GUJARAT TECHNOLOGICAL UNIVERSITY PDDC - SEMESTER-VI • EXAMINATION - WINTER 2013

Subject Code: X61902 **Subject Name: Dynamics of Machinery** Time: 02.30 pm - 05.00 pm

Date: 06-12-2013

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) What do you mean by balancing? Explain the method balancing of several 07 masses rotating in different planes? 07
 - (b) Explain partial balancing of reciprocating Engine
- (a) Explain the terms: (1) Variation of tractive force (2) Swaving couple **Q.2** 07 (3) Hammer blow
 - (b) Explain Rayleigh's method for finding the natural frequency of vibratory 07 system

OR

- (b) A shaft having length 1 m and diameter 40 mm is fixed at one end and 07 carries a pulley of mass moment of inertia 20 kg-m² at other end. A band brake exerts a constant frictional torque of 500 N-m around the circumference of the pulley. If the pulley is displaced by 45° and released. Determine:
 - (1) The number of cycles before the pulley comes to the rest
 - (2) The final setting position of the pulley
 - Take modulus of rigidity 84 GN/m^2

Q.3	(a)	Derive the expressions for: (1) Amplitude of steady state vibrations	07
		(2) Phase angle for spring mass damper system subjected to External	
		periodic force fosinwt	
			~
	(b)	Explain the term magnification factor and obtain Expression for it.	07
		OR	
Q.3	(a)	Write a short note on forced vibration due to rotating unbalanced	07
•	(b)	Explain the following terms:	07
	(~)	(1) Vibration isolation (2) Force Transmissibility	•••
0.4	(\cdot)	Employ the mode do to determine the oritical encoded for the formation simple	07
Q.4	(a)	Explain the methods to determine the critical speed of shaft carrying single	07
		rotor neglecting damping	
	(b)	Explain the term half frequency whirling. Derive the expression for it.	07
		OR	
0.4	(\cdot)	Here actional for many of tensional action of these action areas	07
Q.4	(a)	How natural frequency of torsional vibration of three rotor system is	07
		determined?	
O.4	(b)	Explain the concept of torsionality & Equivalent shaft.	07
0.5	(a)	Derive the principle of normal modes for longitudinal vibrations of uniform	07
Z.C	(4)	have	07
	<i>(</i> 1)		~-
	(b)	Explain the working principles of:	07
		(1) Vibrometers (2) Frequency measuring instruments	
		OR	
05	(9)	What is FFT? With the help of block diagram Explain the working of FFT	07
Q	(a)	what is 1111. What the help of block diagram Explain the working of 111	07
		analyzer.	
	(b)	What are the various Instrumentation systems used for condition	07
		monitoring?	
