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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST - 1

Even Semester: 2018-19

Course Code: CIV213

Course Name: Design of Structural Steel Elements

Programme & Sem: B.Tech (CIV) & VI Sem

Date: 01 March 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) IS800 -2007 code is permitted.

Part A

Answer **all** the Questions. Each question carries **four** marks. (3Qx4M=12)

1. Explain advantages and disadvantages of steel structures.
2. Write short notes on limit state of strength and limit state of serviceability.
3. Explain the four types of welds with neat sketch.

Part B

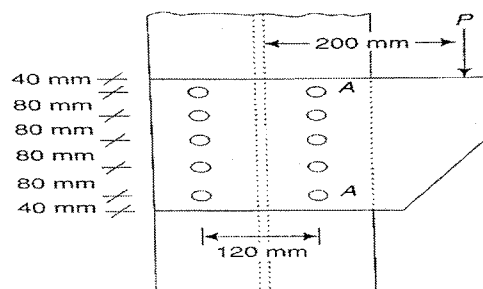
Answer **all** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

4. Design a lap joint between two plates of size 100x16mm thick and 100x10mm thick so as to transmit a factored load of 100kN using single row of M16 bolts of grade 4.6 and Fe410 grade plates. Sketch the bolt arrangement.
5. Two plates 10mm and 18mm thick are to be joined by a double cover double butt joint. Assume cover plates of 8mm thickness. Design the joint to transmit a factored load of 500kN using M20 of grade 4.6 bolts and Fe410 plate.

Part C

Answer the Question. Question carries **twelve** marks. (1Qx12M=12)

6. Find the safe load P carried by the joint shown in **figure below**. The bolts used are 16mm diameter of grade 4.6. The thickness of the flange of I-section is 9.1mm and that of bracket plate 10mm.





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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST - 2

Even Semester: 2018-19

Course Code: CIV 213

Course Name: Design of Structural Steel Elements

Program & Sem: B.Tech & VI Sem

Date: 13 April 2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Write legibly and draw clear diagrams wherever required.
- (iii) Scientific and non-programmable calculators are permitted.
- (iv) Use of IS800: 2007 and IS808:1989 are permitted.

Part A

Answer **both** the Questions. **Each** question carries **six** marks.

(2Qx6M=12)

1. Explain the various defects in welds.
2. What should be the size of fillet weld to connect the plates as shown in fig.1? Both the plates are 12mm thick, total length of weld is 206mm and the plates have to transmit a factored load of 270kN. Use Fe410 steel and shop welding.

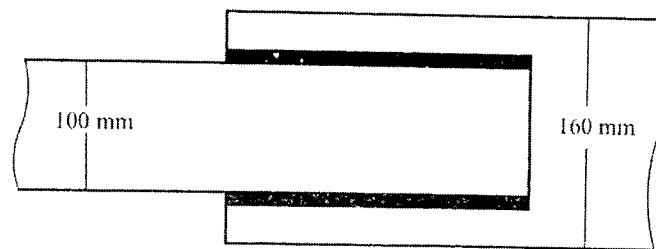


Fig.1

Part B

Answer **both** the Questions. **Each** question carries **eight** marks.

(2Qx8M=16)

3. Explain the various modes of failure of tension members with relevant equations for strength calculations.
4. An ISMC250 (Fe410 grade steel) is to carry a factored tensile load of 880kN. The channel section is to be welded to a 12mm thick gusset plate using shop weld. Design a fillet weld if the overlap is limited to 400mm.

Part C

Answer the Question. Question carries **twelve** marks.

(1Qx12M=12)

5. Determine the design tensile strength of the plate 130mm X 12mm bolted using 16mm diameter bolts as shown in fig.2 Steel used is Fe410.

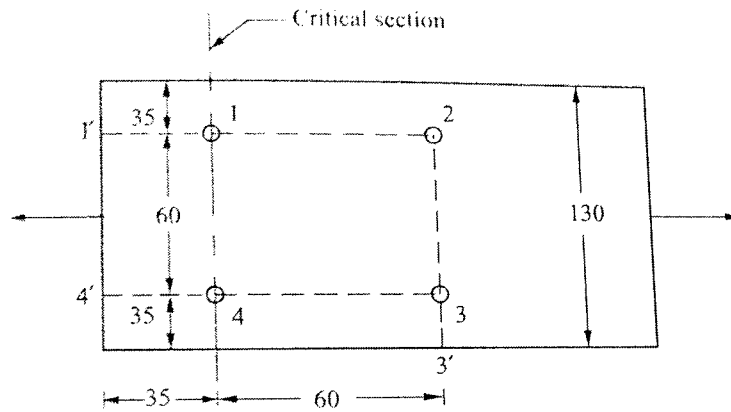


Fig.2



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PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Even Semester: 2018-19

Course Code: CIV 213

Course Name: Design of Structural Steel Elements

Program & Sem: B.Tech & VI Sem

Date: 21 May 2019

Time: 3 Hours

Max Marks: 80

Weightage: 40%

Instructions:

- (i) Assume any suitable data if any
(ii) IS: 800 -2007 and IS: 808 code are permitted.

Part A

Answer **all** the Questions.

(20Qx1M=20M)

1. The question consists of **20** multiple choice questions. Each MCQ carries **1** mark. Choose **ONLY ONE** appropriate choice.

(i) Elastic Modulus of Steel is

- a) 1.5×10^9 N/mm² b) 2×10^5 N/mm² c) 2×10^5 N/m² d) 1.5×10^5 N/m²

(ii) Which of the following is correct criteria to be considered while designing?

- a) Structure should be aesthetically pleasing but structurally unsafe
b) Structure should be cheap in cost even though it may be structurally unsafe
c) Structure should be structurally safe but less durable
d) Structure should be adequately safe, should have adequate serviceability

(iii) When two plates are placed end to end and are joined by two cover plates, the joint is

- a) Lap joint b) Butt joint c) Chain bolted lap joint d) Double cover butt joint

(iv) The strength of a bolted joint is equal to its

- a) Shearing strength b) Bearing strength c) Tearing strength d) Least of these value

(v) What is the ultimate tensile strength of bolt of class 4.6?

- a) 400 N/mm² b) 600 N/mm² c) 240 N/mm² d) 500 N/mm²

(vi) The size of a butt weld is specified by the effective throat thickness which in the case of incomplete penetration, is taken as

- a) $\frac{1}{2}$ of the thickness of thicker part b) $\frac{3}{4}$ of the thickness of thicker part
c) $\frac{3}{4}$ of the thickness of thinner part d) $\frac{7}{8}$ of the thickness of thinner part

(vii) What is the minimum pitch distance?

- a) 2.0 x nominal diameter of bolt b) 3.0 x nominal diameter of bolt
c) 1.5 x nominal diameter of bolt d) 2.5 x nominal diameter of bolt

(xix) What is the effective length when both ends of compression member are fixed?

- a) $0.65L$ b) $0.8L$ c) L d) $2L$

(xx) Web Crippling of steel beam occurs at the point where

- a) B.M is maximum b) Shearing force is minimum
c) Concentrated loads act d) Deflection is maximum

Part B

Answer **all** the Questions. **Each** question carries **ten** marks.

(3Qx10M=30M)

2. Explain the possible failure modes in compression members with sketch.
3. Determine the load carrying capacity of the column section shown in fig.1 below. If it's actual length is 4.5m. Its one end is fixed and other end hinged. The grade of steel is Fe415.
4. Explain the four classes of sections of beam as per IS code.

Part C

Answer **both** the Questions. **Each** question carries **fifteen** marks.

(2Qx15M=30M)

5. Design a column to support a factored load of 1000 kN. The column has effective length of 7m with respect to z-axis and 5m with respect to y-axis. Use Steel of grade Fe 410.
6. Design a simply supported beam of span 4m carrying live load of 20kN/m and dead load of 20kN/m. Use steel of grade Fe410 steel.

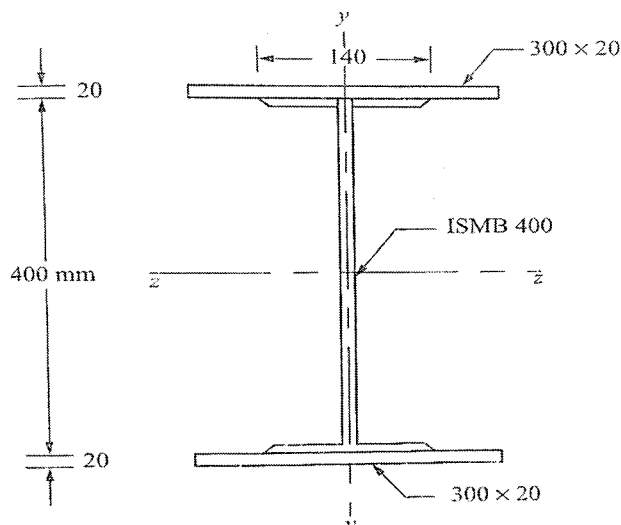


Fig.1 Q (12)

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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

SUMMER TERM/ MAKE UP ENDTERM EXAMINATION

Semester: Summer Term 2019

Date: 23 July 2019

Course Code: CIV 213

Time: 2 Hours

Course Name: Design of Structural Steel Elements

Max Marks: 80

Program & Sem: B.Tech / VI Sem (2015 Batch)

Weightage: 40%

Instructions:

- (i) Assume any suitable data wherever require
(ii) IS: 800 -2007 and IS: 808 codes are permitted.
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Part A

Answer **all** the Questions. Each question carries **five** marks. (4Qx5M=20)

1. Explain the procedure for design of the compression member
2. Explain the significance of effective length of compression member.
3. Write short notes on web crippling and web buckling.
4. Explain how to calculate the design bending strength of laterally supported beam.

Part B

Answer **all** the Questions. Each question carries **ten** marks. (3Qx10M=30)

5. Explain the possible failure modes in compression members with sketch.
6. Determine the design compressive load for a column section ISHB 350 @710.2 N/m, 3.5m high. The column is restrained in direction and position at both the ends. Use steel of Fe415.
7. Explain the four classes of sections of beam as per IS code.

Part C

Answer **both** the Questions. Each question carries **fifteen** marks. (2Qx15M=30)

8. Design a column to support a factored load of 1000 kN. The column has effective length of 7m with respect to z-axis and 5m with respect to y-axis. Use Steel of grade Fe 410.
9. Design a simply supported beam of span 4m carrying live load of 20kN/m and dead load of 20kN/m. Use steel of grade Fe410 steel.

