



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]										CO2	L3	
	Values	5-10	10-15	15-20	20-25	25-30	30-35	35-40					
	Frequency	6	8	17	21	15	11	2					
6	Calculate the three and five year moving averages of the following data : [10M]										CO3	L3	
	Year:	2000	2001	2002	2003	2004	2005	2006	2007	2008			2009
	Production ('000 tons)	18	19	20	22	20	19	22	24	25			24
OR													
7	Given below is data on index of production for the period 2011 to 2018. [10M]										CO3	L3	
	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.													
8	A. Find the directional derivative of $f(x, y, z) = xy^2 + yz^3$ at the point $(2, -1, 1)$ in the direction of the vector $i+2j+2k$. [5M]										CO4	L3	
	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]												
OR													
9	A. Show that $\vec{f} = (x^2 - yz)\hat{i} + (y^2 - zx)\hat{j} + (z^2 - xy)\hat{k}$ is irrotational and find the scalar potential ϕ such that $\vec{f} = \nabla\phi$. [5M]										CO4	L4	
	B. Show that $\nabla^2 r^n = n(n+1)r^{n-2}$. [5M]												
10	A. If $\vec{F} = (4xy - 3x^2z^2)\hat{i} + 2x^2\hat{j} - 2x^3z\hat{k}$, prove that $\int_C \vec{F} \cdot d\vec{r}$ i.e., work done is independent path of the curve joining two points. [5M]										CO5	L6	
	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]												
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	