Sanjay Ghodawat University, Kolhapur 2018-19

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Year and Program:2018-19 **School of Technology** **Department of Electronics and Electrical Engineering**

S.Y. B. Tech.

Course Code: EET 202 **Course Title: Numerical Methods and Statistics** **Semester – IV**

Day and Date **End Semester Examination (ESE)** **Time: Max Marks: 100**

Tuesday, 21st May 2019 10:30 Am to 1:30 pm

Instructions:
1) All questions are compulsory.
2) Use of non- programmable calculator is allowed.
3) Figures to the right indicate full marks.

		Marks	Bloom's Level	CO
Q.1	**Solve the following**			
a)	Explain types of errors and hence evaluate the sum $s=\sqrt{3}+\sqrt{5}+\sqrt{7}$ to the four places of decimals and find its absolute and relative errors.	07	L_2	CO1
	OR			
a)	Find the real positive root of $x^3-4x+1=0$ by Regula -Falsi method.	07	L_1	CO1
b)	Solve $x+y+z=9,\ 2x-3y+4z=13,\ 3x+4y+5z=40$ by Gauss-Jordon method	08	L_3	CO2
	OR			
b)	Solve $2x-y+3z=9,\ x+y+z=6,\ x-y+z=2$ by Gauss-elimination method.	08	L_3	CO2
Q.2	**Solve the following**			
a)	Using backward difference formula find t when $p=84$ from the following data	07	L_3	CO3

p :	60	70	80	90
t :	226	250	276	304

OR

a)	Using Newton's divided differences find $f(6)$ from the following data	07	L_3	CO3

x :	3	7	9	10
$f(x)$:	168	120	72	63

b)	The population of a certain town is given below. Find the rate of growth of population in 1961 and 1971.	08	L_1	CO4

x (Years) :	1931	1941	1951	1961	1971
y (Population in Thousands) :	40.62	60.80	79.95	103.56	132.65

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OR

b) Using Lagrange's interpolation formula find $f'(8)$ from the following table — 08 — L_3 — CO4

x :	6	7	9	12
$f(x)$:	1.556	1.690	1.908	2.158

Q.3 **Solve any Two**

a) Find the positive root of $x-\cos x=0$ by bisection method. — 08 — L_1 — CO1

b) Solve $28x+4y-z=32,\ 2x+17y+4z=35,\ x+3y+10z=24$ by Gauss-Seidel method. — 08 — L_3 — CO2

c) Apply Lagrange's interpolation formula to find $y(10)$ from the following table — 08 — L_3 — CO3

x:	5	6	9	11
y:	12	13	14	16

d) Use Stirling's formula to obtain y' at x=900 from the following table — 08 — L_3 — CO4

x:	0	300	600	900	1200	1500	1800
y:	135	149	157	183	201	205	193

Q.4 **Solve any Two**

a) Use Trapezoidal rule, Simpson's 1/3 rd rule, Simpson's 3/8th rule to compute $\int_{-3}^{3} x^4\,dx$ by taking $h=1$. Verify your result by actual integration. — 09 — L_5 — CO5

b) Apply Trapezoidal rule, Simpson's 1/3 rd rule, Simpson's 3/8th rule to compute the value of the definite integral $\int_{0.2}^{1.4}\left(\sin x-\log_e x+e^x\right)dx$ with $h=0.2$. — 09 — L_3 — CO5

c) Divide interval (1, 2) into 4 equal parts and find $\int_1^2 \frac{dx}{x}$ using Simpson's 1/3rd rule and Trapezoidal rule. Compare your answer with exact solution. — 09 — L_4 — CO5

Q.5 **Solve any Two**

a) Solve $\frac{dy}{dx}=x+3y$ with $x_0=0,\ y_0=1$ by Euler's modified formula for $x=0.1$. Correct to four decimals, taking $h=0.05$. Also find exact value. — 09 — L_3 — CO6

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b) Solve $\frac{dy}{dx} = xy$ with initial conditions $y(1) = 2$ and find y at $x = 1.2,\ 1.4$ by Runge-Kutta method of fourth order. 09 L_3 CO6

c) Solve by Picard's method $\frac{dy}{dx} = y - x$ when $x = 0,\ y = 2$ upto $y^{(5)}$. Also compare your answer with exact particular solution. 09 L_3 CO6

Q.6 **Solve any Three**

a) Apply using Trapezoidal rule to calculate $\int_0^1 \frac{dx}{1+x^2}$ with $h = 0.2$. Hence obtain approximate value of π. 06 L_3 CO5

b) Find the volume of solid of revolution formed by rotating about x-axis, the area bounded by lines $x = 0,\ x = 1,\ y = 0$ and the curve passing through the points given below (use Simpson's 1/3rd rule) 06 L_1 CO5

x:	0	0.25	0.50	0.75	1
y:	1	0.9896	0.9589	0.9089	0.8415

c) Use Taylor series method to solve $\frac{dy}{dx} = 1 - 2xy$ with initial condition $y(0) = 0$ for $y(0.2)$ & $y(0.4)$. Correct to four decimal places. 06 L_3 CO6

d) Using Euler's method, solve $\frac{dy}{dx} = x^2 + y^2$ with initial condition $x = 0,\ y = 1$ for $x = 1$ in 5 steps. 06 L_3 CO6

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