

2017

STRUCTURES-VI

Paper : ENG 6.5

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. (A) Choose the correct answer from any of the choices given : $2 \times 5 = 10$
- (i) The permissible stress to which a structural member can be subjected to is known as
- a) Bearing stress
 - b) Working stress
 - c) Tensile stress
 - d) Compressive stress.

(ii) The gross diameter of a rivet is the diameter of

- a) Rivet before driving
- b) Rivet after driving
- c) Rivet hole
- d) Rivet head.

(iii) Maximum permissible slenderness ratio of a tension member in which a reversal of direct stress occurs due to loads other than wind or seismic force is

- a) 350
- b) 250
- c) 180
- d) 300.

(iv) A fillet weld whose axis is parallel to the direction of the applied load is known as

- a) Diagonal fillet weld
- b) End fillet weld
- c) Side fillet weld
- d) Effective fillet weld.

(v) The rivets which are heated and then driven in the weld are known as

- a) Power driven shop rivets
- b) Power driven field rivets
- c) Hand driven rivets
- d) Cold driven rivets.

(B) Fill in the blanks : 2×5=10

(i) The minimum pitch for a rivet of diameter 'd' is

(ii) A structural member subjected to tensile force in a direction parallel to its longitudinal axis is generally known as a member.

(iii) A tension member is designed on the basis of area.

(iv) For a fillet welt of size 's' the throat thickness is given by

(v) The nominal diameter of a rivet is given by the formula $d = \dots\dots\dots$

2. (A) Draw the various zones of a typical weld and level it.
- (B) What are the functions of the coating on the electrodes? $10 \times 2 = 20$
3. (A) What is structural steel? What are the advantages and disadvantages of steel sections?
- (B) What are the various types of welded joints? Explain with diagram. $10 + 5 = 15$
4. A double riveted double cover butt joint is used to connect plates 12mm thick. Using Unwin's Formula, determine, the diameter of rivets, rivet value, gauge and efficiency of joint. Adopt the following stresses :
- Working stress in shear in power driven rivets = 100N/mm^2 .
 - Working stress in bearing in power driven rivets = 300N/mm^2 .
 - For plates working stress in axial tension = $0.6f_y$, $f_y = 260\text{N/mm}^2$.

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5. A column of ISHB 450 @ 87.2kg/m carried an axial load of 600kN and a moment of 50kN-m in the plane of the web. Design the base of the column with attached base plate. Take allowable bearing pressure on footing as 4N/mm^2

If the allowable bearing capacity of the soil is 150kN/m^2 , find the size of the bed block. 15

6. A rolled steel beam ISLB 550 @ 0.846kN/m carrying a total load of 35.000kg uniformly distributed is connected to a column ISWB 250 @ 0.4012kN/m . Design the connection. 15

