B.E. Mechanical Engineering Seven Semester
# ME705 - Design of Mechanical Drives

P. Pages : 2

Time : Four Hours

GUG/W/18/1840

Max. Marks : 80

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Notes : 1. All questions carry equal marks.
2. Answer Q 1 or Q 2, Q 3 or Q 4, Q 5 or Q 6 and Q 7 or Q 8.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.
5. Use of DDB by Prof B. D. Shiwalkar is permitted.

**1.** a) State the applications of coupling and flywheel. **6**

b) Design a rigid coupling to transmit the power of 30 kW between two line shafts. The speed of shaft is 900 rpm. **14**

**OR**

**2.** a) Differentiate bet$^n$ Hydrodynamic & Hydrostatic bearings. **4**

b) Design a Journal bearing to support the generator shaft. the radial load is 4 kN. The Journal diameter is 65 mm and speed is 750 rpm. **16**

**3.** a) State & explain various stresses in belt occurring during power transmission. **4**

b) Design a flat belt drive to transmit the power of 10 kW between two line shafts. The driving line shaft is rotating at 750 rpm and driven shaft has to rotate at 250 rpm. The drive is subjected to medium shock load and operating for 24 hrs/day. **16**

**OR**

**4.** a) Compare chain drive with Belt drive. **4**

b) Design the chain drive to transmit the power of 7.5 kW from electric motor to the line shaft. The electric motor speed is 1500 rpm and the line shaft has to rotate at 500 rpm. This drive is subjected to medium shock load and it is operating for 24 hrs/day. **16**

**5.** a) State the advantages and disadvantages of worm gear drive. **4**

b) Design a helical gear drive to transmit the power of 15 kW between two line shafts. The driving line shaft is rotating at 600 rpm and driven shaft has to rotate 200 rpm. The drive is subjected to medium shock loads and it is operating for 8 hrs/day. **16**

**OR**

**6.** a) Explain the following terms related to gears. **6**
   i) Wear load
   ii) Endurance strength
   iii) Dynamic load.

1

b) Design a bevel gear drive to transmit the power of 12 kW bet$^n$ two line shafts. The driving shaft is rotating at 800 rpm and driven shaft should rotate at 200 rpm. The angle bet$^n$ the shafts is 60º. This drive is subjected to moderate shock load and operating for 8 hrs/day. **14**

**7.** a) State various types of brakes. Also state their advantages & application. **7**

b) Design a multiple plate clutch to transmit the power of 15 kW at 1500 rpm bet$^n$ J.C. Engine & line shaft. Assume suitable data. **10**

c) State the applications of plate clutches. **3**

**OR**

**8.** a) How the wire ropes are designated? **2**

b) Derive the expression to determine the bending load in wire ropes. **4**

c) Design the wire rope, sheave and Draw to lift the load of 80 kN through the height of 40 meters with maximum velocity of 30 m/min. This speed is to be achieved within 7 seconds. Assume suitable data. **14**

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