H.T No										

Regulations: A18

Sreenidhi Institute of Science and Technology

(An Autonomous Institution)

Code No: 7HC16 **Date: 30-Aug-2021(FN)**

B.Tech II-Year II- Semester External Examination, Aug/Sept-2021 (Regular)

MATHEMATICS-II (Differential Calculus) - (CSE, IT and ECM)

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

Note: *a) No additional answer sheets will be provided.*
b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.
c) Missing data can be assumed suitably.

ANSWER ANY 5 OUT OF 8 QUESTIONS. EACH QUESTION CARRIES 14 MARKS.

Bloom's Cognitive Levels of Learning (BCLL)

Remember	L1	Apply	L3	Evaluate	L5
Understand	L2	Analyze	L4	Create	L6

			BC LL	CO(s)	Marks
1.	a)	Show that $u=x+y+z, v=xy+yz+zx, w=x^2+y^2+z^2$ are functionally dependent and hence find the relation between them.	L3	CO1	[7M]
	b)	A rectangular box open at the top is to have volume of 32 cubic feet. Find the dimensions of the box requiring least material for its construction.	L5	CO1	[7M]
2.	a)	Solve $\left(1+e^{\frac{x}{y}}\right)dx+\left(1-\frac{x}{y}\right)e^{\frac{x}{y}}dy=0$	L4	CO2	[7M]
	b)	A body is originally at $80^{\circ}c$ and cools down to $60^{\circ}c$ in 20 minutes. If the temperature of the air is $40^{\circ}c$, find the temperature of the body after 40 minutes.	L4	CO2	[7M]
3.	a)	Solve the differential equation $\left(D^2-5D+6\right)=e^x \sin x$	L3	CO3	[7M]
	b)	Solve $(D$¿¿$2+4)y=\tan 2x$¿ by the method of variation of parameters	L4	CO3	[7M]
4.	a)	Find root of the equation f(x) = e^x-3x using Newton Raphson method that lies between 0 and 1.	L3	CO4	[7M]
	b)	Find the polynomial $f(x)$ by using Lagrange's formulae and hence find $f(3)$	L3	CO4	[7M]

x:	0	1	2	3
y:	2	3	12	147

5.	a)	Using Taylor's series method, find an approximate value of y at x=0.2 for the differential equation $y'-2y=3e^x$ for y (0) = 0.	L4	CO5	[7M]
	b)	Find y (0.1) using Runge- Kutta fourth order formula , given that $y'=x+x^2y$	L4	CO5	[7M]

and y (0) =1

6. a) Find $L^{-1}\left\{\frac{1}{s(s+2)^3}\right\}$. L3 CO6 [7M]

   b) State Convolution theorem on Laplace Transform and hence find the Inverse Laplace Transform of $\frac{1}{s(s^2+a^2)}$. L4 CO6 [7M]

7. a) If u = log $\left(\frac{x^2+y^2}{x+y}\right)$,prove that xu_x + yu_y =1 L3 CO1 [5M]

   b) Solve x $\frac{dy}{dx}+y=\log x$ L2 CO2 [5M]

   c) Solve $(D^3+1)\,y=\cos 2x$ L2 CO3 [4M]

8. a) If $x^3-x-4=0$, then by Bisection method find first two approximations $x_0 \wedge x_1$ L3 CO4 [5M]

   b) If $\frac{dy}{dx}=x-y$, y (0) = 1 find y (0.1) by Euler's method. L4 CO5 [5M]

   c) Find the Laplace Transform of $\left(\frac{sint}{t}\right)$ L3 CO6 [4M]

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