S.E. / Civil / Sem-IV / CBCGS / R-19 / 'C' Scheme / Sub:- SA / S.H. 2024
Date:- 04.12.2024
QP. Code:- 10067854

**Duration: 3 Hours.**

[Total Marks:80]

NOTE:

- **Question No. 1 is compulsory.**
- **Attempt any Three out of the remaining five questions.**
- **Figure to the right indicates full marks. Draw neat sketches wherever necessary.**
- **Assume suitable data wherever required.**

**Q.1** Answer **any four** from the following. **20**

(a) Two-wheel loads 20kN and 50kN spaced at 3m apart, move on a girder of span 15m. Find the maximum bending moment at a section 6m from the left end. Any wheel load can lead the other. **05**

(b) A three hinged parabolic arch is hinged at A,B and C. Rise for arch AC is 4 m and for BC is 6 m. Arch AC carries udl of 16 kN/m and arch BC carries load of 40 kN at 10 m from B as shown. Total span of arch is 40 m Determine reactions and horizontal thrust. **05**
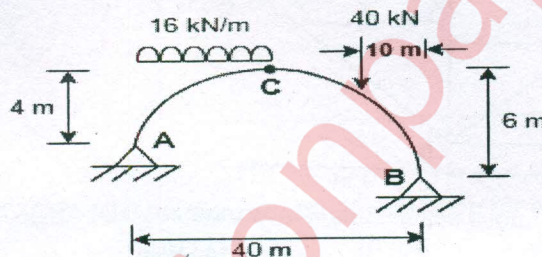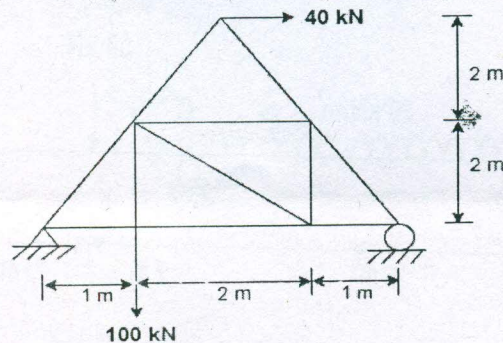

(c) Explain perfect frame, deficient frame and redundant frame showing sketches. **05**

(d) Draw BMD for the following propped cantilever beam using Moment Distribution method. **05**
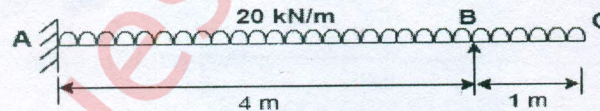
(e) Find the shape factor for a solid circular section of diameter D. **05**

Q.2 (a) Find the forces in members of pin-jointed frame as shown. **12**

(b) State the static and kinematic indeterminacy of structures given below:
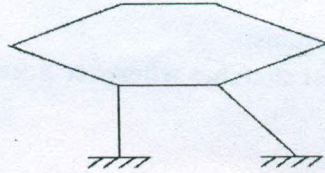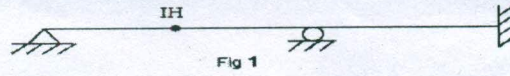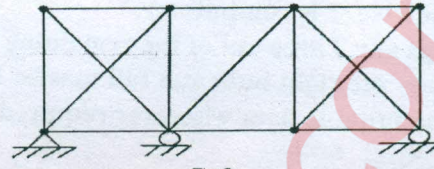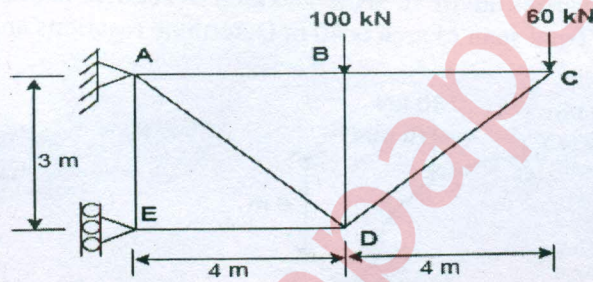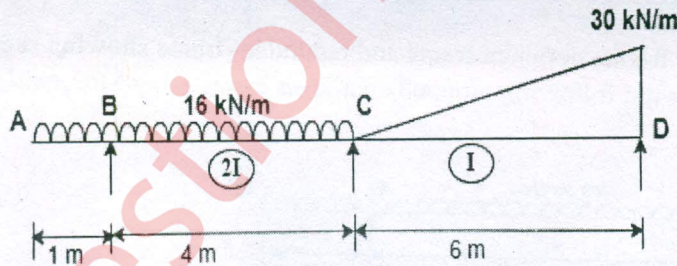IH = Internal Hinge

Fig 1

Fig 2

Fig 3

06

(c) State the limitation of Clapeyron's theorem.

02

Q.3 **(a)** Determine the vertical deflection of joint **C**, for a pin jointed frame as shown, cross-sectional area of all members are equal and take E = 200 GPa.
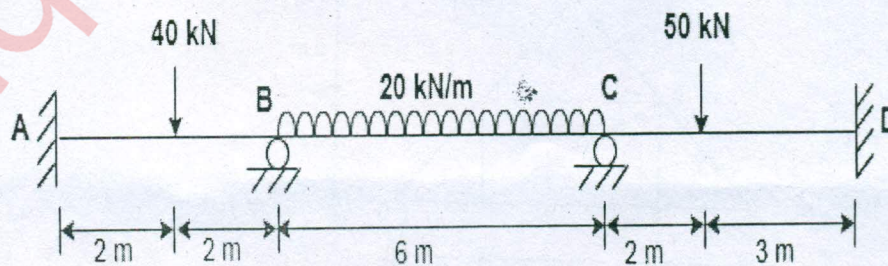

10

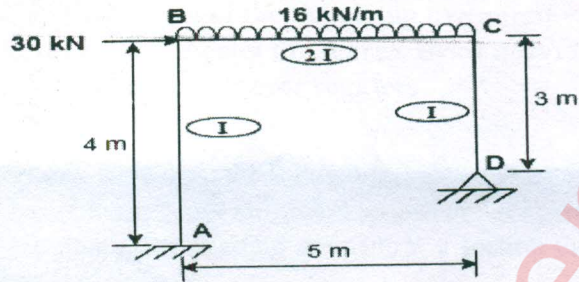**(b)** Draw the BMD for a continuous beam using Three moment Clapeyron's theorem

10

Q.4 **(a)** A continuous beam ABCD is loaded as shown. The support B sink by 10 mm. Draw BMD, Use moment distribution method. Take E = 200 X 10^6 kN/m^2 and I = 100 X 10^6 mm^4
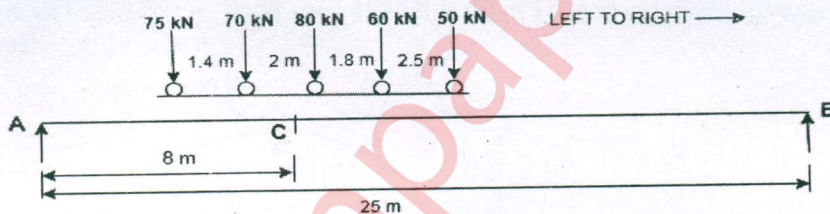

12

(b) A three hinged symmetric parabolic arch has span 40 m and a central rise 6 m. it is loaded with udl of 16 kN/m on left half span and 60 kN at 15 m from right support.. Calculate Normal Thrust and Radial Shear at 12 m from left support. **08**

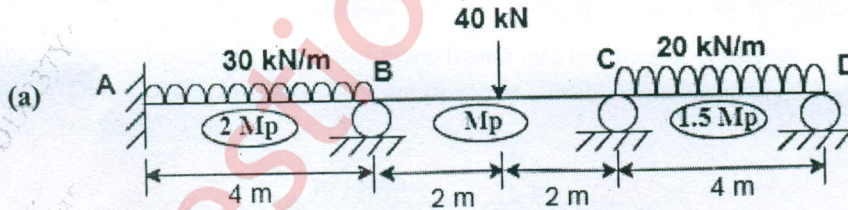**Q.5 (a)** Analyse the frame as shown in the figure using Flexibility method. **12**

(b) The wheel loads as shown in the figure moves over a girder of 25m. Find the maximum bending moment at 8 m from the left end. **08**
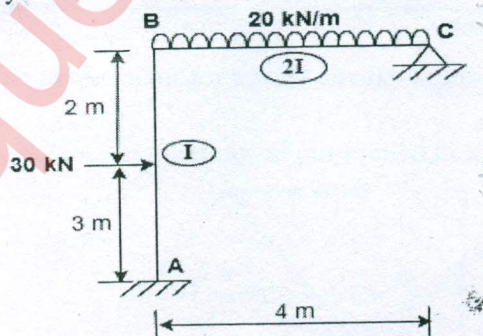
Q.6 Determine the Plastic moment of resistance for a continuous beam as shown. **10**

(a)

(b) Analyse the frame as shown in the figure by Stiffness method. **10**