	Sanjay Ghodawat University, Kolhapur Established as State Private University under Govt. of Maharashtra. Act No XL, 2017	**2020-21** EXM/P/09/00

Year and Program: S.Y B.Tech.	**School of Technology**	**Department: Aeronautical**
Course Code: AET202	**Course Title: Applied Numerical Methods**	**Semester :IV**
Day :Monday **Date :21.06.2021**	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

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.

Q.1 **Answer the following (any Two)** **Marks** **Bloom's Level** **CO**

a) Find the positive real root of the equation $xe^x = 2$ by the method of false position which lies in the interval $(0,1)$. 8 L_1 CO1

b) Apply Gauss-elimination method to solve the equations 8 L_1 CO2

$x + 4y - z = -5$; $x + y - 6z = -12$; $3x - y - z = 4$

c) Solve the following equations by Gauss-Seidal iteration method 8 L_1 CO2

$20x + y - 2z = 17$; $3x + 20y - z = -18$; $2x - 3y + 20z = 25$

Q.2 **Answer the following (any two) –**

a) Find the value of *f(9)* by using Lagrange's formula. 8 L_3 CO3

x	5	7	11	13	17
f(x)	150	392	1452	2366	5202

b) Six dice are thrown 729 times. How many times do you expect at least three dice to show 5 or 6? 8 L_4 CO4

c) A random variable *X* has the following probability distribution 8 L_3 CO4

X	0	1	2	3	4	5	6
P(X)	k	3k	5k	7k	9k	11k	13k

i) Find k

ii) Evaluate P(X<4), P($X \geq 5$) and P(3<$X \leq 6$)

Q.3 **Answer the following (any two) –**

a)	Evaluate $\int_0^1 \frac{dx}{1+x^2}$, by dividing the interval of integration into 6 equal parts by Simpson's rule. Hence find approximate value of π .	9	L_2	CO5
b)	Solve $\frac{dy}{dx} = 2x - y$ with initial conditions $x_0 = 0,\ y_0 = 0$ by Taylor's method. Find y as power series of x . Also find the approximate value of y for $x = 0.2$ and $x = 0.4$	4	L_1	CO5
c)	Using Picard's method, solve $\frac{dy}{dx} = 1 + xy$ with $x_0 = 0,\ y_0 = 0$ up to three iterations.	9	L_3	CO6

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