Department of Computer Science
COMSATS University Islamabad, Lahore Campus
M. A. Jinnah Campus, Lahore

Mid-Term Examination– FALL 2023

Course Title:	Differential Equations			Course Code:	MTH242	Credit Hours:	3 (3,0)
Course Instructor/s:	Farrukh Shehzad			Programme Name:	BS Computer Science		
Semester:	7th	Batch: FA20	Section: [redacted]		Date:	04-11-2023	
Time Allowed:	1 hour 30 minutes			Maximum Marks:	25		
Student's Name:	[redacted]			Reg. No.	[redacted]		/LHR

Important Instructions / Guidelines:

- Creativity and thinking are required.
- Attempt all questions.

(9+8+8=25)

Question #1

A culture initially has P_0 number of bacteria. At t=1 the number of bacteria is measured to be $\frac{3}{2}P_0$. If the rate of growth is proportional to the number of bacteria P(t) present at time t, determine the time necessary for the number of bacteria to triple.

Question #2

a) Differentiate between autonomous and non-autonomous DEs.

b) Find the general solution of the higher-order differential equation $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} - 2y = 2x^2 - 3x + 6$. Using the undetermined coefficients.

Question #3

a) What is the Wronskian function?

b) Solve the higher order differential equation $\frac{d^2y}{dx^2} - y = \frac{1}{x}$. by variation of parameters.