Total No. of Questions : 10]

SEAT No. :

P2130

[Total No. of Pages : 5

[5254] -523
B.E. (Civil)
STATISTICAL ANALYSIS AND COMPUTATIONAL METHODS
(2012 Pattern)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.***

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) Evaluate 1/18 by Newton Iteration Method. **[4]**

b) By using Regula Falsi Method, find root of equation : $xe^x = 2$, correct to four decimal places. **[6]**

OR

Q2) a) A curve is drawn to pass through the points given by the following table. **[5]**

x	1	1.5	2	2.5	3	3.5	4
y	2	2.4	2.7	2.8	3	2.6	2.1

Estimate the area bounded by the curve x axis and the lines X = 1 and X = 4

b) Evaluate $\int_1^5 \frac{1}{x}$ using Gaussian 3 point formula. **[5]**

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Q3) a) A rocket is launched from the ground. Its acceleration is registered during the first 80 sec and is given in the table below. Using Simpson's 1/3rd rule, find the velocity of the rocket at t = 80 sec. **[5]**

t (sec)	0	10	20	30	40	50	60	70	80
f(cm/s^2)	30	31.63	33.34	35.47	37.75	40.33	43.25	46.29	50.67

b) Find Inverse of following matrix by Gauss Jordan Method. **[5]**

$$\begin{matrix} 2 & 2 & 3 \\ 2 & 1 & 1 \\ 1 & 3 & 5 \end{matrix}$$

OR

Q4) a) Write down importance of optimization techniques and also Enlist the different Techniques. **[4]**

b) Solve by Gauss Seidal Method. **[6]**

$$4x_1 + x_2 + x_3 = 5$$
$$x_1 + 6x_2 + 2x_3 = 19$$
$$-x_1 - 2x_2 - 5x_3 = 10$$

Q5) a) Write down limitations of statistics. **[4]**

b) From the following data calculate mode and median. **[7]**

Marks	10	20	30	40	50	60
Number of Students	8	23	45	65	75	80

c) Pollution levels of 10 cities are as under :
240, 260, 290, 245, 255, 288, 272, 263, 277, 255. Calculate standard deviation with the help of assumed mean. **[6]**

OR

Q6) a) Write down limitations of sampling. **[4]**

b) The following table shows the monthly expenditures of 80 students of a university on morning breakfast expenditure in (Rs.). **[7]**

Expenditure (Rs.)	No. of Students
780-820	2
730-770	6
680-720	7
630-670	12
580-620	18
530-570	13
480-520	9
430-470	7
380-420	4
330-370	2

Calculate arithmetic mean, standard deviation and coefficient of variation of the above data.

c) The scores of two batsmen A and B in ten innings during a certain season are **[6]**

A	32	28	47	63	71	39	10	60	96	14
B	19	31	48	53	67	90	10	62	40	80

Find using coefficient of variation which of the two batsmen A or B is more consistent in scoring.

Q7) a) A box contains 3 red and 7 white balls. One ball is drawn at random and in its place a ball of the other colour is put in the box, now, one ball is drawn at random from the box. Find the probability that it is red. **[6]**

b) In Mumbai with 100 companies each having approximately same employees, the distribution of machine tools in 2016 was as follows.

No. of m/c tools	0	1	2	3	4
No. of companies	63	28	6	2	1

Fit Poisson distribution for the above **[7]**

c) Write short notes on chi square distribution and its applications. **[4]**

OR

Q8) a) Out of 320 families with 5 children each, what percentage would be expected to have :

i) 2 boys and 3 girls

ii) Atleast one boy?

Assume equal probability for boys and girls **[5]**

b) The life time of machine tool for a random sample of 10 from a large consignment gave the following data. **[5]**

Item	1	2	3	4	5	6	7	8	9	10
Life (hrs)	4.2	1.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6

Can we accept the hypothesis that the average life machine tool 4 hrs.

c) 200 digit are chosen at random from a set of tables, The frequencies of the digits are as follows. **[7]**

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	18	19	23	21	16	25	22	20	21	15

Use Chi square test to assess the correctness of the hypothesis that the digits were distributed in equal numbers in the tables from which they were chosen.

Q9) a) Following table gives information about advertisement expenditure and sales. **[8]**

	Mean	SD	Corelation coefficient
Expenditure(x)	20	5	0.8
Sales (y)	120	25	0.8

b) Estimate the production for the year 2000 with the help of the following table : **[8]**

Year	1975	1980	1985	1990	1995	2000	2005
Production in tonnes	20	22	26	30	35	?	43

OR

Q10) a) The following table gives indices of industrial production of registered unemployed (in hundred thousand). Calculate the value of the coefficient of correlation. **[8]**

Year	2004	2005	2006	2007	2008	2009	2010	2011
Index of production	100	102	104	107	105	112	103	99
No. of unemployed	15	12	13	11	12	12	19	26

b) Determine the percentage of Engineers under 35 years of age. **[8]**

Age	<25 yrs	<30 yrs	<40 yrs	<50 yrs
Percentage of Engineers	52	67.3	84.1	94.1

Use Lagrange's method.

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