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[B19 BS 1102]

I B. Tech I Semester (R19) Regular Examinations
MATHEMATICS – II
(Common to CSE, ECE & IT)
MODEL QUESTION PAPER

TIME : 3 Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT**
All questions carry equal marks
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	UNIT-I	CO	KL	M
1.a)	Using Newton's forward difference interpolation formula find Y (3), from the following table X: 0, 5, 10, 15, 20, 25 Y: 7, 11, 14, 18, 24, 32	CO3	K2	8
b)	Find the interpolating polynomial f(x) for the data of the following table x: 0, 1, 4, 5 f(x): 4, 3, 24, 39	CO3	K1	7
	(OR)			
2. a)	Using Gauss backward formula, find f(42), from the following table X: 20, 25, 30, 35, 40, 45 f(x): 354, 332, 291, 260, 231, 204	CO4	K2	8
b)	Using Lagrange's interpolation formula find Y (10) from the following table x: 5, 6, 9, 11 Y: 12, 13, 14, 16	CO4	K3	7
	UNIT-II			
3.a)	Find the cube root of 41 using Newton-Raphson method.	CO5	K2	8
b)	Evaluate $\int_0^2 \frac{dx}{x^3+x+1}$ by using Simpsons 1/3rd rule with $h = 0.25$	CO5	K2	7
	(OR)			
4. a)	Find a real root of the equation $x \log_{10} x = 1.2$ by Regula-false method correct tothree decimal places	CO5	K2	8
b)	Evaluate $y(0.8)$ using Runge Kutta method given $y' = (x+y)^{\frac{1}{2}}, y(0.4) = 0.41$	CO5	K3	7
	UNIT-III			
5.a)	If $U = \tan^{-1}\frac{x^3+y^3}{x-y}$ and $x U_X + y U_y = \sin 2U$, prove that $x^2U_{xx} + 2xy\,U_{xy} + y^2U_{yy} = 2\cos 3U \sin U$.	CO1	K2	8

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b)	If u = $x^2 - 2y^2$, v = $2x^2 - y^2$ where x = rcos θ, y = r sin θ then show that $\frac{\partial(u,v)}{\partial(r,\theta)}$ = 6 r^3 sin 2θ.	CO1	K2	7
	(OR)			
6. a)	Expand $x^2y + 3y - 2$ in powers of $(x-1)$ and $(y+2)$ using Taylor's theorem.	CO1	K2	8
b)	By using the method of differentiation under the integral sign prove that $\int_0^\infty \frac{\tan^{-1}(ax)}{x(1+x^2)} dx = \frac{\pi}{2}\log(1+a)$, a $\geq$ 0.	CO1	K3	7
	UNIT-IV			
7. a)	Solve x^2(y - z)p + y^2(z - x)q = z^2(x - y).	CO2	K2	8
b)	solve $(D^2 - DD' - 2D'^2)$ z = (y - 1)e^x.	CO2	K2	7
	(OR)			
8. a)	Solve x(y - z)p + y(z - x)q = z(x - y).	CO2	K2	8
b)	solve (D + D' - 1)(D + 2D' - 3)z = 3x + 6y + 4.	CO2	K2	7
	UNIT-V			
9.a)	Obtain the solution of $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$ by the method of separation of variables.	CO6	K2	8
b)	A tightly stretched elastic string of length L, fixed at its end points is initially in a position given by $u(x,0) = u_0 sin^3\frac{\pi x}{L}$. If it is released from rest, find the displacement at any subsequent time.	CO6	K3	7
	(OR)			
10.a)	Obtain the solution of $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 0$ by the method of separation of variables.	CO6	K2	8
b)	A bar of conducting material of length π units is initially kept at a temperature sin x. Find the temperature at any subsequent time if the ends of the bar are held at zero temperature.	CO6	K3	7

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