Name: **Enrolment No:**	UPES

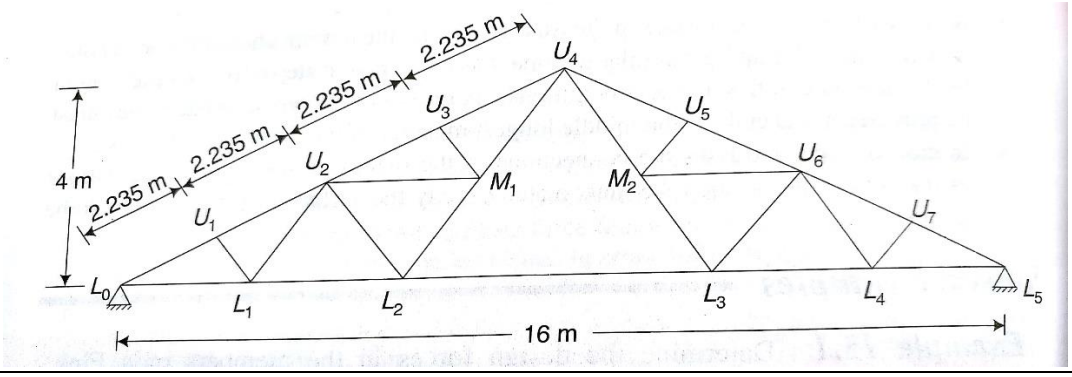
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Course: **Advance Design of Steel Structures** **Semester: VIII**
Program: **B.Tech.Civil Engineering**
Time: 03 hrs. **Max. Marks: 100**

Instructions: Answer all questions of Section A, B & 2 question from Section C
(Assume all the necessary data if necessary)
NOTE: IS 800:2007, IS 875(3) and IS 808 should be Allowd/Provided

SECTION A

S. No.		Marks	CO
Q 1	What are Secondary stresses in roof trusses? How does those differ from primary stresses?	**5**	**CO4**
Q 2	What is the correct Orientation of Placement of channel section purlins over roof trusses? Describe with neat sketch.	**5**	**CO4**
Q 3	Differentiate between surge loads and drag load as applied to gantry girders carrying cranes.	**5**	**CO3**
Q 4	How does a plate girder derive post-buckling strength?	**5**	**CO2**
	SECTION B		
Q 5	Design a slab base for a column ISHB 350 @ 710.2 N/m subjected to an factored axial compressive load of 1500 kN for the following conditions: a. Load is transferred to the base plate by direct bearing of column flanges b. Load is transferred to the base plate by welded connections; the column end and the base plate are not machined for bearing. c. Whether anchor bolts are required? The base rests on concrete pedestal of grade M20.	**5+5+2**	**CO1**
Q 6	Design a Welded Plate Girder of 20m span using the tension field action for the following factored forces. Maximum moment Mz = 5000kNm Maximum Shear force = 900 kN The girder is laterally restrained. Use steel of grade Fe 410 and assume yield stress of steel to be 250 Mpa irrespective of thickness of plates. Connections need not to be designed. i. Design of Web, Classification of flanges, Check for Bearing Strength, Check for Shear using post critical method and tension field method ii. Check for shear capacity of end panel, check for moment capacity of end panel, design of end bearing stiffner, check for outstand, check for buckling of stiffner, check for bearing capacity of stiffner iii. Design of intermediate transverse stiffners, check for buckling of stiffner,	**10+10 +8**	**CO2**

SECTION-C			
Q 9	A Gantry girder to be used in an industrial building carrying a manually operated overhead travelling crane, for the following data; Crane Capacity:200kN Self-weight of the Crane: 200kN Self-weight of trolley, electric motor, hook etc : 40kN Approximate minimum approach of the crane hook to the gantry girder : 1.2m Wheel base: 3.5m c/c distance between the gantry rails: 16m c/c distance between the columns: 8m self-weight of rail sections: 300 N/m Diameter of crane wheels: 150mm Steel of grade Fe 410. Calculate Design Forces, Maximum BM, Mximum SF, Lateral forces, Preliminary Trial Section, MI of Gantry Girder, Plastic Modulus of Section, Classification of Section,Check for Moment Capacity	**20**	**CO3**
Q 10	In the Previous Question if the moment Satisfies the criteria then; Combined Check for Local Moment Capacity, check for Buckling Resistance in Bending, check for Shear capacity, web Buckling Check, Deflection Check and Design the connections.	**20**	**CO3**
Q 11	Determine the design forces due to Dead Load, Live load and Wind Load with schematic diagram for a Fink type roof truss for an industrial building for the following data. Also, Find the reactions. Overall Length of the Building: 48m Overall width of the building: 16.5m Width (c/c of roof columns) : 16m c/c spacing of trusses: 8m Rise of truss: ¼ of span Self-weight of Purlin: 318 N/m Height of Columns: 11m Roofing and Side coverings : Asbestos cement sheets (dead weight = 171 N/m^2) Location : Selaqui Both the ends of the truss are hinged Use steel of Grade Fe 410 	**20**	**CO4**