or

Let x be independent variable. To find the straight line fitting in the following data :

| | | | | | |
|-----|---|-----|-----|-----|-----|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 1 | 1.8 | 3.3 | 4.5 | 6.3 |

5. In sample eight calculate the student- t of the following variable when mean (m) is zero :

$$-4, -2, -2, 0, 2, 2, 3, 3$$

Or

In sample ten calculate the student- t of the following variable when mean (M) is 65 :

$$63, 63, 64, 65, 66, 69, 69, 70, 70, 71$$

Section 'C'

Answer the following long answer type questions with word limit 300-350. 5×5=25

1. A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has :

(a) no girl ?

(b) at least one boy and one girl ?

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Or

The second, third and fourth term in the binomial expansion $(x + a)^n$ are 240, 720 and 1080 respectively. Find x , a and n .

2. Calculate the mean deviation about mean from the following data :

| | | | | | |
|-----------|-----|------|-------|-------|-------|
| Class | 0-6 | 6-12 | 12-18 | 18-24 | 24-30 |
| Frequency | 8 | 10 | 12 | 9 | 5 |

Or

Calculate the mean and standard deviation from data given below :

| | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Age (year) | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
| Frequency | 4 | 8 | 10 | 16 | 12 | 06 | 04 |

3. If $\beta_1 = \frac{1}{\frac{3}{6}}$ and $\beta_2 = \frac{35}{12}$. Then find binomial distribution.

Or

Find the binomial distribution. Which mean is 4 and variance is 3. Also find out mode 2.

4. Find both regression line for the following data :

| | | | | | | | | |
|-----|----|----|----|----|----|----|----|----|
| x | 65 | 66 | 67 | 67 | 68 | 69 | 71 | 73 |
| y | 67 | 68 | 64 | 68 | 72 | 70 | 69 | 70 |

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Or

Five dice are thrown 192 times then numbers 4, 5 or 6 thrown by the following :

| | | | | | | |
|------------------------------|---|----|----|----|---|---|
| No. of dice thrown 4, 5 or 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| f_0 | 7 | 19 | 35 | 24 | 8 | 3 |

Then find Chi-square (χ^2).

5. Find z-test for two set of observations. For $z_{0.05} = 0.6576$ given that $v_1 = 8$, $v_2 = 7$.

| | | | | | | | | | |
|--------|----|----|----|----|----|----|----|----|----|
| Set I | 17 | 27 | 18 | 25 | 27 | 29 | 27 | 23 | 17 |
| Set II | 16 | 16 | 20 | 16 | 20 | 17 | 15 | 21 | — |

Or

Height in cm of 10 persons are given below :

157.5, 157.5, 165, 167.5, 170, 172.5, 175, 175, 177.5 and 177.5 cm.

Explain the above data the mean height is 165 cm given that

$$\left. \begin{array}{l} t = 1.8 \text{ for } P = 0.947 \\ t = 1.9 \text{ for } P = 0.955 \end{array} \right\} v = 9$$

□ □ □ □ □ d □ □ □ □ □

[6]

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