Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

Second Semester

Common to all Branches

UMAT24201 / MA3251- STATISTICS AND NUMERICAL METHODS

(Statistical Tables Can be Permitted)

Regulations – 2024 & 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Define type I and type II error.	L1	1	2
2.	A normal population has a mean of 6.48 and s.d of 1.5. In a sample of 400 members mean is 6.75. Is the difference significant?	L2	1	2
3.	What are the basic principles of design of experiment?	L1	2	2
4.	List out the merits of Randomized block design.	L1	2	2
5.	Obtain the iterative formula for fixed point method.	L1	3	2
6.	Solve the system of equations $x-2y=0,2x+y=5$ by Gauss Jordan method.	L3	3	2
7.	Form the Newton's divided difference table for the following data: x 5 7 11 13 $f(x)$ 150 392 1452 2366	L2	4	2
8.	State Trapezoidal rule to evaluate single integral.	L1	4	2
9.	Compute $y(0.2)$ from, $\frac{dy}{dx}=x+y$, $y(0)=1$ with $h=0.2$ by using Euler's method.	L2	5	2
10.	State Adams-Bash forth Predictor and corrector formula.	L1	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a i	During a country wide investigation the incidence of TB was found to be 1%. In a college of 400 strength 5 were reported to be affected whereas in another college of 1200 strength 10 were reported to be affected. Does this indicate any significant difference?	L3	1	8
	ii	A group of 10 rats fed on diet A and another group of 8 rats fed on diet B, recorded the following increase in weight (gms). Does it show superiority of diet A over Diet B?	L3	1	8

Diet A	5	6	8	1	12	4	3	9	6	10
Diet B	2	3	6	8	10	1	2	8		

Or

	b	In an investigation into the health and nutrition of two groups of children of different social status, the following results are got. Discuss the relation between the health and their social status using χ^2 test.	L3	1	16

Social Status Healths	Poor	Rich
Below Normal	130	20
Normal	102	108
Above Normal	24	96

12.	a	An experiment was designed to study the performance of 4 different detergents for cleaning fuel injectors. The following "cleanliness" readings were obtained with specially designed equipment for 12 tanks of gas distributed over 3 different models of engines: Perform the ANOVA and test at 0.01 level of significance whether there are difference in the detergents or in the engines by using randomized block design.	L3	2	16

	Engine 1	Engine 2	Engine 3
Detergent A	45	43	51
Detergent B	47	46	52
Detergent C	48	50	55
Detergent D	42	37	49

Or

	b	Obtain the main effects and interactions in the following 2^2- factorial experiment and write down the ANOVA table.	L3	2	16

	(I) 00	a 10	b 01	ab 11
Block I	64	25	30	6
Block II	75	14	50	33
Block III	76	12	41	17
Block IV	75	33	25	10

13.	a i	Compute a real root of the equation $e^x - 4x = 0$ to 4 decimal places by Newton Raphson method .	L3	3	8
	ii	Solve by Gauss-Seidel method. $27x + 6y - z = 85,\ x + y + 54z = 110,$ $6x + 15y + 2z = 72$	L3	3	8

Or

	b	Using power method, find all the eigen values of $\begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix}$	L3	3	16
14.	a i	Using Lagrange's interpolation formula, calculate the profit in the year 2000 from the following data:	L2	4	8

Year x:	1997	1999	2001	2002
profit.in lakhs y:	43	65	159	248

	ii	Find the rate of growth of the population in 1941 & 1961 of a certain town is shown in the following table.	L2	4	8

Year x	1931	1941	1951	1961	1971
Population y in 1000	40.62	60.80	79.95	103.56	132.65

Or

	b	Evaluate $\int_0^1\int_0^1 e^{x+y}dxdy$ using Trapezoidal rule and Simpson's rule taking h=k=0.5.	L2	4	16
15.	a i	Using Taylor's series method compute the value of y (0.1) correct to four decimal places given $\frac{dy}{dx} = x^2+y$ and y(0)=1.	L2	5	8
	ii	Obtain the value y(0.2) by Runge Kutta Method of fourth order for $\frac{dy}{dx} + xy^2 + y = 0, y(0) = 1$	L2	5	8
		Or			
	b	Determine the value of y(0.8) using Milne's predictor-corrector method, given $\frac{dy}{dx} = x^3 + y, y(0) = 2, h = 0.2$.	L2	5	16