

Name:

Enrolment No:



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

Course: Design of Steel Structures (CEEG 312)

Semester: VI

Program: B.Tech. Civil Engineering

Time: 03 hrs.

Max. Marks: 100

Instructions: Answer all questions of Section A, B & 2 question from C;

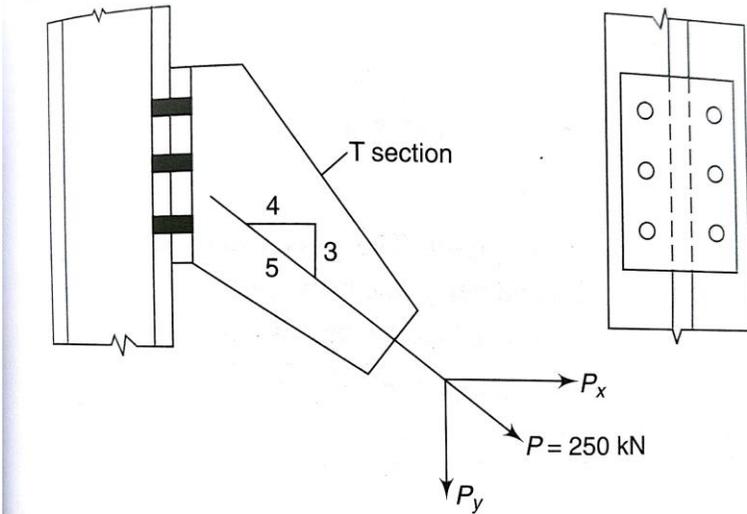
(Assume all the necessary data if necessary)

NOTE: IS 800 and IS 875 should be Allowed/Provided

SECTION A

Q. No.		Marks	CO
1	Answer all, i. Compression members are more critical than tension members. Comment! ii. Why plastic or compact sections are preferred? iii. What is inelastic buckling? iv. How does strain hardening affect the strength of the member?	4 x 5 = 20	CO1 CO2 CO3 CO4

SECTION B

2	Determine the adequacy of the fasteners in figure when M20 parallel shank HSFG grade 8.8 bolts in clearance holes are used with a factored load of 500 kN. Assume that the strength of the column flange and structural T (ST) sections do not govern the design. 	15	CO1
3	Determine the size and length of the fillet weld for the lap joint to transmit a factored load of 120 kN, assuming site welds, Fe 410 steel. Assume width of plate as 75 mm.	10	CO1
4	Calculate the moment carrying capacity of a laterally unrestrained ISMB 400 member of length 3m.	15	CO3

**SECTION-C**

5	Design a continuous beam of spans 4.9m, 6m and 4.9m carrying a uniformly distributed load of 32.5 kN/m and the beam is laterally supported.	<b>20</b>	<b>CO3</b>
6	Design a purlin on a sloping roof truss with the dead load of 0.15 kN/m <sup>2</sup> (cladding and insulation), a live load of 2 kN/m <sup>2</sup> and wind load of 0.5 kN/m <sup>2</sup> (suction). The purlins are 2m centre to centre and of span 4m, simply supported on a rafter at a slope of 20 degrees. Provide channel section purlin.	<b>20</b>	<b>CO4</b>
7	Design a double angle discontinuous strut to carry a factored load of 175 kN. The length of the strut is 3m between intersection. The two angles are placed back to back and tack bolted. Consider the following cases i. Angles are placed opposite sides of gusset plate ii. Angles are placed on the same side of gusset plate	<b>20</b>	<b>CO2</b>

Name:

Enrolment No:



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

**Course:** Design of Steel Structures (CEEG 312)

**Semester:** VI

**Program:** B.Tech. Civil Engineering

**Time:** 03 hrs.

**Max. Marks:** 100

**Instructions:** Answer all questions of Section A, B & 2 question from C;

(Assume all the necessary data if necessary)

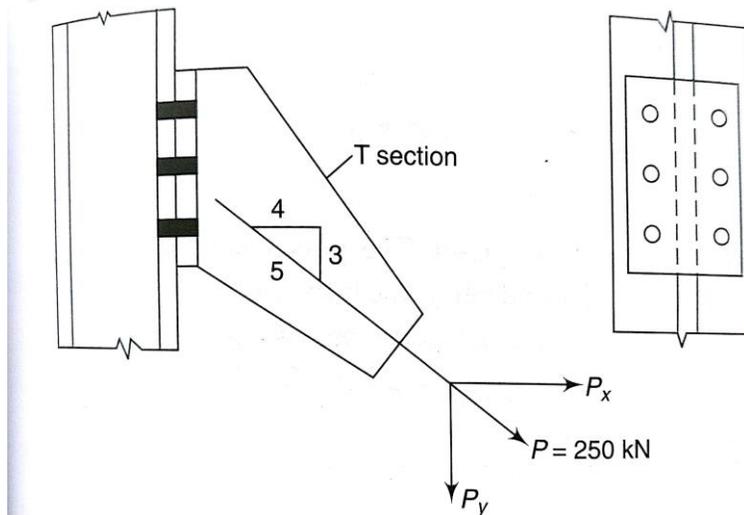
*NOTE: IS 800 and IS 875 should be Allowed/Provided*

**SECTION A**

S. No.		Marks	CO
Q 1	Answer all, i. How does ductility affect the strength? ii. What is geometry factor and how does it influence the strength of the member? iii. What is shear lag? iv. Under what circumstances will block shear failure dominate.	$4 \times 5 = 20$	CO1 CO2 CO3 CO4

**SECTION B**

Q 2 Determine the adequacy of the fasteners in figure when 20mm diameter grade 4.6 bolts are used. Assume that the strength of the column flange and structural T (ST) sections do not govern the design.



**15**      **CO1**

Q 3 Determine the size and length of the fillet weld for the lap joint to transmit a factored load of 120 kN, assuming site welds, Fe 410 steel. Assume width of plate as 75 mm. Use 3mm fillet weld.

**10**      **CO1**

Q 4	Calculate the moment carrying capacity of a laterally unrestrained ISMB 350 member of length 3.5m.	15	CO3
<b>SECTION C</b>			
Q 5	Design a continuous beam of spans 5m, 7m and 5m carrying a uniformly distributed load of 35 kN/m and the beam is laterally supported.	20	CO3
Q 6	Design a purlin on a sloping roof truss with the dead load of 0.15 kN/m <sup>2</sup> (cladding and insulation), a live load of 2 kN/m <sup>2</sup> and wind load of 0.5 kN/m <sup>2</sup> (suction). The purlins are 2m centre to centre and of span 4m, simply supported on a rafter at a slope of 20 degrees. Provide angle section purlin.	20	CO4
Q 7	Design a double angle discontinuous strut to carry a factored load of 150 kN. The length of the strut is 2m between intersection. The two angles are placed back to back and tack bolted. Consider the following cases iii. Angles are placed opposite sides of gusset plate iv. Angles are placed on the same side of gusset plate	20	CO2