Date	13.07.2024	Time	11.30 AM– 1.00 PM
TEST	CIE - I	Maximum Marks	10+30
Course Title	BRIDGE COURSE MATHEMATICS	Course Code	MA149TA
Semester	IV	Programs	All branches

Instructions: Answer all question

Sl. No	Part - A	Marks
1	The interval in which the real root of the equation $x^2 - 4x - 7 = 0$ lies is ________.	1
2	Given $\frac{dy}{dx} = x + y,\ y(0) = 1, h = 0.2,\ k_1 = 0.2,\ k_2 = 0.24,\ k_3 = 0.244,$ $k_4 =$ ______ using Runge- Kutta fourth order method.	1
3	In Newton-Raphson method for finding the root of an equation $f(x) = 0$, in the interval [a, b] the curve $f(x)$ is replace by __________.	1
4	Simpson's 1/3rd rule is used only when the number of sub intervals is ______.	1
5	Given x: 0, 0.25, 0.5, 0.75, 1 $F(x)$: 0, 2.45, 3.97, 5.58, 5.78 The value of $\int_0^1 F(x)\,dx$ is ___________.	2
6	Solve $\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$.	2
7	The Taylor series solution of $y' = x - y^2,\ y(0) = 1$ up to second degree terms is _____.	2
	Part - B	
1	Evaluate $\int_0^1 \frac{x}{1+x^2}\,dx$ by Weddle's rule taking seven ordinates and hence find $\log_e 2$.	6
2	Find a positive real root of the equation $e^x sinx = 1$ correct to four decimal places using Newton Raphson method.	6
3	Employ Taylor's series method to obtain approximate value of y at $x = 0.2$ for the differential equation $\frac{dy}{dx} = 2y + 3e^x$ with $y(0) = 0$.	6
4	Compute $y(0.1)$ using Runge- Kutta fourth order method given that $\frac{dy}{dx} = y^2 + x,\ y(0) = 1$, taking $h = 0.1$	6
5	Solve (i) $(D^2 - 4)y = 0$ (ii) $\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} - \frac{dy}{dx} - 2y = 0.$	6

DEPARTMENT OF MATHEMATICS

Academic year 2023-2024 (Even Semester 2024)

Date	29.08.2024	Time	9.30 AM– 11.00 AM
TEST	CIE - II	Maximum Marks	10+30
Course Title	BRIDGE COURSE MATHEMATICS		Course Code: MA149TA
Semester	IV	Programs	All branches

Instructions: Answer all question

Sl. No		Marks
	Part - A	
1	If $u = x^2y + 5y^2z + 3z^2x$ then $\frac{\partial u}{\partial x}$ *and* $\frac{\partial u}{\partial y} =$ __________.	2
2	If $\vec{f} = y^2\,\hat{\imath} + 2x\hat{\jmath} + z^2\hat{k}$ then $div\,\vec{f}$ at the point (1, −2, 0) is __________.	2
3	If $u = 2x + 2y$ and $v = x - 3y$, then $\frac{\partial(u,v)}{\partial(x,y)} =$ ______.	2
4	The P I of $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 3e^{-2x}$ is __________	2
5	The unit tangent vector of the curve $\vec{r}(t) = \cos 2t\,\hat{\imath} + sin2t\,\hat{\jmath} + 2t\,\hat{k}$ is __________.	2
	Part - B	
1	Solve $(D^2 + 4)y = e^{2x} + \cos 3x$	6
2	Find $J\left(\frac{u,v,w}{x,y,z}\right)$ given $u = x^2 + y^2 + z^2,\ v = xy + yz + zx,\ w = x + y + z.$	6
3	Compute the unit normal vector to the surface $f(x,y,z) = xy^2 - 4x^2y + z^2$ at (1,-1,2).	6
4	A particle moves along the curve $x = 2t^2,\ y = t^2 - 4t,\ z = 3t - 5$, where t is time. Compute the components of velocity and acceleration in the direction of the vector $\hat{\imath} - 3\hat{\jmath} + 2\hat{k}$ at $t = 1$.	6
5	Show that $\vec{F} = (e^x cosy + yz)\hat{\imath} + (xz - e^x siny)\hat{\jmath} + (xy + z)\hat{k}$ is irrotational.	6