SE(CIVIL) / SEM-IV / R-19 / SA / 20.05.22 (E)

University of Mumbai

Examinations Summer 2022 QP CODE: 93379

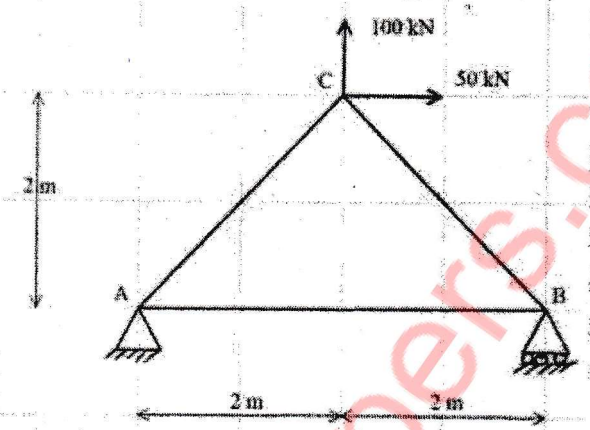
Program: **Civil Engineering**

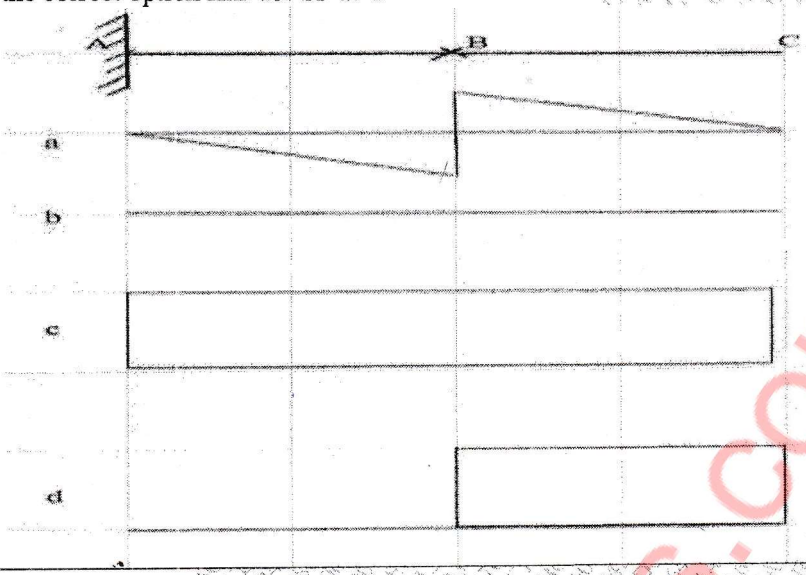
Curriculum Scheme: Rev – 2019, C Scheme

Examination: SE Semester IV

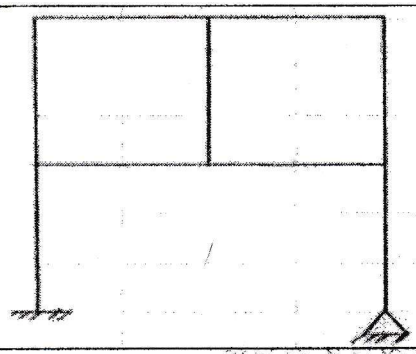
Course Code: CEC 402 and Course Name: Structural Analysis

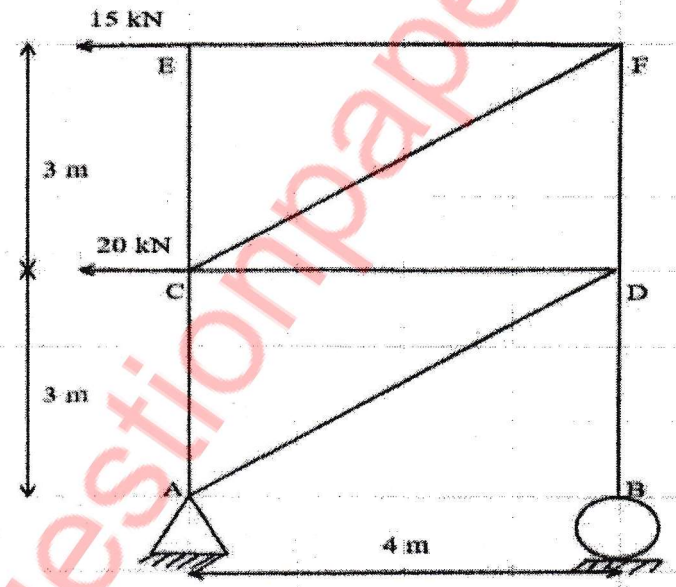
Time: 2 hour 30 minutes Max. Marks: 80

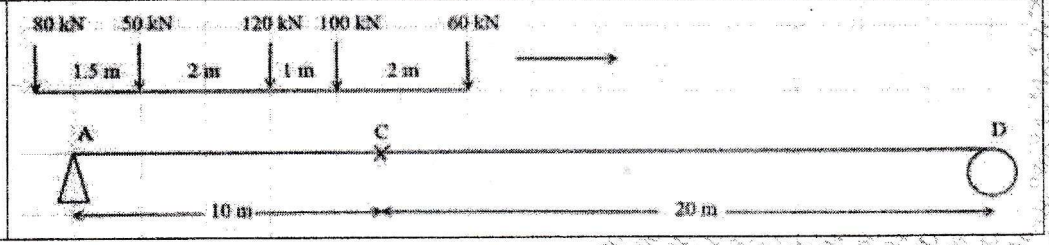
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Force in member BC= 
Option A:	35.35 kN (C)
Option B:	35.35 kN (T)
Option C:	17.68 kN (C)
Option D:	17.68 kN (T)
2.	A 3-hinged symmetrical parabolic arch is subjected to a UDL of (w/unit run) overthe entire span. The bending moment at quarter span is
Option A:	$wl^2/8$
Option B:	$wl^2/12$
Option C:	Zero
Option D:	$wl^2/24$
3.	Shape factor for the triangular cross section of beam of base 'b' and height 'h' is
Option A:	3.34
Option B:	2.34
Option C:	1.69
Option D:	3.69
4.	The ratio of stiffness of any member to that of total stiffness of all members meeting at a joint is called
Option A:	stiffness factor
Option B:	distribution factor
Option C:	rotation factor
Option D:	carry over factor
5.	What is B.M. diagram Area for Simply supported beam of span 5m and carrying UDL 12KN/m?
Option A:	125
Option B:	37.5
Option C:	150

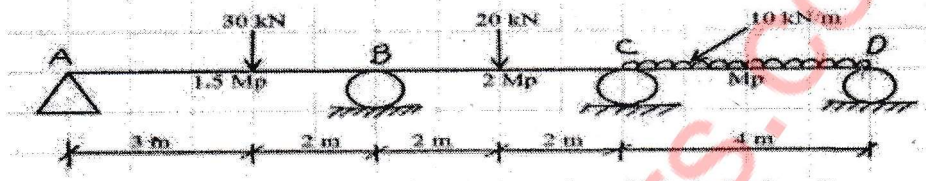
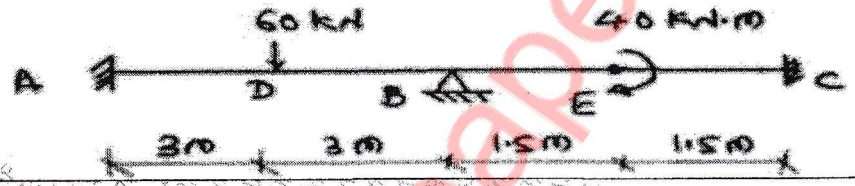
Option D:	50
6.	Choose the correct option ILD for SF at C 
Option A:	a
Option B:	b
Option C:	c
Option D:	d
7.	For a propped cantilever beam with udl over entire span plastic moment capacity will be
Option A:	$\frac{wL^2}{8}$
Option B:	$\frac{wL^2}{11.656}$
Option C:	$\frac{wL^2}{12}$
Option D:	$\frac{wL^2}{16}$
8.	Static and Kinematic indeterminacy for the structure given below 
Option A:	0 & 6
Option B:	1 & 5
Option C:	2 & 4
Option D:	1 & 5
9.	Static and Kinematic indeterminacy for the structure given below

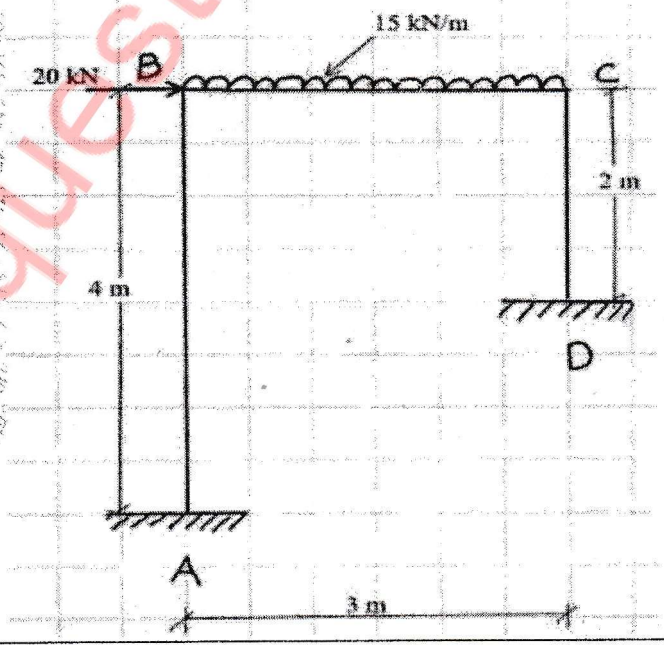
64A6AB6403A4A6CB48000E1337CB604D

	
Option A:	08 & 10
Option B:	09 & 09
Option C:	10 & 08
Option D:	09 & 10
10.	Any member of a pin jointed plane truss is subjected to
Option A:	shear force only
Option B:	bending moment only
Option C:	shear force and bending moment only
Option D:	axial force only

Q2.	**Solve any Two Questions out of Three** **10 marks each**
A	Determine the forces in all members for a fig shown below 
B	A 3-hinged symmetrical parabolic arch ACB has a span of 40 m. It has a central riseof 6 m. Two hinges are at the left support A & right support B. At crown C, there is an internal hinge. Left part AC carries a UDL of 10 kN/m. At crown C, there is a downward point load of 20 kN. Calculate radial shear, normal thrust & bending moment at 3 m from the left hinge A.
C	A simply supported girder AB of span 30 m is traversed by a system of wheel load in figure given below. Calculate i. Maximum BM at section "C" 10 m away from the left support ii. Location and magnitude of absolute maximum BM

Q3	Solve any Two Questions out of Three 10 marks each
A	A portal frame ABCD has left end A hinged & right end D roller-supported. The height of the frame is 6 m. The left vertical column AB carries a point load of 20 kN(from left to right) at mid-point E. Beam BC of length 5 m. carries a UDL of 10 kN/m on its entire length. All the members have uniform flexural rigidity. Using Unit Load Method (Virtual Work Method), calculate the horizontal deflection of roller support D.
B	Find Plastic Moment carrying capacity "Mp" for a continuous beam shown in fig below 
C	Analyze continuous beam by using three moment theorem. 

Q4	Solve any Two Questions out of Three 10 marks each
A	i. Draw stress diagram of elastic state, elastoplastic state and fully plastic state for a beam of rectangular cross section ii. Find the shape factor and plastic moment for the I- Section having flange 200 mm x20 mm. and web 400 mm x 10 mm, if the permissible yield stress in tension and compression is 250 MPa.
B	Analyze the frame given below by using Flexibility method and draw BMD 

C	Analyze two span continuous beam as shown in fig. by stiffness method.