Sanjay Ghodawat University, Kolhapur 2019-20

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017 EXM/P/09/01

Year and Program:2019-20 S.Y.B.Tech | **School of Technology** | **Department: Aeronautical**

Course Code: AET 202 | **Course Title: Applied Numerical Methods** | **Semester – IV**

Day and Date: Monday 30/12/19 | **End Semester Examination (ESE)** | **Time:** 3hr 10:30 am-01:30 pm | **Max Marks: 100**

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

		Marks	Bloom's Level	CO
Q.1				
a)	Use secant method to determine the real root of the equation $\cos x - xe^x = 0$ correct up to four decimal places by using initial values $x_0 = 0, x_1 = 1$.	07	L_2	CO1
	OR			
a)	Find the positive real root of the equation $f(x) = x^3 - 5x + 1 = 0$ by the method of false position which lies in the interval $(0,1)$.	07	L_2	CO1
b)	Apply Gauss-Jordan method to solve the equations $x + y + z = 9;\quad 2x - 3y + 4z = 13;\quad 3x + 4y + 5z = 40.$	08	L_1	CO2
	OR			
b)	Solve the following equations by Gauss-Seidal iteration method $15x + 2y + z = 18;\quad 2x + 20y - 3z = 19;\quad 3x - 6y + 25z = 22.$	08	L_1	CO2
Q.2				
a)	Find the Cubic polynomial by using Newton's forward interpolation formula which takes the following values.	07	L_3	CO3

x	0	1	2	3
$f(x)$	1	2	1	10

OR

a)	From the following table find $f(1.22)$ by using Stirling's formula	07	L_3	CO3

x	1	1.1	1.2	1.3	1.4
$f(x)$	0.841	0.891	0.932	0.963	0.985

ESE

Q.6 **Solve any Three of the following.**

a) A river is 80 m wide. The depth y of the river at a distance x from one bank is given by the following table — 06 — L_4 — CO5

x (distance)	0	10	20	30	40	50	60	70	80
y (depth)	0	4	7	9	12	15	14	8	3

Apply Simpson's one-third rule to find the approximate area of cross-section of the river.

b) Use Romberg's method to compute $\int_0^{0.5} \frac{x}{\sin x} dx$, correct to two decimal places. — 06 — L_2 — CO5

c) Find the approximate value of y for $x = 1.2$ form $\frac{dy}{dx} = \frac{2xy + e^x}{x^2 + xe^x}$, given that $y(1) = 0$, by using Runge-kutta fourth order method. — 06 — L_2 — CO6

d) Using Runge-kutta second order method find the approximate value of y for $x = 1.1$. Given $\frac{dy}{dx} = 3x + y^2$ with $y(1) = 1.2$. — 06 — L_1 — CO6

*****

ESE