

## University of Mumbai

### Examination 2020

Examinations Commencing from 23<sup>rd</sup> December 2020 to 6<sup>th</sup> January 2021 and from 7<sup>th</sup> January 2021 to 20<sup>th</sup> January 2021

Program: Civil Engineering

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: CE-C702 and Course Name: Theory of Reinforced concrete structure

Time: 2-hour

Max. Marks: 80

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<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
1.	In WSM, the indirect relation between Steel and Concrete is expressed in terms of _____
Option A:	Strain Compatibility
Option B:	Modular ratio
Option C:	Residual Strain
Option D:	Stress compatibility
2.	Calculate the allowable stress for steel bar with yield strength of 500N/mm <sup>2</sup> . Adopt WSM Method.
Option A:	300.50 N/mm <sup>2</sup>
Option B:	280.90 N/mm <sup>2</sup>
Option C:	166.67 N/mm <sup>2</sup>
Option D:	250.00 N/mm <sup>2</sup>
3.	Calculate Permissible Shear Stress in Concrete if grade of Concrete is M25 and Percentage Steel in the beam is 0.65%. Adopt WSM
Option A:	0.43 MPa
Option B:	0.61 MPa
Option C:	0.23 MPa
Option D:	0.33 MPa
4.	Partial Safety Factor for Concrete and Steel as per WSM is _____ and _____ respectively
Option A:	1.15 and 1.5
Option B:	3 and 1.78
Option C:	1.5 and 1.15
Option D:	1 and 1

5.	Calculate the Modular Ratio for Concrete of grade M25.
Option A:	13.33
Option B:	12
Option C:	10.98
Option D:	14
6.	Which IS code is used for general construction of RCC?
Option A:	IS 456
Option B:	IS 256
Option C:	IS 800
Option D:	IS 100
7.	Minimum grade of concrete for RCC work
Option A:	M10
Option B:	M15
Option C:	M20
Option D:	M25
8.	Design Strength of Concrete as Material is taken as _____ in Limit State of Collapse.
Option A:	0.45f <sub>ck</sub>
Option B:	0.67f <sub>ck</sub>
Option C:	0.55f <sub>ck</sub>
Option D:	0.23f <sub>ck</sub>
9.	Deflection of doubly reinforced beam are ____ compared to singly reinforced beams of same depth
Option A:	More
Option B:	Equal
Option C:	Less
Option D:	Zero
10.	The Design strength of Steel is taken _____
Option A:	0.87f <sub>y</sub>
Option B:	0.446f <sub>ck</sub>
Option C:	0.67f <sub>ck</sub>
Option D:	0.5f <sub>y</sub>
11.	When HYSD bars are used in place of mild steel bars the bond strength
Option A:	Increases
Option B:	Decreases
Option C:	Does not change

Option D:	Becomes Zero
12.	In a simply supported beam, bending moment at the end
Option A:	Zero
Option B:	Maximum
Option C:	Minimum
Option D:	Unit
13.	Basic value of span/depth ratio for limit of deflection for simply supported slab having span up to 10m shall be
Option A:	7
Option B:	10
Option C:	26
Option D:	20
14.	Maximum diameter of bar for R.C slab having thickness D is restricted to
Option A:	D/4
Option B:	D/5
Option C:	D/8
Option D:	D/6
15.	The amount of reinforcement for torsion in each of four layers shall be equal to _____ of maximum mid span steel
Option A:	$\frac{2}{3}$
Option B:	$\frac{1}{2}$
Option C:	$\frac{3}{4}$
Option D:	$\frac{4}{3}$
16.	The minimum percentage of steel in column should not be less than
Option A:	0.8
Option B:	1.5
Option C:	4
Option D:	3
17.	Effective length of column recommended by code for a column held in position and restrained against rotation in both ends is
Option A:	0.8 L
Option B:	0.65 L
Option C:	L
Option D:	2L
18.	The diameter of main bar in column should not be less than
Option A:	16 mm
Option B:	8 mm
Option C:	12 mm

Option D:	20 mm
19.	The Maximum cross-sectional area of main bar in column should not be greater than
Option A:	4%
Option B:	6%
Option C:	8%
Option D:	10%
20.	Footing is that portion of a foundation which transfers the load to the.
Option A:	Column
Option B:	Slab
Option C:	Beam
Option D:	Soil

<b>Q2</b>	<b>Solve any two out of three.</b>	<b>10 marks each</b>
A	A rectangular beam having 200mm width and 400 mm effective depth is reinforced with 3 bars of 16 mm diameter. Find the ultimate UDL which the beam can carry over a span of 5m. use M20 and Fe415.	
B	Find out ultimate MR of doubly reinforced rectangular section of size 250*550 mm effective having tensile reinforcement 3054 mm <sup>2</sup> and compressive reinforcement 982mm <sup>2</sup> use M20 and Fe415.	
C	Design a short axially circular column carrying factored load of 1500 KN. Use M20 and Fe415	

<b>Q3</b>	<b>Solve any one Questions out of Two.</b>	<b>20 marks each</b>
A	Design a RCC Slab of Dimension 5 m* 4m simply supported from all the four edges on beams width of 300mm take live load =3KN/m <sup>2</sup> and floor finish load 1 KN/m <sup>2</sup> use M20 and Fe415 grade of concrete to steel respectively.	
B	Design footing for two column i.e column A and column B spaced at 4m apart the SBC of the soil 200 KN/m <sup>2</sup> .M20 and Fe415 grade of concrete to steel respectively. Use LSM Column A 450mm*450mm Pa =800 KN Column B 600mm*600mm Pb =1200 KN	