R22 Regulation *Subject code: 4B2AM*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech II Semester Regular/Supplementary Examinations, June 2024

STATISTICAL METHODS AND VECTOR CALCULUS

(Common to CSE,CSE(AI&ML),CSE(DS) & IT)

Maximum Marks: 60 Date:26.06.2024 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

		All the following questions carry equal marks (10X1M=10 Marks)	CO	Bloom Tx
1.	a	Find arithmetic mean of the marks obtained by 10 students of class X in mathematics in a certain examination. The marks obtained are 25,30,21,55,47,10,15,17,45,35.	1	L1
	b	What is Geometric and Harmonic mean?	1	L1
	c	Define Kelleys co-efficient of skewnes	2	L1
	d	Define Kurtosis	2	L1
	e	What are the Moving average methods	3	L1
	f	What is Time Series Analysis?	3	L1
	g	Find greatest value of the directional derivative of x^2yz^3 at (2, 1 -1).	4	L3
	h	Define irrotational vector	4	L1
	i	State Green Theorem	5	L1
	j	State Stokes theorem	5	L1

Part-B

	Answer All the following questions. (5X10M=50Marks)							
2	Find the mean, median and the mode for the following distribution. (10M)						1	L1
	Heights of plants	1-5	6-10	11-15	16-20	21-25		
	No.of the plants	7	10	16	32	24		
	OR							
3	a. What are some of the important functions of statistics? (5M) b. Give a brief note of the measures of central tendency together with their merits and demerits. (5M)						1	L1 L3

4	Calculate Karl Pearson's coefficient of skewness from the following data. (10M) Profits (in lakhs): 70-80 | 80-90 | 90-100 | 100-110 | 110-120 | 120-130 | 130-140 | 140-150 No. of Cos.: 12 | 18 | 35 | 42 | 50 | 45 | 30 | 8	2	L3
	OR		
5	Calculate the mean deviation from mean and its coefficient from the following data: (10M) Class / frequency: 0-10: 5; 10-20: 8; 20-30: 12; 30-40: 15 class / frequency: 40-50: 20; 50-60: 14; 60-70: 12; 70-80: 6	2	L3
6	Determine the trend values of the following data by using 3-Yearly moving average. Also find the short term fluctuations for the various years, assuming additive model. Plot the original and trend values on the graph. (10M) Years: 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 Product Tones: 26 | 27 | 28 | 30 | 29 | 27 | 30 | 31 | 32 | 31	3	L2
	OR		
7	Explain the various components of a time series with suitable illustrations. (10M)	3	L2
8	Find the directional derivative of $xyz^2 + zx$ at the point(1,1,1) in a direction of normal to the surface $3xy^2 + y = z$ at the point(0,1,1) . (10M)	4	L2
	OR		
9	a. Show that $\nabla r = \hat{r}$ (5M) b. Show that $\nabla(\log r) = \frac{\hat{r}}{r}$ (5M)	4	L1
10	Evaluate $\int_s \bar{F}.\bar{n}dS$ where $\bar{F} = z\bar{i} + x\bar{j} - 3y^2z\bar{k}$ and S is the surface of the plane $x^2 + y^2 = 16$ included in the first octant between $z = 0$ *and* $z = 5$ (10M)	5	L4
	OR		
11	Evaluate $\int_C (xy + x^2)dx + (x^2 + y^2)dy$, where C is the square bounded by the lines x=-1, x=1, y=-1, y=1 using Green's theorem. (10M)	5	L3