

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC - SEMESTER-VI • EXAMINATION – WINTER 2013****Subject Code: X61902****Date: 06-12-2013****Subject Name: Dynamics of Machinery****Time: 02.30 pm - 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) What do you mean by balancing? Explain the method balancing of several masses rotating in different planes? **07**
- (b) Explain partial balancing of reciprocating Engine **07**
- Q.2** (a) Explain the terms: (1) Variation of tractive force (2) Swaying couple (3) Hammer blow **07**
- (b) Explain Rayleigh's method for finding the natural frequency of vibratory system **07**

OR

- (b) A shaft having length 1 m and diameter 40 mm is fixed at one end and carries a pulley of mass moment of inertia 20 kg-m^2 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 (2) Phase angle for spring mass damper system subjected to External periodic force $f_0 \sin \omega t$ **07**
- (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
- Q.4** (a) Explain the methods to determine the critical speed of shaft carrying single rotor neglecting damping **07**
- (b) Explain the term half frequency whirling. Derive the expression for it. **07**

OR

- Q.4** (a) How natural frequency of torsional vibration of three rotor system is determined? **07**
- Q.4** (b) Explain the concept of torsionality & Equivalent shaft. **07**
- Q.5** (a) Derive the principle of normal modes for longitudinal vibrations of uniform bars. **07**
- (b) Explain the working principles of: **07**
- (1) Vibrometers (2) Frequency measuring instruments

OR

- Q.5** (a) What is FFT? With the help of block diagram Explain the working of FFT analyzer. **07**
- (b) What are the various Instrumentation systems used for condition monitoring? **07**
