

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – SUMMER • 2014****Subject Code: 152504****Date: 17-06-2014****Subject Name: Dynamics of Machines & Production Engineering Drawing****Time: 10.30 am - 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. Use Answer-Book for theoretical & drawing sheet for graphical solution in Engg. Drawing answers.(Follow First Angle Projection Method)

Q.1 (a) Define: Static Balancing & Dynamic Balancing. Also define Hammer Blow & Variation in Tractive Force with respect to reciprocating balancing. **07**

(b) Four masses P, Q, R & S are attached to a shaft and revolve in the same plane. The masses are 12 Kg, 10 Kg, 16 Kg and 15 Kg respectively and their radii of rotations are 40 mm, 50 mm, 60 mm and 35 mm. The angular positions of masses Q, R, & S are 60° , 125° and 270° from mass P. Determine the magnitude and position of the balancing mass at a radius of 90 mm. **07**

Q.2 (a) With usual notations prove that Maximum fluctuation of energy. $\Delta E = E \times 2C_s$; where E = Mean Kinetic energy of flywheel and C_s = Co-efficient of fluctuation of speed. **07**

(b) The turning moment diagram for a petrol engine is drawn to the following scales: Turning moment, 1 mm = 500 N-m; Crank angle, 1 mm = 2° . The turning moment diagram repeats itself at a every half revolution of the engine and the areas above and below the turning moment line taken in order are 260, -580, 80, -380, 870, -250 mm². The rotating parts are equivalent to a mass of 55 Kg at a radius of gyration of 2.1 mm. Determine the co-efficient of fluctuation of speed when the engine runs at 1600 rpm. **07**

OR

(b) Explain D'Alembert's Principle. Explain the meaning of Equivalent Offset Inertia Force. **07**

Q.3 (a) A vibrating system consists of a mass of 50 Kg, a spring of stiffness 30 KN/m and a damper. The damping provided is only 20% of the critical value. Determine: (i) the damping factor (ii) the critical damping coefficient (iii) the natural frequency of damped vibrations (iv) the logarithmic decrement (vi) the ratio of two consecutive amplitudes. **07**

(b) Describe a two-rotor vibratory system and find the ratio of their amplitudes with usual notations. **07**

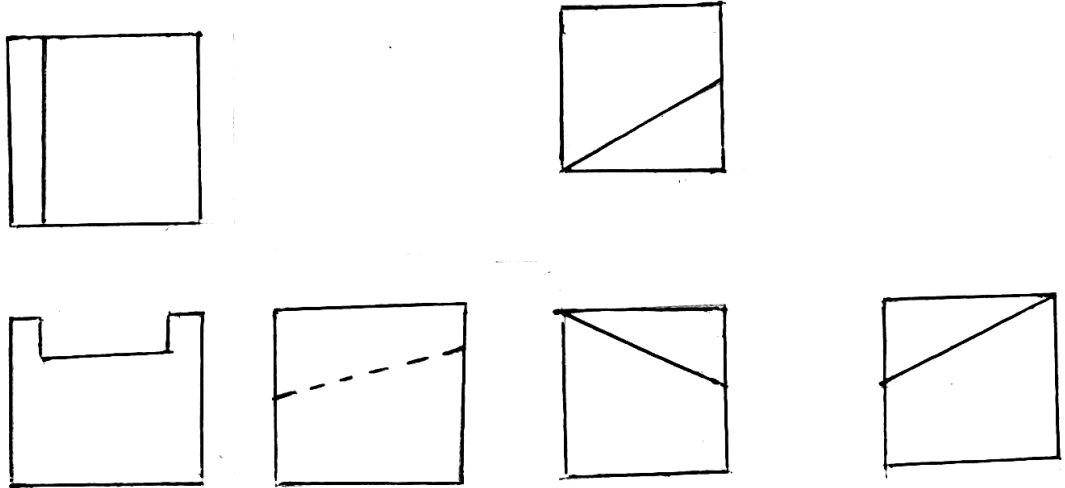
OR

Q.3 (a) A horizontal gas engine running at 240 rpm has a bore of 220 mm and a stroke of 440 mm. The connecting rod is 924 mm long and the reciprocating parts weigh 20 Kg. When the crank has turned through an angle of 30° from the inner dead centre, the gas pressure on the cover and crank sides are 500 KN/m² and 60 KN/m² respectively. Diameter of the piston rod is 40 mm. Determine Analytically (i) turning moment on the crank shaft (ii) thrust on the bearings. **07**

(b) What do you mean by balancing machines? Describe any ONE type of balancing machine with diagram. **07**

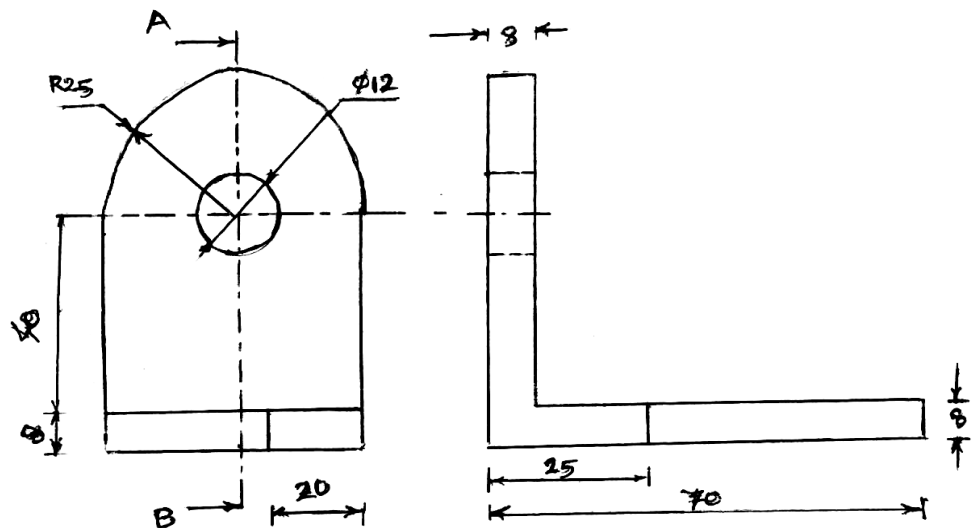
Q.4 (a) Where foundation bolts are used? Draw any THREE foundation bolts using Free hand Sketch. **07**

- (b) Draw missing lines, full or dotted as the case may be, in the orthographic views of two objects shown in figure 1. Also draw freehand isometric view to support your answer. **Figure 1....** 07



OR

- Q.4 (a) A pentagonal prism side 30 mm and height 60 mm stands on one of its sides at the base on the H.P. and its axis inclined at 30° to H.P. A cutting plane passing through the midpoint of the axis is inclined at 30° to V.P. Draw sectional elevation and true shape of section. 07
- (b) Draw any FOUR types of Nuts with freehand sketch having proportionate dimensions. 07
- Q.5 (a) Draw the following geometrical symbols (i) straightness (ii) flatness (iii) circularity (iv) cylindricity 07
- (b) The front view and the L.H.S.V. of an object using first angle projection method are given in figure 2. (All dimensions are in mm). Draw the following views. (i) Top view (ii) Sectional L.H.S.V. - **Figure 2 • All dimensions are in MM** 07



OR

- Q.5 (a) A vertical square prism, base 50 mm side and height 85 mm has a face inclined at 30° to V.P. It is completely penetrated by another square prism, base 40 mm side and axis 95 mm long, faces of which are equally inclined to the V.P. The axes of the two prisms are parallel to the V.P. and bisect each other at right angles. Draw the projections showing lines of penetrations. 07
- (b) What is Bill of Material? Differentiate between Assembly and Detailed Drawing. Explain each of their uses. 07
