QP Code: R264G006 | Reg. No | | | | | | | | | | | AY 24

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)

M.Sc. (Fourth Semester – Regular/ Supplementary) Examinations, April – 2026

24MPEMA24021- Mathematical Modelling

(Mathematics)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	Define Doubling Period in population growth model.	CO1	K1
b.	Define Epidemic Model with Removal and immigration.	CO2	K1
c.	The angles of elevation of the foot and the top of a flag-post on a tower, from a point a metres from the foot tower are α and β respectively. Show the height of the flag-post is a (tan β - tan α) metres.	CO3	K2
d.	What is the nature of the graph of $S(c)=\frac{1}{1+c^2}$, where S(c) is the survivable function?	CO4	K2
e.	Find the Jacobian about the trivial steady state and non-trivial steady state for the following model $\frac{dx}{dt}=x-y+xy, \frac{dy}{dt}=3x-2y-xy$?	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions

		Marks	CO #	Blooms Level
2. a.	Discuss the Mathematical Modelling for (i) Diffusion (ii) Change of price of commodity	10	CO1	K4
	(OR)			
b.	Discuss the Mathematical Modelling for Growth of Science and Scientist.	10	CO1	K4
3.a.	Discuss SIS Model with constant number of Carriers.	10	CO2	K4
	(OR)			
b.	Discuss the Mathematical Modelling for Prey and Predator.	10	CO2	K4
4.a.	Discuss in detail the Domar's First Debt Model.	10	CO3	K4
	(OR)			
b.	Discuss the logistic law of population growth.	10	CO3	K4
5.a.	Discuss in detail the Harrod Model.	10	CO4	K4
	(OR)			
b.	Discuss the Mathematical Modelling for Elliptic Motion of Satellites.	10	CO4	K4
6.a.	Discuss the Mathematical modelling for a Stochastic Epidemic process with no removal.	10	CO5	K4
	(OR)			
b.	Discuss the Mathematical Modelling of EOQ with several production runs of unequal length.	10	CO5	K4

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