University of Mumbai
Examination 2020

Program: **CBCS**
Curriculum Scheme: Rev2016
Examination: TE Semester VI
Course Code: CEC 602 and Course Name: Design and Drawing of Steel Structures
Time: 2 hour Max. Marks: 80

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Q1.	Elastic Modulus of Steel is _____
Option A:	1.5×10^9 N/mm^2
Option B:	2.0×10^5 N/mm^2
Option C:	2.0×10^5 N/m^2
Option D:	1.5×10^9 N/m^2
Q2.	What is serviceability?
Option A:	It refers to condition when structure is not usable
Option B:	It refers to services offered in the structure
Option C:	It means that the structure should perform satisfactorily under different loads, without discomfort to user
Option D:	It means that structure should be economically viable
Q3.	Which method is mainly adopted for design of steel structures as per IS code?
Option A:	Limit State Method
Option B:	Working Stress Method
Option C:	Ultimate Load Method
Option D:	Earthquake Load Method
Q4.	Lacing bars in a steel column should be designed to resist_____
Option A:	Bending moment due to 2.5% of the column load
Option B:	Shear force due to 2.5% of the column load
Option C:	2.5% of the column load
Option D:	Both (A) and (B)
Q5.	Which of the following relation is correct?
Option A:	Permissible Stress = Yield Stress x Factor of Safety
Option B:	Permissible Stress = Yield Stress / Factor of Safety
Option C:	Yield Stress = Permissible Stress / Factor of Safety
Option D:	Permissible Stress = Yield Stress – Factor of Safety
Q6.	What is the yield strength of bolt of class 4.6?
Option A:	400 N/mm^2
Option B:	240 N/mm^2
Option C:	250 N/mm^2
Option D:	500 N/mm^2
Q7.	Which of the following type of weld is most suitable for lap and T-joints?
Option A:	Fillet weld

Option B:	Groove weld
Option C:	Slot weld
Option D:	Plug weld
Q8.	The presence of holes _____ the strength of tension member
Option A:	does not affect
Option B:	improves
Option C:	reduces
Option D:	doubles
Q9.	What is the effective length when both ends of compression member are fixed?
Option A:	0.65L
Option B:	0.8L
Option C:	L
Option D:	2L
Q10.	What is slenderness ratio of compression member?
Option A:	ratio of effective length to radius of gyration
Option B:	ratio of radius of gyration to effective length
Option C:	difference of radius of gyration and effective length
Option D:	product of radius of gyration and effective length
Q11.	Slenderness ratio of lacing is limited to
Option A:	200
Option B:	145
Option C:	500
Option D:	380
Q12.	Which of the following statement is true?
Option A:	Number of battens in a column should be such that member is divided into not less than three bays
Option B:	Number of battens in a column should be such that member is divided into less than three bays
Option C:	Number of battens in a column should be such that member is divided into less than two bays
Option D:	No restriction on number of battens
Q13.	Battens should be designed to resist moment equal to
Option A:	Vt L_0 n
Option B:	Vt L_0 / n
Option C:	Vt /L_0 n
Option D:	Vt L_0 /2n
Q14.	A beam section is provided on the basis of(i) section modulus, (ii) deflection, (iii) shear
Option A:	i, ii
Option B:	ii, iii
Option C:	i, iii
Option D:	i, ii and iii

Q15.	As per IS specification, the beam sections should be
Option A:	not symmetrical about any principal axes
Option B:	at least symmetrical about one of the principal axes
Option C:	symmetrical about all principal axes
Option D:	unsymmetrical about all principal axes
Q16.	The design bending strength of beams when $V \leq 0.6Vd$ is given by
Option A:	$\beta b / Zpfy \gamma m0$
Option B:	$\beta bZpfy / \gamma m0$
Option C:	$\beta bZp / fy \gamma m0$
Option D:	$\beta bZpfy \gamma m0$
Q17.	The value of βb in the equation of design bending strength for plastic section is given by
Option A:	1.5
Option B:	2.0
Option C:	0.5
Option D:	1.0
Q18.	The design bending strength of laterally unsupported beams is governed by
Option A:	torsion
Option B:	bending
Option C:	lateral torsional buckling
Option D:	yield stress
Q19.	The value of design bending compressive stress fbd is
Option A:	X_{LT} fy
Option B:	X_{LT} fy /fy
Option C:	X_{LT} fy x fy
Option D:	X_{LT} /fy
Q20.	The maximum diagonal compression in plate girder simply supported occurs
Option A:	does not occur
Option B:	above neutral axis
Option C:	below neutral axis
Option D:	at neutral axis

Q2 **20 Marks**	A simply supported **welded plate Girder** of span 24m is subjected to UDL of 50 kN/m over the span excluding self-weight, Design cross section, give check for shear buckling and design bending strength, also provide 2-step curtailment assuming plate girder is laterally supported throughout, and no intermediate stiffeners are provided. (No need to design welded connections and stiffeners)

Q3. **(10 Marks Each)**	
A	A Column ISHB 300@576.83 N/m strengthened with two cover plates of size 350 x 20mm to carry factored axial load of 2000kN, calculate Size, Thickness and number of bolts required for the **Gusset base** assuming M20 concrete grade and 24mm bolt diameter, draw diagrams showing all details.
B	A mild steel column, 6m high, has its ends solidly built in. it consists of two channels ISMC300 placed back-to-back with 180mm gap between them. Design the column and suitable **battening system**.