

[B19 BS 1201]

I B. Tech II Semester (R19) Regular Examinations
MATHEMATICS – II
(Common to CE, EEE & ME)
MODEL QUESTION PAPER

TIME : 3 Hrs.

Max. Marks: 75 M

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

	UNIT-I							CO	KL	M
1.a)	Using Newton's forward difference interpolation formula find Y (3), from the following table							CO3	K2	8
	X	0	5	10	15	20	25			
	Y	7	11	14	18	24	32			
b)	Find the interpolating polynomial f(x) for the data of the following table							CO3	K1	7
	x	0	1	4	5					
	f(x)	4	3	24	39					
(OR)										
2. a)	Using Gauss backward formula, find f(42), from the following table							CO4	K2	8
	X	20	25	30	35	40	45			
	f(x)	354	332	291	260	231	204			
b)	Using Lagrange's interpolation formula find Y (10) from the following table							CO4	K3	7
	x	5	6	9	11					
	Y	12	13	14	16					
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 1/3 rd 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

b)	If $u = x^2 - 2y^2$, $v = 2x^2 - y^2$ where $x = r \cos \theta$, $y = r \sin \theta$ then show that $\frac{\partial(u,v)}{\partial(r,\theta)} = 6r^3 \sin 2\theta$.	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