Roll No. .....

24258

B. Tech. 5th Semester (ME) Examination – December, 2014

MECHANICAL MACHINE DESIGN-I

Paper : ME-303-F

Time : Four hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all. Question No. 1 is ***compulsory*** and select at least ***one*** question from each Section. Design data book is permitted and assume suitable data whenever required.

1. (a) Difference between uniform pressure theory & uniform wear theory and condition how they apply on design 4

(b) Derive self locking condition of brake. 4

(c) Explain the concept of fits with sketch. 4

(d) Derive expression for co-efficient of fluctuation of energy for flywheel. 4

(e) Design of flat key. 4

SECTION – A

2. (a) Discuss preliminary design and detailed design. How to select best possible solution ? 10

(b) Discuss various types of fits and tolerances. 10

3. (a) How the material Selection is done and classify the various types Engg. Materials ? 10

(b) What is factor of safety ? Explain the factors influencing the choice of factor of safety. 10

SECTION – B

4. Design a double riveted butt joint with two cover plates for the longitudinal steam of a boiler shell, 0.70 m diameter to carry a maximum steam pressure of 1.05 N/mm^2 .The allowable stress are : f_l = 35 N/mm^2, f_s = 28 N/mm^2. Assume the efficiency of the joint 80%.

20

5. Two steel rods of equal diameter are required to join with a cotter joint. Each rod is subjected to an axial tensile force of 60 kN. Design and draw the joint specifying its main dimension. 20

SECTION – C

6. Design completely belt drive to drive a winch from an electric motor of 11 kW power. Speed of motor shaft is

750 rev/min. Belt position is horizontal and there is considerable variation of load. 20

7. Design a bushed pin type flexible coupling to transmitting 32 kw at 960 rpm, the overload torque is 20% more than mean torque. Shear stress for shaft, key & pin is same as 40 Mpa, compressive stress 80 mpa & also draw sketch. 20

SECTION – D

8. What is a Clutch ? Explain the various types of clutches in use with figure with their practical use. 20

9. Explain various types of brakes indicating the application. What is self energizing condition of brakes ? Discuss the thermal consideration in brake design. 20