

02189

**DIPLOMA – VIEP – MECHANICAL ENGG. –
III SEM**

Term-End Examination

December, 2010

BME-056 : Theory of Machine

Time : 3 hours

Maximum Marks : 70

Note : Answer any seven questions. Assume any missing data suitably. Use of scientific calculator is allowed.

1. Explain *any Four* of the following terms : $2\frac{1}{2} \times 4 = 10$
 - (a) Kinematic chain
 - (b) Constrained motion.
 - (c) 'Lower pair' and 'Higher pair'
 - (d) Circular pitch
 - (e) Mechanical advantage of a linkage.

2. Explain the causes of vibrations in machines, their harmful effects and remedies. **10**

3. With a neat sketch explain the working of crank and slotted Lever quick return motion mechanism. **10**

4. A square threaded bolt of root dia. 22.5 mm and pitch 5 mm is tightened by screwing a nut whose mean dia. of bearing surface is 50 mm. If co-efficient of friction for nut and bolt is 0.1 and for nut and bearing surface is 0.16. Find the force required at the end of a spanner 500 mm long when the load on the bolt is 10 kN. 10
5. In a flat belt drive the initial tension is 2000 N. The co-efficient of friction between the belt and the pulley is 0.3 and the angle of lap on the smaller pulley is 150° . The smaller pulley has the radius of 200 mm and rotates at 500 rpm. Find the power transmitted by the belt. 10
6. Four masses m_1, m_2, m_3 and m_4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotations are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are $45^\circ, 75^\circ$ and 135° . Find the position and magnitude of the balancing mass required, if its radius of rotation is 0.25 m. 10
7. (a) Define the following terms as applied to governors. 2
- (i) Sensitiveness (ii) Stability
- (b) With a neat diagram explain the working of a porter governor. 8

8. (a) Explain simple and compound gear trains. 4
- (b) A toothed wheel has 96 teeth and its module is 1.25. Find the followings : 2+2+2
- (i) Pitch circle diameter
- (ii) Diametral pitch.
- (iii) Circular pitch.
9. (a) What is the difference between the function of a fly wheel and a Governor ? 4
- (b) Explain the terms : 'Co - efficient of fluctuation of Energy' and 'Co - efficient of fluctuation of Speed'. 6
10. Write short note on *any two* of the following : 5+5
- (a) Single slider crank chain mechanism.
- (b) Turning - moment diagram
- (c) Bearings.
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