University of Mumbai

Examination 2020 under cluster : KJSIEIT

Program: Civil Engineering

Curriculum Scheme: Rev 2016

Examination: TE Semester VI

Course Code: C604 and Course Name: Environmental Engineering-II

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks.**
1.	Which of the following activated sludge process has minimum food to microorganism ratio?
Option A:	Extended aeration
Option B:	Step aeration
Option C:	Modified aeration
Option D:	Conventional
2.	Volume of returned sludge/Volume of influent sludge ratio of a conventional activated sludge plant is
Option A:	0.25 to 0.5
Option B:	10 to 20
Option C:	25 to 30
Option D:	1 to 5
3.	The 1 day BOD at 20 degree C of waste water sample is 100 mg/lt. Determine its ultimate BOD. Assume K = 0.1/ day at 20 degree C.
Option A:	Lo = 180.68 mg/lt
Option B:	Lo = 486.21 mg/lt
Option C:	Lo = 580. 98 mgl/lt
Option D:	Lo = 260.54 mg/lt
4.	The depth of bio-filters varies between
Option A:	0.6 to 1.0 m
Option B:	1.2 to 1.5 m
Option C:	1.5 to 1.8 m
Option D:	2.5 to 5.5 m
5.	R.C.C. chamber constructed at suitable intervals along the sewer lines, for providing access into them is called _____
Option A:	Inverted siphons
Option B:	Clean-outs
Option C:	Manhole
Option D:	Flushing tank
6.	The flow through velocity for Imhoff tank, should, generally not exceed
Option A:	0.3 m/min
Option B:	3 m/min
Option C:	30 m/min

Option D:	0.03m/min
7.	Which solid waste disposal method is ecologically most acceptable?
Option A:	Composting
Option B:	Landfill
Option C:	Incineration
Option D:	pyrolysis
8.	The optimum temperature for sludge digestion is
Option A:	10 degree C
Option B:	25 degree C
Option C:	37 degree C
Option D:	55 degree C
9.	Sewage sickness occurs when
Option A:	Sewage contains pathogenic organisms
Option B:	Sewage enters the water supply system
Option C:	Sewage gets clogged dues to accumulation of solids
Option D:	Voids of soil get clogged due to continuous application of sewage on a piece of land.
10.	For conventional activated sludge process, the mixed liquor suspended solid should range between
Option A:	10 to 100 mg/l
Option B:	150 to 300 mg/l
Option C:	1500 to 3000 mg/l
Option D:	5000 to 10000 mg/l
11.	_____ provides only one sewer to carry both foul sewage and rainwater.
Option A:	Separate water carriage system
Option B:	Combined water carriage system
Option C:	Partially combined water carriage system
Option D:	Conservancy system
12.	High rate activated sludge plant can produce sufficiently good quality effluent by removing _____ of BOD from sludge.
Option A:	80 - 85%
Option B:	5 - 10 %
Option C:	20 - 30 %
Option D:	40 - 50 %
13.	A grit chamber is usually installed _____ primary sedimentation tanks.
Option A:	Before
Option B:	In
Option C:	In Between
Option D:	After
14.	The BOD removal in an oxidation pond may be up to
Option A:	100 %
Option B:	85%

Option C:	80%
Option D:	90%
15.	What is a sewer that runs full under gravity, flow at a pressure above the atmosphere in the sewer called?
Option A:	Flushing manhole
Option B:	Inverted siphon
Option C:	Curb inlet
Option D:	Siphon
16.	If 10 ml of raw sewage is diluted to 250 ml, the dilution factor is
Option A:	10
Option B:	25
Option C:	1/25
Option D:	250
17.	The settling velocity of a spherical body in still water is given by
Option A:	Stroke's law
Option B:	Lacey's formula
Option C:	Darcy's formula
Option D:	Hazen William's formula
18.	Which type of bacteria is used in trickling filters?
Option A:	Facultative
Option B:	Nitrifying
Option C:	Blue-green bacteria
Option D:	Anaerobic
19.	Allowable head loss in bar screen is
Option A:	150 mm
Option B:	300 mm
Option C:	280 mm
Option D:	75 mm
20.	Which gas is responsible for pungent smell, while decomposition of sewage?
Option A:	HCL
Option B:	H_2SO_4
Option C:	H_2S
Option D:	CO_2

Q2.	**Solve any questions four out of six (5 marks each) (Total: 20 Marks)**
A	Explain in brief aerobic decomposition and anaerobic decomposition.
B	What is Sludge volume index? What is its significance?
C	Write note on high-rate trickling filter.
D	Explain flow sheet for conventional sewage treatment plant with neat sketch.
E	Write short note on Combined & Separate system of sewerage.
F	Write short note on E-wastes and Plastic wastes.

Q3.	**Solve any two questions out of three (10 marks each) (Total:20 Marks)**
A	Design a conventional activated sludge plant to treat domestic sewage by using given data: 1. Population = 35000 2. Average sewage flow = 180 lpcd 3. BOD of sewage = 220 mg/l 4. BOD removal in primary treatment = 30 % 5. Overall BOD reduction desired = 85 %.
B	The sewage flows from a primary settling tank to a standard rate trickling filter at a rate of 5 million liters per day having a 5-day BOD of 150 mg/l. Determine the depth and the volume of the filter, adopting a surface loading of 2500 $l/m^2/day$ and an organic loading of 165 $g/ m^3/day$. Also determine the efficiency of the filter unit, using NRC formula.
C	Design a septic tank for a hostel housing 125 persons. Also design the soil absorption system for the disposal of the septic tank effluent, assuming the percolation rate as 20 minutes per cm. Assume suitable data if necessary.

University of Mumbai

Examination 2020 under cluster : KJSIEIT

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

Program: **BE Civil**

Curriculum Scheme: Rev 2016

Examination: TE Semester VI

Course Code: CEC605 and Course Name: Water Resources Engineering-I

Time: 2 hours Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	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
2.	Irrigation from wells is what type of irrigation system?
Option A:	Lift Irrigation
Option B:	Tank Irrigation
Option C:	Direct Irrigation
Option D:	Flow Irrigation
3.	The irrigation is necessary in
Option A:	regions 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
4.	For irrigation purposes, the p-H value of water should be
Option A:	between 3 & 6
Option B:	between 6 & 8.5
Option C:	between 8.5 & 11
Option D:	more than 11
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.	An irrigation project designed to serve a command of more than 2000 hectares and up to 10000 hectares, is known as
Option A:	major irrigation project
Option B:	minor irrigation project

Option C:	medium irrigation project
Option D:	none of them, since irrigation projects are classified on the basis of their cost
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.	Kor-Watering is the irrigation water supplied to a crop:
Option A:	at the time of its sowing
Option B:	just before harvesting
Option C:	about three weeks after sowing
Option D:	about three weeks before harvesting.
9.	The kor period, within which a crop must receive its first major watering, will be :
Option A:	less for humid climates
Option B:	equal for all climates
Option C:	less for dry climates
Option D:	independent of climate
10.	Permanent wilting point moisture content for a crop represents the:
Option A:	hygroscopic water
Option B:	capillary water
Option C:	field capacity water
Option D:	gravitational water
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.	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:	$D=(8.64\ \Delta)/B$
13.	The lag time in hydrograph is:
Option A:	another name for the peak discharge
Option B:	how big the river channel is
Option C:	the time distance between peak rainfall and peak discharge
Option D:	the time distance between the end of the storm and peak discharge
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.	What does hydrograph base on day gives?
Option A:	Idea about flood period during the month
Option B:	Idea of rainfall
Option C:	Idea of draught during the year
Option D:	Idea of scarcity of water in the upcoming year
16.	In case of a flowing well, the piezometric surface is always _____
Option A:	below the ground level
Option B:	above the ground level
Option C:	at the ground level
Option D:	above or below 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	*Explains the different zones of storage in a reservoir. Also draw a neat diagram.*
B	*Define the following: aquifer, aquifuge, aquiclude, transmissibility, drawdown, cone of depression.*
C	*Derive the relation between duty, delta and base period. Also find delta for a crop if*

	duty for a base period of 98 days is 1600 ha/cumecs.
D	*Explain in detail the recuperation test*
E	*Draw a single peaked hydrograph and explain its components*
F	*Write a short note on reservoir sedimentation, its prevention and methods of desilting.*

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

Given below are the ordinates of a 6h unit hydrograph for a catchment. Calculate the ordinates of direct runoff hydrograph due to a rainfall excess of 4.5

Time hrs.	0	3	6	9	12	15	18	24	30	36	42	48	54	60	69
Flow cumecs	0	25	50	85	125	160	185	160	110	60	36	25	16	8	0

University of Mumbai

Examination 2020 under cluster KJSIEIT

Program: **Civil Engineering**

Curriculum Scheme: Rev 2016

Examination: TE Semester VI

Course Code: CE-DLO6061 and Course Name: Advanced Construction Equipments

Time: 2-hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Dragline does not have
Option A:	Chain and rope arrangement
Option B:	High self-weight
Option C:	Positive hydraulic control
Option D:	Huge size.
2.	The deepest, inclined and centrally located drill holes are called
Option A:	Rim holes
Option B:	Reliever holes
Option C:	Relief holes
Option D:	Cut holes
3.	The equipment used to remove weared out pavement and lay a new layer is called
Option A:	Sack rammer
Option B:	Jack hammer
Option C:	Tack hammer
Option D:	Back rammer
4.	Vibratory pile drivers provide vibratory motion to the piles using
Option A:	Spinning counterweights
Option B:	Balancing counterweights
Option C:	Counterbalancing weights
Option D:	Counter spinning weights.
5.	Single and double toggle are types of
Option A:	Gyratory Cone crusher
Option B:	Jaw crusher
Option C:	Hammer mill
Option D:	Rod and ball crusher
6.	NATM stands for
Option A:	New Austrian Tunneling Method
Option B:	Navy advised Tunneling Method
Option C:	New Australian Tunneling Method
Option D:	Norwegian advanced tunneling method

7.	Removal of debris from inner portion of a tunnel to open atmosphere is called
Option A:	Lead
Option B:	Lift
Option C:	Mucking
Option D:	Scraping
8.	Modular shuttering is most suitable for
Option A:	tunnels
Option B:	Mass housing projects
Option C:	Small contractors
Option D:	Chimney construction
9.	Prefabricated housing system is most suitable
Option A:	For low-cost housing project.
Option B:	Rural and remote areas
Option C:	For cold regions
Option D:	during disaster or emergency events
10.	Well point is a
Option A:	Tunneling system
Option B:	Pile driving system
Option C:	Dewatering system
Option D:	Blasting system
11.	A water desalination plant installed at the sea coast will use
Option A:	Soil improvement techniques
Option B:	Pipeline insertion system
Option C:	TBM
Option D:	Jumbo machine for drilling and blasting
12.	The source of power most neglected in India is
Option A:	Tidal power
Option B:	Hydro power
Option C:	Thermal power
Option D:	Atomic power
13.	Thermal power plants use coal for
Option A:	Harnessing its own heat.
Option B:	Boiling water and creating steam.
Option C:	Lighting the interiors of the power plant
Option D:	Running Generators
14.	Subsurface drainage system is a major activity in construction of
Option A:	Bus stations
Option B:	Chimneys
Option C:	Airports
Option D:	bridges

15.	Dredging is a major operation to be done while constructing
Option A:	Railway Stations
Option B:	Nuclear power plants
Option C:	Space stations
Option D:	Harbours and ports
16.	The only monorail in Mumbai runs from
Option A:	Chembur to Satrasta
Option B:	Chembur to Wadala
Option C:	Versova to Ghatkopar
Option D:	Chembur to Backbay Reclamation
17.	Track laying machine lays tracks at a speed of
Option A:	1.5km/day
Option B:	1 km/day
Option C:	2.5km/day
Option D:	0.5km/day
18.	The underground metro whose work is ongoing will run between
Option A:	Thane-Kalyan via Bhiwandi
Option B:	Colaba-Seepz
Option C:	Wadala-Thane-Kasarvadavali
Option D:	Kasarvadavali-Miraroad-Bhayander
19.	Damages to underground utility lines can easily be located using
Option A:	Great trigonometrical radars
Option B:	Underground utility locator
Option C:	Ground positioning remotes
Option D:	Ground penetrating radar
20.	Air compressors are not used for
Option A:	Jet grouting
Option B:	Guniting
Option C:	Running stone crushers
Option D:	Cleaning

Q2	
A	**Solve any Two** **5 marks each**
i.	Explain the working of a Jaw crusher.
ii.	Explain heading, drift, shaft and pilot tunnel with neat sketch.
iii.	Explain well point system installed for dewatering of trenches.
B	**Solve any One** **10 mark each**
i.	What safety precautions should be taken when tunneling in rocks is to be done?
ii.	Write a detailed note on Vertical shaft sinking machine.

Q3.	
A	**Solve any Two** **5 marks each**
i.	Describe the working of a Ground penetrating radar.
ii.	With the help of a neat sketch, explain the components of a hydropower plant.
iii.	Draw a neat labelled sketch of a tower crane & state few applications of it.
B	**Solve any One** **10 marks each**
i.	Describe Incremental launching method of bridge construction.
ii.	Define magnetic levitation. Explain EDS and EMS systems of Maglev.

University of Mumbai

Examination 2020 under cluster KJSIEIT

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

Program: Civil Engineering

Curriculum Scheme: Rev2016

Examination: TE Semester VI

Course Code:DLOC6062 and Course Name: Traffic Engineering and Management

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	_____ is the present value of a future payment or a series of future payments at the given rate of interest.
Option A:	Interest rate
Option B:	Present Worth
Option C:	Rate of Return
Option D:	Discounting
2.	____ is the term commonly used in economic analysis for the rate at which economic benefits are obtained by a project.
Option A:	Interest rate
Option B:	Present Worth
Option C:	Rate of Return
Option D:	Discounting
3.	A major rehabilitation of a pavement will be done 10 years from hence at a cost of Rs100 lakh. The series of uniform annual payments that must be set apart to accumulate this amount, if the interest rate is 9% per annum is Rs ____ lakh
Option A:	0.658
Option B:	6.58
Option C:	65.8
Option D:	658
4.	The analysis of transportation data and building models to describe the mathematical relationship that can discerned in the trip making behaviour is known as _____ .
Option A:	Trip generation
Option B:	Trip distribution
Option C:	Modal split
Option D:	Route assignment
5.	Estimate trip rate for a residential land use with 2865 thousands of square feet and

	7156 person trips
Option A:	2.5
Option B:	0.4
Option C:	6.3
Option D:	1.6
6.	_____ is the dependent variable in regression analysis for Trip Generation.
Option A:	Households
Option B:	Car ownership
Option C:	Income
Option D:	Number of trips
7.	The modal split share CAR: BUS: METRO for a city is 35:20:45. The number of trips made by CAR, BUS & METRO out of total 2500 trips made from origin to destination are _____, _____ & _____ respectively.
Option A:	500, 875, 1125
Option B:	875, 500, 1125
Option C:	1125, 875, 500
Option D:	500, 1125, 875
8.	Utilities of two transport modes are 1.0 each. Estimate the probability of one of the modes
Option A:	0.45
Option B:	0.55
Option C:	0.50
Option D:	0.60
9.	What is the acceleration due to retardation of a vehicle in m/sec^2 when on pavement surface having a longitudinal coefficient of friction of 0.38
Option A:	3.7278
Option B:	3.800
Option C:	3.9812
Option D:	3.0808
10.	What is the basic capacity of a lane if the operating speed is 65km/hr with a safe stopping sight distance of 90m. Assume average length of vehicle = 6m
Option A:	771 veh/hr
Option B:	654 veh/hr
Option C:	677 veh/hr
Option D:	560 veh/hr
11.	Free flow speed on a lane was 60km/hr and jam density was 90 veh/km. the maximum flow in veh/hr that could be expected on this lane is
Option A:	5400
Option B:	2700
Option C:	2750
Option D:	1350

12.	Design capacity is often provided as
Option A:	Basic capacity
Option B:	Practical capacity
Option C:	Ideal capacity
Option D:	Possible capacity
13.	As per IRC: 106, at LOC C design service volume , the volume of traffic will be around how many times the maximum capacity adopted for the design of urban roads?
Option A:	0.7
Option B:	0.3
Option C:	10
Option D:	30
14.	The present worth of a sum of Rs 750000 at the end of 10 years when the discount rate is 10 % per annum is Rs. _____
Option A:	2,891.25
Option B:	2,891,250.00
Option C:	2,891,25.00
Option D:	28,912.50
15.	The traffic flow parameters which is not used to measure effectiveness is
Option A:	Flow
Option B:	Delay
Option C:	Density
Option D:	Speed
16.	Space headway is defined as
Option A:	length of vehicle from front to back bumper
Option B:	Space gap between two successive vehicle
Option C:	length from the centre of one vehicle to the centre of another
Option D:	distance between common points of successive vehicles
17.	With Increase in traffic density , traffic flow
Option A:	Increases
Option B:	Decreases
Option C:	First increases and then decreases after reaching a maximum value at optimum speed
Option D:	First decreases and then increases after reaching a maximum value at optimum speed
18.	The Average Number of cars passing a point on a NH is 2000 PCU/hr per lane. The cars travel at an average speed pf 50km/hr. What is the clear distance between the successive cars if the average length of a car is 5.5m
Option A:	30.5m
Option B:	34.5m
Option C:	14.5m
Option D:	19.5m
19.	As per IRC :106, it is advisable to design road cross sections for traffic volume

	equal to the maximum capacity at LOS
Option A:	B
Option B:	C
Option C:	D
Option D:	E
20.	With Increase in traffic speed , traffic density
Option A:	Increases
Option B:	Decreases
Option C:	First increases and then decreases after reaching a maximum value at optimum speed
Option D:	First decreases and then increases after reaching a maximum value at optimum speed

Q2 **(20 Marks Each)**	
A	**Solve any Two** **5 marks each**
i.	Explain briefly Lowry's Land-use-Transport model?
ii.	Mention different types of traffic controlling devices and explain any one briefly?
iii.	Define PCU and mention the various values of PCU for different vehicles
B	**Solve any One** **10 marks each**
i.	What is Jam density and its significance? At a time, in front of the JNPT in Mumbai, a long queue of trucks were waiting for inspection and permission to enter. The trucks have an average length of 17m and the average space between the front and rear bumpers of successive trucks is 3m. What is the jam density in a lane (trucks/km).
ii.	With help of diagram explain the relation between Q ,K and V
Q3. **(20 Marks Each)**	
A	**Solve any Two** **5 marks each**
i.	Explain in brief Car Following Theory and Queuing Theory.
ii.	With a neat Sketch explain the Design of Rotary island
iii.	Mention different types of parking facilities
B	**Solve any One** **10 marks each**

i.	Define and Distinguish between Time mean speed and Space Mean speed. Calculate the TMS and SMS of three vehicles travelling over a 2km length in 2.1min, 2.1min and 2.5 min respectively.
ii.	Mention Different Methods of Economic Evaluation and explain any one briefly

University of Mumbai

Examination 2020 under cluster KJSIEIT

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

Program: **BE Civil Engineering**

Curriculum Scheme: Rev 2016

Examination: TE Semester VI

Course Code: CE-DLO6063 and Course Name: Ground Improvement Techniques

Time: 2-hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The effect of salinity in soil is
Option A:	Increase the moisture content and make soil dry and rough
Option B:	Decrease the unit weight of soil with increase in salinity
Option C:	Decrease undrained shear resistance of the soil
Option D:	Increase undrained shear resistance of the soil
2.	For stabilization of heavy clays, the following method is generally most effective.
Option A:	Mechanical stabilization
Option B:	Electrical stabilization
Option C:	Thermal stabilization
Option D:	Chemical stabilization
3.	Permeation grouting is also known as
Option A:	Slurry grouting
Option B:	Compaction grouting
Option C:	Jet grouting
Option D:	Chemical grouting
4.	The rate of injection of grout is not depends on
Option A:	Viscosity of the grout
Option B:	Permeability
Option C:	Shear strength of the soil
Option D:	Type of work
5.	In compaction grouting, grout hole
Option A:	May be inclined with inclination not exceeding more than 20° of vertical
Option B:	May be inclined with inclination exceeding more than 20° of vertical
Option C:	May not be inclined
Option D:	May be inclined
6.	Method adopted for shallow compactions
Option A:	Dynamic compaction
Option B:	Rolling and vibrating using rollers
Option C:	Compaction grouting

Option D:	Blast densification
7.	In suspension grouting D15 indicating
Option A:	Particle size at which 15 % of the soil is finer
Option B:	Particle size at which 85 % of the grout is finer
Option C:	Particle size at which 15 % of the soil is coarser
Option D:	Particle size at which 85 % of the soil is coarser
8.	Mechanical Stabilization requires
Option A:	Mixing of two or more types of natural soils
Option B:	Addition of chemicals to soils
Option C:	Addition of lime to soils
Option D:	Addition of cementing, material to soils
9.	Electro-kinetic injection in soil results in
Option A:	increased strength, increased compressibility, reduced liquefaction potential
Option B:	increased strength, reduced compressibility, increased liquefaction potential
Option C:	increased strength, reduced compressibility, reduced liquefaction potential
Option D:	increased strength, increased compressibility, increased liquefaction potential
10.	Precompression without any applied loading is obtained by
Option A:	Preloading without surcharge
Option B:	Preloading with vertical drains
Option C:	Electro-osmosis
Option D:	Installing sand drains
11.	In reinforced soils as a whole, checking of stability for sliding, overturning, bearing and slip is known as
Option A:	External stability
Option B:	Internal Stability
Option C:	Slope stability
Option D:	supplemental stability
12.	Vertical sand drains were installed in a saturated clay. Estimate the average degree of consolidation considering simultaneous vertical and radial drainage, when average degree of consolidation assuming only vertical drainage was 70% and average degree of consolidation assuming only radial drainage was 80%.
Option A:	85%
Option B:	90%
Option C:	94%
Option D:	98%
13.	Vibro-compaction or Vibroflotation is adopted for
Option A:	Construction on clayey soil
Option B:	Construction on granular fill
Option C:	Construction on dredged material
Option D:	Construction on organic silt
14.	Components of Reinforced soil wall are soil, reinforcement and

Option A:	Skin
Option B:	Nails
Option C:	Water
Option D:	Additives
15.	Estimate the pull out capacity per meter length of a steel nail of diameter 50 mm driven in soil in horizontal position, while it was under a vertical stress of 144 kN/m^2. Consider the interface friction angle between the nail and soil surface as 30^o.
Option A:	9.14 kN
Option B:	13.06 kN
Option C:	5.63 kN
Option D:	18.81 kN
16.	The equivalent circle has an effective diameter for a square pattern
Option A:	1 S
Option B:	2 S
Option C:	1.05 S
Option D:	1.13 S
17.	Stone columns of 800 mm diameter in square pattern with 1.6 m c/c spacing are installed in soft clay underneath an embankment. From the unit cell concept, estimate the tributary soil area surrounding each column.
Option A:	2.06 m^2
Option B:	1.86 m^2
Option C:	2.56 m^2
Option D:	1.71 m^2
18.	Irrespective of the method used to construct the stone columns, the blanket laid over the top of the stone columns should consists of
Option A:	clean gravel
Option B:	clean medium to coarse sand
Option C:	clean fine sand or silt
Option D:	clay or silty clay
19.	Critical length of stone column is considered as
Option A:	about 2 times the diameter of stone column
Option B:	about 4 times the diameter of stone column
Option C:	equal to diameter of stone column
Option D:	about 5 times the diameter of stone column
20.	Mononobe-Okabe method is limited to
Option A:	Dry cohesive backfill
Option B:	Backfill slopes (3H:1V or flatter)
Option C:	Coefficient of seismic active earth pressure more than or equal to 0.6
Option D:	Free draining backfill material with limited seismic active wedge

Q2.	Solve any Four out of Six 5 marks each
A	State five major problematic soils and explain the various geotechnical problems faced by them.
B	Explain basic mechanism of soil reinforcement? State the various soil reinforcement field applications.
C	Explain cement stabilization? What are the chemical reactions that take place in cement stabilization?
D	What do you mean by preloading? State advantages and disadvantages.
E	Describe in details compaction grouting method with neat sketch
F	State and explain the factors that influence stone-column foundation response?

Q3.	Solve any Four out of Six 5 marks each
A	What is soil nailing? Explain stepwise process of soil nailing technique
B	State and explain desirable characteristics of grout
C	Write a short note on deep mixing methods?
D	What are the basic design parameters of stone column?
E	What are the different failure mechanisms of stone column?
F	How do you evaluate dynamic compaction method?

University of Mumbai

Examination 2020 under cluster KJSIEIT

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 2016

Examination: TE VI Sem

Course Code: CE-DLO6064 and Course Name: Advance Structural Analysis

Time: 2 hour Max. Marks: 80

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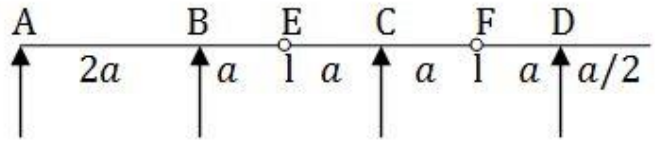
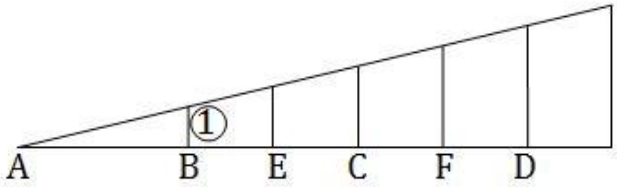
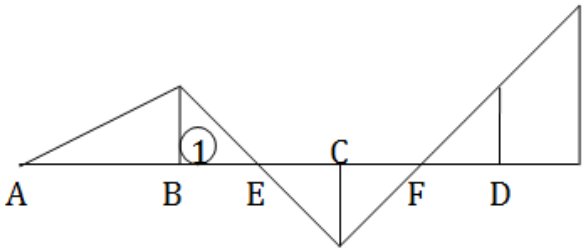
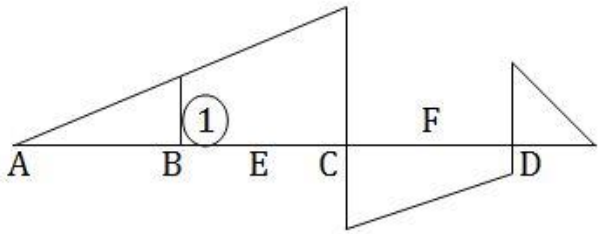
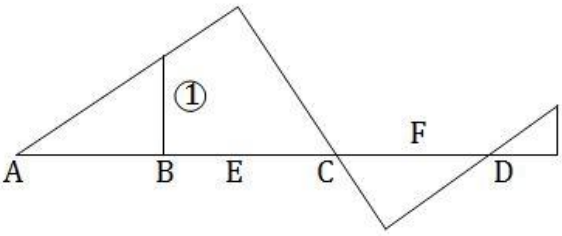
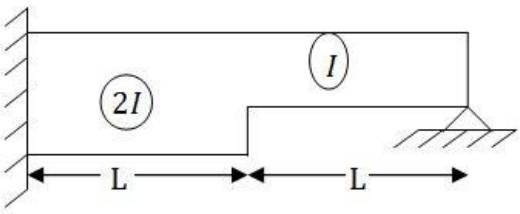
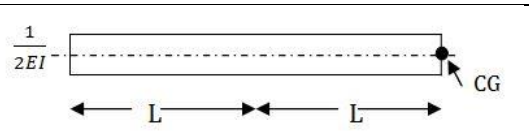
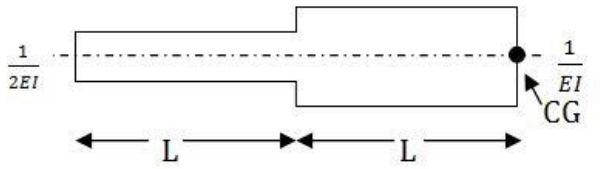
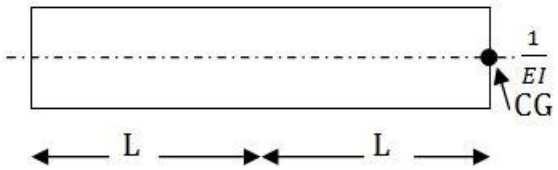
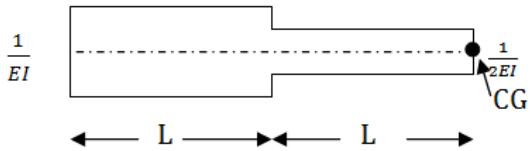
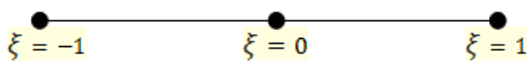
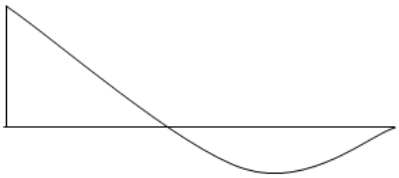
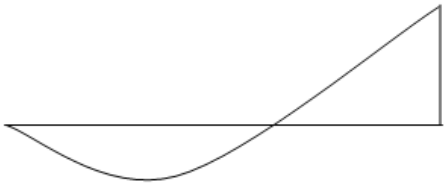
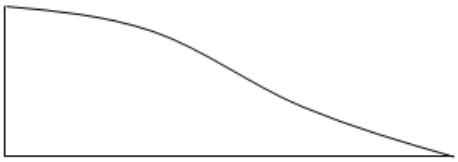
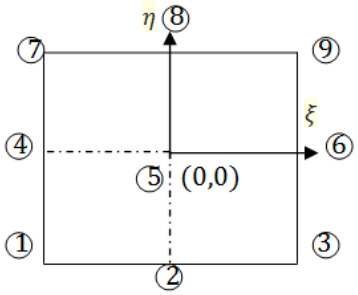
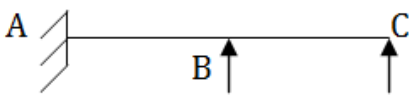
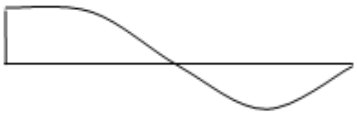
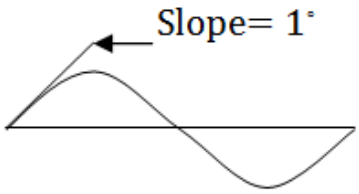
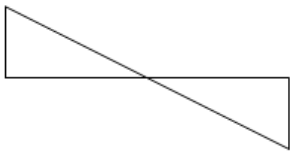
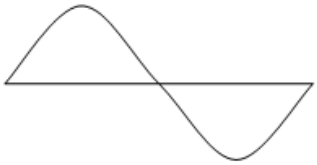
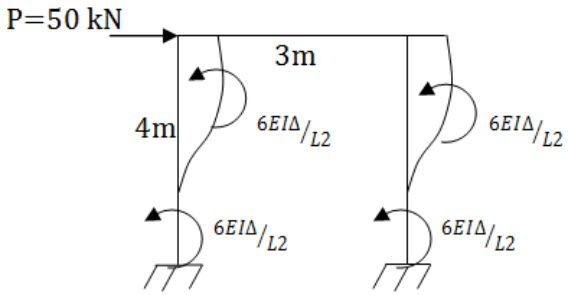
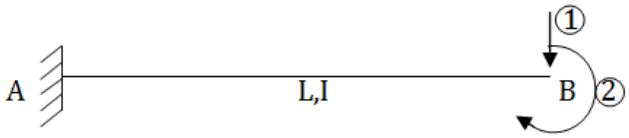
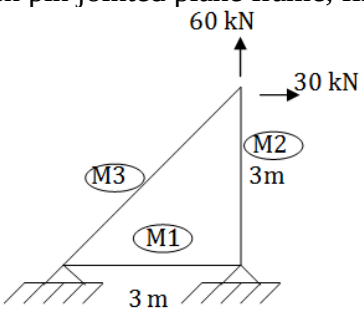
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Choose the correct flexibility matrix for given plane frame element 
Option A:	$= \begin{bmatrix} 0 & 0 & 0 \\ 0 & L^3/3EI & L^2/2EI \\ 0 & L^2/2EI & 0 \end{bmatrix}$
Option B:	$= \begin{bmatrix} L/AE & 0 & 0 \\ 0 & L^3/3EI & L^2/2EI \\ 0 & -L^2/2EI & -L/EI \end{bmatrix}$
Option C:	$\begin{bmatrix} L/AE & 0 & 0 \\ 0 & L^3/3EI & L^2/2EI \\ 0 & L^2/2EI & L/EI \end{bmatrix}$
Option D:	$\begin{bmatrix} L^3/3EI & 0 & 0 \\ 0 & L^3/3EI & L^2/2EI \\ 0 & L/AE & L/EI \end{bmatrix}$
2.	Column analogy method is applicable for
Option A:	Determinant structure
Option B:	Indeterminant structure having static indeterminacy less than or equal to 3
Option C:	In determinant structure having $D_k > D_s$
Option D:	Statically determinant structure
3.	In column analogy method, the area of analogous column for a fixed beam of span L and flexural rigidity EI is taken as _____?

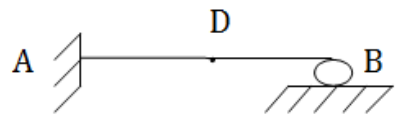
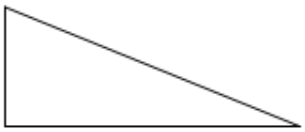
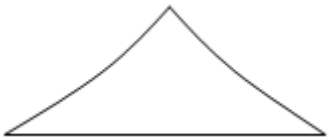
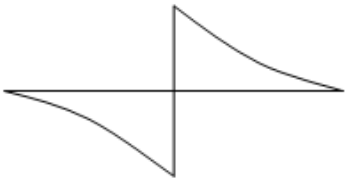
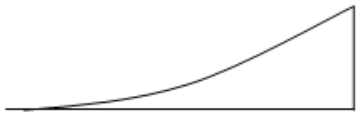
Option A:	L/EI
Option B:	$L/3EI$
Option C:	$L/4EI$
Option D:	$L/2EI$
4.	The influence line diagram for reaction B of the beam shown in figure is _____ 
Option A:	
Option B:	
Option C:	
Option D:	
5.	Which one of the following is the correct analogous column of following? 

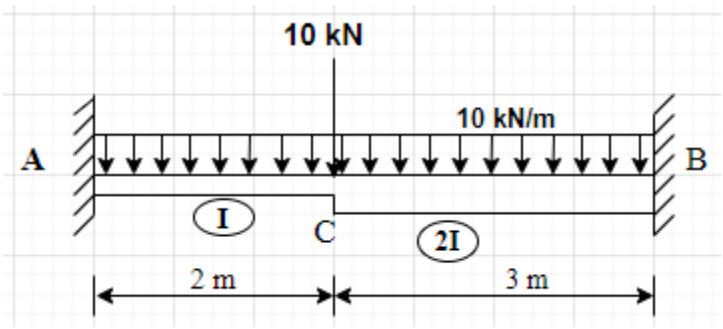
Option A:	
Option B:	
Option C:	
Option D:	
6.	Influence line for redundant structures can be obtained by
Option A:	Unit load theorem
Option B:	Maxwell's Betti Theorem
Option C:	Castigliano's Theorem
Option D:	Muller Breslau Principle
7.	Modified Stiffness of symmetric beam with antisymmetric loading is
Option A:	$2EI/_L$
Option B:	$4EI/_L$
Option C:	$6EI/_L$
Option D:	$3EI/_L$
8.	In C° continuity element the only unknown is
Option A:	Slope
Option B:	Displacement
Option C:	Bending
Option D:	Reaction
9.	For 3-noded bar element with natural co-ordinate system  Obtain the variation of shape function for Node 2 (N_2)
Option A:	

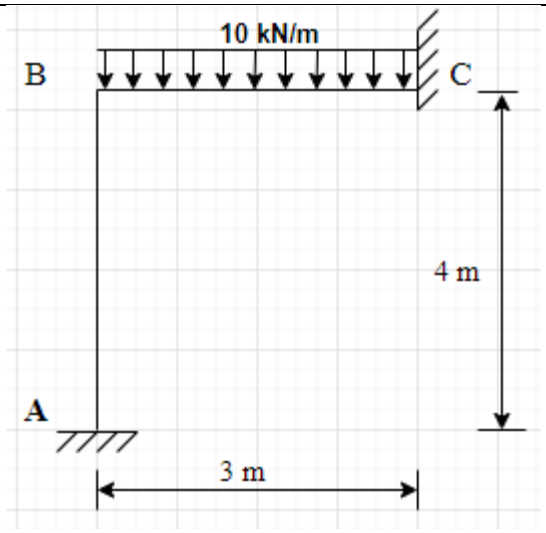
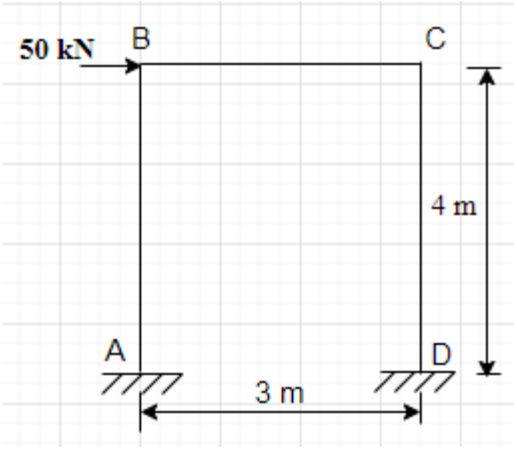
Option B:	
Option C:	
Option D:	
10.	Which one of the following is the shape function for the Node 7 in nine noded rectangular element in natural co-ordinate system using Langrange's function. 
Option A:	$N_7 = \frac{(\xi+1)\xi\eta(\eta-1)}{4}$
Option B:	$N_7 = \frac{\xi(\xi-1)(\eta+1)\eta}{4}$
Option C:	$N_7 = \frac{(\xi+1)(\eta+1)\xi\eta}{4}$
Option D:	$N_7 = \frac{\xi(\xi-1)\eta(\eta-1)}{4}$
11.	The modified stiffness for column with hinged support in symmetric frame with antisymmetric loading is _____
Option A:	$3EI/_L$
Option B:	$6EI/_L$
Option C:	$4EI/_L$
Option D:	$EI/_L$
12.	The influence line for vertical reaction at A of the beam is 

Option A:	
Option B:	
Option C:	
Option D:	
13.	
Option A:	*100*
Option B:	*50*
Option C:	*0*
Option D:	*25*
14.	Which one of the following is flexibility method of analysis?
Option A:	Moment Distribution Method
Option B:	Kani's Method
Option C:	Column Analogy Method
Option D:	Slope deflection Method
15.	By Elastic Centre technique, value of F_{22} is _____
Option A:	I_{xx} (Moment of Inertia about X-axis)
Option B:	I_{yy} (Moment of Inertia about Y-axis)
Option C:	Total elastic area
Option D:	I_{xy}
16.	Elastic Centre is present at _____
Option A:	Support of the frame
Option B:	Centre of gravity of elastic area
Option C:	Centre of beam
Option D:	About X-axis

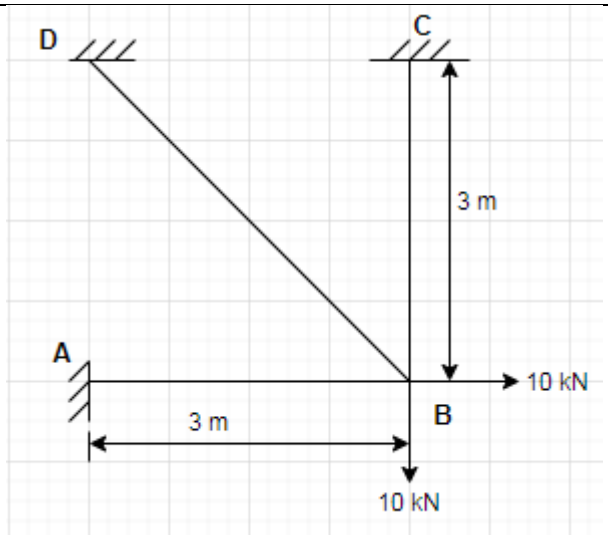
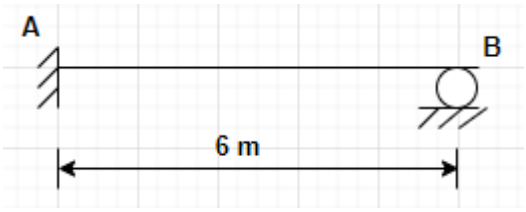
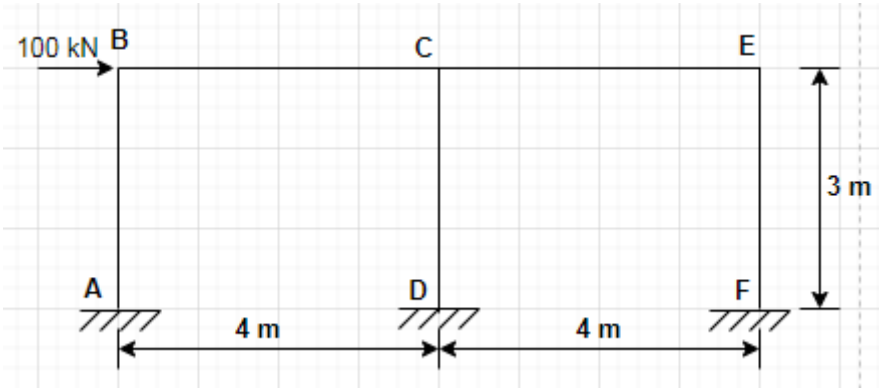
17.	Use of Pascal's triangle in Finite Element method is
Option A:	To find the polynomial shape function
Option B:	To write higher order dimensional polynomial
Option C:	Both (A) and (B)
Option D:	None of the above
18.	Develop the flexibility matrix for the following beam element 
Option A:	$= \begin{bmatrix} L^2/_{2EI} & L/_{EI} \\ L^3/_{3EI} & L^2/_{2EI} \end{bmatrix}$
Option B:	$F = \begin{bmatrix} L^3/_{3EI} & L^2/_{2EI} \\ L^2/_{2EI} & L/_{EI} \end{bmatrix}$
Option C:	$\begin{bmatrix} L/_{EI} & L^3/_{3EI} \\ L^2/_{2EI} & L/_{EI} \end{bmatrix}$
Option D:	$= \begin{bmatrix} L^3/_{3EI} & L^2/_{2EI} \\ L^2/_{2EI} & L^3/_{3EI} \end{bmatrix}$
19.	The given pin jointed plane frame, find the member matrix in local co-ordinate system 
Option A:	$M = AE \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0.23 & 0 \\ 0 & 0 & 0.33 \end{bmatrix}$
Option B:	$M = AE \begin{bmatrix} 0.33 & 0 & 0 \\ 0 & 0.33 & 0 \\ 0 & 0 & 0.23 \end{bmatrix}$
Option C:	$M = AE \begin{bmatrix} 0.23 & 0 & 0 \\ 0 & 0.33 & 0 \\ 0 & 0 & 0.33 \end{bmatrix}$
Option D:	$= AE \begin{bmatrix} 0.33 & 0 & 0 \\ 0 & 0.33 & 0 \\ 0 & 0 & 0.33 \end{bmatrix}$
20.	ILD for the BMD at D will be

	
Option A:	
Option B:	
Option C:	
Option D:	

Q.No.2	**Solve any Two Questions out of Three 10 marks each**
A	Find the bending movement at Support A and support B by column Analogy Method. (10) 
B	Find the support reaction at Support A and support B by Elastic Centre Method. (10)

	
C	Draw Bending Movement Diagram for the given structure by modified moment Distribution Method. (10) 

Q. No. 3	**Solve any Two Questions out of Three 10 marks each**
A	Analyze the pin jointed plane frame by Stiffness Method (10)

	
B	Draw the Influence Line Diagram for reaction Vb for the given structural at the interval of 2 meter. (10) 
C	Draw BMD by Portal Frame Method. (10) 

University of Mumbai
Examination 2020 under cluster : KJSIEIT)

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

Program: Civil Engineering

Curriculum Scheme: Rev2016

Examination: TE Semester VI

Course Code: CEC601 and Course Name: Geotechnical Engineering -II

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Cohesion and density of soil are $2t/m^2$ and $2t/m^3$ respectively for factor of safety of 2 and stability number 0.1 , the safe height of slope is
Option A:	2.5m
Option B:	10m
Option C:	5m
Option D:	50m
2.	According to Coulomb's wedge theory, the active earth pressure slides the wedge
Option A:	down and outwards on a slip surface
Option B:	up and inwards on a slip surface
Option C:	horizontal upward and parallel to base
Option D:	Horizontal inward and parallel to base.
3.	The stability of upstream slope or earth dam has to be checked for the
Option A:	Sudden draw down condition
Option B:	Steady seepage condition
Option C:	Upstream and downstream slope
Option D:	Quick sand condition
4.	The minimum allowable factor of safety against sliding
Option A:	1.5
Option B:	2
Option C:	2.5
Option D:	3
5.	In case of counterfort retaining wall, the toe slab act as a
Option A:	Fixed
Option B:	Cantilever
Option C:	Roller
Option D:	Simply supported
6.	In passive case the wall moves
Option A:	Towards the backfill
Option B:	Away from backfill
Option C:	No movement at all

Option D:	Downwards
7.	Coulomb's theory for lateral pressure is applicable for
Option A:	Homogeneous soils
Option B:	Non homogenous soils
Option C:	Smooth retaining walls
Option D:	Soil which have angle of internal friction
8.	A direct shear test was conducted on a cohesionless soil specimen under a normal stress of 200kN/m^2. The specimen failed at a shear stress of 100kN/m^2. The angle of internal friction of the soil is
Option A:	26.6
Option B:	29.5
Option C:	30
Option D:	32.6
9.	Load carrying capacity of foundation, if it is not back filled is
Option A:	Increased
Option B:	Decreased
Option C:	No effect
Option D:	Zero
10.	Test plate 30cm x 30cm resting on a sand deposit settles by 10mm under a certain loading intensity. A footing 150cm x 200cm resting on the same sand deposit and loaded to the same load intensity settles by
Option A:	15.7mm
Option B:	27.8mm
Option C:	35.77mm
Option D:	42.37mm
11.	The ultimate bearing capacity of a soil, is
Option A:	total load on the bearing area
Option B:	safe load on the bearing area
Option C:	load at which soil fails
Option D:	load at which soil consolidates
12.	As per IS code maximum permissible differential settlement on clay soil is
Option A:	25mm
Option B:	40mm
Option C:	65mm
Option D:	100mm
13.	The width and depth of the footing are 2 and 1.5 m respectively. The water table at the site is at a depth of 3m below the ground level. The water table correction factor for the calculation of the bearing capacity of soil is….
Option A:	0.875
Option B:	1
Option C:	0.925
Option D:	0.5

14.	Pile is driven in uniform clay of large Depth. The clay has an unconfined compressive strength of 0.9 x 10^4kN/m^2 . Pile is 30 cm diameter and 6m long. Determine safe load carrying capacity. Assume factor of safety 3. Adhesion factor 0.75
Option A:	5.45 tone
Option B:	6.89 tone
Option C:	7.34 tone
Option D:	6.23 tone
15.	Determine the safe allowable on a precast pile driven by drop hammer weight 60 kN Height of hammer is 1.3 m and the average Penetration recorded in the last few blows is 0.8 cm Per blow. Take the factor of safety as 6.
Option A:	422.22kN
Option B:	433.33 kN
Option C:	444.44kN
Option D:	455.55kN
16.	The types of hammer which is not used for driving piles is
Option A:	Drop hammer
Option B:	Diesel hammer
Option C:	Vibratory hammer
Option D:	Standard penetration hammer
17.	The maximum shear stress occurs on the filament which makes an angle with the horizontal plane equal to
Option A:	30°
Option B:	45°
Option C:	60°
Option D:	90°
18.	The direct shear test suffers from the following disadvantage
Option A:	Drain condition cannot be controlled
Option B:	Pore water pressure cannot be measured
Option C:	Shear stress on the failure plane is not uniform.
Option D:	The area under the shear and vertical loads does not remain constant throughout the test
19.	The coefficient of compressibility of soil, is the ratio of
Option A:	stress to strain
Option B:	strain to stress
Option C:	stress to settlement
Option D:	Rate of loading to that of settlement.
20.	A double drainage clay layer 6m thick , settles by 30mm in three years under the influence of certain loads. It is final consolidation settlement has been estimated to be 120mm. if a thin layer of sand having negligible thickness is introduce at a depth of 1.5m below the top surface , the final consolidation settlement of clay layer will be
Option A:	60mm
Option B:	120mm
Option C:	180mm

Option D:	200mm

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	A square group of friction piles 16 in number each of 0.5m diameter are installed at 1.5m center to center in a uniform clay stratum of 16m deep. The depth of piles extends to 12m below surface. The average unconfined compressive strength of clay is 80kN/m^2, the clay has liquid limit 56%. Take ɣ = 1.8t/m^3, G = 2.6, e = 0.65 and adhesion factor as 0.45. I] calculate the allowable load taking factor of safety as 3. II] Determine the settlement of pile group at that load.
B	A rectangular footing has a size of 1.8 m x 3m and has to transmit the load of column at a depth of 1.5m calculate the safe load which the footing can carry use IS code method take η= 40%, G= 2.67, W= 15%, C = 8kN/m^2, ϕ = 33^0, Nc= 38.13, Nq= 25.86, $N_ɣ$ = 35.2.
C	A retaining wall 8m high retain sand with ϕ = 30^0 and ɣ =24kN/m^3 up to depth of 4m From the top. From 4 to 8m the material is cohesive soil with having C= 20kN/m^2 and ϕ = 20^0, ɣ =18kN/m^3. The water table at the depth of 5m from the ground level. $ɣ_{sat}$ =21kN/m^3 for cohesive soil. Find the total active thrust on the wall along with its point of application.

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Explain procedure for Swedish circle method in detail.
B	A saturated soil has Cc = 0.27, its void ratio at stress of 125kN/m^2 is 2.04 and its permeability is 3.5x10^{-8}cm/s. compute I] change in void ratio if stress is increased to 187.5kN/m^2 II] Settlement if soil stratum is 5 thick. III] Time required for 50% consolidation to occur if drainage is one way and Tv = 0.196.
C	In a drained triaxial compression test a saturated specimen of cohesionless sand fails at a deviator stress of 450kN/m^2. When cell pressure was 135kN/m^2. Find the effective angle of shearing resistance of sand and angle of inclination of the failure plane with the horizontal.

University of Mumbai

Examination 2020 under cluster : KJSIEIET

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 2016

Examination: TE Semester VI

Course Code: CE-C602 and Course Name: Design and Drawing of Steel Structures

Time: 2 hour Max. Marks: 80

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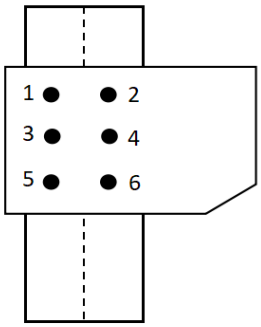
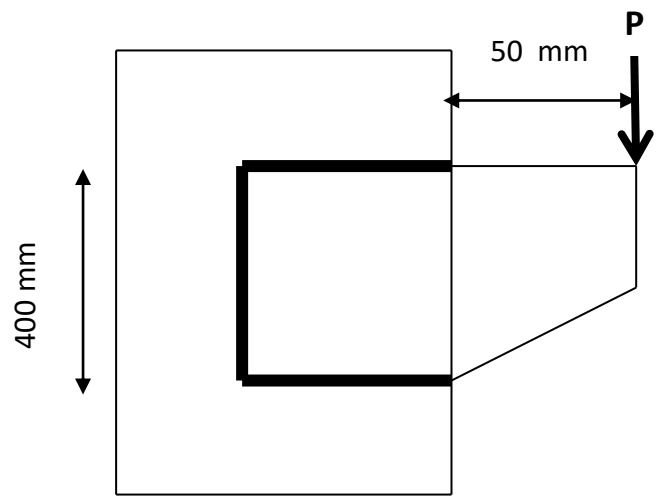
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	A lap joint consists of two plates of thickness 10 mm and 8 mm. The overlapping distance should not be less than _____
Option A:	32mm
Option B:	40 mm
Option C:	50 mm
Option D:	25 mm
2.	A 20 mm diameter bolt of grade 4.6 is in double shear, the shearing strength of bolt will be_____ (assume threads in the shear planes)
Option A:	135.9 kN
Option B:	45.25 kN
Option C:	90.5 kN
Option D:	70.5 kN
3.	Two plates of 14 mm and 12 mm are joined by fillet weld, the maximum size of fillet weld is _____
Option A:	16.5
Option B:	15.5
Option C:	12.5
Option D:	10.5
4.	The design shearing and bearing strength of an ordinary black bolt are 30 kN and 75 kN respectively. If the factored load is 150 kN, number of bolts required are____
Option A:	5
Option B:	3
Option C:	4
Option D:	6
5.	An ISMC 300 @ 0.363 kN/m is connected to a 12mm thick gusset plate. The size of the weld is 6 mm. Assume site welding. The strength of the weld is
Option A:	600 N/mm
Option B:	663 N/mm
Option C:	750 N/mm
Option D:	450 N/mm

6.	Calculate the net area of an angle ISA 90×90×8 which is connected to the gusset plate through single leg. Bolts used are M20 grade 4.6.
Option A:	1100 mm ^{2}
Option B:	1000 mm^2
Option C:	1200 mm^2
Option D:	500 mm^2
7.	An ISA 150×75×10 is connected to a gusset plate of thickness 12mm by four M18 grade 4.6 bolt . The Tensile strength governed by yielding of gross section of the angle if gusset is connected to the longer leg is _____
Option A:	450 kN
Option B:	250kN
Option C:	390 kN
Option D:	490kN
8.	The shear lag width for ISA 75X75X10 is_____ (Assume gauge distance = 40 mm)
Option A:	105 mm
Option B:	100 mm
Option C:	150 mm
Option D:	110 mm
9.	An ISMB 300 is to be used as a compression member. Considering the buckling about y-y axis, the corresponding buckling class as per IS 800: 2007 will be
Option A:	A
Option B:	B
Option C:	C
Option D:	D
10.	The yield stress ratio (ε) of Fe 410 grade of steel is_____
Option A:	0.25
Option B:	0.5
Option C:	1.0
Option D:	0.75
11.	A steel column in a multi-storeyed building carries an axial load of 250 kN. It is built up of two ISMC 350 channels connected by lacing. The lacing carries a load of _____
Option A:	5 kN
Option B:	12.50 kN
Option C:	18.75 kN
Option D:	6.25 kN
12.	Two ISMC 300 sections are placed back-to-back with a spacing of 200 mm to form a built up column. If the battens plates are used to make the built-up column by bolted connection, the length of the batten should be
Option A:	380 mm
Option B:	470 mm
Option C:	410 mm

Option D:	330 mm
13.	What is the design shear strength of ISWB 300 @ 48.1 kg/m?
Option A:	390.8 kN
Option B:	291.3kN
Option C:	490.2 kN
Option D:	270.5 kN
14.	What is the web crippling strength of ISLB 400 @ 56.9 kg/m (assume bearing width 100 mm)?
Option A:	215.6 kN
Option B:	245.3 kN
Option C:	311.8 kN
Option D:	411.8 kN
15.	What is gross section yielding?
Option A:	Considerable deformation of the member in longitudinal direction may take place before it fractures, making the structure unserviceable
Option B:	Considerable deformation of the member in longitudinal direction may take place before it fractures, making the structure serviceable
Option C:	Considerable deformation of the member in lateral direction may take place before it fractures, making the structure unserviceable
Option D:	Considerable deformation of the member in lateral direction may take place before it fractures, making the structure serviceable
16.	The partial safety factor for dead load and wind load for a roof truss for limit state of strength are respectively
Option A:	1. 0 and 1.5
Option B:	1.5 and 1.5
Option C:	1.2 and 1.2
Option D:	1.2 and 1.5
17.	A 15 mm thick plate is connected to two 8 mm plates on either sides connected using 16 mm diameter field bolts carrying a safe load 230 kN. Calculate the bolt value .
Option A:	56.70 kN
Option B:	43.29 kN
Option C:	36.19 kN
Option D:	21.65 kN

18.	For the bracket connection shown in figure, which is the critical bolt ? 
Option A:	Bolt 1
Option B:	Bolt 2
Option C:	Bolt 3
Option D:	Bolt 4
19.	The non-uniform stress distribution that occurs in a tension member adjacent to a connection, in which all elements of the cross section are not directly connected, is commonly referred to as the_____.
Option A:	Shear lag effect
Option B:	Gross section yielding
Option C:	Net section rupture
Option D:	Rupture in plate
20.	The design compressive stress of an axially loaded compression member in IS: 800-2007 is given by
Option A:	Rankine formula
Option B:	Secant formula
Option C:	Merchant Rankine formula
Option D:	Perry Robertson formula

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	Design a built-up column with two channel sections which are placed face to face to support factored axial compressive load of 1600 kN ,if the effective length of column is 60 m. Design section ,with suitable bolted lacing system (d=20 mm)
B	Determine the safe load bracket connection can carry ,if the size of fillet weld is 8mm for the connection shown in **Fig 1.**

	 **Fig. 1**
C	An ISLB 300 @ 369.8 N/m transmits an end reaction of 390 kN under a factored load ,to the web of ISMB 450 @ 710.2N/m. Design a bolted frame connection .Steel is of grade Fe 410 and bolts are of grade 4.6

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Design a central section of 30 m long welded plate girder subjected to a factored load of 45 kN/m including self weight .Provide suitable curtailment of flange plate.
B	A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1700 kN. Design a suitable bolted gusset base .The base rests on M 15 grade concrete pedestal .Use 24 mm diameter bolts of grade 4.6.
C	Design a bridge truss diagonal subjected to a factored tensile load of 300 kN.The length of the diagonal is 3.0 m .The tension member is connected to a gusset plate 16 mm thick with one line of 20 mm diameter bolts of grade 8.8

University of Mumbai

Examination 2020 under cluster : KJSIEIT

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

Program: Civil Engineering

Curriculum Scheme: Rev2016

Examination: TE Semester VI

Course Code: CEC603 and Course Name: Transportation Engineering -II

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The type of railway gauge used in thinly populated areas having sharp curves, steep gradients, narrow bridges or tunnels is
Option A:	Meter gauge
Option B:	Broad gauge
Option C:	Narrow gauge
Option D:	Standard gauge
2.	Reduction in expansion joints in rails indicates
Option A:	Hogging
Option B:	Creep
Option C:	Bending
Option D:	Slip
3.	The metal bar bolted to the ends of two rails to join them is called
Option A:	Chair
Option B:	Spike
Option C:	Bearing plate
Option D:	Fishplate
4.	In plate laying operation the first action is
Option A:	Laying of rails
Option B:	Laying of sleepers
Option C:	Laying of ballast
Option D:	Joining rails
5.	Type of rails used in the beginning is
Option A:	Double Headed rail
Option B:	Bull Headed rail
Option C:	Flat Footed rail
Option D:	Thick Footed rail
6.	Which signal is placed along with semaphore signal on the same pole
Option A:	Shunting signal
Option B:	Routing signal
Option C:	Warner signal
Option D:	Repeater signal

7.	On a turnout, the distance through which a tongue rail moves at its toe from its closed position to open position
Option A:	Throw of switch
Option B:	Toe of switch
Option C:	Heel of switch
Option D:	Nose of switch
8.	Conflicting movement of signals and points is prevented using
Option A:	Signaling system
Option B:	Interlocking system
Option C:	Guard system
Option D:	Block system
9.	A rising gradient, following a falling gradient that gives additional kinetic energy for the moving train to overcome steep gradient, is called
Option A:	Ruling gradient
Option B:	Helper gradient
Option C:	Pusher gradient
Option D:	Momentum gradient
10.	Grade compensation is provided
Option A:	On curves with ruling gradient
Option B:	On hilly tracks
Option C:	On curves on level ground
Option D:	On valleys
11.	Aircraft Aprons are areas where
Option A:	Aircraft is landing
Option B:	Aircraft is parked
Option C:	Aircraft is repaired
Option D:	Aircraft is loaded
12.	Classification of airports by FAA is based on
Option A:	Approach speed of aircraft
Option B:	Handling capacity of number of aircrafts
Option C:	Total area of airport
Option D:	Length of runway
13.	Runway should be oriented
Option A:	Towards North direction
Option B:	As per the slope of land
Option C:	Perpendicular to direction of wind
Option D:	Along the direction of wind
14.	Type -I Wind rose diagram gives information on
Option A:	Direction, intensity and force of wind
Option B:	Direction, duration and intensity of wind
Option C:	Direction and duration of wind
Option D:	Direction and intensity of wind

15.	Any object within 4.5 km from the end of runway is considered an obstruction if its actual height is more than
Option A:	30m
Option B:	300m
Option C:	40m
Option D:	400m
16.	Find out the correction due to elevation, in length of runway for a location 54m above mean sea level
Option A:	31m
Option B:	28m
Option C:	43m
Option D:	39m
17.	Which is of commercial importance
Option A:	Harbour
Option B:	Port
Option C:	Wet dock
Option D:	Dry dock
18.	The protective barriers in harbour constructed to protect from strong waves
Option A:	Breakwaters
Option B:	Piers
Option C:	quays
Option D:	wharves
19.	Which is a part of sub-structure of bridge
Option A:	Girders
Option B:	Bearings
Option C:	Abutments
Option D:	Railings
20.	Effective span of bridge is
Option A:	End to end distance of the bridge
Option B:	Center to center distance between adjacent supports
Option C:	Clear distance between adjacent supports
Option D:	Distance from one wing wall to the other

Q2	**Solve any Four out of Six - 5 marks each**
A	Explain can't deficiency
B	State the function of Ballast and enlist materials used in ballast
C	How is taxiway layout decided? Give a neat layout of taxiway
D	Explain the three controls of aircraft
E	Differentiate between natural harbor and artificial harbor with diagram.
F	Define Afflux and Scouring
Q3.	**Solve any Four out of Six - 5 marks each**
A	Write note on different types of railway yards

B	Draw the figure of a right-hand turnout and mark all the elements
C	What is the difference between theoretical nose and actual nose of points and crossings
D	What is the function of breakwater? What are its types?
E	The mean of maximum and mean of average daily temperatures of the hottest month on an airport site is 44.8 degrees and 26.2 degrees respectively. If it is 400 m above mean sea level and maximum difference in elevation along the proposed runway profile is 6.3 m, determine the actual length of runway to be provided for a basic runway length of1260 m.
F	Calculate the economic span of a bridge from the given data

Span	5	8	11	14	17
Cost of Girder (Rs)	2000	6000	15000	22000	40000
Cost of Foundation (Rs)	15000	20000	25000	35000	42000