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, July 2025

STATISTICAL METHODS AND VECTOR CALCULUS

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

Maximum Marks: 60 Date:11.07.2025 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 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)		Marks	CO	BTL
1.a	Define Secondary data.	1M	CO1	L1
b	Define Median.	1M	CO1	L1
c	Define Mean deviation.	1M	CO2	L2
d	Define Karl Pearson's coefficient skewness.	1M	CO2	L2
e	What is the first step in the semi-average method?	1M	CO3	L1
f	What is the limitation of graphic method?	1M	CO3	L1
g	Define Irrotational vector.	1M	CO4	L1
h	If $\bar{f} = xy^2\bar{\imath} + 2x^2yz\bar{\jmath} - 3yz^2\bar{k}$ find $div\bar{f}$.	1M	CO4	L2
i	Define Surface integral.	1M	CO5	L1
j	State Stokes theorem of transformation between line integral and surface integral.	1M	CO5	L2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Explain the classification and Tabulation of data.	10M	CO1	L2
	OR			
3	a) A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household:	5M	CO1	L3

Family Size	1-3	3-5	5-7	7-9	9-11
Number of families	7	8	2	2	1

Calculate the mode this data.

b) Calculate the geometric mean of the following series of monthly income of a bench of families 180, 250, 490, 1400, 1050. 5M

4	Calculate the Coefficient of variation by using actual mean method for the following data. Prices of Rice: 1.75, 1.72, 1.73, 1.76, 1.71, 1.80, 1.87, 2.34 No. of Centres: 3, 2, 4, 5, 6, 2, 7, 1	10M	CO2	L5
	OR			
5	Calculate the value of the Bowley"s coefficient of skewness from the following series. Wages (in Rs): 10-20, 20-30, 30-40, 40-50, 50-60, 60-70, 70-80 No. of persons: 1, 3, 11, 21, 43, 32, 9	10M	CO2	L5
6	Calculate four yearly moving averages for the following data. Year: 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012 Value: 1150, 1250, 1320, 1400, 1300, 1320, 1500, 1700	10M	CO3	L3
	OR			
7	Explain the graphic method of measuring the trend in a time series. What are its advantages and limitations?	10M	CO3	L2
8	a) Find the directional derivative of the function $xy^2 + yz^2 + zx^2$ along the tangent to the curve $x = t, y = t^2, z = t^3$ at the point (1,1,1). b) Find a unit normal vector to the given surface $x^2y + 2xz = 4$ at the point $(2, -2, 3)$.	5M 5M	CO4	L2
	OR			
9	Find the value of 'n' if $r^n\bar{r}$ is solenoidal.	10M	CO4	L5
10	Verify Gauss divergence theorem for $\bar{F} = x^3\bar{\imath} + y^3\bar{\jmath} + z^3\bar{k}$, over the cube formed by the planes $x = 0, x = a, y = 0, y = a, z = 0, z = a$.	10M	CO5	L3
	OR			
11	Verify Green's theorem $\oint(3x^2 - 8y^2)dx + (4y - 6xy)dy$ where C is the region bounded by $y = \sqrt{x}$ and $y = x^2$.	10M	CO5	L3