## Structural Engineering & Construction (CBCS Pattern) M.Tech. Second Semester CBCS **PSES253 - Elective-II : Plastic Analysis and Design**

\* 3 1 4 1 \*

	Note	<ol> <li>All questions carry equal marks.</li> <li>Answer any five questions.</li> <li>Due credit will be given to neatness and adequate dimensions.</li> <li>Assume suitable data wherever necessary.</li> <li>Illustrate your answers wherever necessary with the help of neat sketches.</li> <li>I.S.I Hand Book for structural steel section, I.S. Code 8000/1962 or 1964, I.S. 456 (Revised), I.S. 875 may be consulted., IS 800, BS 5950 is allowed.</li> </ol>	
1.	a)	Explain briefly the fundamental principles of structural analysis of ultimate load.	6
	b)	Compute the load for the continuous beam loaded and supported as under. Perform the moment balancing operation Draw B.M.D. Take E.I = constant. $A = \bigcup_{B \neq C} \bigcup_{C} \bigcup_{C} \bigcup_{D} \bigcup_{C} \bigcup$	8
2.		A two span continuous beam ABC has span length $AB = 6m = BC$ . It carries uniformly distributed load of 30 kN/m throughout. A and C are simply supported. Taking load factor = 1.80 and shape factor = 1.15, design suitable I-section. Assume yield stress = 250 N/mm <sup>2</sup> . Indicate any method by which economy of material may be achieved.	14
3.	a)	Explain the influence of "Axial force" on plastic moment for a beam of 'Rectangular cross-section".	4
	b)	Enumerates the factor due to which plastic moment is influenced. Discuss influence of shear force on plastic moment of a beam of 'Rectangular cross section''.	4
	c)	Design a column, in a commercial building, subjected to a factored load of 1500 kN. It is 8m in height, hinged at both end and braced at mid depth about weaker axis to give lateral restrain against buckling. Assume $f_{cd} = 150$ MPa.	6
4.	a)	Explain the classifications of connections and specify the main requirements of connections.	6
	b)	Explain the interior beam-column connection with neat sketch in compression region.	8

P. Pages: 2

Time : Three Hours

GUG/W/18/11020

\_\_\_\_\_

Max. Marks: 70

5. For a pitched slope portal frame shown in fig 2. locate instantaneous center of rotation. Determine value of  $M_P$  (plastic moment) for complete collapse.



14

- Steel beam with flanges embedded in concrete slab have simply supported span of 8m. The C/C spacing of beam is 4m. It carries RCC slab 140mm thick. The superimposed load is 4 kN/m<sup>2</sup> and floor finish of 1.5 kN/m<sup>2</sup> yield strength of steel is 250 N/mm<sup>2</sup>. Design the section of the internal beam and essentially check it for deflection at
  - 1) Ultimate load

6.

2) Working load.



\*\*\*\*\*\*