24258

B. Tech. 5th Semester (F) Scheme (ME) Examination,

December–2018

MECHANICAL MACHINE DESIGN–I

Paper–ME-303-F

Time allowed : 4 hours]   *[Maximum marks : 100*

Note :   *Question* **one** *is compulsory and attempt* **one**

question from each section.

1.   (a)   Mechanical properties of metals

       (b)   F.O.S.

       (c)   Basic procedure of Machine design

       (d)   Fits. $4 \times 5 = 20$

Section–A

2.   Design and draw a cotter joint to transmit to KV. The design stresses may be taken as 70 MPa in tension; 80 MPa in shear; 135 MPa in crushing.

     $P = 70$ KN; $\sigma_t = 70$ MPa; $\tau = 80$ MPa; $\sigma_c = 135$ MPa.

                                         20

3.   Design and drawn a knuckle joint to transmit 160 kN. The design stresses may be taken as 85 MPa in tension; 70 MPa in shear; 160 MPa in crushing.

     $P = 160$ KN; $\sigma_t = 85$ MPa; $\tau = 70$ MPa; $\sigma_c = 160$ MPa.

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Section–B

4. (a) Types of keys

   (b) Muff Coupling

   (c) Flange coupling. 　　　　20

5. Design a cost iron protective type flange coupling to transmit 15 kw at 900 rpm from an electric motor to a compressor. The service factor may be asumed as 1.35. The following permissible stress may be used.

   Shear stress for shaft. bolt and key material = 40 MPa

   Crushing stress for bolt and key = 80 MPa

   Shear stress for cast iron = 8 MPa

   Draw a neat sketch of coupling. 　　　　20

Section–C

6. Design and draw all types of clutches :

   (a) Single plate clutch

   (b) Multiplate clutch

   (c) Cone clutch

   (d) Centrifugal clutch. 　　　　20

7. A flywheel of mass 100 kg and radius of gyration, 350 mm is rotating at 720 r.p.m. It is brought to rest by means

kg. The break drum is made of cast iron FG 260 having specific heat 460 J/kg°C. Assuming that the total heat generated is absorbed by the brake drum only. calculate the temperature rise. 　　　　20

8. Explain the design consideration of casting. forging and machining with neat diagram. 　　　　20

9. (a) Fatigue and endurance limit

   (b) Stress concentration factor

   (c) Notches sensitivity

   (d) Fatigue stress concentration factor. 　　　　20