| BME-060 |

DIPLOMA IN MECHANICAL ENGINEERING (DME)

Term-End Examination

00519

June, 2015

BME-060 : MACHINE DESIGN

Time : 2 hours   *Maximum Marks : 70*

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

1. Define the following :   *7×2=14*

    (a) Ductility

    (b) Toughness

    (c) Creep

    (d) Normalising

    (e) Tempering

    (f) Coupling

    (g) Joint

2. (a) Compare the stress-strain curve for ductile
        material and brittle material.   7

(b) Select suitable materials for the following cases, indicating the reason : $2 \times 3\frac{1}{2} = 7$

   (i) Nut of a heavy duty screw jack

   (ii) Low speed line shaft coupling

3. Discuss the design procedure of spigot and socket cotter joint. 14

4. Design a protective type of cast iron flange coupling for a steel shaft transmitting 15 kW at 200 rpm and having an allowable shear stress of 40 N/mm². The working stress in the bolts should not exceed 30 N/mm². Assume that the same material is used for shaft and key and that the crushing stress is twice the value of its shear stress. The maximum torque is 25% greater than the full load torque. The shear stress for cast iron is 14 N/mm². 14

5. (a) What do you mean by torsional rigidity and lateral rigidity ? Explain. 7

   (b) How is the shaft designed when it is subjected to twisting moment only ? 7

6. (a) Show by neat sketches the various ways in which a riveted joint may fail. 7

   (b) A plate 10 cm wide and 1 cm thick is to be welded to another plate by means of double parallel fillets. The plates are subjected to a static load of 80 N. Find the length of the weld, if the permissible stress in the weld does not exceed 5·5 N/mm². 7

7. Derive an equation for the torque required to raise load on square threaded screws. *14*

8. Write short notes on any *four* of the following : $4\times3\frac{1}{2}=14$

   (a) Self Locking Screws

   (b) Caulking and Fullering

   (c) Oldham Coupling

   (d) Riveted Joint

   (e) Elastic Constants

   (f) Alloy Steel