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Seat	Set	D
No.		

T.E. (Civ	il) (Part – I) (New (DESIGN OF STEE	•	on, 2018
Day and Date : Friday, Time : 2.30 p.m. to 5.3			Total Marks : 70
N. B. :	 3) Figures to the rig 4) Assume suitable of before the solution 5) Draw the approprior 6) Q. No. 1 is comp 30 minutes in Anacarries one mark 7) Answer MCQ/Ob 	(Q. No. 1) non programmable of the full of	calculator is allowed. marks. and mention it clearly never necessary. e solved in first to. 3. Each question
Duration: 30 Minutes	MCQ/Objective 1	Type Questions	Marks : 14
1. Choose the correct	t option :		14
i) The maximum about	strain at the end of p	lastic hinge for stru	ctural steel is
	b) 1.5%	c) 15%	d) 25%
ii) The design win	d speed is V. The de	esign wind pressure	will be given as
a) $0.4 V^2$	b) 0.5 V ²	c) 0.6 V ²	d) 0.8 V ²
point load is	ad for a propped car b) 0.586 Mp/l	•	bjected to central d) None of the above
iv) Which of the fo a) Triangular s c) Rectangula		maximum value of b) I – section d) Circular section	·

P.T.O.



v)	The bending mome a) equal to zero b) equal to yield me c) equal to plastic to d) greater than the	oment of the secti moment of the sec	on ctio			
vi)	If the same number following patterns va) Chain c) Diamond		ffici b)	-		e
vii)	The value of load fator gravity load is at a) 1.15			margin of safet	ry in plastic desig d) 2.25	ın
viii)	The most economic a) rectangular			n is tubular	d) hexagonal	
ix)	Web crippling gene a) Bending momer c) Concentrated lo	nt is maximum	b)	int where Shear force is I Deflection is m		
x)	The maximum pern resulting from wind a) 180			ratio of a memb 250	er carrying loads d) 350	
xi)	The rolled steel I set these provides a) Large moment of b) Large moment of c) greater lateral st d) all the above	of inertia of less cro of resistance as co	oss	sectional area		
xii)	The thickness of sin a) 1/30 th length beto	ween inner rivets	b)	1/40 th length be	tween inner rive	
xiii)	Shape factor is the a) Only on ultimate b) Only on yield str c) Only on geomet d) Both on yield str	estress of materia ress of material ry of section	l			
xiv)	The number of seis a) 3	mic zones in whic b) 5	h th		peen divided as d) 7	
						Set P



Seat	
No.	

Day and Date: Friday, 30-11-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

- N. B.: 1) Attempt any three questions from each Section.
 - 2) **Use** of IS 800-2007 and IS 875 are allowed, but **not** allowed for MCQ (Q. No. 1)
 - 3) Use of scientific non programmable calculator is allowed.
 - 4) Figures to the **right** indicate the **full** marks.
 - 5) Assume suitable data **if necessary** and mention **it clearly** before the solution.
 - 6) Draw the appropriate sketches whenever necessary.

SECTION - I

- 2. Determine the tensile strength of ISMC 175 when it is connected to gusset plate through the web by two rows of 16 mm bolts with a connecting length of 100 mm.
 - 9

9

 Design single angle discontinuous strut to carry a factored axial compressive load of 62 kN the length of the strut is 2.9 m between intersections. It is connected to 12 mm thick gusset plate by 20 mm diameter 4.6 grade bolts. Use Fe410 grade of steel.

9

4. Design a built up column of two rolled I sections to resist an axial load of 3500 kN. The length of the column is 4.6 m. It is restrained against rotation and translation at bottom and restrained against rotation and free at top. Take Fy = 250 Mpa. Design the suitable lacing or battening system.

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5. Attempt the following:

- a) Explain web buckling and web crippling with neat sketch.
- b) Classification of cross sections such as plastic. compact, semi-compact, slender with necessary sketches.
- c) Theorems of plastic analysis.

- 6. A simply supported beam of span L of circular section is subjected to central point load W find
 - a) Shape factor of circular section
 - b) Length of plastic hinge.

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- 7. A proposed cantilever beam in built in a concrete wall. It supports a dead load of 20 kN/m and a live load of 10 kN/m. The length of beam is 5 m. Select a suitable section with necessary checks. Assume stiff bearing length of 100 mm. 9
- 8. A 10 m \times 10 m godown is to be constructed. The steel roof trusses will be used for roofing. The trusses will be supported over masonry walls 300 mm thick. Galvanized corrugated iron sheets will be used for covering. Propose a suitable type of roof truss.
 - The basic wind pressure is 1.0 KN/m² and there is no any snowfall. Determine load at each panel point.

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 A column ISHB 300 @ 0.630 kN/m with one cover plate 400 mm × 20 mm on either side is carrying axial load of 1700 kN. Design gusseted base.
 M20 grade of concrete is to be used under the base slab.

Set P

Seat	
No.	

Set

Q

T.E. (Civil) (Part – I) (New CBCS) Examination, 2018 DESIGN OF STEEL STRUCTURES

Day and Date: Friday, 30-11-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

- N. B.: 1) Use of IS 800-2007 and IS 875 are allowed, but not allowed for MCQ (Q. No. 1)
 - 2) Use of scientific non programmable calculator is allowed.
 - 3) Figures to the **right** indicate the **full** marks.
 - 4) Assume suitable data **if necessary** and mention **it clearly** before the solution.
 - 5) Draw the appropriate sketches **whenever** necessary.
 - 6) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 7) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct option:
 - i) The most economical section for column is
 - a) rectangular
- b) solid round
- c) tubular
- d) hexagonal
- ii) Web crippling generally occurs at the point where
 - a) Bending moment is maximum
- b) Shear force is maximum
- c) Concentrated load acts
- d) Deflection is maximum
- iii) The maximum permissible slenderness ratio of a member carrying loads resulting from wind is
 - a) 180
- b) 200
- c) 250
- d) 350
- iv) The rolled steel I section are most commonly used as beam because these provides
 - a) Large moment of inertia of less cross sectional area
 - b) Large moment of resistance as compared to other section
 - c) greater lateral stability
 - d) all the above

P.T.O.

v)	,	tween inner rivets	ould not be less that b) 1/40 th length be d) 1/60 th length be	etween inner rivets
vi)	Shape factor is the a) Only on ultimate b) Only on yield st c) Only on geome d) Both on yield st	e stress of materia ress of material try of section	ıl	
vii)	The number of seignal 3	smic zones in whic b) 5	ch the country has contry has	been divided as d) 7
viii)	The maximum stra			ctural steel is
	a) 0.11%	b) 1.5%	c) 15%	d) 25%
ix)	The design wind s	peed is V. The des	sign wind pressure	will be given as
	a) 0.4 V ²	b) 0.5 V ²	c) 0.6 V ²	d) 0.8 V ²
x)	The collapse load point load is		•	bjected to central d) None of the above
xi)	Which of the follow a) Triangular secti c) Rectangular se	ving sections has n	•	shape factor ?
xii)	The bending mome a) equal to zero b) equal to yield m c) equal to plastic d) greater than the	noment of the secti moment of the sec	ion ction	
xiii)	If the same number of bolts has been used in the joints, then which of the following patterns will yield highest efficiency? a) Chain b) Staggered c) Diamond d) Staggered diamond			
xiv)	The value of load for gravity load is a a) 1.15		s for margin of safe c) 1.85	ty in plastic design d) 2.25



Seat	
No.	

Day and Date: Friday, 30-11-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

- N. B.: 1) Attempt any three questions from each Section.
 - 2) **Use** of IS 800-2007 and IS 875 are allowed, but **not** allowed for MCQ (Q. No. 1)
 - 3) Use of scientific non programmable calculator is allowed.
 - 4) Figures to the **right** indicate the **full** marks.
 - 5) Assume suitable data **if necessary** and mention **it clearly** before the solution.
 - 6) Draw the appropriate sketches **whenever** necessary.

SECTION - I

- 2. Determine the tensile strength of ISMC 175 when it is connected to gusset plate through the web by two rows of 16 mm bolts with a connecting length of 100 mm.
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- Design single angle discontinuous strut to carry a factored axial compressive load of 62 kN the length of the strut is 2.9 m between intersections. It is connected to 12 mm thick gusset plate by 20 mm diameter 4.6 grade bolts. Use Fe410 grade of steel.
- 4. Design a built up column of two rolled I sections to resist an axial load of 3500 kN. The length of the column is 4.6 m. It is restrained against rotation and translation at bottom and restrained against rotation and free at top.
 - Take Fy = 250 Mpa. Design the suitable lacing or battening system. 10
- 5. Attempt the following:
 - a) Explain web buckling and web crippling with neat sketch.
 - b) Classification of cross sections such as plastic. compact, semi-compact, slender with necessary sketches.
 - c) Theorems of plastic analysis.

- 6. A simply supported beam of span L of circular section is subjected to central point load W find
 - a) Shape factor of circular section
 - b) Length of plastic hinge.

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- 7. A proposed cantilever beam in built in a concrete wall. It supports a dead load of 20 kN/m and a live load of 10 kN/m. The length of beam is 5 m. Select a suitable section with necessary checks. Assume stiff bearing length of 100 mm. 9
- 8. A 10 m \times 10 m godown is to be constructed. The steel roof trusses will be used for roofing. The trusses will be supported over masonry walls 300 mm thick. Galvanized corrugated iron sheets will be used for covering. Propose a suitable type of roof truss.
 - The basic wind pressure is 1.0 KN/m² and there is no any snowfall. Determine load at each panel point.

9

 A column ISHB 300 @ 0.630 kN/m with one cover plate 400 mm × 20 mm on either side is carrying axial load of 1700 kN. Design gusseted base.
 M20 grade of concrete is to be used under the base slab.

Seat	
No.	

Total Marks: 70 Day and Date: Friday, 30-11-2018

Time: 2.30 p.m. to 5.30 p.m.

- 1) **Use** of IS 800-2007 and IS 875 are allowed, but **not** N. B. : allowed for MCQ (Q. No. 1)
 - 2) Use of scientific non programmable calculator is allowed.
 - 3) Figures to the **right** indicate the **full** marks.
 - 4) Assume suitable data if necessary and mention it clearly before the solution.
 - 5) Draw the appropriate sketches **whenever** necessary.
 - 6) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 7) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct option:

14

- i) The bending moment at plastic hinge is
 - a) equal to zero
 - b) equal to yield moment of the section
 - c) equal to plastic moment of the section
 - d) greater than the plastic moment of the section
- ii) If the same number of bolts has been used in the joints, then which of the following patterns will yield highest efficiency?
 - a) Chain

b) Staggered

c) Diamond

- d) Staggered diamond
- iii) The value of load factor which occurs for margin of safety in plastic design for gravity load is about
 - a) 1.15
- b) 1.65
- c) 1.85
- d) 2.25
- iv) The most economical section for column is
 - a) rectangular b) solid round
- c) tubular
- d) hexagonal

P.T.O.

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v)	Web crippling general Bending moments c) Concentrated lo	nt is maximum	b)	Shear force is	
vi)	The maximum perr resulting from wind a) 180			ratio of a memb 250	er carrying loads d) 350
vii)	The rolled steel I so these provides a) Large moment of b) Large moment of c) greater lateral so d) all the above	of inertia of less cr of resistance as co	oss	s sectional area	
viii)	The thickness of sinal 1/30 th length bet c) 1/50 th length bet	ween inner rivets	b)	1/40 th length be	tween inner rivets
ix)	Shape factor is the a) Only on ultimate b) Only on yield str c) Only on geomet d) Both on yield str	e stress of material ress of material rry of section	ıl		
x)	The number of seis	smic zones in whice b) 5	ch t	-	peen divided as d) 7
xi)	The maximum strain abouta) 0.11%	in at the end of pla b) 1.5%			tural steel is d) 25%
xii)	The design wind sp	peed is V. The des	sign	wind pressure	will be given as
	a) 0.4 V ²	b) 0.5 V ²	c)	0.6 V ²	d) 0.8 V ²
xiii)	The collapse load f point load is	or a propped can	ilev	er of span 1 sub	ojected to central
	a) 0.414 Mp/l	b) 0.586 Mp/l	c)	11.656 Mp/l	d) None of the above
xiv)	Which of the follow a) Triangular section: c) Rectangular section:	on	b)	imum value of s I – section Circular sectior	·

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Seat	
No.	

Day and Date: Friday, 30-11-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

- N. B.: 1) Attempt any three questions from each Section.
 - 2) **Use** of IS 800-2007 and IS 875 are allowed, but **not** allowed for MCQ (Q. No. 1)
 - 3) Use of scientific non programmable calculator is allowed.
 - 4) Figures to the right indicate the full marks.
 - 5) Assume suitable data **if necessary** and mention **it clearly** before the solution.
 - 6) Draw the appropriate sketches whenever necessary.

SECTION - I

- 2. Determine the tensile strength of ISMC 175 when it is connected to gusset plate through the web by two rows of 16 mm bolts with a connecting length of 100 mm.
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- 3. Design single angle discontinuous strut to carry a factored axial compressive load of 62 kN the length of the strut is 2.9 m between intersections. It is connected to 12 mm thick gusset plate by 20 mm diameter 4.6 grade bolts. Use Fe410 grade of steel.
- 4. Design a built up column of two rolled I sections to resist an axial load of 3500 kN. The length of the column is 4.6 m. It is restrained against rotation and translation at bottom and restrained against rotation and free at top.

Take Fy = 250 Mpa. Design the suitable lacing or battening system.

5. Attempt the following:

9

- a) Explain web buckling and web crippling with neat sketch.
- b) Classification of cross sections such as plastic. compact, semi-compact, slender with necessary sketches.
- c) Theorems of plastic analysis.



- 6. A simply supported beam of span L of circular section is subjected to central point load W find
 - a) Shape factor of circular section
 - b) Length of plastic hinge.

10

- 7. A proposed cantilever beam in built in a concrete wall. It supports a dead load of 20 kN/m and a live load of 10 kN/m. The length of beam is 5 m. Select a suitable section with necessary checks. Assume stiff bearing length of 100 mm. 9
- 8. A 10 m \times 10 m godown is to be constructed. The steel roof trusses will be used for roofing. The trusses will be supported over masonry walls 300 mm thick. Galvanized corrugated iron sheets will be used for covering. Propose a suitable type of roof truss.
 - The basic wind pressure is 1.0 KN/m² and there is no any snowfall. Determine load at each panel point.

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9

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 M20 grade of concrete is to be used under the base slab.

Set R

Seat No.

Set

S

T.E. (Civil) (Part – I) (New CBCS) Examination, 2018 DESIGN OF STEEL STRUCTURES

Day and Date: Friday, 30-11-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct option:
 - i) The maximum permissible slenderness ratio of a member carrying loads resulting from wind is
 - a) 180
- b) 200
- c) 250
- d) 350
- ii) The rolled steel I section are most commonly used as beam because these provides
 - a) Large moment of inertia of less cross sectional area
 - b) Large moment of resistance as compared to other section
 - c) greater lateral stability
 - d) all the above
- iii) The thickness of single flat lacing should not be less than
 - a) 1/30th length between inner rivets b) 1/40th length between inner rivets
 - c) 1/50th length between inner rivets d) 1/60th length between inner rivets

iv)	Shape factor is thea) Only on ultimateb) Only on yield strc) Only on geometd) Both on yield str	e stress of materia ress of material ry of section	Í	
v)	The number of seisa) 3	smic zones in whic b) 5	ch the country has l c) 6	peen divided as d) 7
vi)	The maximum strain about		_	
	a) 0.11%	b) 1.5%	c) 15%	d) 25%
vii)	The design wind sp	peed is V. The des	sign wind pressure	will be given as
	a) 0.4 V ²	b) 0.5 V ²	c) 0.6 V ²	d) 0.8 V ²
viii)	The collapse load f point load is		•	
	a) 0.414 Mp/I	b) 0.586 Mp/I	c) 11.656 Mp/I	d) None of the above
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xi)	If the same number following patterns va) Chain c) Diamond			
xii)	The value of load fa for gravity load is a	bout	_	
	a) 1.15	b) 1.65	c) 1.85	d) 2.25
xiii)	The most economic a) rectangular	cal section for colu b) solid round	ımn is c) tubular	d) hexagonal
xiv)	Web crippling gene a) Bending momer c) Concentrated lo	nt is maximum	e point where b) Shear force is d) Deflection is m	



Seat	
No.	

Day and Date: Friday, 30-11-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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SECTION - I

- 2. Determine the tensile strength of ISMC 175 when it is connected to gusset plate through the web by two rows of 16 mm bolts with a connecting length of 100 mm.
 - 3

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- 3. Design single angle discontinuous strut to carry a factored axial compressive load of 62 kN the length of the strut is 2.9 m between intersections. It is connected to 12 mm thick gusset plate by 20 mm diameter 4.6 grade bolts. Use Fe410 grade of steel.
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- 6. A simply supported beam of span L of circular section is subjected to central point load W find
 - a) Shape factor of circular section
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10

- 7. A proposed cantilever beam in built in a concrete wall. It supports a dead load of 20 kN/m and a live load of 10 kN/m. The length of beam is 5 m. Select a suitable section with necessary checks. Assume stiff bearing length of 100 mm. 9
- 8. A 10 m \times 10 m godown is to be constructed. The steel roof trusses will be used for roofing. The trusses will be supported over masonry walls 300 mm thick. Galvanized corrugated iron sheets will be used for covering. Propose a suitable type of roof truss.
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- A column ISHB 300 @ 0.630 kN/m with one cover plate 400 mm × 20 mm on either side is carrying axial load of 1700 kN. Design gusseted base.
 M20 grade of concrete is to be used under the base slab.