




MAHARAJA INSTITUTE OF TECHNOLOGY
MYSORE
DEPARTMENT OF MATHEMATICS
I - Internal Assessment
II- Semester.

Sub. Name: Mathematics-II for
computer science Engineering stream
Sub Code: BMATS201
Date:08/05/2024
Total Marks: 30
Faculty: Dr. AM/Dr. RSI/ SS/ Dr.
ACK/VB/ BK / BV/ TNG / ND

250

Answer any one full question, select one full from each part.

Q.N o	PART-A					M	BT L	CO s							
1	Use fourth order Runge- Kutta method to find $y(0.1)$ given $\frac{dy}{dx} = 3e^x + 2y, y(0) = 1, h = 0.1$.					7	L2	1							
	Use Simpson's $3/8^{\text{th}}$ rule to find $\int_0^{0.6} e^{-x^2} dx$ by taking 6 sub intervals.					8	L3	3							
OR															
2	a	Using Regula Falsi method to find the approximate root of the equation $\tan x + \tanh x = 0$, the root lies in between 2 and 3. Carryout upto 4^{th} approximation.				7	L2	1							
	b	From the following data estimate the number of students scoring marks in between 40 and 45				8	L2	3							
	<table border="1"> <tr> <td>marks</td> <td>30 - 40</td> <td>40 - 50</td> <td>50 - 60</td> <td>60 - 70</td> <td>70 - 80</td> </tr> <tr> <td>No. of students</td> <td>31</td> <td>42</td> <td>51</td> <td>35</td> <td>31</td> </tr> </table>		marks	30 - 40	40 - 50				50 - 60	60 - 70	70 - 80	No. of students	31	42	51
marks	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80										
No. of students	31	42	51	35	31										
3	a	Given that $y' = x^2 + \frac{y}{2}$ and $y(1) = 2, y(1.1) = 2.2156, y(1.2) = 2.4649, y(1.3) = 2.7514$. Evaluate $y(1.4)$ by Milne's method. Apply corrector formula twice.				7	L2	1							
	b	If $f(0) = 2, f(1) = 3, f(2) = 12, f(5) = 147$, find $f(3)$ using Lagrange's interpolation formula				8	L2	3							
OR															
4	a	Using Newton-Raphson method, find a real root of $x \sin x + \cos x = 0$ near to π , correct to 4 decimal places				7	L2	1							
	b	Use Newton's divided difference formula to find $f(4)$, given				8	L2	3							
<table border="1"> <tr> <td>x</td> <td>0</td> <td>2</td> <td>3</td> <td>6</td> </tr> <tr> <td>f(x)</td> <td>-4</td> <td>2</td> <td>14</td> <td>158</td> </tr> </table>		x	0	2	3				6	f(x)	-4	2	14	158	
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	<p>MAHARAJA INSTITUTE OF TECHNOLOGY MYSORE DEPARTMENT OF MATHEMATICS II - Internal Assessment II- Semester.</p>	<p>Sub. Name: Mathematics -II for CSE stream Sub Code: BMATS201 Date:10-06-2024 Total Marks: 30 Faculty: Dr. AHS/Dr. AM/Dr. RSI/Dr. ACK/ SS/MVS/VB/MRG/BK/TNG/HBB/BV/ND</p>
<p>Instructions to students Answer any one full question, select one full from each part.</p>		

Q.No	PART-A	M	BTL	COs
1	a Find $y(0.1)$, $y(0.2)$ by using Taylor's series method, given $\frac{dy}{dx} = y - x^2$, $y(0) = 1$ considering up to 4 th degree	7	L3	3
	b Define Triple integral, then Evaluate $\int_{-1}^1 \int_0^z \int_{x-z}^{x+z} (x + y + z) dz dy dx$.	8	L3	2
OR				
2	a Using Modified Euler's formula compute $y(0.4)$ given that $\frac{dy}{dx} = x + \sin y$, $y(0) = 1$ by taking $h = 0.2$, carry out 2 modifications at each step (keep x in radian)	7	L3	3
	b Solve, by changing the order of integration $\int_0^\infty \int_x^\infty \frac{e^{-y}}{y} dy dx$.	8	L3	2
PART-B				
3	a Obtain the directional derivative of $\phi = 4xz^3 - 3x^2y^2z$ at $(2, -1, 2)$ along $2i - 3j + 6k$.	7	L2	1
	b If $\vec{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$, Calculate $\text{div } \vec{F}$ and $\text{curl } \vec{F}$ at $(1, 1, 1)$.	8	L1	2
OR				
4	a Define irrotational vector . use that Find a, b, c such that $\vec{F} = (x + y + az)i + (bx + 2y - z)j + (x + cy + 2z)k$.	7	L1	1
	b Show that cylindrical polar co-ordinate system is orthogonal.	8	L2	2



MAHARAJA INSTITUTE OF TECHNOLOGY
MYSORE
DEPARTMENT OF MATHEMATICS
III - Internal Assessment
II - Semester.

Sub. Name:
Mathematics-II for CSE Stream
Sub Code: M23BMATS201
Date: 15/07/2024
Total Marks: 30
Faculty: Dr.AM/Dr.RSI/Dr.ACK/SS/MVS/
VB/MRG/BK/HBB/BV/ND

NOTE: Answer any TWO full questions, choosing at least ONE from each PART

Q.No	PART-A		M	BTL	Cos
1	a	Find the volume of tetrahedral bounded by the planes $x=0; y=0; z=0; \frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$	7	L2	2
	b	Find $\int_0^1 x^{\frac{3}{2}} (1-x)^{\frac{1}{2}} dx$	8	L1	1
OR					
2	a	Find the area of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ by double integration.	7	L1	2
	b	Show that $\int_0^{\frac{\pi}{2}} \sqrt{\sin \theta} d\theta \times \int_0^{\frac{\pi}{2}} \frac{d\theta}{\sqrt{\sin \theta}} = \pi$	8	L2	1
PART-B					
3	a	Define Subspace of a vector space Show that W is a subspace of $V(R)$ where $W = \{x, y, z/x = y = z\}$ in $V_3(R)$	7	L2	2
	b	Verify the Rank-Nullity theorem for the linear transformation $T: R^3 \rightarrow R^3$ defined by $T(x, y, z) = (x + y, x - y, 2x + z)$ and also find Range space and Null space.	8	L2	2
OR					
4	a	Find the Basis and Dimension for the span $S = \{(2, 4, 2), (1, -1, 0), (1, 2, 1), (0, 3, 1)\}$ in $V_3(R)$	7	L2	2
	b	Find the matrix of the linear transformation $T: V_3(R) \rightarrow V_2(R)$ defined by $T(x, y, z) = (x + y, y + z)$ relative to the bases $B_1 = \{(1, 1, 0), (1, 0, 1), (1, 1, -1)\}$, $B_2 = \{(2, -3), (1, 4)\}$.	8	L2	2