Vivekananda College of Engineering & Technology, Puttur [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®] Affiliated to VTU, Belagavi & Approved by AICTE New Delhi			
CRM08	Rev 1.10	BS	08/02/2021

CONTINUOUS INTERNAL EVALUATION- 3

Dept: BS	Sem / Div: III/A & B	Sub: Transform Calculus, Fourier series and Numerical Techniques	S Code:18MAT31
Date: 15/02/2021	Time: 9:30-11:00 am	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

Q N		Questions	Marks	RBT	COs
		PART A			
1	a	Using Runge – Kutta method of fourth order solve $\frac{dy}{dx}=x+y$, y(0.4) =1 at x=0.5 correct to four decimal places.	8	L2	CO4
	b	If $\frac{dy}{dx}=2e^x-y$, y(0) =2, y(0.1) =2.010, y(0.2) =2.040, y(0.3) =2.090 find y(0.4) corrected to 4 decimal places by using Milne's predictor-corrector method (Use corrector formula twice)	8	L2	CO4
	c	Given that $\frac{dy}{dx}=(1+y)x^2$ and y(1) =1, y(1.1) =1.233, y(1.2) =1.548, y(1.3) =1.979 determine y(1.4) by Adams-Bash forth method.	9	L2	CO4
		OR			
2	a	Apply Runge – Kutta fourth order method to find an approximate value of y when x = 0.2 given that $\frac{dy}{dx}=x+y$ and y=1 when x=0.	8	L2	CO4
	b	Given that $\frac{dy}{dx}=x^2+y^2$ and y(0) =1, y(0.1) =1.245, y(0.2) =1.6043, y(0.3) =2.1235, determine y(0.4) by Adams-Bash forth method.	8	L2	CO4
	c	Using Milne's predictor-corrector method find y when x = 0.8, given $\frac{dy}{dx}=x-y^2$ given y(0) = 0, y(0.2) = 0.02, y(0.4) = 0.0795, y(0.6) = 0.1762. Apply corrector formula twice.	9	L2	CO4
		PART B			
3	a	Using Runge-Kutta method solve $\frac{d^2y}{dx^2}=x\left(\frac{dy}{dx}\right)^2-y^2$ at x=0.2 with $x_0=0, y_0=1, z_0=0$, take h=0.2	8	L3	CO4
	b	Derive Euler's equation in the standard form viz, $\frac{\partial f}{\partial y}-\frac{d}{dx}\left(\frac{\partial f}{\partial y^1}\right)=0$	8	L3	CO5
	c	Prove that the Geodesics on a plane are straight lines.	9	L3	CO5
		OR			
4	a	Use Milne's method to compute y(0.8) given that $\frac{d^2y}{dx^2}=1-2y\frac{dy}{dx}$ and the following table of initial values. x: 0, 0.2, 0.4, 0.6 y: 0, 0.02, 0.0795, 0.1762 z = dy/dx: 0, 0.1996, 0.3937, 0.5689	8	L3	CO4

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CONTINUOUS INTERNAL EVALUATION- 3

b	Find the curve on which the functional $\int_0^1 [y'^2 + x^2 y']\,dx$ with $y(0)=0$, $y(1)=1$ can be extermized.	8	L3	CO5
c	A heavy cable hangs freely under gravity between two fixed points. Show that the shape of the cable is a catenary.	9	L3	CO5

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