17553

16172

4 Hours / 100 Marks Seat No. | | | | | | | | |

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.

Marks

1. Attempt any FIVE of the following: **20**

a) Describe the procedure of machine design.

b) State the different sizes of shaft.

c) State and draw any two welded joints.

d) Draw the different types of screw threads.

e) State and sketch the different types of rivetted heads.

f) Define.

(i) Perfect Frame

(ii) Ductility

g) Define factor of safety. State any two factors which affects selection of FOS.

h) Describe the process of caulking.

Marks

2. Attempt any TWO of the following: **16**

a) A mild steel shaft is supported in two bearing 1 m apart and transmits 15 kw at 300 rpm to a pulley of 200 mm diameter at a dist of 300 mm from the left hand bearing. The belt passing over the pulley is vertical and ratio of belt tension is 2% pulley weighs 500 N. Design the diameter of shaft by any one theory. Take $\delta t = 70$ N/mm^2 and $\tau = 56$ N/mm^2.

b) Draw and explain stress - strain diagram for ductile material.

c) State any four advantages and disadvantages of welded joints.

3. Attempt any TWO of the following: **16**

a) Find out the forces in the various members of truss as loaded in Fig. No. 1 by method of joints. Tabulate the result.

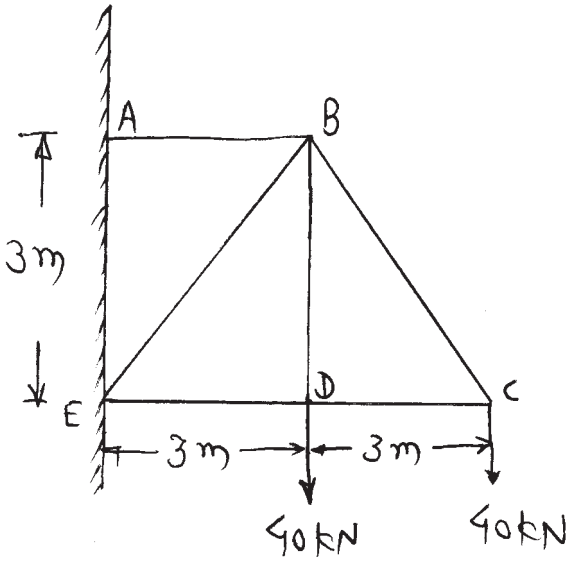

Fig. No. 1

b) Give the detailed design procedure for circumferencial lap joint for a boiler.

c) (i) What is stress concentration? State any two remedies for it.

(ii) State the methods of rivetting with neat sketch.

Marks

4. Attempt any TWO of the following: **16**

a) When method of sections is preferred over method of joints? Explain method of sections with suitable example, which is used for analysis of framed structure.

b) Explain in detail design procedure of sunk key.

c) Explain detail design procedure for circular flanged pipe joint.

5. Attempt any TWO of the following: **16**

a) Determine the forces in all members of the following trusses as shown in Fig. No. 2.

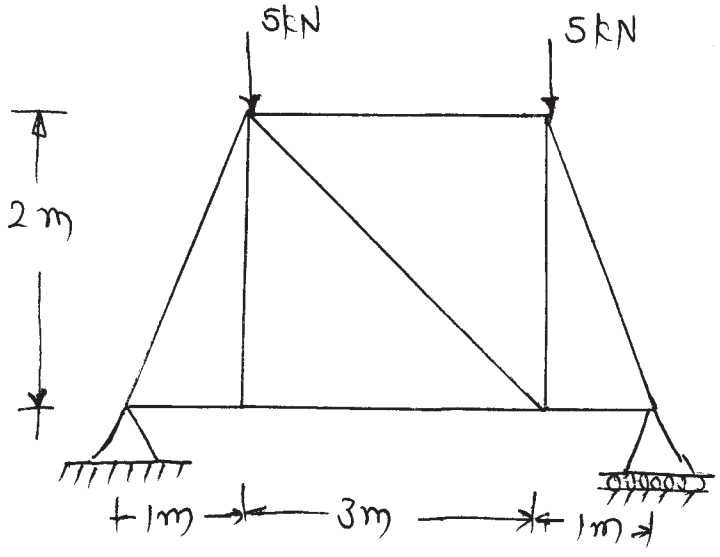

Fig. No. 2

b) A plate 75 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 weld are 70 MPa and 50 MPa respectively. Find the length of each parallel if the joint is subjected to static load of 55 kN.

c) (i) State the effect of keyway on the strength of shaft.

(ii) Draw a neat sketch of double rivetted lap joint and single rivetted single strap butt joint.

Marks

6. Attempt any FOUR of the following: **16**

a) Describe any two stresses to be considered while designing pipes and pipe joints.

b) Explain the different types of locking devices.

c) What is key ? State the function of key.

d) What are the assumptions made in the design of welded joint.

e) State the general design consideration of machine design.

f) Draw a neat sketch of protective type flange coupling.
