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BME-056

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

00842

Term-End Examination

December, 2016

BME-056 : THEORY OF MACHINES

Time : 2 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks. Assume missing data suitably, if any. Use of scientific calculator is allowed.*

1. Explain any ***four*** of the following terms : $4 \times 3\frac{1}{2} = 14$

   (a) Sliding pair and Turning pair

   (b) Degrees of freedom

   (c) Kinematic chain

   (d) Angular acceleration

   (e) Angular momentum

2. A vertical shaft of 100 mm diameter rotating at 150 r.p.m. rests on a flat end foot step bearing. The coefficient of friction is 0·05 and the shaft carries a vertical load of 15 kN. Find the power lost in friction assuming (a) uniform pressure, and (b) uniform wear. *14*

3. (a) A belt is running over a pulley of diameter 120 cm at 200 r.p.m. The angle of contact is 165° and coefficient of friction between the belt and pulley is 0·3. If the maximum tension in the belt is 3000 N, find the power transmitted by the belt.

   (b) Derive the expression for the velocity of a belt at which maximum power is transmitted. *7+7*

4. (a) A spur gear has a module of 2 mm and its pitch line velocity is 0·6283 m/s. If the number of teeth of this spur gear is 30, find the speed of the gear. Also determine its circular pitch.

   (b) Explain in brief the law of gearing. *7+7*

5. Explain the difference between the turning moment diagram of a 4-stroke and a 2-stroke I.C. engine with suitable sketches. Also derive the expression for coefficient of fluctuation of speed. *14*

6. Explain in detail the principle and working of a Watt governor. *14*

7. Explain vibration and its effects. Also explain in detail the various types of vibration. *14*

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

   (a) Flat and V Belt Drives

   (b) Lower and Higher Pairs

   (c) Flywheel and Governor

   (d) Types of Bearings