R22 Regulation *Subject code: 4B2AM*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Semester Supplementary Examinations, January 2024

Statistical Methods and Vector Calculus

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

Maximum Marks: 60 Date:23.01.2024 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	Write the Relation between Mean Median and Mode.	CO1	L1
	b	Define Geometric mean and Harmonic mean.	CO1	L1
	c	Define mean deviation and standard deviation.	CO2	L1
	d	Define Karl Pearsons coefficient of skewness.	CO2	L1
	e	Define components of Time series	CO3	L1
	f	Explain ratio to trend method.	CO3	L2
	g	Define Curl of a vector point function.	CO4	L1
	h	Define solenoidal vector.	CO4	L1
	i	Define Surface integral	CO5	L1
	j	State Green's theorem	CO5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)

2	Find Mean, Median and Mode for the following data: [10M]						CO1	L3
	Age in years	5-15	15-25	25-35	35-45	45-55		
	No of patients	23	11	14	15	13		
	OR							
3	A. Explain diagrammatic and graphical representation of data. [5M] B. Find Arithmetic, geometric and harmonic mean for the data 2,3,4,5,6. [5M]						CO1	L2 L3
4	Calculate the Quartile deviation and Standard deviation of the following distribution. [10M]						CO2	L3

x	0	1	2	3	4	5	6	7	8
f	a	8	28	56	70	56	28	8	1

	OR		
5	Obtain Karl Pearson's measure of skewness for the following data: [10M] Values: 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 Frequency: 6 | 8 | 17 | 21 | 15 | 11 | 2	CO2	L3
6	Calculate the three and five year moving averages of the following data : [10M] Year: 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 Production ('000 tons): 18 | 19 | 20 | 22 | 20 | 19 | 22 | 24 | 25 | 24	CO3	L3
	OR		
7	Given below is data on index of production for the period 2011 to 2018. [10M] Year: 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 Index of production: 109.2 | 119.8 | 129.7 | 140.8 | 153.8 | 152.2 | 152.6 | 163 Find the trend line and predict the index of production for the year 2012 by 3-year moving averages method.	CO3	L3
8	A. Find the directional derivative of $f(x,y,z) = xy^2 + yz^3$at the pint (2,-1,1)in the direction of the vector i+2j+2k. [5M] B. Find the angle of intersection of the spheres $x^2 + y^2 + z^2 = 29$ and $x^2 + y^2 + z^2 + 4x - 6y - 8z = 47$ at $(4,-3,2)$ [5M]	CO4	L3
	OR		
9	A. Show that $\bar{f} = (x^2 - yz)\hat{\imath} + (y^2 - zx)\hat{\jmath} + (z^2 - xy)\hat{k}$ is irrotational and find the scalar potential φ such that $\bar{f} = \nabla\varphi$. [5M] B. Show that $\nabla^2 r^n = n(n+1)r^{n-2}$. [5M]	CO4	L4
10	A. If $\vec{F} = (4xy - 3x^2z^2)\hat{\imath} + 2x^2\hat{\jmath} - 2x^3z\hat{k}$, prove that $\int_c \vec{F}.d\vec{r}$ i.e., work done is independent path of the curve joining two points. [5M] B. Evaluate by Green's theorem for $\int_c[(3x^2 - 8y^2)dx + (4y - 6xy)dy]$, where C is the region bounded by $x = 0, y = 0$ and $x + y = 1$. [5M]	CO5	L6
	OR		
11	Apply Divergence theorem to evaluate $\iint_S (x+z)dydz + (y+z)dzdx + (x+y)dxdy$ where S is the surface of the sphere $x^2 + y^2 + z^2 = 4$. [10M]	CO5	L6