Hall Ticket Number :										

R-14

Code: 4GC31

II B.Tech. I Semester Supplementary Examinations February 2022

Mathematics-II

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 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. a) Determine the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$ 6M

   b) 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. 8M

UNIT–II

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

   b) Using Newton-Raphson Method, compute $\sqrt{41}$ correct to four decimal places 7M

OR

4. Estimate the value of $f(22)$ and $f(42)$ from the following table by Newton's forward and backward interpolation formula. 14M

x	20	25	30	35	40	45
y	354	332	291	260	231	204

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. Using Picard's process of successive approximation, obtain a solution up to fifth approximation of the equation $\frac{dy}{dx} = x + y$ such that $y = 1$ when x=0.Check your answer by finding the exact solution. 14M

UNIT–IV

7. a) Find the Fourier series expansion for $f(x)=e^{x}$ in $0<x<2$® 10M

   b) Form the partial differential equations (by eliminating the arbitrary constants and arbitrary functions) from $z=ax+by+a^{2}+b^{2}$ 4M

OR

8. Form the partial differential equation by eliminating arbitrary function from $F\left(x+y+z,x^{2}+y^{2}+z^{2}\right)=0$ 14M

UNIT–V

9. a) 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

   b) Evaluate $\int_{c}\frac{e^{z}}{(z-1)^{3}}dz$ with C: $|z-1|=\frac{1}{2}$ using Cauchy's Integral Formula 7M

OR

10. a) Apply C-R conditions to $f(z)=z^{2}$ and show that the function is analytic everywhere. 7M

    b) Evaluate $\int_{c}\frac{1}{(z-1)(z-3)}dz$ with C: $|z|=2$ using Cauchy's Integral Formula 7M

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