6. (a) How the bevel gears are classified? Explain with neat sketches. 8

(b) For bevel gears, define the following with neat sketches :

(i) Cone distance (ii) pitch angle (iii) Face angle (iv) Back cone distance (v) Addendum angle (vi) Crown height. 12

7. (a) What is a clutch? Why a positive clutch is used? Describe, with a help of a neat sketch, the working of a jaw clutch. 10

(b) What are the materials used for lining of friction surfaces? 3

(c) A plate clutch having a single driving plate with contact surfaces on each side is required to transmit 110kw at 1250 r.p.m. The outer diameter of the contact surfaces is to be 300 mm. The co-efficient of friction is 0.4. Assuming a uniform pressure = 0.17N/mm². determine the inner diameter of the friction surfaces. 7

8. The diameters of the driving and driven pulleys are 900 mm and 1200 mm respectively and the centre distance is 3m. The output of the driven shaft is 110 kw. Assuming : Belt speed = 21 m/s, co-efficient of friction = 0.30, slip = 1.5% at each pulley, friction loss at each shaft = 5%

BACHELOR OF PRINTING ENGG. EXAMINATION, 2012

(2nd Year, 2nd Semester)

Printing Machine Design

Time : Three hours.   Full Marks : 100

Attempt *any five* questions.

1 (a) What are the various types of fits according to Indian standard? Explain them with the help of neat diagrams. 8

(b) What is the significance of preferred number? 3

(c) Define "interchangeability" and discuss its importance. 4

(d) The dimensions of the mating parts according to basic hole system, are given as follows :

Hole : 37.500 mm Shaft : 37.470 mm

37.523 mm   37.445 mm

Find the hole tolerance, shaft tolerance and minimum allowance, maximum allowance. 5

2. (a) What are the advantages and disadvantages of thread joints? 4

(b) What do you understand by the Single Start and double Start thread? 2

(c) Define the following terms with neat sketches.

(i) major diameter (ii) minor diameter

(iii) pitch diameter (iv) pitch

(v) angle of thread (vi) lead.   8

(d) A lever loaded safety valve has a diameter of 100mm. and the blow off pressure is 1.6 N/mm^2. The fulcrum of the lever is screwed into the C.I. body of the cover. If the permissible tensile stress is limited to 50 Mpa and the leverage ratio is 8. Find the diameter of the threaded part of the fulcrum and select the size of the bolt.   6

3. (a) How the shaft is designed when it is subjected to twisting moment only?   10

(b) A shaft made of mild steel is required to transmit 100 kw at 300 r.p.m. The supported length of the shaft is 3 metres. It carries two pulleys each weighing 1500N supported at a distance of 1 metre from the ends respectively. The safe value of stress = 60N/mm^2. Draw the load diagram and determine the diameter of the shaft.   10

4. (a) Define the terms load, stress and strain. Discuss the various types of stresses and strain.   6

(b) What is meant by working stress and how it is calculated from the ultimate stress or yield stress of a material? What will be the factor of safety in each case for different types of loading?   6

(c) The piston rod of a steam engine is 50 mm in diameter and 600mm long. The diameter of piston is 400mm. and the maximum steam pressure is 0.9 N/mm^2. Find the compression of the piston rod,if the young's modulus for the material of the piston rod is 210KN/mm^2.   8

5. (a) What is the function of a coupling? What are the requirements of a good coupling?   4

(b) How do you classify couplings?   2

(c) Indicate what type of coupling is used under the following conditions :   6

(i) with shafts having collinear axes.

(ii) shafts having intersecting axes.

(iii) shafts having parallel axes with a small distance apart.

(d) Sketch a protective type flange coupling and indicate there on its leading dimensions for shaft size of 'd'. 8

Determine :

(i)   The r.p.m. of each shaft.

(ii) Difference in belt tensions.

(iii) Size of leather belt required.

(iv) The required shaft sizes, assuming pure torsion and
      an allowable stress of 56 MPa.

(v)   The overall efficiency of this transmission.

—— X ——