

# 17553

**11920**

**4 Hours / 100 Marks**

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.
  - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any FIVE of the following :** **20**
- a) State the general machine design procedure.
  - b) State the different types of shaft which are used for transmission of power.
  - c) State any four advantages of welded joints.
  - d) Draw the different types of Rivet heads. (Any four)
  - e) Describe the bolts of uniform strength.
  - f) List different types of pipe joints.
  - g) Define perfect frame and imperfect frame.

P.T.O.

- 2. Attempt any FOUR of the following :** **16**
- a) Draw Stress-Strain diagram for a ductile material showing all the important points.
  - b) State the effect of keyway on the strength of shaft.
  - c) Define Welding. State its any two disadvantages.
  - d) Describe the process of Caulking.
  - e) List and draw various types of screw threads.
  - f) Describe the method of sections used for analysis of framed structure.
- 3. Attempt any TWO of the following :** **16**
- a) A plate 100 mm wide and 10 mm thick is joined with another steel plate by means of single transverse and double parallel fillet weld. The permissible tensile and shear stress in weldment are 75 MPa and 56 Mpa respectively. Determine the required length of each fillet weld.
  - b) A line shaft is rotating at 200 rpm transmitted a power of 20 Kw. The shaft may be assumed to be made up of mild steel with an allowable shear stress of 42 N/mm<sup>2</sup>. The bending moment is 1000 N.m. Find the Suitable diameter of shaft.
  - c) Define factor of safety. State any six factors affecting selection of FOS.

4. Attempt any TWO of the following :

16

- Explain design procedure for an Axially loaded unsymmetrical welded joint.
- Find the forces in all the members of the truss as shown. Use method of joint Refer Figure No. 1.

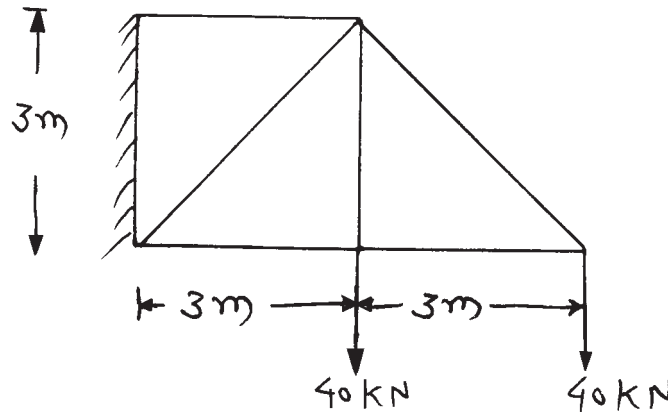


Fig. No. 1

- Give the detailed design procedure of a circular flanged pipe joint.

5. Attempt any TWO of the following :

16

- Find the forces in all the members of the truss as shown by using method of joints. Refer Figure No. 2.

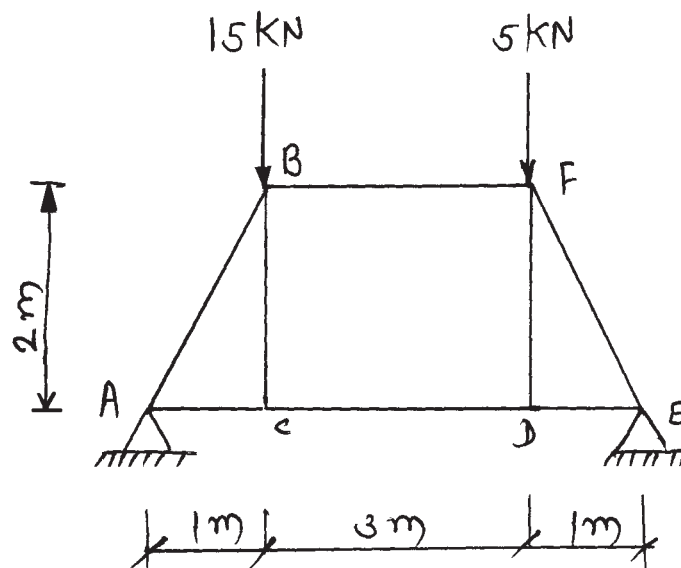


Fig. No. 2

- b) It is required to design split muff coupling to transmit 50Kw power at 120 rpm. The shaft, key and clamping bolts are made of plain carbon steel 30 C8. The number of clapping bolt are 8. The coefficient of friction between the sleeve halves and shaft is 0.3. Take  $\sigma_t = 80 \text{ N/mm}^2$  &  $\tau = 40 \text{ N/mm}^2$ .
- c) (i) Designate the following material FeE300 & 45C8.  
(ii) Describe the method of riveting.

**6. Attempt any FOUR of the following :**

**16**

- a) State any four advantages of standardization.
- b) State the materials used for shaft.
- c) A solid shaft is transmitting 1 MW at 240 rpm. Determine the diameter of shaft, If the maximum torque transmitted exceeds. The mean torque by 20%. Take the maximum allowable shear stress as  $60 \text{ N/mm}^2$ .
- d) Define the terms associated with riveted joints.
- e) Determine the safe tensile load for bolts of M20 & M36. Assume the bolts are not initially stressed and take safe tensile stress as 200 Mpa.
- f) (i) State any two advantages of screwed joints.  
(ii) Draw a neat sketch of Fullering process.
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