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BCE-032

01084

Diploma in Civil Engineering DCLE(G)
Advanced Level Certificate Course in Civil Engineering
DCLEVI/ACCLEVI

Term-End Examination

June, 2013

BCE-032 : THEORY OF STRUCTURES-I

Time : 2 hours *Maximum Marks : 70*

Note : *Question number 1 is **compulsory**. Attempt **any four** questions from the remaining. In all solve **five** questions. Assume suitable data wherever necessary and mention it. **Use** of calculator and steel tables is **permitted**.*

1. Choose the most appropriate answer from the following alternatives in each case. **7x2=14**

(a) The maximum pitch in the direction of the stress in a rivetted joint for compression member is :

(i) 2.5 d

(ii) 16t or 200 mm whichever is less.

(iii) 4t+100

(iv) 12t or 200 mm whichever is less.

(b) When two plates are placed end to end and are joined using cover plates on either side. The joint is known as.

(i) Lap joint (ii) Butt joint

(iii) Chain riveted lap joint

(iv) Double cover Butt joint

(c) The throat thickness in a fittet weld is :

(i) perpendicular distance from the root to hypoteneuse

(ii) longer side of the triangle of the fillet

(iii) shorter side of the triangle of the fillet

(iv) the length of the hypoteneuse of the triangle of the fillet.

(d) The minimum size of the fillet weld is :

(i) 1mm (ii) 2mm

(iii) 3mm (iv) 5mm

(e) Lacings or battens in built up columns are designed for a transverse shear of :

(i) 1.5% of the axial load

(ii) 2.0% of the axial load

(iii) 2.5% of the axial load

(iv) 3.0% of the axial load

(f) The maximum bending moment in a purlin of a roof truss may be taken as :

(i) WL/6 (ii) WL/8

(iii) WL/10 (iv) WL/12

(g) If 'd' is the clear depth of web between the roots to fillets and 't' w is the web thickness, the slendevness ratio of steel beams for checking web buckling is given by :

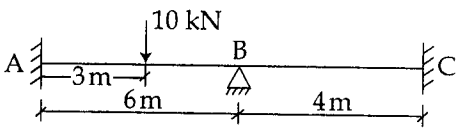
(i) d/t_w (ii) $\sqrt{d/t_w}$

(iii) $d\sqrt{3}/t_w$ (iv) $d\sqrt{2}/t_w$

2. (a) State the Moment Area Theorems. 4

(b) A fixed beam AB of span 10m carries a point load of 10kN at 7m from the left hand support. Using moment area theorem analyse the beam and draw the bending moment and shear force diagrams. 10

3. Analyse the continuous beam shown below and draw the bending moment and shear force diagrams. The beam has constant EI throughout. 14



4. A simply supported beam AB of span 9m is loaded with point load of 36kN at a distance of 6m from the left hand support A. EI for the beam is constant and is equal to 6000 kN-m^2. Using the moment area theorems. Calculate the slopes at supports and deflection at the centre. 14

5. (a) Mention with the help of neat sketches, the various types of tension member a roof truss can be provided with by means of neat sketches. 7

(b) A tension member in a roof truss carries a tensile force of 25kN. The effective length of the member is 2 metres. Using steel of grade f_y=250MPa design a suitable rod which can be used as a tension member. 7

6. (a) Mention the various types of welds used in steel structures with help of sketches. **4**

(b) A 6mm thick angle section is connected to a 10mm thick gusset plate by means of fillet weld. The angle is subjected to a tensile force of 55kN. Design the welded joint and draw the neat sketch of the joint. The permissible stress in fillet weld is $110N\backslash mm^2$. The effective length of the member may be assumed as 3.0m. **10**

7. A masonary dam is 8m high and 2m wide at the top and 6m wide at the base. It retains water to a depth of 7.0m. The water face of the dam is vertical. Calculate maximum and minimum stresses at the base. The weight of masonary is $23.0kN/m^3$. Also calculate the factor of saftey against sliding if the coefficient of friction between the soil and the dam base is 0.6. **14**

8. Write short notes on ***any four*** of the following :

(a) Advantages and disadvantages of welding

(b) Strength and efficiency of riveted joints

(c) Properties of Influence Lines **4x3½=14**

(d) Loads on roof trusses.

(e) Biaxial bending of Beams

(f) Web crippling of I-beams

(g) Pratt Truss.
