

**B.TECH. SEM -V (CIVIL ) 2014 COURSE (CBCS) : SUMMER -  
2018**

**SUBJECT : STRUCTURAL ANALYSIS – II**

Day : **Thursday**  
Date : **24/05/2018**

**S-2018-2332**

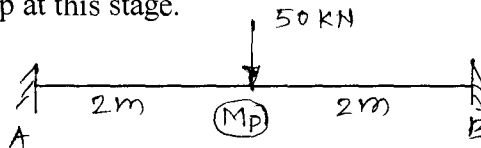
Time : **10.00 AM TO 01.00 PM**  
Max. Marks : 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Assume suitable data if necessary.

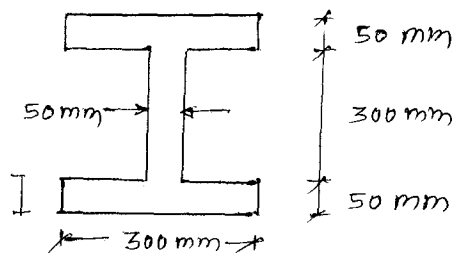
**Q.1 a)** What is plastic hinge? How it is developed? [05]

**b)** A beam is subjected to ultimate load as shown in figure. Calculate plastic moment capacity  $M_p$  at this stage. [05]

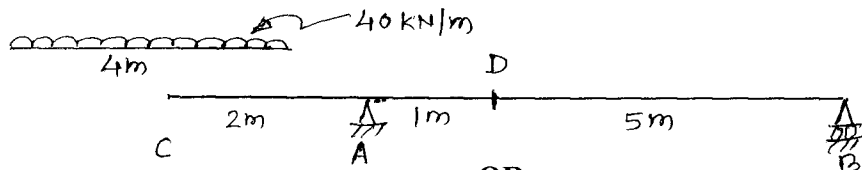


**OR**

Find out plastic moment capacity of the cross section shown in figure. Take yield stress in tension and compression as  $250 \text{ N/mm}^2$ . [10]

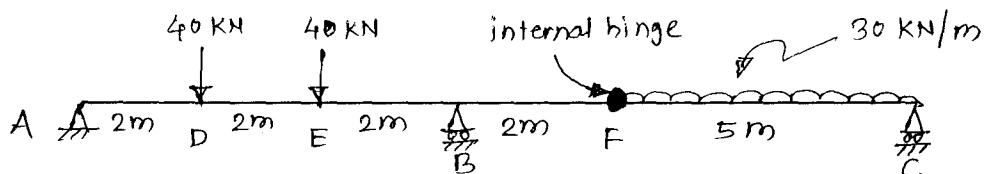


**Q.2** Draw an ILD and calculate maximum values for support reactions, shear force and bending moment at 'D' for the beam shown in figure; If an udl of length 4 m moves over the beam from left to right side. [10]

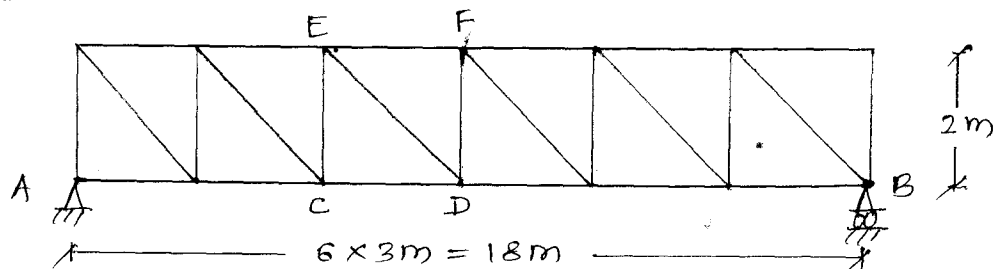


**OR**

A beam is subjected to loading as shown in figure. Calculate support reactions, shear force and bending moment at D using concept of an ILD. [10]



**Q.3** An udl of  $60 \text{ kN/m}$  of length  $20 \text{ m}$  moves over truss shown in figure. Find out maximum tension and compression force developed in the members CD, ED and EF. [10]



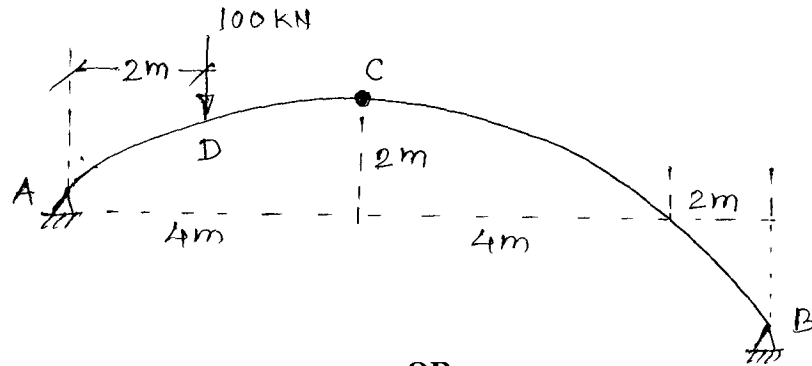
**OR**

Two point loads  $100 \text{ kN}$  followed by  $60 \text{ kN}$ , having  $2 \text{ m}$  distance between them moves from left side to right side on the truss shown in figure (shown in Q.3). Find out maximum tension and compression force developed in members CD, ED and EF. [10]

**P.T.O.**

**Q.4 a)** What is structural difference between beam, three hinged arch and two hinged arch? [05]

**b)** A three hinged parabolic arch is loaded as shown in figure. Calculate support reactions. [05]

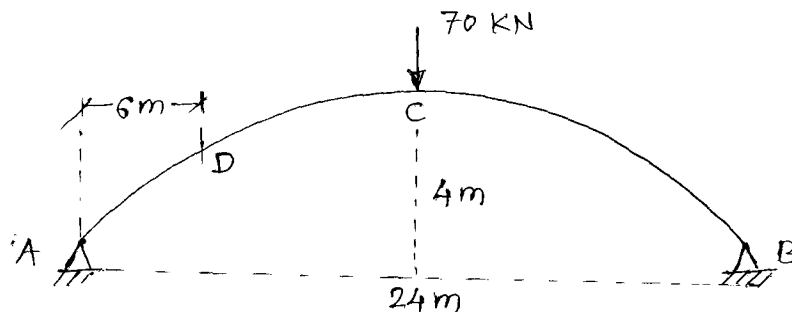


OR

A three hinged arch of span 30 m and rise 6 m carries an udl of 50 kN/m over right half portion. Calculate horizontal thrust and maximum values of positive and negative bending moment and their location. [10]

**Q.5 a)** A two hinged parabolic arch of span ' $l$ ' and rise ' $h$ ' is subjected to an udl of ' $w$ ' per meter over whole span. Show that horizontal thrust developed is  $wl^2/8h$ . [05]

**b)** A two hinged arch is loaded as shown in figure. Calculate bending moment at 6 m from left support. [05]



OR

A two hinged parabolic arch is loaded as shown in figure. Calculate normal thrust and radial shear at D. (Refer above arch in Q.5 b) [10]

**Q.6 a)** How will you select suitable approximate method for analysis? [05]

**b)** State and explain assumptions made in cantilever method of analysis. [05]

OR

Analyse the frame shown in figure using portal method. [10]

