Subject Code: 20MA301BS	SET-II	HT NO:			7	R					

CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

B. Tech. III Semester Supply End Examinations, August-2023

Statistical and Numerical Methods

Common to CE, CSE & IT

Time: 3 Hours **Max. Marks: 70**

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	For the following distribution find the missing probability	2M	CO1	L3

X	-3	-2	-1	0	1	2	3
P(X)	0.001	0.01	0.1	?	0.1	0.01	0.001

b	List the properties of probability distribution function	2M	CO1	L1
c	Define point and interval estimations with an example for each	2M	CO2	L1
d	Define types of errors in sampling	2M	CO2	L1
e	Explain about Student's t-distribution	2M	CO3	L1
f	List the properties of chi- square test	2M	CO3	L1
g	Define root of an equation graphically	2M	CO4	L2
h	If $y = a_0 + a_1x + a_2x^2$ then give the normal equations	2M	CO4	L3
i	Using Euler's method find $y(0.1)$ if $y' = x - y^2$, $y(0) = 1$	2M	CO5	L3
j	Write the formula for trapezoidal rule	2M	CO5	L2

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	A random variable X has following P.D. Find (i) k (ii) P(X>6) (iii) Find Mean	5M	CO1	L3

X	0	1	2	3	4	5	6	7
P(X)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

b	If the probability density function of a random variable X is $f(x) = \begin{cases} \frac{1}{2}\sin x \, , for\ 0 \le x \le \pi \\ 0 \, , otherwise \end{cases}$ Find the mean , median and mode	5M	CO1	L2

OR

3	a	In tossing a coin 10 times simultaneously. Find the	5M	CO1	L2

probability of getting

i)at least 7 heads ii) atmost 3 heads iii)exactly 6 heads

	b	A car hire firm has 2 cars which it hires out day by day.The number of demands for a car on each day is distributed as poisson with mean 1.5 Calculate the proportion of days i)on which there is no demand ii) on which demand is refused	5M	CO1	L2
4		A population consists of 5,10,14,18,13,24.Consider all possible samples of size 2 which can be drawn a) with and b) without replacement from the population. Find i) The mean of the populationii) Standard deviation of the population iii) The mean of the sampling distribution of means iv) Standard deviation of the sampling distribution of means	10M	CO2	L5
		OR			
5	a	Write the procedure for testing of hypothesis	5M	CO2	
	b	A sample of the height of 6400 Englishmen has a mean of 67.85 inches and a S.D of 2.56 inches while another sample of heights of 1600 Austrians has a mean of 68.55 inches and S.D of 2.52 inches. Do the data indicate that Austrians are on the average taller than the Englishmen ? (Use α as 0.01)	5M	CO2	L4
6		Ten specimens of copper wires drawn from a large lot have the following breaking strength(in kg) 518,572,570,568,572,578,572,569,548.Test whether the mean breaking strengths of the lot may be taken to be 518 kg weight	10M	CO3	L4
		OR			
7		On the basis of information given below about the treatment of 200 patients suffering from disease , state whether the new treatment is comparatively Superior to the conventional treatment.	10M	CO3	L4

Treatment	Favorable	Not Favorable	Total
New	60	30	90
Conventional	40	70	110

8	a	Using Newton Raphson method find square root of a number	5M	CO4	L2

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	b	Find root of the equation $x^3 - 5x + 1 = 0$ using bisection method in 5 stages	5M	CO4	L3
		OR			
9	a	The temperatures T (in °C) and lengths L (in mm) of a heated rod are given below . If $L = a_0 + a_1 T$, find the best values for a_0 *and* a_1.	5M	CO4	L3

T	20	30	40	50	60	70
L	800.3	800.4	800.6	800.7	800.9	801.0

	b	Fit the curve of the form $y = ae^{bx}$ to the following data	5M	CO4	L3

X	77	100	185	239	285
Y	2.4	3.4	7	11.1	19.6

10		Evaluate $\int_0^1 \frac{1}{1+x}\, dx$ by using i) Trapezoidal rule ii) Simpson's $\frac{1}{3}$ *rule* iii) Simpson's $\frac{3}{8}$ *rule* and compare with its actual value	10M	CO5	L5
		OR			
11		$y^1 = x - y^2$, y(o)=1 Using Taylor series method. And compute y(0.1),y(0.2)	10M	CO5	L5

CO : Course Outcomes

BL : Bloom's Taxonomy Levels

L 1 : Remembering **L 2 : Understanding**

L 3 : Applying **L 4 : Analysing**

L 5 : Evaluating **L 6 : Creating**

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