Total No. of Questions : 10]

SEAT No. :

P3664

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[4959]-1023
B.E. (Civil)
STATISTICAL ANALYSIS AND COMPUTATIONAL METHODS
(2012 Course) (Elective-IV) (401010 C) (Semester-II)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***
4) ***Use of electronic pocket calculator is allowed in the examination.***
5) ***Use of cell phone is prohibited in the examination hall.***

Q1) a) Explain False Position Method with suitable example. **[4]**

b) By using Bisection Method, find an approximate root of equation: $\cos x = 1/x$, that lies between $x = 1$ and $x = 1.5$. Carry out computations upto 3 iterations. **[6]**

OR

Q2) a) Explain Simpson's $1/3^{rd}$ and $3/8^{th}$ rule and its applications with suitable examples. **[5]**

b) Evaluate $\int_0^{\pi} \sin x \, dx$ by using Gauss Legendre two point formula. **[5]**

Q3) a) Write short notes on: **[4]**

i) Gauss two point formula.

ii) Trapezoidal Rule and its use.

b) Solve the following equation by Gauss Jordan Method **[6]**

$$x + y + z = 8$$

$$2x + 3y + 4z = 18$$

$$4x + 3y + 2z = 15$$

OR

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Q4) a) Explain optimization techniques and its applications. **[4]**

b) Solve by Gauss Elimination Method **[6]**

$$x_1 + x_2 - x_3 = 5$$

$$2x_1 + 3x_2 + x_3 = 2$$

$$3x_1 + 2x_2 - x_3 = -1$$

Q5) a) Explain the role of statistics in engineering applications. **[3]**

b) From the following data calculate mean, mode and median. **[6]**

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
Number of Students	29	224	465	582	634	644	650	653	655

c) The following table gives length of life in hours for 400 excavators. **[7]**

Length of life (hours)	1000-1199	1200-1399	1400-1599	1600-1799	1800-1999	2000-2199	2200-2399	2400-2599	2400-2599
Number of excavators	12	30	65	78	90	55	36	25	09

Calculate:

i) Average length of life of an excavator.

ii) Standard deviation of the length of life of excavator.

iii) The percentage number of excavators where length of life of excavator falls within $\bar{X} + 2\sigma$

OR

Q6) a) What are various relationships between measures of dispersion. **[3]**

b) In a survey of 35 families in a village, the number of children per family recorded and the following data obtained:

1, 0, 2, 3, 4, 5, 6, 7, 2, 3, 4, 0, 2, 5, 8, 4, 5, 12, 6, 3, 2, 7, 6, 5, 3, 3, 7, 8, 9, 7, 9, 4, 5, 4, 3.

Represent the data in the form of a discrete frequency distribution. **[6]**

c) Goals scored by two teams in a football match are as follows: **[7]**

No. of goals scored in a football match	No. of football matches played	
	Team "A"	Team "B"
0	15	20
1	10	10
2	07	05
3	05	04
4	03	02
5	02	01
Total	42	42

Calculate coefficient of variation and state which team is more consistent.

Q7) a) A fair dice is tossed twice. Find the probability of getting a 4, 5 or 6 on the first toss and 1, 2, 3 or 4 on the second toss. **[4]**

b) In a distribution exactly normal 6% of items are under 30 and 75 are under 60. What is the mean standard deviation distribution and normal distribution. **[6]**

c) Explain χ^2 test and write constant of χ^2 distributions. **[7]**

OR

Q8) a) To test a desirability of a certain modification in typists desks, 9 typists were given 2 tests of nearly as possible the same nature, one on the desk in use and the other on the new type. The following difference in the number of words typed per minute were recorded: **[6]**

Typists	A	B	C	D	E	F	G	H	I
Increase in no. of words	2	4	0	3	–1	4	–3	2	5

Does the data indicate the modification in desk promotes speed in typing? **[6]**

b) A coin is tossed six times what is the probability of obtaining four or more heads? Use Binomial method. **[5]**

c) Fit a Poisson Distribution to the following data and calculate theoretical frequencies: **[6]**

Deaths	0	1	2	3	4
Frequency	122	60	15	02	01

Q9) a) Calculate the Karl Pearson's co-efficient of correlation between expenditure and sale. **[8]**

Expenditure	39	65	62	90	82	75	25	98	36	78
Sales	47	53	58	86	62	68	60	91	51	84

b) Height of the two buildings A and B are given below. Find Height of the building B, when the height of the building A is 70ft. **[9]**

Ht of Building 'A' (ft)	71	68	66	67	70	71	70	73	72	65	66
Ht of Building 'B' (ft)	69	64	65	63	65	62	65	64	66	59	62

OR

Q10)a) Using Newton's method of interpolation estimates from the following data the number of employees carrying Rs. 240 or more but less than Rs. 250 per day. **[9]**

Earning less than	200	250	300	350	400
No. of workers	296	599	804	918	466

b) From the following data obtain the regression equation. **[8]**

x	6	2	10	4	8
y	9	11	5	8	7

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