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BIME-022

DIPLOMA – VIEP – MECHANICAL ENGINEERING (DMEVI)

Term-End Examination

00360

June, 2016

BIME-022 : POWER TRANSMITTING ELEMENTS

Time : 2 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks. Assume missing data suitably, if any.*

1. (a) Explain with sketch how the velocities of different points on a link are calculated with instantaneous centre method. 7

(b) Discuss the merits and demerits of belt, rope, chain and gear drives for the transmission of power. 7

2. (a) A solid circular shaft of diameter 'd' is subjected to a torsional moment M_t and a bending moment M_b. Find the various types of stresses induced in it. 7

(b) What is the difference between the open belt drive and crossed belt drive ? Derive the expression for the length of belt in terms of diameter of pulleys and the centre distance between them. 7

3. (a) What is the effect of initial tension in belts on maximum power transmitted by them ? 7

(b) How are different types of chains classified ? Describe with sketches. 7

4. Discuss the constructional features of ropes used for power transmission. What type of stresses are induced in wire ropes ? 14

5. Give the classification of gears.

(a) What are the various forms of gear tooth profiles ? Compare them. 7

(b) What are the desirable properties of gear materials ? Discuss the necessity and methods of gear lubrication. 7

6. (a) Discuss the different types of worms and worm gears. What are spiral and hypoid gears ? 7

(b) For a single speed spur gear drive, gear ratio is 10 : 1 and centre distance is 27·5 cm. The pinion transmits 500 HP at 1800 rpm. Assume involute teeth with standard addendum of one module and pressure angle of 22·5°. If normal tooth pressure is not to exceed 1000 kg/cm^2 of width, find : 7

(i) Diametrical pitch, if no interference

(ii) The number of teeth in each wheel

(iii) The width of pinion

7. Write short notes on the following : $4 \times 3\frac{1}{2} = 14$

(a) Types of keys

(b) Flexible bushed pin coupling

(c) Gear hobbing

(d) Types of failures in gears

8. What is the condition for the maximum power transmitted by a belt in terms of centrifugal tension and belt strength ?

A shaft which rotates at a constant speed of 160 rpm is connected by belting to a parallel shaft 72 cm apart which has to run at 60, 80 and 100 rpm. The smallest pulley on the driver shaft is 4 cm in radius. Determine the remaining radii of two stepped pulleys for

(a) a crossed belt

(b) an open belt

Neglect belt thickness and slip. *14*