No. of Printed Pages : 4 682 BME-060

DIPLOMA IN MECHANICAL ENGINEERING (DME)

Term-End Examination, 2019

BME-060 : MACHINE DESIGN

Time : 2 Hours] **[Maximum Marks : 70**

Note : Answer **any five** questions in all. **Q.no.1** is **compulsory.**
Use of Scientific calculator is permitted.

1. Choose the correct answer : [7x2=14]

(a) The carbon percentage in High Carbon Steel is :

(i) More than 0.5%

(ii) Less than 0.5%

(iii) 5%

(iv) 2.5%

(b) Ductility is measured by :

(i) Percentage reduction

(ii) Percentage elongation

(iii) Both (i) and (ii)

(iv) Change in diameter

(c) For ductile materials, allowable Stress(σ) is given by :

(i) σ = Yield strength / factor of safety

(ii) σ = Failure stress / allowable stress

(iii) σ = Tensile strength / factor of safety

(iv) σ = Failure load / working load

(d) For Grey Casttron modulus of rigidity in N/mm^2 is :

(i) 10,000 N/mm^2 (ii) 20,000 N/mm^2

(iii) 30,000 N/mm^2 (iv) 40,000 N/mm^2

(e) The threads are self locking, therefore threaded joints can be placed in :

(i) Horizontal Position

(ii) Vertical Position

(iii) Inclined Position

(iv) All Position

(f) When shaft is subjected to axial tensile force, the tensile stress is given by :

(i) $\sigma_t = \frac{P}{\pi d^2}$

(ii) $\sigma_t = \frac{2P}{\pi d^2}$

(iii) $\sigma_t = \frac{4P}{\pi d^2}$

(iv) $\sigma_t = \frac{6P}{\pi d^2}$

(g) Addition of Molybdenum increases :

(i) Only hardness

(ii) Only wear resistance

(iii) Only strength

(iv) Hardness and wear resistance

2. Explain the properties of Engineering Materials. Give suitable examples. [14]

3. Write about, four types of Case Hardening of steels.[14]

4. An electric motor weighing 10KN is lifted by means of an eye bolt of dia(d), which is screwed into frame of the motor. The eye bolt has coarse threads. It is made of plain carbon steel 30c8 (S_{yt} = 400 N/mm²) and the factor of Safety is 6. Determine size of the bolt. [14]

5. A circular shaft, 50mm in diameter is welded to the support by means of circumferential fillet weld. It is subjected to torsional moment of 2500 N-m. The permissible shear stress in the weld is limited to 140 N/mm^2. Determine the size of the weld. [14]

6. The standard cross-section for a flat key, fitted on a 50mm diameter shaft is, 16x10mm. The key is transmitting 475N-m torque from the shaft to the hub. The key is made of commercial steel ($S_{yt} = S_{yc} = 230$ N/mm^2). Determine the length of key, if factor of safety is 3. [14]

7. Answer **any two** of the following : [2x7=14]

   (a) Stress-Strain diagram of Ductile materials.

   (b) Types of Plain carbon, Steels and their properties with composition.

   (c) Forms of different threads with advantages.

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