| **BME-060**

DIPLOMA IN MECHANICAL ENGINEERING (DME)
Term-End Examination
00146 **December, 2014**
BME-060 : MACHINE DESIGN

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Each question carries equal marks. Use of scientific calculator and design data handbook is permitted.*

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1. (a) Explain stress-strain diagram for a ductile material. What properties can you define with the help of this diagram ? 7

   (b) Describe three stages of creep. 7

2. (a) What are the different types of joints ? Explain the causes of their failure. 7

   (b) Why are gibs used in cotter joint ? Explain the use of single and double gib with the help of sketch. 7

3. (a) Design a knuckle joint to transmit 150 N. The design stresses may be taken as 7.5 N/mm^2 in tension, 6.0 N/mm^2 in shear and 15 N/mm^2 in compression. 10

   (b) Write equations for the tensile and crushing failure of a cotter joint. 4

4. (a) Explain the procedure for designing a longitudinal and circumferential joint for a boiler. 7

(b) Explain the modes of failure of a riveted joint. 7

5. (a) List the various types of power threads giving their relative advantages and disadvantages. 7

(b) What do you understand by overhauling and self locking screws ? Show that the efficiency of self locking screw is less than 50%. 7

6. (a) What is a key ? State its function. What are the effects of keyway cut into the shaft ? 7

(b) Give the design procedure for protective type flange coupling. 7

7. (a) A mild steel shaft transmits 23 kW at 200 rpm. It carries a central load of 900 N and is simply supported between the bearing 2·5 m apart. Determine the size of the shaft, if the allowable shear stress is 42 N/mm^2 and the maximum tensile or compressive stress is not to exceed 56 N/mm^2. What size of the shaft will be required, if it is subjected to gradually applied loads ? 10

(b) When the shaft is subjected to fluctuating loads, what will be the equivalent twisting moment and equivalent bending moment ? 4

8. Write short notes on any *four* of the following : $4 \times 3\frac{1}{2} = 14$

(a) Universal Coupling

(b) Bearing material

(c) Fasteners

(d) Welded joints

(e) Quenching

(f) Alloy Steel

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