

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2023****Subject Code:2161901****Date:18-07-2023****Subject Name:Dynamics of Machinery****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) Explain static and dynamic balancing.	03
	(b) Explain 'primary' and 'secondary' balancing of reciprocating	04
	(c) Explain the balancing of several masses rotating in same plane.	07
Q.2	(a) Define the terms: Natural frequency, Damping and Resonance,	03
	(b) Explain why the reciprocating masses are partially balanced.	04
	(c) Derive the following expressions, for an uncoupled two cylinder locomotive engine:-	07
	1) Hammer blow	
	2) Swaying couple	
	3) Variation in tractive force	
	OR	
	(c) Four masses A,B,C and D having their radii of rotation as 200 mm,150 mm,250 mm and 300 mm are 200 kg, 300 kg , 240 kg and 260 kg in magnitude respectively. The angle between the successive masses are 45°, 75° and 135° respectively. Find the position and magnitude of the balance mass required, if its radius of rotation is 200 mm.	07
Q.3	(a) Write various classification of vibrations.	03
	(b) Differentiate between Free and Forced Vibration.	04
	(c) Derive an expression for logarithmic decrement.	07
	OR	
Q.3	(a) What are the cause and effect of vibration?	03
	(b) Differentiate between coulomb damping and viscous damping.	04
	(c) Find the equation for natural frequency of a spring mass vibrating system by using equilibrium method.	07
Q.4	(a) What is the whirling of shaft?	03
	(b) Derive an expression for natural frequency of single rotor system,	04
	(c) Discuss the balancing of V Engine.	07
	OR	
Q.4	(a) Define damping factor and write its significance.	03
	(b) What is vibration isolation? Discuss in brief different material used for vibration isolation	04
	(c) Derive the expression for equivalent damping coefficient, when two dampers with damping coefficients C_1 and C_2 are connected in series and in parallel.	07

- Q.5 (a)** Write the differential equation for forced vibration. **03**
(b) Discuss the Rayleigh's method to obtain the natural frequency of the beam. **04**
(c) Derive an expression for length of torsionally equivalent shaft system. **07**

OR

- Q.5 (a)** Write working of Vibrometer. **03**
(b) Explain Jump phenomenon in cam. **04**
(c) Draw and explain a plot of magnification factor versus frequency ratio curves **07**