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BME-056

**DIPLOMA IN MECHANICAL ENGINEERING  
(DME)/ADVANCED LEVEL CERTIFICATE  
COURSE IN MECHANICAL ENGINEERING  
(DMEVI/ACMEVI)**

**Term-End Examination, 2019**

**BME-056 : THEORY OF MACHINES**

**Time : 2 Hours**

**Maximum Marks : 70**

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**Note :** Answer any five questions. All questions carry equal marks. Use of scientific calculator allowed. Assume missing data suitably. Standard symbols and notations have usual meaning.

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1. Explain any two of the following : [2×7=14]
  - (a) Kinematic pairs
  - (b) Links and their classification
  - (c) Cycloidal Profile Teeth
  - (d) Free and Forced Vibrations

2. Explain Whitworth Quick-Return Mechanism with neat sketch. [14]



3. Two mating involute gears having 30 and 40 teeth have 8mm module. The pressure angle is  $20^\circ$ . If path of approach and path of recess are half of the maximum possible length, find addendum on each gear. [14]
4. A shaft carried a pulley of 100 cm diameter which rotates at 500 rpm. The ropes drive another pulley with a speed reduction of 2 : 1. The drive transmits 190kW. The groove angle is  $40^\circ$ . The distance between pulley centres is 2.0m. The coefficient of friction between rope and pulley is 0.20. The rope weighs 0.12 kg/m. The allowable stress for the rope is  $175 \text{ N/cm}^2$ . The initial tension in the rope is limited to 800 N. Determine : [14]
- (a) Number of ropes and rope diameter
- (b) Length of each rope
5. Explain interference in involute profile gear teeth and the measures necessary to prevent it. [14]
6. (a) A machine part having a mass of 2.5 kg vibrates in a viscous medium. A harmonic exciting force of 30N acts on the part and causes a resonant amplitude of 14mm with period of 0.22 second. Find the damping coefficient. If the frequency of

the exciting force is changed to 4 Hz, determine the increase in the amplitude of the forced vibrations upon the removal of the damper. [10]

- (b) Define underdamped and overdamped mechanical systems. [4]

7. Write short notes on **any two** of the following : [2×7=14]

- (a) Gyroscopic effect  
(b) Types of Governors  
(c) Coriolis Acceleration Component

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