No. of Printed Pages : 4

BME-060

DIPLOMA IN MECHANICAL ENGINEERING (DME)

00840

Term-End Examination

June, 2014

BME-060 : MACHINE DESIGN

Time : 2 hours *Maximum Marks : 70*

Note : *Question no. 1 is* ***compulsory****. Attempt* ***five*** *questions from the remaining. Use of scientific calculator and Machine Design Data book is allowed.*

1. Select the most appropriate alternative among the four responses and write the same in your answer book : *10×2=20*

(a) Toughers of a material is characterised by

(i) ductility

(ii) brittle nature

(iii) resistance to fracture

(iv) malleability

(b) Grey cast iron contains carbon in the form of

(i) Cementite

(ii) Martensite

(iii) Ferrite

(iv) Graphite flakes

(c) Elastic constants are dependent on

(i) material and not sample

(ii) shape of the sample

(iii) strain rate and temperature

(iv) Both (i) and (iii)

(d) Yield strength is an indicator of

(i) beginning of plastic deformation

(ii) strain hardening

(iii) attaining of the UTS

(iv) None of the above

(e) Hardness of a material is a measure of its

(i) resistance to wear

(ii) ductility

(iii) elastic limit

(iv) ability to withstand shock

(f) Creep is influenced by

(i) temperature

(ii) material

(iii) time

(iv) All these three factors

(g) The carbon percentage in low carbon steel is

(i) less than 0·27%

(ii) between 0·27% to 0·57%

(iii) greater than 0·57%

(iv) greater than 2%

(h) Annealing is carried out to

(i) impart hardness

(ii) relieve stress

(iii) increase strength

(iv) increase wear resistance

(i) Buttress threads are used to withstand

(i) axial loads

(ii) radial loads

(iii) twists

(iv) cyclic loads

(j) The key used in tapering shaft ends is

(i) saddle key

(ii) feather key

(iii) woodruff key

(iv) gib head key

2. Explain giving equations how the eye diameter and thickness of fork are determined for a Knuckle joint. *10*

3. Give examples for eccentrically loaded welded joints. How are they analysed ? Explain. *10*

4. Sketch and explain three types of thread fasteners. Also describe different types of head shapes used in them. *10*

5. Design a rectangular key for a shaft of 50 mm diameter. The shearing and crushing stresses for the key material are 42 MPa and 70 MPa. *10*

6. Using neat sketches explain any five types of shafts. Also give application for each. *10*

7. A hollow shaft with diameter ratio 0·7 is required to transmit 500 kW at 300 rpm with a uniform twisting moment. Allowable shearing stress is 60 N/mm^2 and twist in 20 m length is not to exceed 1 degree. Calculate the minimum external diameter and internal diameter of the shaft satisfying these conditions and find actual value. $G = 8{\cdot}2 \times 10^4$ N/mm^2. *10*