Hall Ticket Number :										

R-14

Code: 4GC31

II B.Tech. I Semester Supplementary Examinations May/June 2022

Mathematics-II

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Test for consistency and solve 5x+3y+7z=4; 3x+26y+2z=9; 7x+2y+10z=5 8M

   b) Show that the Eigen values of diagonal matrix are just the diagonal elements of the matrix 6M

OR

2. Verify Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix}1 & 1 & 2\\ 3 & 1 & 1\\ 3 & 3 & 1\end{bmatrix}$ and hence find A^4. 14M

UNIT–II

3. a) Find the missing term in the table

x	2	3	4	5	6
y	45	49.2	54.1	-	67.4

7M

   b) Find the Cubic polynomial which takes the values. $y(0)=1$, $y(1)=0$, $y(2)=1$ and $y(3)=10$ 7M

OR

4. a) Find the real root of the equation $x\log_{10}x=1.2$ by Regula-falsi method correct to four decimal places. 7M

   b) Using Lagrange formula find $f(4)$. Given

x	0	2	3	6
y	-4	2	14	158

7M

UNIT–III

5. Use Runge-Kutta method to evaluate $y(0.1)$ and $y(0.2)$ given that $y'=x+y$, $y(0)=1$ 14M

OR

6. Apply Fourth order Runge-Kutta Method to find an approximate value of y when $x=1.2$ in step of 0.1, given that $y'=x^2+y^2$, $y(1)=1.5$. 14M

UNIT–IV

7. a) Form the partial differential equations (by eliminating the arbitrary constants and arbitrary functions) from $z=ax+by+a^2+b^2$ 5M

b) Find the half range cosine series for the function $f(x) = x$, when $0 < x < ®$ hence show that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots = \frac{®^2}{8}$ 9M

OR

8. Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ where $u(x,0) = 6e^{-3x}$ 14M

UNIT–V

9. a) If $u = x^2 + y^2$, find harmonic conjugate $v(x,y)$ and write the corresponding complex potential $f(z) = u + iv$ 7M

b) Show that the polar form of Cauchy's Riemann equations are $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \_}, \frac{\partial v}{\partial r} = \frac{1}{r}\frac{\partial u}{\partial \_}$ 7M

OR

10. Determine p such that the function $f(z) = \frac{1}{2}\log(x^2 + y^2) + i\tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function 14M

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