

**DIPLOMA - VIEP - MECHANICAL  
ENGINEERING - III SEM/ADVANCED LEVEL  
CERTIFICATE COURSE IN MECHANICAL  
ENGINEERING  
(DMEVI/ACMEVI)**

**Term-End Examination**

**December, 2011**

**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. **2½x4=10**
  - (a) Kinematic Link
  - (b) Successfully constrained motion
  - (c) Sliding pair and Turning pair
  - (d) Four bar chain
  - (e) Inversion
2. Explain the working principle of Whitworth's Quick Return Mechanism with neat sketch. **10**
3. The thrust on propeller shaft of a marine engine taken up by 8 collars whose external and internal diameters are 660 mm and 420 mm respectively. The thrust pressure is 0.4 MN/m<sup>2</sup> and may be assumed uniform. The Co-efficient of friction between the shaft and collars is 0.4. If the shaft rotates at 90 r.p.m. find. **10**
  - (a) Total thrust on the collars and
  - (b) Power absorbed by friction at the bearing.

4. Describe the various types of belts used for the transmission of power with suitable sketch. 10
5. A flat belt, 8 mm thick and 100 mm wide transmits power between two pulleys, running at 1600 m/min. The mass of the belt is 0.9 kg/m length. The angle of lap in the smaller pulley is  $165^\circ$  and the co-efficient of friction between belt and pulley is 0.3. If the maximum permissible stress in the belt is  $2 \text{ MN/m}^2$ . Find. 10
- (a) Maximum power transmitted
  - (b) Initial tension in the belt
6. Four masses A,B,C and D are attached to a shaft and revolve in the same plane. The masses are 12 kg, 10 kg, 18 kg and 15 kg respectively and their radii of rotations are 4 cm, 5 cm, 6 cm and 3 cm. The angular position of the masses B,C and D are  $60^\circ$ ,  $135^\circ$  and  $270^\circ$  from the mass A. Find the magnitude and position of the balancing mass at a radius of 10 cm. 10
7. Explain the working of Hartnell governor with neat sketch. 10
8. Explain the balancing of different masses revolving in the same plane. 10
9. What do you mean by Flywheel ? Explain mass M.I. of Flywheel for an IC Engine. 10
10. Write short notes of *any two* of the following. 5+5
- (a) Coefficient of fluctuation of speed.
  - (b) Centrifugal Tension
  - (c) Causes of vibration in machines.
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