Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (OLD) EXAMINATION – WINTER 2018

Subject Code:161901 **Date: 07/12/2018**

Subject Name: Dynamics Of Machinery

Time: 02:30 PM TO 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q-1	A	Define Static and Dynamic balancing with suitable example.	7
	B	Explain Vibration isolation and transmissibility	7
Q-2	A	Write down short note on Variation of Tractive Force, Swaying couple and Hammer Blow.	7
	B	Explain concept of Direct and Reverse Crank.	7
		OR	
	B	Four masses m1, m2, m3 and m4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45°, 75° and 135°. Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m.	7
Q-3	A	Discuss different cases showing the characteristics of the system performance for a damped free vibration.	7
	B	Describe Dunkerley's method to find the natural frequency of a shaft carrying several loads.	7
		OR	
Q-3	A	Explain Hozer's method to determine natural frequencies of multi-rotor system.	7
	B	What are various frequency measuring instruments? Explain any one in detail.	7
Q-4	A	Define logarithmic decrement and derive an expression for it.	7
	B	A, B, C and D are four masses carried by a rotating shaft at radii 100, 125, 200 and 150 mm respectively. The planes in which the masses revolve are spaced 600 mm apart and the mass of B, C and D are 10 kg, 5 kg, and 4 kg respectively. Find the required mass A and the relative angular settings of the four masses so that the shaft shall be in complete balance.	7
		OR	
Q-4	A	Explain an analytical method of balancing of several masses rotating in different planes.	7
	B	Derive an expression for torsionally equivalent shaft system	7
Q-5	A	Explain the method to determine the critical speed of shaft carrying single rotor, considering damping.	7
	B	Explain with neat sketch why reciprocating masses are partially balanced?	7

OR

Q-5 A Define and only write the equation of the following terms; 7
I) Natural Frequency, II) Logarithmic Decrement, III) Natural Frequency Of Damped Vibration, IV) Damping Factor, V) Dynamic Magnifier, VI) Displacement Transmissibility.

B A cantilever shaft 50 mm diameter and 300 mm long has a disc of mass 100 kg at its free end. The Young's modulus for the shaft material is 200 GN/m^2. Determine the Frequency of longitudinal and transverse vibrations of the shaft. 7

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