Total No. of Questions: 6

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Enrollment No.....



Faculty of Engineering

End Sem (Even) Examination May-2019 CE2CO17 Structural Design & Drafting-II (Steel)

Programme: Diploma Branch/Specialisation: CE

Duration: 3 Hrs. Maximum Marks: 60

	-	estions are con should be writ	•		f any, are indicated. Answ b, c or d.	ers c
Q.1	i.	Size of rivet	hole is	size of riv	/et	1
		(a) More tha	n	(b) Less tha	n	
		(c) Equal to		(d) Not con	npared with	
	ii.	Which of the	following is	advantage of l	HSFG bolts over bearing	1
		type bolts?				
		(a) Joints are	not rigid			
		(b) Bolts are	subjected to sl	nearing and be	aring stresses	
		(c) High stren	ngth fatigue			
		(d) Low station	c strength			
	iii.	What are stee	el tension men	nbers?		1
		(a) Structura	l elements the	at are subjecte	ed to direct compressive	
		loads.				
		(b) Structura	l elements tha	t are subjected	to direct tensile loads.	
		(c) Structura	l elements tha	it are subjected	d to indirect compressive	
		loads.				
		(d) Structura	l elements tha	t are subjected	to indirect tensile loads	
	iv.	The strength	of tensile men	nbers is not inf	fluenced by:	1
		(a) Length of	connection	(b) Net area	a of cross section	
		(c) Type of fa	abrication	(d) Length	of plate	
	v.	What is the	effective len	gth when bo	th ends of compression	1
		member are f	ixed?			
		(a) $0.65L$	(b) 0.8L	(c) L	(d) 2L	
	vi.	Lacing shall	be designed to	resist a total	transverse shear equal to	1
		of axial	force in mem	ber		
		(a) 5%	(b) 1%	(c) 4.3%	(d) 2.5%	
					рт	\circ

P.T.O.

	vii.	A beam section is provided on the basis of			1
		I. Section modulus II. De	flection III. S	Shear	
		(a) I, II (b) II, III	(c) I, III	(d) I, II and III	
	viii.	As per IS specification, the b	beam sections s	hould be	1
		(a) Not symmetrical about a	ny principal axe	es	
		(b) At least symmetrical abo	ut one of the pr	rincipal axes	
		(c) Symmetrical about all pr	incipal axes		
		(d) Unsymmetrical about all	principal axes		
	ix.	The range of economical sp	The range of economical spacing of trusses varies from (where L		
		is span).			
		(a) $L/3$ to $L/5$	(b) $L/4$ to $2L/4$	5	
		(c) $L/3$ to $L/2$	(d) $2L/5$ to $3I$		
	х.	The external wind pressure a	_	depends on	1
		(a) Degree of permeability o	f roof		
		(b) Slope of roof			
		(c) Both (a) and (b)			
		(d) None of these			
Q.2	i.	Explain various types of loa	nd to be conside	ered in design of steel	2
		structures.			
	ii.	Differentiate between weld j	oint and rivet jo	oint	3
	iii.	Design a double riveted lap			5
		Calculate the efficiency of t		-	
		σ_t , = 90 MPa, τ_s = 75 MPa,	$\sigma_c = 150 \text{ MPa}$		
OR	iv.	A 15mm thick plate is join	ed to a 13mm	plate by 200mm long	5
		(effective) butt weld. Determ	nine the strengt	h of joint if a double V	
		Butt weld is used. Assume	e that Fe-410	grade plates and shop	
		welds are used.			
Q.3	i.	Draw various types of section			2
	ii.	A tension member of a tr			8
		125x75x10mm carrying a			
		rivets be used design the cor	inection to the	gusset plate using a lug	
		angle.			

OR	iii.	Determine the axial load capacity of the column ISHB 300 @ 577 N/m if the length of column is 3m and it's both ends pinned.	8
Q.4	i. ii.	Explain different types of bracings used in a braced building? Design a column of effective length 5.90m. It is subjected to a factored axial compressive load of 2000KN. Provide two channels back to back connected with battens by site welded connection. Use steel of grade Fe-410.	3 7
OR	iii.	Calculate the value of the least radius of gyration for a compound column consisting of ISHB 250 @ 536.6 N/m with one cover plate 300mm x 20 mm on each flange.	7
Q.5	i.	Explain various types of built up steel sections used for beam.	4
	ii.	Design a simply supported beam of effective span 1.75m carrying a factored concentrated load of 350KN at mid span.	6
OR	iii.	An ISMB 500 section is used as a beam over a span of 6m, with simply supported ends. Determine the maximum factored uniformly distributed load that the beam can carry if the ends are restrained against torsion, but compression flange is laterally unsupported.	6
Q.6		Attempt any two:	
-	i. ii.	Explain different types of steel roof truss. Describe the procedure for calculations of dead load, live load and wind load acting on roof truss.	5 5
	iii.	Enumerate the selection criteria of steel roof truss.	5

Marking Scheme

CE2CO17 Structural Design & Drafting-II (Steel)

Q.1	i.	Size of rivet hole is size of	of rivet	1
		(a) More than		
	ii.	Which of the following is advantage	of HSFG bolts over bearing	1
		type bolts?		
		(c) High strength fatigue		
	iii.	What are steel tension members?		1
		(b) Structural elements that are subject	cted to direct tensile loads.	
	iv.	The strength of tensile members is not influenced by:		
		(d) Length of plate		
	v.	What is the effective length when	both ends of compression	1
		member are fixed?		
		(a) 0.65L		
	vi.	Lacing shall be designed to resist a to	otal transverse shear equal to	1
		of axial force in member		
		(d) 2.5%		
	vii.	A beam section is provided on the bas	sis of	1
		I. Section modulus II. Deflection	III. Shear	
		(d) I, II and III		
	viii.	tions should be	1	
		(b) At least symmetrical about one of	the principal axes	
	ix.	The range of economical spacing of	trusses varies from (where L	1
		is span).		
		(a) $L/3$ to $L/5$		
	x. The external wind pressure acting on a roof depends on			
		(b) Slope of roof		
Q.2	i.	Types of load to be considered in des	ign of steel structures.	2
	ii.	Differentiate between		3
		Weld joint	1.5 marks	
		Rivet joint	1.5 marks	
	iii.	Design a double riveted lap joint fo	or MS plates 10.5 mm thick.	5
		Calculate the efficiency of the joint.	-	
		Shear Strength	2 marks	
		Bearing Strength	2 marks	

OR iv. Determine the strength of joint if a double V Butt weld is used Q.3 i. Types of sections used for tension members. Diagram Description 1 mark Description 1 mark ii. Design the connection to the gusset plate using a lug angle. Strength of rivet Pattern 2 marks Lug angle 2 marks Lug angle 0 Determine the axial load capacity of the column E. length Section 3 marks Check 4 marks Q.4 i. Types of bracings used in a braced building Diagram Diagram Diagram Description 1.5 marks Description 1.5 marks Description 1.5 marks Ii. Design a column of effective length E. length Section 3 marks Spacing 3 marks OR iii. Calculate the value of the least radius of gyration for a compound rolumn Q.5 i. Types of built up steel sections used for beam. Diagram Description 2 marks Description 2 marks Description 1 mark Section Modulus 2 marks Choosing Section 1 mark Check 2 marks			Correct Answer	1 mark	
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OR iii. Determine the axial load capacity of the column E. length Section 3 marks Check 4 marks Q.4 i. Types of bracings used in a braced building Diagram Diagram Description 1.5 marks Description 1.5 marks Description 1.5 marks F. length E. length Section 3 marks Spacing 3 marks Spacing 3 marks OR iii. Calculate the value of the least radius of gyration for a compound column Q.5 i. Types of built up steel sections used for beam. Diagram Description 2 marks Description 2 marks Description 2 marks Description 2 marks Choosing Section 1 mark Check 2 marks OR iii. B.M. 1 mark Section Modulus Choosing Section 1 mark Section Modulus 2 marks Check 2 marks Choosing Section 1 mark Section Modulus 2 marks Choosing Section 1 mark			Strength of rivet	4 marks	
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Section Modulus 2 marks Choosing Section 1 mark	OR	iii.	B.M.	1 mark	6
Choosing Section 1 mark					-
_					
			Check	2 marks	

Q.6		Attempt any two:		
	i.	Types of steel roof truss.		5
		Diagram	2 marks	
		Description	3 marks	
	ii.	Calculations of dead load	1 mark	5
		Live load	1 mark	
		Wind load acting on roof truss	3 marks	
	iii.	Selection criteria of steel roof truss.		5
		1 mark for each	(1 mark * 5)	
