Code No: P18BST07 R18

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END REGULAR/SUPPLEMENTARY EXAMINATIONS, JAN - 2023
MATHEMATICS-III
(Common to CE,EEE,ME,ECE,CSE,CSIT,IT,AME,CSE(IoTCSBT) Branches)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1.	a)	Write the Newton Raphson formula to find the cube root of N.	[2M]	1	
	b)	Explain merits and demerits of R-K method.	[2M]	2	
	c)	Write Dirichlet's conditions in Fourier series	[2M]	3	
	d)	Write the Fourier cosine transform	[2M]	4	
	e)	Form a PDE by eliminating the arbitrary constants *a* and b from $\left(x-a\right)^2+\left(y-b\right)^2=z^2\cot^2\alpha$.	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.	a)	Find an approximate value of the real root of $x^3-4x+9=0$ by Bisection method.	[5M]	1	
	b)	Using Lagrange's formula, express the function $\frac{3x^2+x+1}{(x-1)(x-2)(x-3)}$ as a sum of partial fractions.	[5M]	1	
		OR			
3.	a)	Find an approximate value of the real root of the equation $x\log_{10}x=1.2$ by Regula falsi method correct up to four decimal places.	[5M]	1	
	b)	Evaluate $\int_{1}^{18}$ by using Newtons Raphson method correct up to three decimal places.	[5M]	1	
		UNIT-II			
4.	a)	Find by Taylor's series method the values of y at $x=0.1$ and $x=0.2$ to five places of decimals from $\frac{dy}{dx}=x^2+y-1, y(0)=1$	[5M]	2	
	b)	Using Modified Euler's method, find $y(0.2)$ and $y(0.4)$given that $\frac{dy}{dx}=y+e^x, y(0)=0$	[5M]	2	
		OR			

5.		Using Runge–Kutta method of fourth order to find y at $x = 0.1$ given that $\frac{dy}{dx} = 3ex - 2y, y(0) = 0$ and $h = 0.1$	[10M]	2	
		UNIT-III			
6.		Expand $f(x) = \sqrt{1 - \cos x}, 0 < x < 2\pi$ in a Fourier series Hence deduce that $\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \cdots = \frac{1}{2}$	[10M]	3	
		OR			
7.		Obtain a half range cosine series for $f(x) = \begin{cases} kx, & 0 < x < \frac{l}{2} \\ k(l - x), & \frac{l}{2} < x < l \end{cases}$. Deduce the sum of the series $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots = \frac{\pi^2}{8}$ half range sine series.	[10M]	3	
		UNIT-IV			
8.		Find Fourier transform of $f(x) = \begin{cases} 1, & x < 1 \\ 0, & x > 1 \end{cases}$. Hence evaluate $\int_0^\infty \frac{\sin x}{x}\, dx$	[10M]	4	
		OR			
9.		Find the finite Fourier sine and cosine transform of $f(x)$ defined by $f(x) = x$, where $0 < x < 4$	[10M]	4	
		UNIT-V			
10.		Solve $3u_x + 2u_y = 0$ and $u(x, 0) = 4e^{-x}$ by the method of separation of variables.	[10M]	5	
		OR			
11.		Derive one-dimensional heat flow equation.	[10M]	5	

******