

University of Mumbai

Examination 2021 under cluster __ (Lead College: __KJSIET____)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: Civil Engineering

Curriculum Scheme: Rev 2012

Examination: BE Semester VII

Course Code: CEC701 Course Name: **Limit State Method for Reinforced Concrete Structure**

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	For a singly reinforced beam of 400 mm effective depth, what is the depth of Whitney's stress block considering balanced section?
Option A:	172 mm
Option B:	150 mm
Option C:	125 mm
Option D:	225 mm
2.	Which of the following is disadvantage of Ultimate load method?
Option A:	Does not give satisfactory strength.
Option B:	Does not give idea of collapse load.
Option C:	Does not consider reserved plastic strength.
Option D:	Does not consider serviceability requirements.
3.	Limit state of collapse does not deal with which of the following limit state?
Option A:	Flexure
Option B:	Shear
Option C:	Torsion
Option D:	Cracking
4.	In limit state method, factor of safety is applied to which of the following?
Option A:	Concrete strength only.
Option B:	Reinforcement strength only.
Option C:	Concrete and Reinforcement Strength and loads.
Option D:	Only to loads.
5.	For HYSD 500, what is the maximum strain in tensile reinforcement at failure?
Option A:	0.003125
Option B:	0.004175
Option C:	0.002145
Option D:	0.05126
6.	For design purposes, what shall be the design compressive strength of M20 grade of concrete without considering partial safety factor for concrete ?
Option A:	13.40 MPa
Option B:	20 MPa

Option C:	15.0 MPa
Option D:	22.5 MPa
7.	If we denote capacity of flanged beam as MF (for neutral axis lying in flange) and capacity of rectangular Beam as MR, then which of the following comparison of the two is correct?
Option A:	MF = MR
Option B:	MF > MR
Option C:	MF < MR
Option D:	MF = 0.5 x MR
8.	For a single span cantilever beam of length 1200 mm (measured from face of support), the effective depth of the beam is 400 mm. Width of column from which the beam projects, is 300 mm, what is the effective span to be considered for the design of cantilever beam?
Option A:	1400 mm
Option B:	1200 mm
Option C:	1500 mm
Option D:	1450 mm
9.	Side Face Reinforcement is related to which of the following?
Option A:	Shear Force
Option B:	Bending Moment
Option C:	Web Area
Option D:	Torsional Moment
10.	A beam has 250 mm as width, 450 mm as effective depth and 942 sqmm as the area of reinforcement, what is the type of the section if M 20 and Fe 415 are used? Use LSM.
Option A:	Balance Section
Option B:	Under-Reinforced Section
Option C:	Over-Reinforced Section
Option D:	Doubly Reinforced Section
11.	If the beam has 230 mm width and 500 mm overall depth, what is the maximum compression reinforcement that can be provided if it is to be designed as a doubly reinforced beam?
Option A:	4600 sq mm
Option B:	3600 sq mm
Option C:	2600 sq mm
Option D:	5600 sq mm
12.	If nominal shear stress in beam exceeds the permissible maximum shear stress of the grade of concrete used, which of the following statement is correct?
Option A:	It is required to provide shear reinforcement.
Option B:	It is not required to provide shear reinforcement.
Option C:	It is required to increase grade of concrete.
Option D:	It is required to reduce cross section of the beam.
13.	What percentage of design shear force can be resisted by bent up bars alone?
Option A:	50%

Option B:	30%
Option C:	10%
Option D:	70%
14.	In the design of slabs, the most critical limit state to be considered is
Option A:	Limit State of Collapse- Compression
Option B:	Limit State of Shear
Option C:	limit state of Collapse- Flexure
Option D:	Limit State of Serviceability
15.	For a chajja of thickness 125 mm, which of the following diameter of bar cannot be used for reinforcement?
Option A:	8 mm
Option B:	10 mm
Option C:	12 mm
Option D:	16 mm
16.	What is the maximum spacing of longitudinal bars along the periphery of the column?
Option A:	150 mm
Option B:	300 mm
Option C:	450 mm
Option D:	200 mm
17.	If the thickness of the slab is 200 mm and shear stress in concrete is 0.56 MPa, what is the design strength of concrete in shear?
Option A:	0.67 MPa
Option B:	0.56 MPa
Option C:	0.35 MPa
Option D:	1.67 MPa
18.	In Limit State Method what is the permissible shear stress in concrete in absence of shear reinforcement for M 25 concrete?
Option A:	1.25 MPa
Option B:	2.32 MPa
Option C:	0.86 MPa
Option D:	0.36 MPa
19.	What is the short terms modulus of elasticity of M30 grade of concrete in MPa?
Option A:	27386.13
Option B:	41386.61
Option C:	35153.15
Option D:	21576.35
20.	What is the minimum thickness of the footing at the edge?
Option A:	100 mm
Option B:	150 mm
Option C:	200 mm
Option D:	250 mm

Q2	Solve any Two Questions out of Three	10 marks each
A	A RC beam carries a factored load of 25 kN/m over a span of 4.5 m. Design the beam for flexure. Use M25 and Fe 415 Make sure the design is under-reinforced.	
B	Find ultimate moment of resistance for a T beam having width of flange as 1200 mm, width of web as 300 mm and thickness of slab as 150 mm. It has an effective depth of 550 mm and is reinforced with 6 bars of 20 mm dia. Use M 25 and Fe 500.	
C	Design a slab of a residential building measuring 4.2 m x 5.15 m. It is supported on 350 mm thick wall on two opposite sides. Use M 20 and Fe 415. Take floor finish load as 1.5 kN per sq m and live load as 2 kN per sq m.	

Q3.	Solve any Two Questions out of Three	10 marks each
A	Design a square column to resist axial load of 1000 kN using M 25 and Fe 500. Make sure that the column satisfies minimum eccentricities requirements.	
B	Find dimensions for the footing for a column 300 x 600 carrying a load of 700 kN and moment of 100 kN m about the major axis. SBC of the soil is 150 kN/m ² .	
C	Design square footing for a column 300 x 300 mm carrying axial load of 1500 kN. SBC of the soil is 250 kN/m ² . Use M 25 and Fe 500. Consider <i>only Two-way shear and bending moment criteria.</i>	

University of Mumbai
Examination 2021 under cluster __ (Lead College: __KJSIEIT__)

Examinations Commencing from to 15th June 2021

Program: CIVIL ENGINEERING

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: CE-C701 and Course Name: Quantity Survey Estimation and Valuation

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks (40 Marks)
1.	Which of the following IS code is used for taking measurement of earthwork in the field
Option A:	IS 1200 : Part 1 : 1992
Option B:	IS 1200 : Part 2 : 1974
Option C:	IS 1200 : Part 3 : 1976
Option D:	IS 1200 : Part 4 : 1976
2.	Which of the following is not purpose of specification
Option A:	To describe quality of different materials required for construction work
Option B:	Specifications are required to clarify the drawings
Option C:	Specifications are helpful to contractor in filling the rates of various items in the tender
Option D:	Specifications are required to used for decision for schedule of the project
3.	Which of the following is the general specification of first class brickwork?
Option A:	Bricks should be break when fall from a height of 1m
Option B:	Soaking of bricks should be for a period of 12 hour before use.
Option C:	Bricks should absorb water more than 30%
Option D:	Brick should not give clear ringing sound
4.	What is the quantity of cement for 10 m ³ of PCC (1:1.5:3) in footing?
Option A:	61 bags
Option B:	71 bags
Option C:	81 bags
Option D:	91 bags
5.	Which IS code is used for taking labour output
Option A:	IS 7272
Option B:	IS 6272
Option C:	IS 7262
Option D:	IS 2772
6.	Which of the following is the most reliable estimate?
Option A:	Preliminary Estimate
Option B:	Detailed Estimate

Option C:	Plinth Area Estimate
Option D:	Cube Rate Estimate
7.	Which of the following C.B.R.I. equation is used to find quantity of cement in tonne
Option A:	0.036A
Option B:	0.071A-0.01
Option C:	0.0204A- 0.014
Option D:	-171+10.46A-0.041A ²
8.	What is the cutting length of a straight mild steel bar used for a beam of 12mm ϕ with overall length is 3m and bar having 90° bend at end and concrete cover 25mm?
Option A:	3066 mm
Option B:	3266 mm
Option C:	3166 mm
Option D:	3366 mm
9.	What is the extra length required for one bend 45° cranked bar?
Option A:	0.42 d
Option B:	0.27d
Option C:	0.50d
Option D:	0.20d
10.	Which of the following is not a method of taking out quantities for estimating building works?
Option A:	Centreline method
Option B:	Long wall short wall method
Option C:	Crossing method
Option D:	Partial Estimation Method
11.	What is the unit of lead for a distance upto 500m?
Option A:	30 m
Option B:	50 m
Option C:	20 m
Option D:	10 m
12.	Which method of earthwork calculation of road is based on assumption that mid area of pyramid is half the average area of ends and end sections are in parallel planes?
Option A:	Mid-Section formula
Option B:	Prismoidal Formula
Option C:	Trapezoidal Formula
Option D:	Mean Area method
13.	An agreement not enforceable by law is known as
Option A:	Valid contract
Option B:	Void contract
Option C:	Voidable contract

Option D:	Breach contract
14.	Which of the following contract in which contractors are required to quote a fixed sum
Option A:	Cost plus fixed fee contract
Option B:	Cost plus % rate contract
Option C:	Item rate contract
Option D:	Lump Sum Contract
15.	Which of the following is not part of E-tendering process?
Option A:	Long procurement cycle
Option B:	No chance of fraud
Option C:	Lifelong storage
Option D:	Shareable content
16.	Which of the following contract is followed by Railway department?
Option A:	Target contract
Option B:	Lump sum contract
Option C:	Item rate contract
Option D:	Material supply contract
17.	The value of year's purchase for an old building if its future life is 15 years and the rate of interest is 7% on capital and 4% for sinking fund is
Option A:	9.33
Option B:	8.33
Option C:	7.33
Option D:	6.33
18.	If a property produces a net income of Rs. 4,000/- per annum and a purchaser desires 8% return on his capital according to highest value of prevailing rate, capitalized value of the property will be
Option A:	40,000
Option B:	50,000
Option C:	60,000
Option D:	70,000
19.	The purpose of valuation in which when there is investment in the property in the hope of gain but with the risk of loss is
Option A:	Speculation
Option B:	Compulsory Acquisition
Option C:	Auction Bids
Option D:	Mortgage
20.	Construction equipment was purchased at Rs. 80,000/-with salvage value of Rs.10,000/-after 5 years. The depreciation and Book value at the end of second year by Straight line method will be
Option A:	52,000 and 14,000
Option B:	14,000 and 52,000
Option C:	15,000 and 55,000
Option D:	55,000 and 15,000

Q2.	(20 Marks)
A	Solve any Two 5 marks each
i.	Describe importance of Quantity Survey Estimation and Valuation.
ii.	Draft general specification of first class brickwork in cement mortar.
iii.	Prepare approximate estimate of (G+4) RCC framed building having total carpet area of 500 sq.mt. Building is located in Kalyan. Assume suitable rate of construction. Also make provision of fund for sanitation, electrification, water supply.
B	Solve any One 10 marks each
i.	<p>Workout the following quantities from given plan and section.</p> <ol style="list-style-type: none"> 1) Earthwork in excavation for foundation in ordinary soil. 2) Quantity of 12 mm thick internal cement plaster (1:4) to wall <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div data-bbox="357 689 842 1377" style="text-align: center;"> <p>PLAN</p> </div> <div data-bbox="1114 922 1433 1310" style="text-align: center;"> <p>FOUNDATION DETAILS</p> </div> </div> <p>Size of door and window:</p> <p>D1 = 1.2m x 2.1m (1 No), D2 = 1.5m x 2.1m(1No), D3 = 1m x 2.1m (2Nos), O1 = 3.0m x 2.1m (1No) , O2 = 1.5m x 2.1m(1No) W1 = 1.5m x 1.5m(2Nos), W2 = 1.2m x 1.5m(2Nos), V = 1m x 1.5m(2Nos)</p>
ii.	Prepare Rate Analysis for internal plastering 12 mm thick with cement mortar (1:4) including scaffolding.

Q3.	(20 Marks)																		
A	Solve any Two 5 marks each																		
i.	Draft Notice inviting tender for construction of school building in Thane region for estimated cost of Rs. 200 lacs time limit for work is two years. Contract will having item rate type and tender fee Rs. 1000/- along with document.																		
ii.	What is valuation? What are the purposes of valuation?																		
iii.	What are the conditions of contracts?																		
B	Solve any One 10 marks each																		
i.	<p>A person has purchased a plot of land costing Rs. 8,00,00,000/- and constructed building thereon at a total cost of Rs. 12,00,00,000 including water supply ,sanitary and electrical installations etc. Allowing a net return 7% on the cost of construction and 6% net return on the cost of land. Workout standard rent of the property with the following data:</p> <p style="margin-left: 40px;">i) Sinking fund on 4 % basis for the future life of 75 years = 0.22%</p> <p style="margin-left: 40px;">ii) Annual maintenance $\frac{1}{2}$ % of the cost of construction.</p> <p style="margin-left: 40px;">iii)Municipal taxes and other outgoings 28.5% of the gross rent</p>																		
ii.	<p>Calculate volume of earthwork in cutting and in banking for the road section whose details are given below. Use mean area method</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 5px;">Chainage (m)</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">20</td> <td style="padding: 5px;">40</td> <td style="padding: 5px;">60</td> <td style="padding: 5px;">80</td> <td style="padding: 5px;">100</td> <td style="padding: 5px;">120</td> <td style="padding: 5px;">140</td> </tr> <tr> <td style="padding: 5px;">RL of Ground</td> <td style="padding: 5px;">161.50</td> <td style="padding: 5px;">160.95</td> <td style="padding: 5px;">160.55</td> <td style="padding: 5px;">161.55</td> <td style="padding: 5px;">161.85</td> <td style="padding: 5px;">162.95</td> <td style="padding: 5px;">162.35</td> <td style="padding: 5px;">162.80</td> </tr> </table> <p>Width of formation 10m. F.L. At zero chainage = 161.60m, rising gradient is 1:110. Side slopes =1.5:1 in banking and 2:1 in cutting.</p>	Chainage (m)	0	20	40	60	80	100	120	140	RL of Ground	161.50	160.95	160.55	161.55	161.85	162.95	162.35	162.80
Chainage (m)	0	20	40	60	80	100	120	140											
RL of Ground	161.50	160.95	160.55	161.55	161.85	162.95	162.35	162.80											

University of Mumbai
Examination 2021 under cluster (Lead College: KJSIEIT)

Examinations Commencing from 15th June 2021

Program: CIVIL ENGINEERING

Curriculum Scheme: Rev2012

Examination: BE Semester VII

Course Code: CE-C 702 and Course Name: Quantity survey Estimation & Valuation

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry 02 marks
1.	Which of the following does not have unit in sq.m. *
Option A:	DPC
Option B:	Form work
Option C:	Concrete jaffries
Option D:	RCC chhajja
2.	Which of the following is/are advantages of item rate contract
Option A:	Elasticity and fair to both the parties
Option B:	Economical
Option C:	Absence of uncertainties
Option D:	Ring formation
3.	In which of the following contract; contractor is required to offer a fixed sum for job in all respect as per given drawings and details?
Option A:	Item rate contract
Option B:	Lump-sum contract
Option C:	All in one contract
Option D:	Labor contract
4.	The rate of an item of work is not depends on
Option A:	Specifications of works
Option B:	Type of contractor
Option C:	Type of structure
Option D:	Type of cement used
5.	Revised estimate is prepared when sanctioned estimate is likely to exceed more than-----%
Option A:	5
Option B:	10
Option C:	15
Option D:	20
6.	While calculating plastering quantity no deduction is made when opening is-----
Option A:	Less than 0.5 sqm
Option B:	More than 0.5 sqm
Option C:	More than 1.0 sqm
Option D:	Less than 1.0 sqm

7.	Supplementary estimate is need to prepare when....
Option A:	Material rates increased more than 10 %
Option B:	Material rates decreased more than 10 %
Option C:	Original design is changed
Option D:	Some extension of work in original design
8.	Maximum utilization of reinforcement steel is possible
Option A:	By using skilled labor's
Option B:	By detail studying drawing and specifications
Option C:	By preparing Bar Bending Schedule
Option D:	By proper storage of steel bars
9.	Window grill painting work is measured in...
Option A:	Running meter
Option B:	Square meter
Option C:	Half the area of grill
Option D:	Cubic meter
10.	DSR stands for
Option A:	Different schedule rates
Option B:	District schedule rates
Option C:	District selected rates
Option D:	Direct selling rates
11.	Bills raised at certain intervals of cumulative nature, for the portion of work completed are called
Option A:	Part bills
Option B:	Final bills
Option C:	Running bills
Option D:	Labor bills
12.	Value is fixed by the rate of depreciation
Option A:	Mortgage value
Option B:	Book value
Option C:	Distress value
Option D:	Capital value
13.	Right in possession for the property at the end of term granted to the tenant
Option A:	Speculative value
Option B:	Reversionary value
Option C:	Monopoly value
Option D:	Market value
14.	The unit of payment of cement concrete in lintels is
Option A:	Per sqm
Option B:	Per cum
Option C:	Per quintal
Option D:	Per Kilograms

15.	The hook and bend allowance should not be less than
Option A:	80 mm
Option B:	75 mm
Option C:	70 mm
Option D:	65 mm
16.	The site office and administrative setup associated with a project is included in
Option A:	work charged establishment
Option B:	contingencies
Option C:	sundries
Option D:	contractors' profit
17.	Which of the statement is incorrect for Mass haul diagram
Option A:	The mass haul diagram is diagrammatic representation of earthwork volumes along a linear profile
Option B:	Net earthwork values are plotted along the X-axis
Option C:	Peak indicate a change from cut to fill and valleys occur when the earthwork changes from fill to cut
Option D:	When a horizontal line intersects two or more points along the curve, the accumulated volumes at those points are equal
18.	Amount which is set aside at regular intervals to accumulate initial investment, at the end of life
Option A:	Years purchase
Option B:	Annulation
Option C:	sinking fund
Option D:	capital investment
19.	The density of steel may be taken as
Option A:	8850 kg/cubic meter
Option B:	7850 kg/cubic meter
Option C:	6850 kg/cubic meter
Option D:	5850 kg/cubic meter
20.	Which of the assumption for calculating earthwork is incorrect
Option A:	The end sections are parallel planes
Option B:	The mid-area of a pyramid is three-fourth of the average area of the ends
Option C:	The volume of the Prismoidal is over estimated and hence a Prismoidal correction is applied
Option D:	The mid-area of a pyramid is half of the average area of the ends

Subjective/descriptive questions

Q.2. Write short note on any **FOUR**

5 marks each

- a) Rules for Deduction in plaster work.
- b) Mass haul diagram.
- c) List out types of contract and explain any one with advantages and disadvantages.
- d) What are the points to be observed while framing the specification of the items? Draft the detailed specification for three coat internal plastering with synthetic enamel paint.
- e) Determine approximate estimate of multi storied building G + 6, Carpet area = 78 m^2 ; FSI = 1.2. Cost of land = $10000/\text{m}^2$. Cost of construction = $8500/\text{m}^2$. Assume the necessary data.
- f) Main inclusions of Tender Notice

Q.3. Attempt any **TWO** Questions out of Three

10 marks each

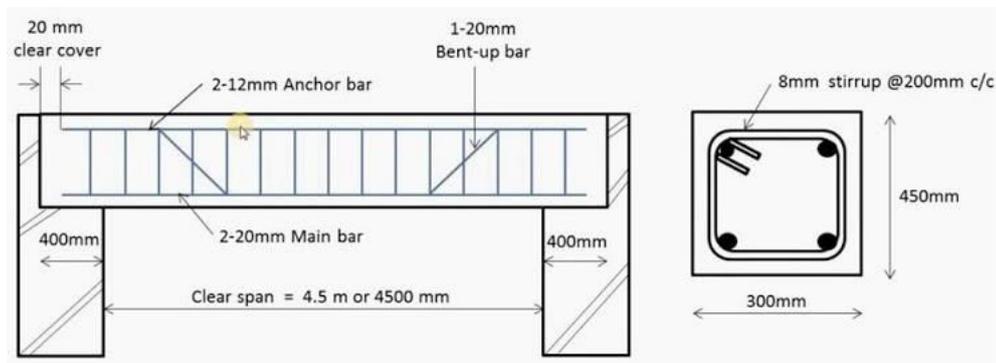


Figure No.1

a) By studying *figure no. 1*. give the details of following

(i) Find cutting length of bent up bar, Stirrups, Main bar And calculate total weight of bent up bars in Kg. Also find quantity of concrete required for Beam only.

b) Draft a tender notice for the construction of Common Effluent treatment plant in Mumbai. It is estimated to cost 70 crores and is to be completed in 20 calendar months.

c) Find out the quantity of earthwork of a road to be constructed with the following data. Formation width = 10 m. Side slope in banking = 2:1, and in cutting 1:1. Downward gradient 1 in 120 from chainage 0 to 120 while it remains in level from 120 to 180 and have again upward gradient 1 in 90 from 180 to 300. Formation level at zero chainage is 210.5m. Chainages and corresponding ground levels are given below.

0	30	60	90	120	150	180	210	240	270	300
210.5	200.8	199.9	198.6	196.4	199.3	198.1	196.3	197.2	196.5	197.2

University of Mumbai

Examination 2021 under cluster __ (Lead College: __KJSIEIT__)

Examinations Commencing from 15th June 2021

Program: **CIVIL ENGINEERING**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: _CE C702 and Course Name: _Theory of Reinforced Concrete Structures

Time: 2 hour

Max. Marks: 80

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Note: Use of IS456:2000 is permitted.

Q1.	Choose the correct option for the following questions. All the Questions are compulsory and carry 2 marks each.
1.	For a rectangular beam of size (250 mm X 525 mm overall depth), with effective cover of 25 mm to tension steel; M20 concrete and Fe415 steel, moment of resistance of balanced section, by working stress method, is
Option A:	46.87 kNm
Option B:	56.87 kNm
Option C:	66.87 kNm
Option D:	76.87 kNm
2.	In a doubly reinforced beam with M20 concrete and Fe415 steel, the compression steel has two bars of 25 mm. The transformed area of compression steel as per working stress theory is
Option A:	15648.29 mm ²
Option B:	16648.29 mm ²
Option C:	17648.29 mm ²
Option D:	18648.29 mm ²
3.	For a rectangular singly reinforced beam, the depth of neutral axis from the top compression fibre is 250 mm. The height of parabolic part of stress block (Limit State Theory) is
Option A:	142.85 mm
Option B:	107.14 mm
Option C:	71.42 mm
Option D:	178.57 mm
4.	For a balanced singly reinforced beam of width 250 mm and effective depth 500 mm with M25 concrete and Fe500 steel, the moment of resistance of the section as per limit state method is
Option A:	233.37 kNm
Option B:	267.67 kNm
Option C:	208.75 kNm
Option D:	245.55 kNm
	For a doubly reinforced beam with M20 concrete and Fe250 steel, compression steel has 2 bars of 16 mm diameter and tensile steel has 4 bars of 20 mm

5.	diameter. Beam width is 230 mm and effective depth is 460 mm. Neglecting f_{cc} (compressive stress in concrete at the level of compression steel) and adopting f_{sc} in compression steel as 217 MPa, the depth of neutral axis as per limit state method is
Option A:	120.35 mm
Option B:	112.35 mm
Option C:	135.35 mm
Option D:	145.35 mm
6.	A T-beam has effective flange width of 1200 mm, flange thickness of 120 mm, width of web 300 mm and effective depth of 560 mm. Concrete grade is M20 and it is reinforced with 4 bars of 25 mm diameter Fe415 steel on tension side (in web). As per limit state theory, the neutral axis lies
Option A:	In flange
Option B:	At the junction of flange and web
Option C:	In the web
Option D:	At the bottom fibre of the web
7.	A balanced T-beam has an effective depth of 500 mm. Concrete is M20 and steel is Fe415. The depth of flange is 120 mm. As per limit state theory, the stresses in the flange will be
Option A:	Uniform
Option B:	Non-uniform
Option C:	Zero
Option D:	Zero at top of flange and maximum at bottom of flange
8.	The development length required for a 16 mm diameter bar of Fe415 steel, with M20 concrete, is
Option A:	452.18 mm
Option B:	552.18 mm
Option C:	652.18 mm
Option D:	752.18 mm
9.	A beam is subjected to a transverse shear of 50 kN at working conditions. The beam width is 250 mm. It is also subjected to a factored torsion of 3 kNm. The value of equivalent shear force as per IS 456:2000 (limit state method) is
Option A:	64.20 kN
Option B:	74.20 kN
Option C:	84.20 kN
Option D:	94.20 kN
10.	A simply supported one-way slab has a clear span of 4 m. The width of supporting wall is 230 mm and effective depth of slab is 120 mm. The effective span of the slab shall be considered as
Option A:	4.23 m
Option B:	4.115 m
Option C:	4.12 m
Option D:	4.46 m
11.	For a simply supported slab, the effective span (L) is 3840 mm and the effective depth (d) is 120 mm. For actual (L/d) equal to allowable (L/d), what must be the

	value of modification factor?
Option A:	1.6
Option B:	1.4
Option C:	1.2
Option D:	1
12.	As per table 19 of IS 456:2000, in limit state method, the shear strength of concrete depends on
Option A:	Percentage of tension steel
Option B:	Grade of concrete
Option C:	Grade of concrete and Percentage of tension steel
Option D:	Grade of steel
13.	In limit state design, the strain distribution is assumed to be
Option A:	Linear
Option B:	Nonlinear
Option C:	Parabolic
Option D:	Parabolic and rectangular
14.	The slab has a overall depth of 130 mm. The maximum diameter of bar that can be used as tensile steel is
Option A:	12 mm
Option B:	16 mm
Option C:	20 mm
Option D:	25 mm
15.	A simply supported beam of length 4 m. carries a UDL of 15 kN/m on its entire span at working conditions. The beam has width of 230 mm and overall depth of 500 mm. The tension steel bars have diameter of 16 mm and the clear cover of 20 mm. The value of shear strength at support section obtained from table 19 of IS 456:2000 (limit state method) is 0.55 MPa. Which of the following statements is correct?
Option A:	The nominal shear stress is greater than the shear strength.
Option B:	The nominal shear stress is less than the shear strength.
Option C:	The nominal shear stress is equal to the shear strength.
Option D:	Shear stirrups are not to be provided.
16.	The maximum deflection (mm) for a beam at service condition is
Option A:	Span/250
Option B:	Span/350
Option C:	Span/450
Option D:	Span/550
17.	For a slab with overall depth of 150 mm and Fe415 steel, the minimum steel area required for 1 m. width is
Option A:	160 mm ²
Option B:	180 mm ²
Option C:	200 mm ²
Option D:	220 mm ²
	The ultimate load carrying capacity as per limit state method for a rectangular

18.	column of size (450 mm X 550 mm) with minimum percentage of steel, M25 concrete and Fe415 steel is
Option A:	2785.74 kN
Option B:	2895.74 kN
Option C:	2995.74 kN
Option D:	3005.74 kN
19.	The ultimate load carrying capacity (limit state method) of a circular column of 300 mm diameter with 1 percent of main reinforcement and helical steel, with M20 concrete and Fe415 steel, is
Option A:	756.37 kN
Option B:	794.18 kN
Option C:	832 kN
Option D:	907.64 kN
20.	A column carries an axial load of 800 kN. Assuming the self weight of the isolated footing as 10 percent of the load carried by column and safe bearing capacity of soil as 200 kN/m ² , the area of footing required is
Option A:	3.4 m ²
Option B:	4.4 m ²
Option C:	5.4 m ²
Option D:	6.4 m ²

Q. 2	Solve <u>Any Two Questions</u> out of the Three.	10 marks each
A	Design a simply supported slab over a clear span of (3.5 m X 7.5 m) using Limit State Method. It carries a live load of 4 kN/m ² and floor finish of 1.2 kN/m ² . The supporting wall has a width of 230 mm. Use M20 Concrete and Fe415 steel. Serviceability checks are not needed. Assume, any data if needed.	
B	Determine the steel required to carry an axial service load of 1000 kN on a rectangular column of size (300 mm X 400 mm), using Limit State Method. Use M20 concrete and Fe415 steel. Assume the column to be short. Draw neat sketches showing the main steel and lateral ties.	
C	Design a square footing for a short axially loaded column of size (300 mm X 300 mm) carrying 600 kN load at service conditions. Use Limit State Method. SBC of soil is 190 kN/m ² . Use M20 concrete and Fe415 steel. Provide depth of footing from one-way shear consideration only.	

Q. 3	Solve both questions (A) and (B)	Total 20 Marks
A	Solve <u>Any Two</u>	5 marks each
i.	A rectangular concrete beam has a width of 220 mm and is reinforced with 2 bars of 20 mm diameter at the bottom as tensile steel. Its effective depth is 400 mm. Materials are M20 concrete and Fe415 steel. Using Limit State Method, estimate ultimate moment of resistance of section.	
ii.	A RCC beam has a support section with a width of 250 mm and effective depth 500 mm. The support section is reinforced with 3 bars of 20 mm diameter on tension side. 8 mm dia-2 legged stirrups are provided at 200 mm C/C. Using M20 concrete and Fe415 steel, calculate shear strength of support section, by Limit State Method.	
	A T-beam of flange width 900 mm, flange thickness 120 mm, web width 270 mm, has an effective depth of 475 mm. The beam has a tensile steel of 4 bars of 20 mm. Using	

iii.	M20 concrete and Fe415 steel, find the ultimate moment of resistance by Limit State Method.
B	Solve <u>Any One</u> 10 marks each
i.	A rectangular beam of width 360 mm and overall depth of 800 mm is subjected to ultimate moment of 220 kNm, factored torsion of 110 kNm and factored shear force of 145 kN. Effective cover on top, bottom and sides is 50 mm. Using M20 concrete and Fe415 steel, design suitable reinforcement for the beam by Limit State Method.
ii.	Find the factored moment of resistance of a beam section (240 mm wide X 460 mm effective depth), reinforced with 2 bars of 16 mm diameter as compression steel at an effective cover of 40 mm and 4 bars of 20 mm diameter as tension steel. Use M20 concrete and Fe250 steel. Take $f_{sc} = 217$ MPa for mild steel. Use Limit State Method.

University of Mumbai
Examination 2021 under cluster __ (Lead College: __KJSIEIT__)

Examinations Commencing from 15th June 2021

Program: **BE Civil**

Curriculum Scheme: 2012

Examination: BE Semester VII

Course Code: CEC703 and Course Name: Irrigation Engineering

Time: 2 hours

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry 02 marks
1.	The irrigation is necessary in
Option A:	regions where the rainfall is excess
Option B:	areas where crops are not grown
Option C:	residential areas
Option D:	areas having scanty and non-uniform rainfall
2.	In which type of irrigation method, the entire land is not wetted?
Option A:	Furrow Method
Option B:	Free Flooding
Option C:	Contour Farming
Option D:	Basin Flooding
3.	Which of the following is not a cross-drainage work?
Option A:	Aqueduct
Option B:	Super-passage
Option C:	Spillway
Option D:	Syphon Aqueduct
4.	The relationship between the duty D in ha/cumecs, the delta in cm, and base period B in days, is given by:
Option A:	$D=864B/\Delta$
Option B:	$D=8.64B/\Delta$
Option C:	$D=(864 \Delta)/B$
Option D:	$D=(8.64 \Delta)/B$
5.	When an oven dried sample of soil is kept in the atmosphere, it absorbs some amount of water. This water is known as
Option A:	capillary water
Option B:	gravitational water
Option C:	hygroscopic water
Option D:	kor water
6.	What is the quality of a good irrigation method from the following?
Option A:	Soil erosion
Option B:	Water logging
Option C:	Leaching

Option D:	Increased yield
7.	For growing irrigated paddy, the ideal water application method is
Option A:	drip irrigation
Option B:	flood irrigation
Option C:	zigzag irrigation
Option D:	sprinkler irrigation
8.	Which of the following is a non-recording rain gauge?
Option A:	Symon's rain gauge
Option B:	Tipping bucket rain gauge
Option C:	Weighing bucket rain gauge
Option D:	Float type rain gauge
9.	Which of the following is not a type of spillway?
Option A:	Ogee
Option B:	Chute
Option C:	Saddle
Option D:	Buttress
10.	Which of the following is not a pressure acting on a gravity dam?
Option A:	Wave pressure
Option B:	Wind pressure
Option C:	Field pressure
Option D:	Uplift pressure
11.	If the intensity of irrigation for Kharif is 45% and that for Rabi is 60%; then the annual intensity of irrigation, is:
Option A:	45%
Option B:	60%
Option C:	100%
Option D:	105%
12.	Which of the following is not a type of precipitation?
Option A:	Arithmetic
Option B:	Orographic
Option C:	Convective
Option D:	Frontal
13.	Fall of moisture from the atmosphere is known as.....
Option A:	Evaporation
Option B:	Transpiration
Option C:	Precipitation
Option D:	Percolation
14.	What is unit hydrograph helpful in?
Option A:	Estimating runoff from a basin
Option B:	Estimating number of days of rain fall
Option C:	Knowing the drought months in a year

Option D:	In deciding the land for hydel power plant
15.	Reservoir sedimentation can be prevented by.....
Option A:	cutting down forests
Option B:	selecting a reservoir site receiving maximum silt from rivers
Option C:	providing check dams and vegetation screens
Option D:	increasing the velocity of water
16.	In case of a flowing well, the piezometric surface is _____
Option A:	always below the ground level
Option B:	always above the ground level
Option C:	always at the ground level
Option D:	maybe below or at the ground level
17.	An aquifer which is confined at its bottom but not at the top is called _____
Option A:	semi-confined aquifer
Option B:	confined aquifer
Option C:	unconfined aquifer
Option D:	artesian aquifer
18.	What is the measure of the fineness of an aquifer?
Option A:	Average grain size
Option B:	Effective diameter of aquifer material
Option C:	Mean particle size
Option D:	Uniformity coefficient
19.	The volume of water which is not useful under ordinary operating conditions is called
Option A:	Surcharge Storage
Option B:	Bank Storage
Option C:	Useful Storage
Option D:	Dead Storage
20.	Water tightness of reservoir basin is investigated under
Option A:	Geological survey
Option B:	Engineering Survey
Option C:	Hydrological Survey
Option D:	Topographical survey

Q2	Solve any Four out of Six	5 marks each
A	Derive the relation between duty, delta and base period. Also find delta for a crop if duty for a base period of 90 days is 1550 ha/cumecs.	
B	Define the following: aquifer, kor period, consumptive use, permanent wilting point, canal lining.	
C	Define a gravity dam and write a short note on the forces acting on a gravity dam	
D	Explain in detail the recuperation test	
E	Draw a single peaked hydrograph and explain its components	
F	Write a short note on the selection of site for reservoir.	

Q3.	Solve any Two Questions out of Three	10 marks each		
A	Calculate the discharge required at the head of canal and the design discharge if time factor is 13/20 and capacity factor is 0.8.			
	Crop	Base Period (days)	Area (ha)	Duty (ha/cumecs)
	Sugarcane	320	850	580
	Overlap of sugarcane in hot weather	90	120	580
	Wheat (Rabi)	120	600	1600
	Bajri (Monsoon)	120	500	2000
	Vegetable (Hot weather)	120	360	600
B	Describe various types of precipitation with neat sketches.			
C	Discuss in detail the failure of earthen dam, with neat sketches			

University of Mumbai

Examination 2021 under cluster __ (Lead College: __KJSIEIT__)

Examinations Commencing from 15th June 2021

Program: BE CIVIL ENGINEERING

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: CE C703 and Course Name: Water Resources Engineering-II

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry 02 marks
1.	The critical velocity ratio was introduced in Kennedy's equation of critical velocity to take into account the effect of :
Option A:	silt grade
Option B:	climatic conditions
Option C:	channel cross-section
Option D:	roughness of bed.
2.	When a channel is protected on the bed and sides with some protective material, and there is no possibility of change in its cross-section and longitudinal slope, then the channel is said to be in :
Option A:	True regime
Option B:	Final regime
Option C:	Permanent regime
Option D:	Initial regime
3.	A gravity dam is subjected to hydro dynamic pressure, caused by :
Option A:	the rising waters of the reservoir when a flood wave enters into it
Option B:	the rising waves in the reservoir due to high winds
Option C:	the increase in water pressure, momentarily caused by the horizontal earthquake, acting towards the reservoir.
Option D:	the increase- In-water pressure, momentarily caused by the horizontal earthquake, acting towards the dam.
4.	Shear key is several times provided between the bottom of a masonry or concrete gravity dam and its foundation, to increase the frictional resistance of the dam against sliding. This key is usually provided :
Option A:	near the toe
Option B:	near the heel
Option C:	near the individual sections in the bed rock
Option D:	near the mid-section
5.	The only provision among the following, which can help control the seepage through the body of an earthen dam and, thus, to keep the phreatic line well within the dam width, is :
Option A:	upstream impervious cutoff
Option B:	drain trench along the downstream toe
Option C:	relief wells

Option D:	chimney drain.
6.	The base width of a rock fill dam, in comparison to that of an earthen dam, is :
Option A:	much larger
Option B:	much smaller
Option C:	sometimes larger sometimes smaller
Option D:	almost equal.
7.	The axis of a gravity dam is the :
Option A:	line of the crown of the dam on the downstream side
Option B:	line of the crown of the dam on the upstream side
Option C:	centre line of the top width of the dam
Option D:	line joining mid points of the base.
8.	A rock toe and a horizontal filter is provided on the downstream base of an earthen dam in order to :
Option A:	prevent piping action in the dam body
Option B:	prevent piping action in the dam foundation
Option C:	to reduce the seepage quantity by blocking its flow
Option D:	to collect and drain out the seepage flow.
9.	When the reservoir is full, the maximum compressive force in a gravity dam is produced
Option A:	at the toe
Option B:	at the heel
Option C:	within the middle third of base
Option D:	at centre of base
10.	Transverse joints in concrete gravity dams are the _____
Option A:	horizontal construction joints at each lift height
Option B:	vertical construction joints of full height and width
Option C:	diagonal construction joints for torsion
Option D:	longitudinal construction joints of full width
11.	The base width of a solid gravity dam is 35 m and the specific gravity of dam material is 2.45. What is the approximate allowable height of the dam having an elementary profile without considering the uplift in meters?
Option A:	191.29m
Option B:	129.92m
Option C:	119.92m
Option D:	112.29m
12.	In a chute spillway, the flow is usually
Option A:	Uniform
Option B:	Subcritical
Option C:	Critical
Option D:	Super critical
13.	If the head of the water over the spillway is less than the design head, then

Option A:	the pressure on the crest will be zero
Option B:	the pressure on the crest will be negative causing cavitation
Option C:	the discharge coefficient of the spillway is increased
Option D:	the discharge coefficient of the spillway will be reduced
14.	The _____ spillway gate coincides with the crest line when lowered and cannot be seen from a distance.
Option A:	Sliding gate
Option B:	Roller gate
Option C:	Tainter gate
Option D:	USBR drum gate
15.	Which type of canal does not need cross drainage structures?
Option A:	Side Slope Canal
Option B:	Contour Canal
Option C:	Watershed Canal
Option D:	Field Channel
16.	The canal, which can irrigate only on one side, is a
Option A:	watershed canal
Option B:	contour canal
Option C:	Side slope canal
Option D:	power canal
17.	A Super passage is the reverse of _____
Option A:	syphon
Option B:	inlets and outlets
Option C:	syphon Aqueduct
Option D:	aqueduct
18.	Which of the following CD works is done by passing canal below the drainage?
Option A:	Aqueduct and Syphon Aqueduct
Option B:	Super passage and Syphon
Option C:	Level-crossing and inlets outlets
Option D:	Canal Syphon and Aqueduct
19.	The gated regulator, which is constructed in the parent canal near the site of an off-taking canal, is called a :
Option A:	canal head regulator
Option B:	distributary head regulator
Option C:	cross regulator
Option D:	head regulator
20.	The central core of the zoned embankment type earth dam _____
Option A:	checks the seepage
Option B:	prevents piping
Option C:	gives stability to the central impervious fill
Option D:	distribute the load over a large area

Q2	Solve any Four out of Six	5 marks each
A	Enlist the difference between Elementary and Practical profile of gravity dam.	
B	Explain with neat diagram the seepage failure of earth dam.	
C	What are different types of spillway gates? Explain in detail with diagram ANY ONE of the spillway gates.	
D	Write in details the procedure for design of channel according to Lacey's theory.	
E	Explain the detailed classification of Canals.	
F	Write a short note on: Canal Regulator & Head Regulator.	

Q3.	Solve any Two Questions out of Three	10 marks each
A	A masonry dam 6m high is 1.5m wide at the top and 4.5m wide at the bottom, with vertical water face. Determine the normal stresses at the toe and heel for reservoir empty and reservoir full conditions. Take $\rho=2.4$ and $c=1$	
B	Design an Ogee spillway for concrete gravity dam, for following data: <ol style="list-style-type: none"> 1. Average river bed level = 250.00m 2. R.L. of spillway crest = 350.00m 3. Slope of d/s face of gravity dam = 0.75:1 4. Design discharge = 6500cumecs 5. Length of spillway = 5spans with a clear length of 9m each 6. Thickness of each pier = 2m 	
C	Design a channel section by Kennedy's theory given the following data: Discharge, $Q = 28$ cumecs Kutter's co-efficient, $N = 0.0225$ Critical Velocity Ratio, $m = 1$ Side slope = 0.5:1 $B/D = 7.6$ Find also the bed slope of the channel.	