University of Mumbai

Examination 2021 under cluster __ (Lead College: _____)

Examinations Commencing from 1st June 2021 to 10th June 2021

Program: BE (Civil)

Curriculum Scheme: Rev 2016

Examination: SE Semester IV

Course Code: CEC401 and Course Name: Applied Mathematics IV

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.	Find the Eigen values of matrix A = $\begin{bmatrix} 3 & 10 & 5 \\ -2 & -3 & -4 \\ 3 & 5 & 7 \end{bmatrix}$
Option A:	3, -2 -2
Option B:	3, 4 1
Option C:	3 ,2,2
Option D:	-3,-4,1
2.	If matrix A = $\begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$ find Eigen values of A^3 +5A + 8I
Option A:	-1,3,-2
Option B:	2,-10, 50
Option C:	-2, 10 ,50
Option D:	-1, 27,-8
3.	If A = $\begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}$ find 5^A
Option A:	$\begin{bmatrix} 325 & 300 \\ 300 & 325 \end{bmatrix}$
Option B:	$\begin{bmatrix} 300 & 125 \\ 100 & 325 \end{bmatrix}$
Option C:	$\begin{bmatrix} 300 & 125 \\ 100 & 325 \end{bmatrix}$
Option D:	$\begin{bmatrix} 300 & 325 \\ 315 & 325 \end{bmatrix}$
4.	Write down the matrix of quadratic form $x^2 - 2y^2 + 3z^2 - 4$ x y + x z -2 y z
Option A:	$\begin{bmatrix} 1 & -4 & 1 \\ -4 & 2 & -2 \\ 1 & -2 & 34 \end{bmatrix}$
Option B:	$\begin{bmatrix} 1 & -2 & 1/2 \\ -2 & -2 & -1 \\ 1/2 & -1 & 3 \end{bmatrix}$
Option C:	$\begin{bmatrix} 1 & -1 & -3 \\ -1 & -2 & 5 \\ -3 & 5 & 3 \end{bmatrix}$

Option D:	$\begin{bmatrix} 1 & -2 & 3 \\ -2 & 2 & -1 \\ 3 & -1 & 3 \end{bmatrix}$
5.	Find the directional derivative of $\emptyset(x,y,z) = xy^2 + yz^3$ at the points (2,-1,1) In the direction of the vector i + 2j +2k.
Option A:	$\frac{11}{3}$
Option B:	$-\frac{11}{3}$
Option C:	$\frac{22}{3}$
Option D:	$-\frac{22}{3}$
6.	A vector field $\bar{F}$ = (y sin z- sin x) i + (x sin z + 2 y z) j + (x y cos z + y^2) k is irrotational what is value of curl $\bar{F}$
Option A:	1
Option B:	-1
Option C:	2
Option D:	0
7.	Evaluate by Green's Theorem $\bar{F} = x^2 i - xy j$ and c is the triangle Having vertices A (0,2) B (2, 0) , C (4,2) .
Option A:	$\frac{16}{3}$
Option B:	$\frac{32}{3}$
Option C:	$-\frac{32}{5}$
Option D:	$-\frac{16}{3}$
8.	Maximize z = $x_1 + 3x_2 + 3x_3$ Subject to $x_1 + 2x_2 + 3x_3 = 4$ $2x_1 + 3x_2 + 5x_3 = 7$ find optimal basic feasible solution.
Option A:	(2,1,0)
Option B:	(1, 3,0)
Option C:	(1 ,0 4)
Option D:	(0 , 2 3)
9.	A continuous random variable X has probability density function f (x) = k x^2 ($1 - x^3$) , 0 $\leq x \leq$ 1 find k .
Option A:	3
Option B:	4
Option C:	5
Option D:	6
10.	If X is Binomially distributed with E (X) = 2 and Var. (X) = 4/3 Find n
Option A:	4
Option B:	5
Option C:	2

Option D:	6
11.	A discrete random variable X has probability density function given below X : -2 -1 0 1 2 3 P(X = x) : 0.2 3/25 0.1 6/25 0.1 6/25 Find E (X)
Option A:	$\frac{3}{25}$
Option B:	$\frac{16}{25}$
Option C:	$\frac{3}{625}$
Option D:	$\frac{3}{325}$
12.	If a random variable X follows Poisson distribution such that p (X = 2) = 9 p (X = 4) + 90 p (X = 6) find mean .
Option A:	2
Option B:	3
Option C:	4
Option D:	1
13.	In small sample test what is sample size n.
Option A:	n > 30
Option B:	n > 40
Option C:	n< 30
Option D:	n < 60
14.	A random sample of 50 items gives the mean 6.2 and variance 10.24. Can it be regarded as drawn from population mean 5.4 find computed value of $\lceil z \rceil \rceil$ |
Option A:	1.77
Option B:	2.77
Option C:	1.27
Option D:	1.61
15.	The ki-square test x^2 is defined as
Option A:	$\sum\left(\frac{(O+E)^2}{E}\right)$
Option B:	$\sum\left(\frac{(O-E)^2}{E}\right)$
Option C:	$\sum\left(\frac{(O-E)^2}{O}\right)$
Option D:	$\sum\left(\frac{(O-E)^2}{2E}\right)$
16.	What is F- Test distribution?
Option A:	$\frac{n_1{s_1}^2}{n_2{s_2}^2}$
Option B:	$\frac{n_1{s_1}^3}{n_2{s_2}^3}$
Option C:	$\frac{n_1{s_1}^2/(n_1-1)}{n_2{s_2}^2/(n_2-1)}$

Option D:	$\frac{s_2^2}{s_1^2}$
17.	What is the type of the given matrix A= $\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$
Option A:	Derogatory
Option B:	Non derogatory
Option C:	Non Diagonalisable
Option D:	Symmetric
18.	The means of two random samples of size 9 and 7 are 196.42 and 198.82 respectively The sum of the squares of the deviations from the means are 26.94 and 18.73 respectively. can T The samples be considered to have been drawn from same population find $\|t\|$
Option A:	2.64
Option B:	1.64
Option C:	3.64
Option D:	4.64
19.	If $\bar{F}$= (x + 3y) i + (y – 2z) j + (a z + x) k is Solenoidal , find the value of a .
Option A:	1
Option B:	2
Option C:	3
Option D:	-2
20.	If the product of two Eigen values of matrix A = $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ is 16, Find the third Eigen value.
Option A:	1
Option B:	3
Option C:	2
Option D:	-1

Q2	**Solve any Four out of Six5 marks each**
A	Show that the matrix A = $\begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}$ is Diagonalisable. Find the diagonal form D and the transforming matrix .
B	Solve the L.P.P by simplex method. Maximize $z = 3x_1 + 2x_2$ Subject to $3x_1 + 2x_2 \leq 18$; $0 \leq x_1 \leq 4$; $0 \leq x_2 \leq 6$; $x_1, x_2 \geq 0$
C	The marks obtained by 1000 students in an examination are found to be normallyDistributed with mean 70 and s. d. 5.Estimate the number of students

	whose marks will be (i) between 60 and 75 (ii) more than 75.
D	The standard deviation calculated from two random samples of sizes 9 and 13 are 1.99 and 1.9. Can the samples be regarded as drawn from the normal populations with the same standard deviations ? (given $F_{0,025}$ = 3.51 with d.o.f. 8 and 12 and $F_{0,025}$ = 4.20 with d.o.f.12 and 8
E	Ten individuals are chosen at random from a population and their heights are found to be 63, 63,64,65,66,69, 69, 70, 70, 71 inches. Discuss the suggestion that the mean height of the Universe is 65 inches.
F	Reduce the quadratic form $6x^2 + 3y^2 + 3z^2 - 4xy + 4xz - 2yz$ to canonical form through congruent transformations. Find its rank ,index, signature and class value

Q3	**Solve any Four out of Six5 marks each**
A	$If\ A = \begin{bmatrix} 1 & 4 \\ 1 & 1 \end{bmatrix}\ find A^7 + 31A^2 + I.$
B	Prove that $\bar{F}$ = (2 x y +z) i + (x^2 + 2 y Z^3) j + ($3y^2Z^2 + x$) k is irrotational. Find the scalar potential $\bar{F}$ and work done in moving an object in this field from (1 , 2 ,0) to (2 , 2 , 1).
C	The average of marks scored by 32 boys is 72 with standard deviation 8 while that of 36 girls is 70 with standard deviation 6. Test at 1% level of significance whether the boys perform better than the girls.
D	Use the dual simplex method to solve the L.P.P. maximize $z = -3x_1 - 2x_2$ Subject to $x_1 + x_2 \geq 1$; $x_1 + x_2 \leq 7$; $x_1 + 2x_2 \geq 10$; $x_2 \leq 3$ $x_1, x_2 \geq 0$
E	Use Gauss Divergence Theorem to evaluate $\iint \bar{N}.\bar{F}$ ds where $\bar{F} = x^2 i + z j + yz k$ And s is the surface of the cube bounded by x = 0, x = 1, y = 0, y = 1, z = 0, z = 1 .
F	In an experiment on immunizations of cattle from Tuberculosis, the results were obtained Use ki- square test to determine the efficiency of vaccine in preventing tuberculosis. Affected / not affected / Total Inoculated 290 110 400 Not inoculated 310 90 400 Total 600 200 800

University of Mumbai

Examination 2021 under cluster __ (Lead College: __KJSIEIT___)

Examinations Commencing from 1 June 2021

Program: **Civil Engineering**

Curriculum Scheme: Rev 2016

Examination: SE Semester IV

Course Code: CEC402 and Course Name: Surveying 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.	Hydrographic surveys deal with the mapping of
Option A:	large water bodies
Option B:	heavenly bodies
Option C:	mountaineous region
Option D:	canal system
2.	An ideal vertical curve to join two gradients, is
Option A:	Circular
Option B:	Parabolic
Option C:	Elliptical
Option D:	Hyperbolic
3.	Side friction factor is used in which of the following cases?
Option A:	Reverse curve
Option B:	Compound curve
Option C:	Transition curve
Option D:	Simple curve
4.	The formula for tangent length can be given as _____
Option A:	T = R + tan(Δ/2)
Option B:	T = R * tan(Δ/2)
Option C:	T = R / tan(Δ/2)
Option D:	T = R – tan(Δ/2)
5.	Which of the following doesn't indicate the linear method of setting out the curve?
Option A:	By offsets from chords produced
Option B:	By offsets from the tangents
Option C:	By deflection angle
Option D:	By offsets of long chords

6.	According to Rankine's method, the formula for finding deflection angle can be given as ----------
Option A:	δ = 1718.9 * C + R
Option B:	δ = 1719.8 * C * R
Option C:	δ = 1781.9 * C / R
Option D:	δ = 1718.9 * C / R
7.	The lens used in aerial photogrammetry is having a maximum coverage capacity of _____ (in angles)
Option A:	93^0
Option B:	63^0
Option C:	53^0
Option D:	98^0
8.	Which among the following surveying methods is meant to be having high precision?
Option A:	Aerial photogrammetry
Option B:	Terrestrial photogrammetry
Option C:	Theodolite surveying
Option D:	Traverse surveying
9.	How much inclination must be provided in a tilted photograph?
Option A:	13˚
Option B:	20˚
Option C:	3˚
Option D:	34˚
10.	Which type of remote sensing uses its own source of electromagnetic energy?
Option A:	Passive
Option B:	Active
Option C:	Satellite
Option D:	Orbital
11.	Signal can be generated by _____
Option A:	Interaction of EM waves with surface
Option B:	Interaction of EM waves with energy source
Option C:	Interaction of EM waves with atmosphere
Option D:	Interaction of EM waves with sensor
12.	Magnitude of refraction depends upon which of the following factors?
Option A:	Density
Option B:	Surface tension
Option C:	Reflection
Option D:	Polarisation
13.	Which of the following is always subtractive?
Option A:	Correction for reflection
Option B:	Correction for dip

Option C:	Correction for parallax
Option D:	Correction for polarization
14.	GIS uses the information from which of the following sources?
Option A:	Non- spatial information system
Option B:	Spatial information system
Option C:	Global information system
Option D:	Position information system
15.	Which among the following is a server based hardware platform of GIS?
Option A:	Autodesk Revit
Option B:	STAAD Pro
Option C:	Arc GIS
Option D:	Google-maps
16.	What will be the length of the base line in case of short baseline method of GPS surveying?
Option A:	Less than 50km
Option B:	Greater than 50km
Option C:	Less than 2km
Option D:	Greater than 100km
17.	Which among the following is more accurate in its output?
Option A:	Absolute positioning
Option B:	Resection method
Option C:	Modern GPS surveying
Option D:	Conventional GPS method
18.	Precise positioning service is having an accuracy range of _____
Option A:	1-5 m
Option B:	5-9 m
Option C:	10-12 m
Option D:	15-20 m
19.	Which of the following must be considered while conducting a road survey?
Option A:	Density
Option B:	Alignment of the curves
Option C:	Specific gravity
Option D:	Atmospheric condition
20.	In which direction it is best to place the total station for obtaining the best output?
Option A:	East
Option B:	West
Option C:	South
Option D:	North

Q2 **(20 Marks Each)**	**Solve any Four out of Six** **5 marks each**
A	What are the objectives of hydrographic surveying?
B	Draw a simple circular curve and explain all the elements of the same.
C	Draw the format of a 7/12 Abstract and state the data mentioned in it.
D	Two straights intersect at chainage of 2056.44m and angle of intersection is 120˚. If the radius of simple curve is 600m calculate tangent distance and chainage at point of commencement.
E	What are the objectives of GIS?
F	Distinguish between land survey and construction survey

Q3. **(20 Marks Each)**	**Solve any Two Questions out of Three** **10 marks each**
A	What do you mean by setting out work? Explain setting out work for a building
B	A downgrade of 2.5% is followed by an upgrade of 3.5%. The RL of point of intersection is 350 m & its chainage is 1400 m. A vertical curve of 200 m length is to be introduced to connect the two grades. If the peg interval is 20 m, Calculate the elevations of the points on the curve using tangent correction method. Tabulate the results.
C	What is GPS ? Give the principle, types of GPS and application of GPS in civil engineering field.

University of Mumbai

Examination 2021 under cluster __ (Lead College: ___KJSIEIT____)

Examinations Commencing from 1 June 2021

Program: **Civil**

Curriculum Scheme: Rev 2016

Examination: SE Semester IV

Course Code: CE-C 403 and Course Name: Structural Analysis I

Time: 2-hour Max. Marks: 80

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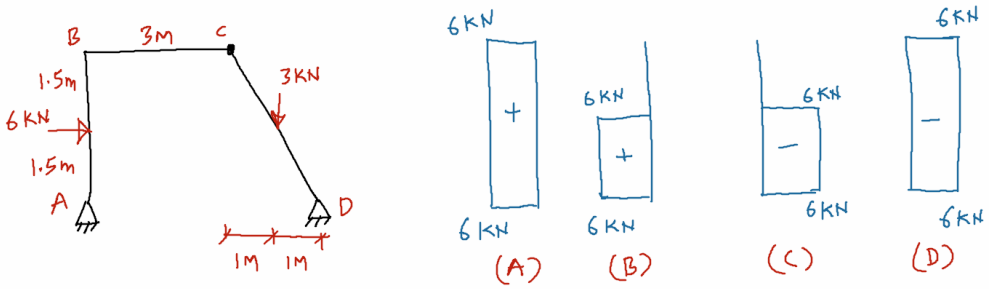
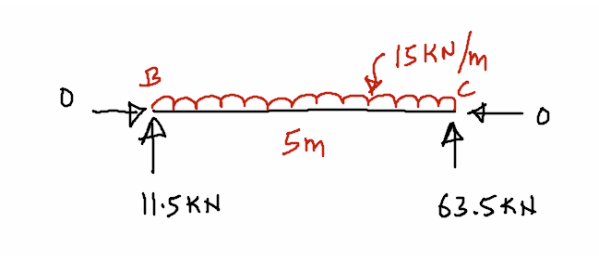
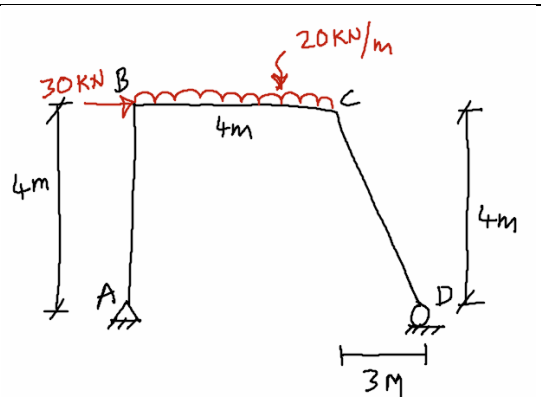
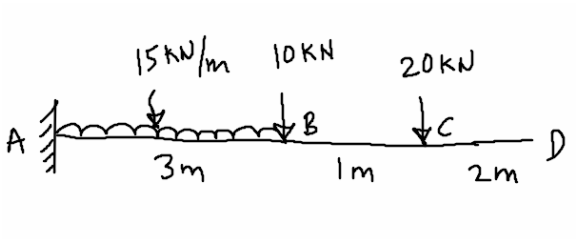
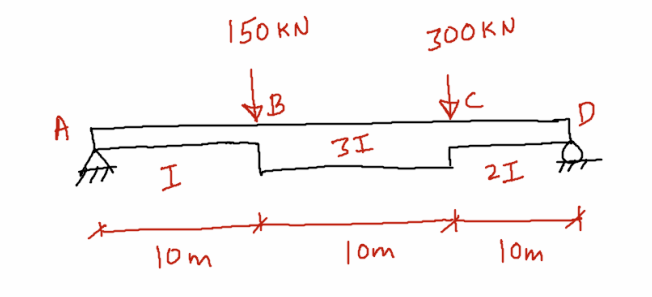
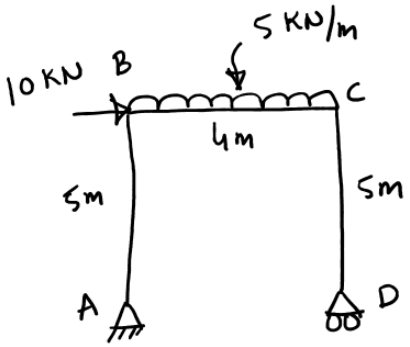
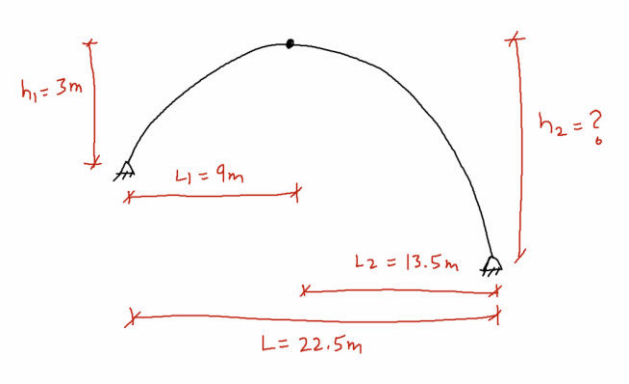
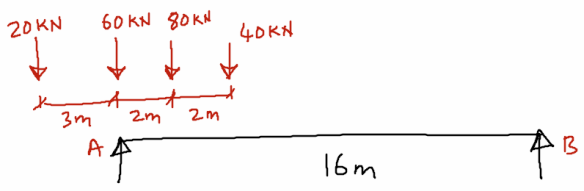
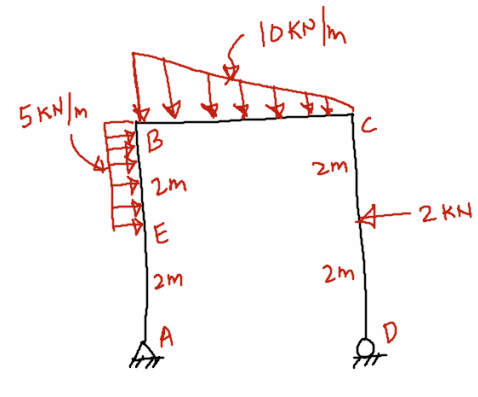
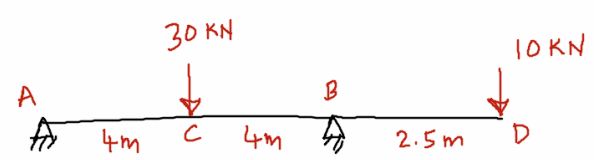
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Select the correct Shear force diagram from figure A, B, C & D for the member AB. Refer Rigid jointed frame as shown in figure. 
Option A:	C
Option B:	A
Option C:	B
Option D:	D
2.	At what distance from B point of Zero shear would be? Refer Figure (free body diagram of member) 
Option A:	0.77 m
Option B:	0.70 m
Option C:	0.90 m
Option D:	0.85 m
3.	Calculate Axial force for member CD. Refer Figure.

	
Option A:	24 kN tension
Option B:	24 kN compression
Option C:	32 kN tension
Option D:	32 kN compression
4.	Choose the correct formula of strain energy due to Axial.
Option A:	U = (M/2EI)
Option B:	U = (M^2/2EI)
Option C:	U = (P^2/2EI)
Option D:	U = (M^2/EI)
5.	At What point, you are likely to get maximum slope and maximum deflection. Refer Figure. 
Option A:	At point C
Option B:	At point B
Option C:	At point A
Option D:	At point D
6.	What would be the lowest value of M/EI diagram at point C? refer Figure 

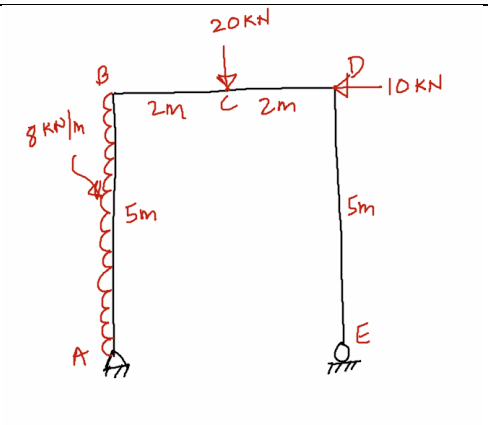
Option A:	1250/EI
Option B:	833.33/EI
Option C:	666.66/EI
Option D:	2000/EI
7.	In Conjugate beam method, slope at a point in Real beam is equal to _____ in conjugate beam.
Option A:	Shear force in Conjugate beam
Option B:	Bending Moment in Conjugate beam
Option C:	Slope in Conjugate beam
Option D:	Deflection in Conjugate beam
8.	Castigliano's theorem is used to find forces and displacements, what is to be done in order to find displacements?
Option A:	Partial Derivatives of Strain Energy with respect to Force(Load & Moment)
Option B:	Partial Derivatives of Strain Energy with respect to displacements
Option C:	Derivatives of Strain Energy with respect to Force(Load & Moment)
Option D:	Derivatives of Strain Energy with respect to displacements
9.	For a rigid jointed frame as shown in figure, Slope at D is to be found out by Unit load Method. To find it, what is to be done? Choose correct option. 
Option A:	Apply horizontal unit load at A
Option B:	Apply unit rotation at D
Option C:	Apply unit rotation at A
Option D:	Apply horizontal unit load at D
10.	What are the possible displacements in a joint of simple pin jointed frame?
Option A:	Deflection in horizontal Direction
Option B:	Deflection in horizontal Direction and rotation of a joint
Option C:	Deflection in horizontal and vertical direction
Option D:	Deflection in Vertical Direction and rotation of a joint

11.	Refer three hinged parabolic arch and find the value of h_2. 
Option A:	7.89 m
Option B:	6.75 m
Option C:	8.65 m
Option D:	4.5 m
12.	A three hinged circular arch of span 21 m and has a rise of 4 m. Find the radius of the circle.
Option A:	16.75 m
Option B:	15.15 m
Option C:	15.78 m
Option D:	16.15 m
13.	A suspension cable passes over a frictionless pulley, in which
Option A:	Tension in the main cable is twice of tension in the Anchor cable
Option B:	Tension in the main cable is half of tension in the anchor cable
Option C:	Tension in the main cable is thrice of tension in the anchor cable.
Option D:	Tension in the main cable is equal to tension in the anchor cable.
14.	A suspension cable 140 m span and 14 m central dip carries a load of 1 kN/m. Find the bending moment at the dip of the cable?
Option A:	150 kN-m
Option B:	Zero
Option C:	200 kN-m
Option D:	130 kN-m
15.	A train of concentrated load as shown in figure moves from left to right on a simply supported girder of span 16 m. Determine Absolute maximum bending moment. 

Option A:	644.6 kN-m
Option B:	544.6 kN-m
Option C:	744.6 kN-m
Option D:	844.6 kN-m
16.	Muller Breslau Principle in structural analysis is used for
Option A:	Drawing Influence line diagram for any force function
Option B:	Writing virtual work equation
Option C:	Superposition of load effect
Option D:	Writing Bending moment Equation
17.	What is the nature of Influence line diagram for Statically Determinate Structures
Option A:	Hyperbola
Option B:	Cubic
Option C:	Linear
Option D:	Parabola
18.	A Cast iron column of hollow circular section 200 mm external diameter, thickness of metal is 20 mm, length 5m has to take load of 100 kN at an eccentricity of 20 mm from the geometrical axis. Find Direct stress developed in the section.
Option A:	10.61 N/mm^2
Option B:	8.84 N/mm^2
Option C:	9.84 N/mm^2
Option D:	13.61 N/mm^2
19.	In symmetrical section (Symmetrical with respect to both axes), the shear Centre
Option A:	Coincides with the centroid of the cross section
Option B:	Lies outside the cross section
Option C:	Lies at the edge of the section
Option D:	Lies in the section but does not coincides with the centroid of the cross section
20.	Asymmetrical bending of beams is a possibility in structural elements like
Option A:	Floor and roof beams covering a rectangular hall
Option B:	Main girders in a bridge deck
Option C:	Purlins in a roof truss
Option D:	Column- beam joint in a framed structure

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	Analyze the rigid jointed frame as shown in figure. Draw AFD, SFD and BMD. BC = 5 m 
B	It is required to evaluate the slope and deflection at point D in terms of EI for the beam shown in figure. 
C	A three hinged parabolic arch of span 20 m and rise 4 m carries uniformly distributed load of 20 kN/m on the left half of the span. Analyze the arch and deduce the maximum positive and negative bending moment in the arch. Also find out radial shear force and normal thrust at a section 5m from the extreme left-hand support.

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Four-point loads 10, 15, 20 and 20 kN have center to center spacing of 2 m between consecutive, and they traverse a girder of 30 m span from left to right with 20 kN load leading. Calculate the maximum bending moment and shear force at 8 m from the left support.
B	Using unit load method, calculate horizontal displacement of roller support (E) for a rigid jointed frame. E = 2 x 10^5 MPa and I = 5 x 10^8 mm^4

	
C	A cast iron column of hollow circular section 200 mm external diameter, thickness of metal 20 mm, length 5 m, has to take a load of 150 kN at an eccentricity of 20 mm from the geometrical axis. If the ends are fixed, calculate the maximum and minimum stresses induced in the section.

University of Mumbai

Examination 2021 under cluster __ (Lead College: _KJSIEIT_____)

Examinations Commencing from 1 June 2021

Program: Civil Engineering

Curriculum Scheme: Rev - 2016

Examination: SE Semester IV

Course Code: CE-C404 and Course Name: Building Design and Drawing

Time: 2 hour Max. Marks: 80

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Section I : MCQ

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	A parallel line to the plot boundaries and line plot in each case by the Authority, beyond which nothing can be built towards the Site Boundaries.
Option A:	Building Line
Option B:	Control Line
Option C:	Property line
Option D:	Plot line
2.	When we are placing Various units of a structure in a correlation of their function and in due proximity with each other is called as
Option A:	Circulation
Option B:	Grouping
Option C:	Aspect
Option D:	Prospect
3.	Two or three column in one common footing is known as
Option A:	Continuous Footing
Option B:	Cantilever Footing
Option C:	Combined Footing
Option D:	Eccentric Footing
4.	For a Building with $75m^2$ built up area constructed on a plot of $225m^2$ area, the floor area ratio will be
Option A:	0.33
Option B:	3
Option C:	0.5
Option D:	0.2
5.	A line of 4 meter on Ground is drawn by 2cm on paper. Its representative fraction (RF) is
Option A:	200:1
Option B:	1:200
Option C:	1:100
Option D:	100:1
6.	Average height of the plinth of Building Should be

Option A:	300-500m
Option B:	1-2m
Option C:	300-450mm
Option D:	50-100mm
7.	In stair Baluster is the _____ member supporting _____
Option A:	Vertical,Handrail
Option B:	Horizontal,Handrail
Option C:	Vertical,Landing
Option D:	Horizontal,Landing
8.	Which of the following is the extension for Autocad drawing file
Option A:	ACDT
Option B:	ACTD
Option C:	ACD
Option D:	DWG
9.	In a Public or Resedential building after how many stairs landing should be provided?
Option A:	20
Option B:	12
Option C:	16
Option D:	18
10.	Headroom for the stairs should not be less than
Option A:	3.4m
Option B:	3.14m
Option C:	2.4m
Option D:	2.14m
11.	Development & Maintain of Building rating system LEED is done by
Option A:	The US Green Building Council
Option B:	The US Department of Energy
Option C:	The US Environmental Protection Agency
Option D:	The New Jersey Board of Public Utilities
12.	Following Green Building Received Platinum LEED certification
Option A:	Unitech Commercial Tower, Chandigarh
Option B:	Logix Cyber Park, UP
Option C:	Suzlon one earth, Pune
Option D:	Dabur India, Chandigarh
13.	A casement Window hung horizontally is called
Option A:	Awning
Option B:	Pivot
Option C:	Transform
Option D:	Hopper
14.	In residential or offices we use this type of door
Option A:	Hinged Door

Option B:	Louvered Door
Option C:	Rotating Door
Option D:	Flush Door
15.	LEED means
Option A:	Leadership in energy and Environmental Document
Option B:	Leadership in energy and Environmental Design
Option C:	Leadership in energy and Efficiency Document
Option D:	Leadership in energy and Efficiency Design
16.	In a Roof, Lowest edge of sloping surface is called as
Option A:	Eves
Option B:	Rafter
Option C:	Pitch
Option D:	Ridge
17.	On a Sloping roof of a building window is provided is called as
Option A:	Louvered Window
Option B:	Lantern Window
Option C:	Dormer Window
Option D:	Aie window
18.	Top edge of shutter in a ventilator open,
Option A:	Does not open
Option B:	Outside
Option C:	Inside
Option D:	Sideways
19.	_____ Command used to obtain parallel lines, concentric lines, & parallel curves in Autocad
Option A:	Copy
Option B:	Fillet
Option C:	Offset
Option D:	Cut
20.	It is the Uppermost part of the building form a framework to give protection from Rain, Heat, Snow, Wind, etc
Option A:	Lintels
Option B:	Truss
Option C:	Chajja
Option D:	Roof

Section II : Descriptive questions

Q2. **(20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	It is proposed to construct a Residential Bungalow as(G+1)RCC framed structure on a plotof40mx 45m.Withfloor-floorheightof3.3m. Following are the requirements:- Living Room= 22 Sq.m. Drawing Room= 20 Sq.m. Masters Bed Room(with A.T) = 20 Sq.m. Kitchen = 12Sq.m. Dining= 16 Sq.m. Bed Room= 16 Sq.m. GuestRoom=14 Sq.m. Pooja Room= 12 Sq.m. Draw with a scale Draw Development Plan for Ground Floor 6mk Draw line plan for first floor 4mk
B	Draw foundation plan & details of one footing for the building you have proposed in Q. no. 2.A
C	Explain Door with types also draw a detailed figure of Door

Q3. **(20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	1. It is proposed to construct a public library in the suburban area of Thane district. The building is (G+1) R.C.C. framed structure, having the following requirements. The plot area is 28mX26m. a) Entrance lobby= min 5mwide b) Librarian's office=50 sq.m c) Newspaper &magazine section=60sq.m d) Reading room(2nos)=100sq.m e) Book stack with issue counter = 80sq.m f) Computing facility room= 70 sq.m g) Conference /meeting room = 120 sq.m h) Cafeteria with kitchen = 120 sq.m i) Stores = 40 sq.m Provide passage, staircase, sanitary unit, parking area, etc. as per bye-laws. Draw with the scale. Draw Development Plan for Ground Floor 6mk

	Draw the line plan of the first floor of building given. 4mk	
B	Draw the front elevation for the building given in Q.No. 3.A	
C	a. Explain Green Building with rating system by LEED	6mk
	b. Define carpet area, Built up area, plinth area and FSI.	4mk

University of Mumbai

Examination 2021 under cluster __ (Lead College: __KJSIEIT_____)

Program: Civil Engineering

Curriculum Scheme: Rev2016

Examination: SE Semester IV

Course Code: CE-C405 and Course Name: Building Materials and Construction Technology

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 most appropriate methods to specify the concrete mix is by
Option A:	the nominal mix ratio
Option B:	the designed mix ratio
Option C:	the degree of control
Option D:	the grade of concrete
2.	The unit weight of plain concrete is generally taken as
Option A:	20 kN/m^3
Option B:	22 kN/m^3
Option C:	24 kN/m^3
Option D:	16 kN/m^3
3.	Addition of air-entraining agents to concrete increase all of the following except
Option A:	Workability
Option B:	strength of concrete
Option C:	Durability
Option D:	Impermeability
4.	For ensuring quality of concrete, which factor is important
Option A:	single sized aggregates
Option B:	two sized aggregate
Option C:	graded aggregates
Option D:	coarse aggregates.
5.	For quality control of Portland cement, the test is essentially not done
Option A:	Soundness test
Option B:	Abrasion test
Option C:	Setting time
Option D:	Fineness test
6.	Which of the following is not a Bogue's compound
Option A:	C3S
Option B:	C3F
Option C:	C4AF
Option D:	C2S
7.	The heat generated during the setting and hardening of cement is called

Option A:	latent heat
Option B:	heat of evaporation
Option C:	heat of hydration
Option D:	heat of setting
8.	Initial setting time of rapid hardening Portland cement is nearly
Option A:	half a minute
Option B:	5 min
Option C:	30 min
Option D:	45 min
9.	Ability to resist weathering action, chemical attack, abrasion or any other process of deterioration is called as
Option A:	Fluidity
Option B:	Workability
Option C:	Durability
Option D:	Permeability
10.	Calcium chloride is considered to be
Option A:	Accelerator
Option B:	Retarder
Option C:	Water reducer
Option D:	Super plasticizer
11.	Which of the following is not a advantage of RMC plant
Option A:	Environment Friendly
Option B:	Reduced Wastage
Option C:	Usage of Cement Bags
Option D:	Quality and Consistency
12.	A 1st class brick immersed in water for 24 hours, should not absorb water (by weight) more than
Option A:	15%
Option B:	17%
Option C:	25%
Option D:	20%
13.	In RHC, which of the following is done to increase the strength?
Option A:	increase %age of C3S and decrease %age of C4AF
Option B:	Increase %age of C2S and decrease %age of C3S
Option C:	increase %age of C3A and decrease %age of C4AF
Option D:	increase %age of C3S and decrease %age of C2S
14.	The process of hardening the concrete by keeping its surface moist is known
Option A:	Placing
Option B:	Curing
Option C:	Compacting
Option D:	Wetting
15.	In Mass Concreting which cement should not be used?

Option A:	PPC
Option B:	OPC
Option C:	RHC
Option D:	LHC
16.	High Strength Concrete is said when its compressive strength is greater than
Option A:	20 Mpa
Option B:	40Mpa
Option C:	25Mpa
Option D:	35Mpa
17.	Strength of cement concrete primarily depends upon
Option A:	quality of water
Option B:	quantity of aggregate
Option C:	quantity of cement
Option D:	water-cement ratio
18.	The term frog means
Option A:	an apparatus to lift the stone
Option B:	a depression on a face of brick
Option C:	vertical joint in a brick work
Option D:	Vertical portion of brick
19.	Removing the stones from bed surface is called as
Option A:	Dressing
Option B:	Mining
Option C:	Quarrying
Option D:	Blasting
20.	What is the standard size of brick?
Option A:	19 x 19 x 9 cm
Option B:	190 x 90 x 90 mm
Option C:	19 x 19 x 19 cm
Option D:	190 x 190 x 90 mm

Q2	
A	**Solve any Two 5 marks each**
i.	Write a short note on requirements of building materials.
ii.	What is pointing? Explain types of Pointing?
iii.	Explain different admixtures which are used in concrete.
B	**Solve any One** **10 marks each**
i.	Explain in detail Properties of Fresh and Hardened Concrete
ii.	Write in detail steps involved for Concrete Mix Design by IS Method.

Q3.	
A	**Solve any Two 5 marks each**
i.	Write a short note on Quarrying of Stones
ii.	Define Glass and Explain different types of Glass.
iii.	Describe Mortar in detail along with its applications.
B	**Solve any One** **10 marks each**
i.	Explain steps involved in manufacturing process of concrete.
ii.	What is formwork? Explain types of formwork along with sketches.

University of Mumbai

Examination 2021 under cluster __ (Lead College: __KJSIEIT_____)

Examinations Commencing from 1 June 2021

Program: **BE CIVIL ENGINEERING**

Curriculum Scheme: Rev - 2016

Examination: SE Semester IV

Course Code: CE-C406 and Course Name: FLUID MECHANICS-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 vertical intercept between EGL and HGL is equal to
Option A:	Pressure head
Option B:	Potential head
Option C:	Kinetic head
Option D:	Piezometric head
2.	What happens to velocity in the converging duct of nozzle?
Option A:	Increases
Option B:	Decreases
Option C:	Same
Option D:	Independent
3.	A liquid flows with the same velocity through two pipes 1 and 2 having the same diameter. If the length of the second pipe be twice that of the first pipe, what should be the ratio of the head loss in the two pipes?
Option A:	1:2
Option B:	2:1
Option C:	1:4
Option D:	4:1
4.	Where is a water hammer developed?
Option A:	Reservoir
Option B:	Penstock
Option C:	Turbine blades
Option D:	Pipe line
5.	In turbulent flow, a smooth pipe and a rough pipe shall have the same friction factor if
Option A:	The flow is highly turbulent
Option B:	The friction factor is independent of Reynolds number
Option C:	The flow is in transition zone from smooth of rough pipe only
Option D:	The Reynolds number is the same and the factor is less than about 4
6.	The head loss at the entrance of the pipe is that….. at it's exit
Option A:	equal to
Option B:	Half
Option C:	Twice

Option D:	four times
7.	The frictional resistance for fluids in motion is
Option A:	proportional to the velocity in laminar flow and to the square of the velocity in turbulent flow
Option B:	proportional to the square of the velocity in laminar flow and to the velocity in turbulent flow
Option C:	proportional to the velocity in both laminar flow and turbulent flow
Option D:	proportional to the square of the velocity in both laminar flow and turbulent flow
8.	The distance y from the pipe boundary at which the point velocity is equal to the average velocity for Turbulent flow is
Option A:	0.223 R
Option B:	0.323 R
Option C:	0.423 R
Option D:	0.523 R
9.	Find the velocity of a bullet fired in standard air if its Mach angle is 30 degree take $\gamma = 1.5$.
Option A:	529.22
Option B:	463.58
Option C:	704.23
Option D:	547.79
10.	Whenever a plate is held immersed at some angle with the direction of flow of the liquid it is subjected to some pressure. The component of this pressure at right angles to the direction of flow of the liquid is known as
Option A:	Surface tension
Option B:	Bulk modulus
Option C:	Drag
Option D:	Lift
11.	What is the efficiency of power transmission through the nozzle?
Option A:	Ratio of power available at the outlet of nozzle to the inlet of the pipe
Option B:	Ratio of power available at the outlet of nozzle to the head loss due to friction in the pipe
Option C:	Ratio of power available at the inlet of the pipe to the outlet of nozzle
Option D:	Ratio of power available at the head loss due to friction in the pipe to the outlet of nozzle
12.	Hydraulic gradient line takes into consideration
Option A:	potential and kinetic heads only
Option B:	potential and pressure heads only
Option C:	kinetic and pressure heads only
Option D:	potential, kinetic and pressure heads
13.	What is the function of a surge tank?
Option A:	It causes water hammer
Option B:	Produces surge in the pipeline
Option C:	Relieves water hammer
Option D:	Supplies water at constant pressure

14.	A nozzle is fitted to a pipe143 mm in diameter and 295 m long, with coefficient of friction as 0·02. If the available head at the nozzle is 130 m find the diameter of the nozzle.
Option A:	29.98 mm
Option B:	33.55 mm
Option C:	48.83 mm
Option D:	41.95 mm
15.	The total head loss for the system is equal to_____
Option A:	Pipe length
Option B:	Pipe diameter
Option C:	Width of the reservoir
Option D:	Height difference of reservoirs
16.	For a nozzle, the vertical intercept between Energy Gradient Line and Hydraulic Gradient Line _____
Option A:	Increases
Option B:	remains constant
Option C:	Decreases
Option D:	initially increases then stagnant
17.	What happens to the coefficient of viscosity if the temperature increases?
Option A:	Increases
Option B:	Decreases
Option C:	Remains the same
Option D:	Independent of temperature
18.	A shock wave is produced when
Option A:	A subsonic flow changes to sonic flow
Option B:	A sonic flow changes to supersonic flow
Option C:	A supersonic flow changes to subsonic flow
Option D:	A sonic flow changes to subsonic flow
19.	Local skin friction coefficient is given by
Option A:	$0.646/ (Re)^{½}$
Option B:	$1.646/ (Re)^{½}$
Option C:	$2.646/ (Re)^{½}$
Option D:	$3.646/ (Re)^{½}$
20.	On which of the factors does the coefficient of bend in a pipe depend?
Option A:	angle of bend and radius of curvature of the bend
Option B:	angle of bend and radius of the pipe
Option C:	radius of curvature of the bend and pipe
Option D:	radius of curvature of the bend and pipe and angle of bend

Q2	Solve any Four out of Six 5 marks each
A	What is boundary layer? Why does it increase with the distance from upstream edge?
B	Write short note on Moody's diagram.
C	Find the maximum power transmitted by a jet of water discharge freely out of nozzle fitted to a pipe is 350m long and 100 mm in diameter with friction factor as 0.07. The available head at the nozzle is 90m.
D	Define the Mach number and derive its equation.
E	Derive expression for energy thickness.
F	A supersonic aircraft flies at an altitude of 1.8 km where temperature is 4°C. Determine the speed of the aircraft if its sound is heard 4 seconds after its passage over the head of an observer. Take R = 287 J/kg K and $\gamma = 1.4$.

Q3.	Solve any Two Questions out of Three 10 marks each
A	A 150mm diameter pipe reduces in diameter abruptly to 100mm diameter. If the pipe carries water 30lps, calculate the pressure loss across the contraction. Take the coefficient of contraction as 0.6
B	An aeroplane is flying at 1000 km/h through still air having a pressure of 78.5 kN/m^2 (abs.) and temperature – 8° C. Calculate on the stagnation point on the nose of the plane :Stagnation pressure, Stagnation temperature, and Stagnation density. Take for air: R = 287 J/kg K and $\gamma = 1.4$.
C	Experiments were conducted in a wind tunnel with wind speed of 60 km/hr on a flat plate of size 2 m long and 1 m wide. The density of sir is 1.15 kg/m^3. The coefficient of lift and drag is 0.75 and 0.15 resp. Calculate lift force, drag force, resultant force, direction of resultant force and power exerted by air on flat plate

University of Mumbai

Examination 2021 under cluster __ (Lead College: _____)

Examinations Commencing from 1st June 2021 to 10th June 2021

Program: BE(CIVIL)

Curriculum Scheme: Rev2019 'C' Scheme

Examination: SE Semester IV

Course Code: CEC401 and Course Name: Engineering Mathematics-IV

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.	Find the value of a if $\bar{F} = (x - 2z)i + (y - 5x)j + (az + 2x)k$ is solenoidal
Option A:	$a = 2$
Option B:	$a = -2$
Option C:	$a = -4$
Option D:	$a = 4$
2.	Vector field is Irrotational if
Option A:	$\nabla \times \vec{f} = 0$
Option B:	$\nabla . \vec{f} = 0$
Option C:	$\nabla \times \vec{f} \neq 0$
Option D:	$\nabla . \vec{f} = 1$
3.	The residue at the pole z =-1 of $f(z) = \frac{1}{(z+1)(z-2)^2}$ is
Option A:	1/3
Option B:	-1/3
Option C:	1/9
Option D:	-1/9
4.	The poles of $f(z) = \frac{3z-1}{(z+1)(z-2)}$ are
Option A:	1,-2
Option B:	-1,-2
Option C:	-1,2
Option D:	1,2
5.	Value of $\int_c \frac{sin2z\ dz}{(z+\pi/3)^4} dz$ is where C:$\lvert z \rvert = 2$
Option A:	$4\pi i/3$
Option B:	$\pi i/3$
Option C:	$2\pi i/3$
Option D:	$4\pi i$
6.	*The value of* $\int_0^{1+i} \bar{z}\ dz$ along straight line y=x is
Option A:	0
Option B:	2

Option C:	3
Option D:	1
7.	If the two regression coefficient are -8/15 and -5/6 then the correlation coefficient is
Option A:	0.667
Option B:	- 0.507
Option C:	-0.667
Option D:	0.607
8.	Line of regression y on x is 8x-10y +66 =0. Line of regression x on y is 40x -18y -214 =0. The value of variance of y is 16. The standard deviation of x is
Option A:	3
Option B:	2
Option C:	6
Option D:	7
9.	$\sum xy = 2638,\ \bar{x} = 14, \bar{y}$ =17, n=10 then cov (x,y) is
Option A:	24.2
Option B:	25.8
Option C:	23.9
Option D:	20.5
10.	Least square fit for the straight line y= ax + b to the data x | 1 | 2 | 3 y | 5 | 7 | 9
Option A:	y = 2x +4
Option B:	y = 2x -3
Option C:	y = 2x +3
Option D:	y = 3x - 4
11.	A random variable X has the following probability distribution. The value of K is x | 2 | 3 | 4 | 5 P(x) | 5/K | 7/K | 9/K | 11/K
Option A:	16
Option B:	8
Option C:	48
Option D:	32
12.	In Poisson distribution if n = 100, p = 0.01, then the value of P (r = 0)
Option A:	1/e
Option B:	2/e
Option C:	3/e
Option D:	1/4e
13.	A continuous random variable X has pdf f(x) = kx; $0 \leq x \leq 1$ and k; $1 \leq x \leq 2$ .then the value of k
Option A:	2
Option B:	2/3

Option C:	3/2
Option D:	3
14.	If random variable X takes the values of x =1,2,3 with corresponding Probabilities 1/6, 2/3 1/6 then E(x) is
Option A:	1
Option B:	3
Option C:	4
Option D:	2
15.	Number of road accident on a highway during a month follows a Poisson distribution with mean 2. Probability that in certain month number of accidents in the highway will be equal to 2 is
Option A:	0.354
Option B:	0.2707
Option C:	0.435
Option D:	0.521
16.	In a normal distribution when mean is 1 and S.D =3 then for the intervals $-1.43 \leq x \leq 6.19$ (for z = -0.81, A= 0.2910, for z =1.73 ,A = 0.4582)
Option A:	0.7492
Option B:	0.4582
Option C:	0.2910
Option D:	0.1672
17.	X is normally distributed $\mu = 15,\ \sigma^2 = 9.$ Given that for z=1, A=0.3413 $P(X \geq 18)$ is given by
Option A:	0.1587
Option B:	0.4231
Option C:	0.2231
Option D:	0.3413
18.	In normal distribution. The area under standard normal curve to the right of y axis is
Option A:	1
Option B:	0
Option C:	0.5
Option D:	0.6
19.	If observed frequencies are 5,10,15 and expected frequencies are each equal to 10 then chi square value is
Option A:	20
Option B:	10
Option C:	15
Option D:	5
20.	Among 64 offspring of a certain cross between guinea pig 34 were red,10 were black and 20 were white, According to genetic model these number should in the ratio 9:3:4. Expected frequencies in the order
Option A:	36,12,16
Option B:	12,36,16
Option C:	20,12,16

Option D:	36,12,35

Q2	**Solve any Four out of Six** **5 marks each**
A	*Evaluate by Green's theorem for the field* $\vec{F} = x^2\hat{i} + xy\hat{j}$ *over the region R enclosed by* y=x^2 and line y=x
B	Evaluate $\int_c \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$; c *is* $\|z\| = 3$
C	Determine the coefficient of correlation between X & Y from the following data

X	51	54	56	59	65	60	70
Y	38	44	33	36	33	23	13

D	There is working women's hostel in a town where 75 % are from neighboring town, the rest all are from same town. 48% of women who hail from same town are graduates and 83 % of the women who have come from neighboring town are also graduates. Find the probability that a woman selected at a random is graduates from the same town.
E	In a certain examination test 2000 students appeared in a subject of statistics. Average marks obtained were 50% with standard deviation 5%. How many students do you expect to obtain more than 60% of marks, supposing that marks are distributed normally? (For z =2, A =0.4772)
F	The following table gives the number of accidents in a district during a week. Apply chi-square test to find whether the accidents are uniformly distributed over the week.

Day	Sun	Mon	Tues	Wed	Thu	Fri	Sat
No.of accidents	13	12	11	9	15	10	14

(*Table value of* $\chi^2 = 12.59, d.f = 6,$ *level of significance* $= 5\%$)

<table>
<tr><td>Q3</td><td>Solve any Four out of Six 5 marks each</td></tr>
<tr><td>A</td><td>Evaluate using Stokes theorem $\iint_s (\nabla \times \bar{f}).\hat{n}\, d\, s$ where s is curve surface of the paraboloid $x^2 + y^2 = 2z$ bounded by the plane z=2 where $\vec{f} = 3(x-y)\hat{i} + 2xz\hat{j} + xy\hat{k}$</td></tr>
<tr><td>B</td><td>Obtain Laurent's series expansions of f(x) = $\frac{z-1}{z^2-2z-3}$; $|z| > 3$</td></tr>
<tr><td>C</td><td>Calculate the Spearman's rank correlation coefficient for the following data.
<table>
<tr><td>x</td><td>32</td><td>55</td><td>49</td><td>60</td><td>43</td><td>37</td><td>43</td><td>49</td><td>10</td><td>20</td></tr>
<tr><td>y</td><td>40</td><td>30</td><td>70</td><td>20</td><td>30</td><td>50</td><td>72</td><td>60</td><td>45</td><td>25</td></tr>
</table></td></tr>
<tr><td>D</td><td>A C.R.V X has the following pdf.$f(x) = k(x - x^2)\,; 0 \le x \le 1$ Find K and mean</td></tr>
<tr><td>E</td><td>Ten individuals are chosen at random from a population & their height are found to be (inches): 63,63,64,65,66,69,69,70,70 &71. In the light of the data, discuss the suggestion that the mean height in the population is 66 inches. (Table value of t_α=2.6, d.f =9, $level\ of\ significance = 5\%$))</td></tr>
<tr><td>F</td><td>Standard deviation of two samples of size 9 & 13 were found to be 12.15 & 11.85. Can it be concluded that the samples were drawn from the normal population with the same standard deviation? (Given $F_{0.025} = 3.51\ for\ d.o.f.8\&\ 12$ & $F_{0.025} = 4.20\ for\ d.o.f.12\&\ 8$)</td></tr>
</table>

University of Mumbai

Examination 2021 under cluster __ (Lead College: ___KJSIEIT_____)

Examinations Commencing from 1 June 2021

Program: **__Civil_____**

Curriculum Scheme: Rev - 2019

Examination: SE Semester IV

Course Code: CEC 402 and Course Name: Structural Analysis

Time: 2 hour Max. Marks: 80

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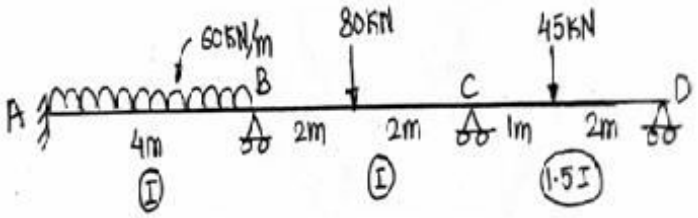
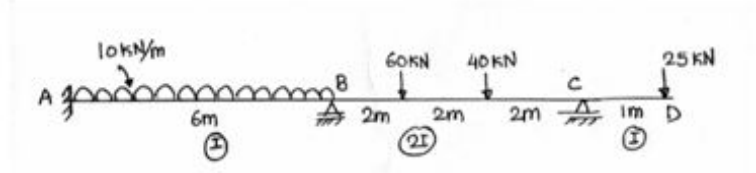
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	In influence line diagrams (ILD)
Option A:	Points remain fixed, position of load changes
Option B:	Points change, position of load remains fixed
Option C:	Both point and position change
Option D:	Both are always fixed
2.	For stable structures, one of the important properties of flexibility and stiffness matrices is that the elements on the main diagonal i) of a stiffness matrix must be positive ii) of a stiffness matrix must be negative iii) of a flexibility matrix must be positive iv) of a flexibility matrix must be negative The correct answer is
Option A:	(ii) and (iii)
Option B:	(i) and (iii)
Option C:	(i) and (iv)
Option D:	(ii) and (iv)
3.	A rigid-jointed plane frame is stable and statically determinate if
Option A:	(m + r) = 2j
Option B:	(m + r) = 3j
Option C:	(3m + r) = 3j
Option D:	(m + 3r) = 3j
4.	A single rolling load of 8 kN rolls along a girder of 15 m span. The absolute maximum bending moment will be
Option A:	8 kN.m
Option B:	25 kN.m
Option C:	30 kN.m
Option D:	35 kN.m
5.	Shape factor for the triangular cross section of beam of base 'b' and height 'h' is
Option A:	3.34
Option B:	2.34
Option C:	1.69
Option D:	3.69

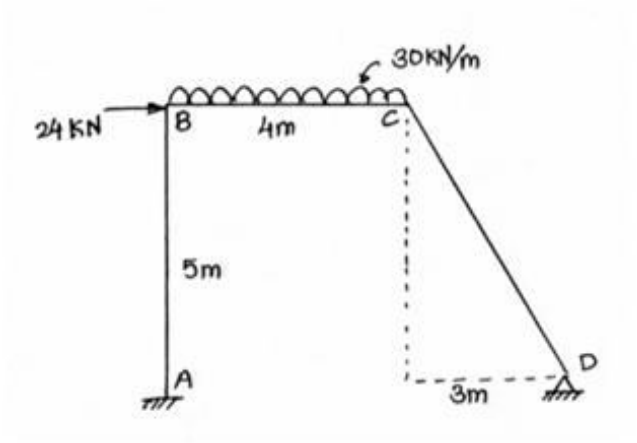
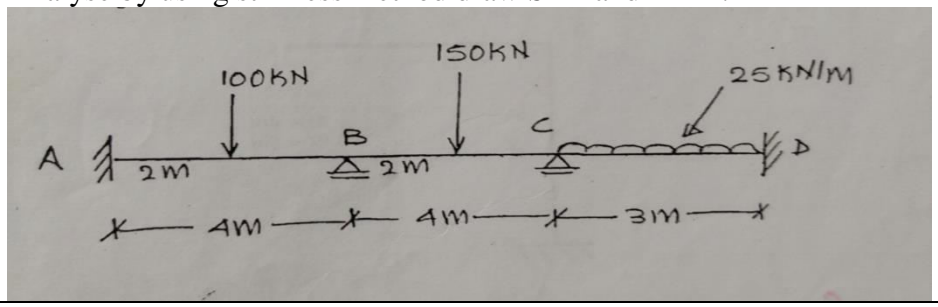
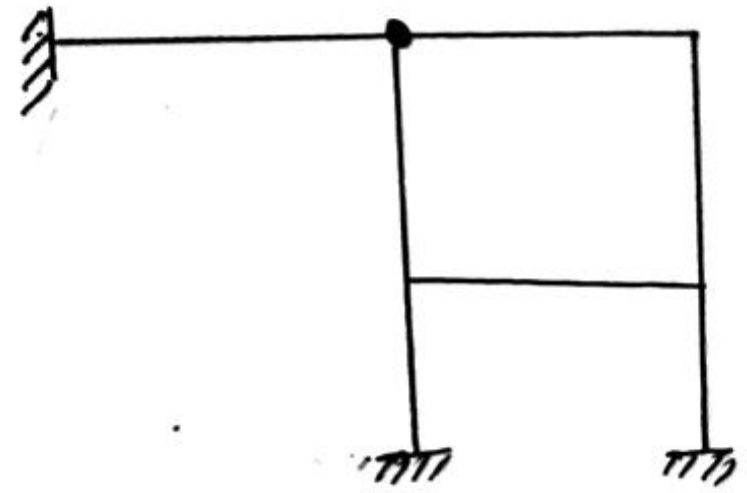
6.	What is B.M. diagram Area for Simply supported beam of span 5m and carrying UDL 12KN/m?
Option A:	125
Option B:	37.5
Option C:	150
Option D:	50
7.	Minimum number of members required in a perfect(stable) truss if number of joints = 6
Option A:	8
Option B:	9
Option C:	10
Option D:	11
8.	Any member of a pin jointed plane truss is subjected to
Option A:	shear force only
Option B:	bending moment only
Option C:	shear force and bending moment only
Option D:	axial force only
9.	Which of the following is formula to calculate shape factor, where Mp= plastic moment, My= Yield moment, Zp= plastic section modulus, Z= elastic modulus, fy= yield stress, Pu= collapse load, Pw= working load
Option A:	Mp / My
Option B:	My / Mp
Option C:	Z / Zp
Option D:	Pu / Pw
10.	The ratio of stiffness of any member to that of total stiffness of all members meeting at a joint is called
Option A:	stiffness factor
Option B:	distribution factor
Option C:	rotation factor
Option D:	carry over factor
11.	The absolute maximum bending moment in a simply supported beam of span 10 m due to a moving load of 40KN/m spanning over 5m is
Option A:	375 KNm at 2.5m from end A
Option B:	375 KNm at midpoint
Option C:	375 KNm at 3.7m from end A
Option D:	500 KNm at midpoint
12	A UDL of intensity 5kN/m and length 2m is passing through a simply supported beam of span 10m.The absolute maximum shear force at a section 4m from the left support is
Option A:	5KN
Option B:	10KN
Option C:	15KN
Option D:	20KN

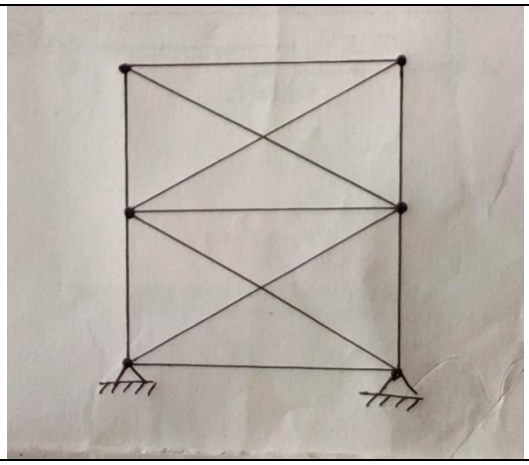
13.	A UDL of intensity 5KN/m and length 2 m is passing through a simply supported beam of span 10 m. The absolute maximum bending moment at section 4 m from the left support is
Option A:	10.6KNm
Option B:	21.6KNm
Option C:	32.4KNm
Option D:	50.6KNm
14.	Mathematically redundant truss satisfies _____ where n= no of members and J= no of joints.
Option A:	$n = 2j - 3$
Option B:	$n = 2j + 3$
Option C:	$n < 2j - 3$
Option D:	$n > 2j - 3$
15.	In analysis of statically determinate plane trusses by method of joints, not more than _____ unknown forces can be determined at a particular joint.
Option A:	1
Option B:	2
Option C:	3
Option D:	4
16.	The number of unknowns to be determined in the stiffness method is equal to
Option A:	the static indeterminacy
Option B:	the kinematic indeterminacy
Option C:	the sum of static and kinematic indeterminacy
Option D:	three times number of supports
17.	A load P is applied at the middle of a simply supported beam of span L. If the beam is made of ductile material, and M_p is the plastic moment, what is the ultimate value of P?
Option A:	$M_p/4L$
Option B:	$2M_p/L$
Option C:	$2.5M_p/L$
Option D:	$4\ M_p/L$
18.	The deflection at any point of a perfect frame can be obtained by applying a unit load at the joint in
Option A:	The direction in which the deflection is required
Option B:	Inclined direction always
Option C:	Horizontal direction always
Option D:	Vertical direction always
19.	If in a pin-jointed plane frame $(m + r) > 2j$, then the frame is (Where 'm' is number of members, 'r' is reaction components and 'j' is number of joints)
Option A:	Stable and statically determinate

Option B:	Stable and statically indeterminate
Option C:	Unstable
Option D:	Kinematically unstable
20.	The three moments equation is applicable only when
Option A:	The beam is prismatic
Option B:	There is no settlement of supports
Option C:	There is no discontinuity such as hinges within the span
Option D:	The spans are equal

Q2 . **(20 Marks)**	**Solve any Two Questions out of Three each** **10 marks**
A	A three hinged symmetrical parabolic arch ADCEB having central rise 6m has a span of 40m. It is hinged at A, B and at crown C. Point D and E are 10m away from left and right support respectively. The arch carries an UDL of 20 KN/m over the portion DE. Find i) support reactions, ii) BM, Normal thrust at D iii) BM and radial shear force at E.
B	Analyse the beam using moment distribution method 
C	Analyse the beam using three moment theorem 

Q3. **(20 Marks)**	**Solve any Two Questions out of Three each** **10 marks**
A	Analyse the frame using flexibility method and draw SFD BMD .

	
B	Analyse by using stiffness method draw SFD and BMD. 
C	Find Static and Kinematic Indeterminacy (neglecting and considering axial deformation)**.** 

University of Mumbai

Examination 2021 under cluster __ (Lead College: ___KJSIEIT____)

Examinations Commencing from 1 June 2021

Program: **Civil**

Curriculum Scheme: Rev 2016

Examination: SE Semester IV

Course Code: CE-C 403 and Course Name: Structural Analysis I

Time: 2-hour Max. Marks: 80

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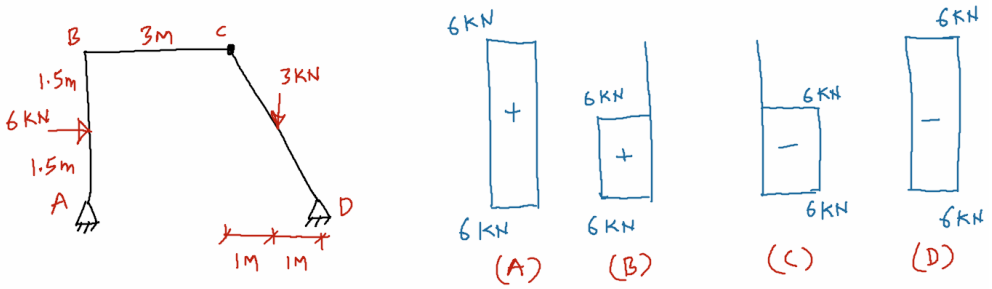
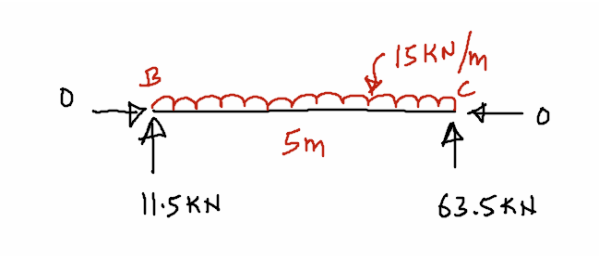
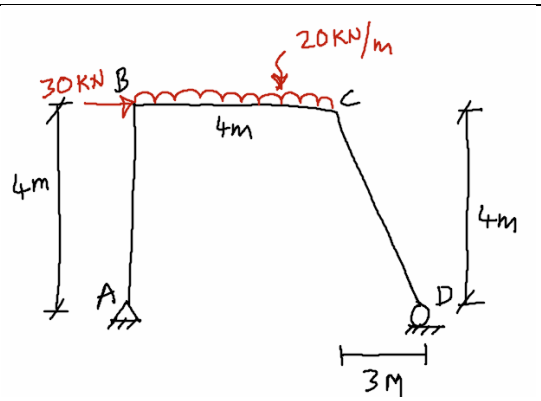
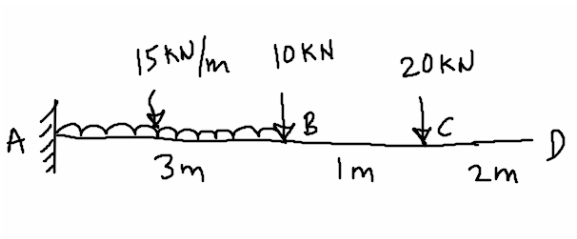
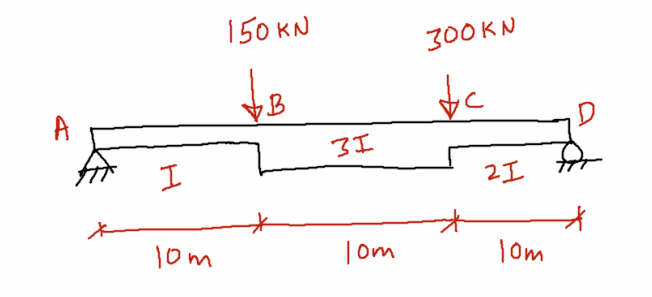
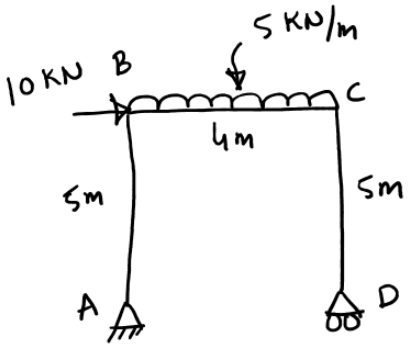
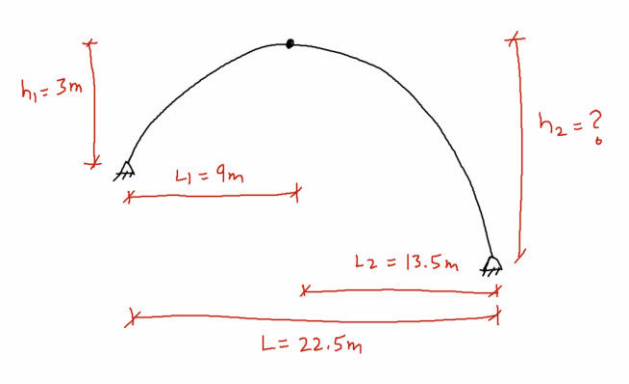
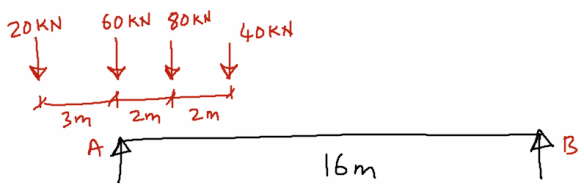
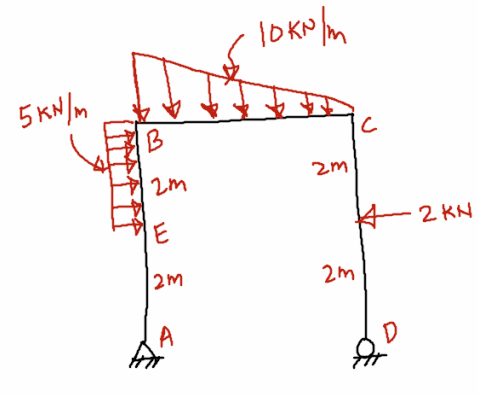
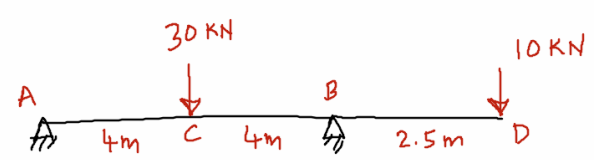
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Select the correct Shear force diagram from figure A, B, C & D for the member AB. Refer Rigid jointed frame as shown in figure. 
Option A:	C
Option B:	A
Option C:	B
Option D:	D
2.	At what distance from B point of Zero shear would be? Refer Figure (free body diagram of member) 
Option A:	0.77 m
Option B:	0.70 m
Option C:	0.90 m
Option D:	0.85 m
3.	Calculate Axial force for member CD. Refer Figure.

	
Option A:	24 kN tension
Option B:	24 kN compression
Option C:	32 kN tension
Option D:	32 kN compression
4.	Choose the correct formula of strain energy due to Axial.
Option A:	U = (M/2EI)
Option B:	U = (M^2/2EI)
Option C:	U = (P^2/2EI)
Option D:	U = (M^2/EI)
5.	At What point, you are likely to get maximum slope and maximum deflection. Refer Figure. 
Option A:	At point C
Option B:	At point B
Option C:	At point A
Option D:	At point D
6.	What would be the lowest value of M/EI diagram at point C? refer Figure 

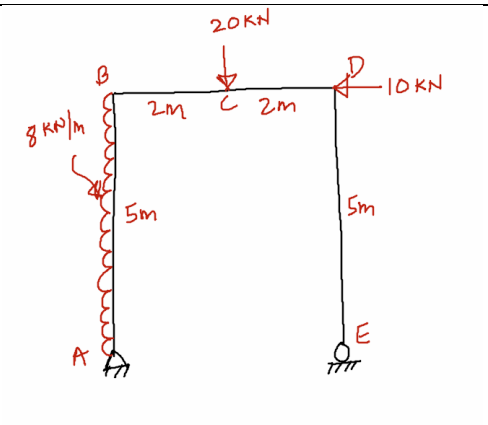
Option A:	1250/EI
Option B:	833.33/EI
Option C:	666.66/EI
Option D:	2000/EI
7.	In Conjugate beam method, slope at a point in Real beam is equal to _____ in conjugate beam.
Option A:	Shear force in Conjugate beam
Option B:	Bending Moment in Conjugate beam
Option C:	Slope in Conjugate beam
Option D:	Deflection in Conjugate beam
8.	Castigliano's theorem is used to find forces and displacements, what is to be done in order to find displacements?
Option A:	Partial Derivatives of Strain Energy with respect to Force(Load & Moment)
Option B:	Partial Derivatives of Strain Energy with respect to displacements
Option C:	Derivatives of Strain Energy with respect to Force(Load & Moment)
Option D:	Derivatives of Strain Energy with respect to displacements
9.	For a rigid jointed frame as shown in figure, Slope at D is to be found out by Unit load Method. To find it, what is to be done? Choose correct option. 
Option A:	Apply horizontal unit load at A
Option B:	Apply unit rotation at D
Option C:	Apply unit rotation at A
Option D:	Apply horizontal unit load at D
10.	What are the possible displacements in a joint of simple pin jointed frame?
Option A:	Deflection in horizontal Direction
Option B:	Deflection in horizontal Direction and rotation of a joint
Option C:	Deflection in horizontal and vertical direction
Option D:	Deflection in Vertical Direction and rotation of a joint

11.	Refer three hinged parabolic arch and find the value of h_2. 
Option A:	7.89 m
Option B:	6.75 m
Option C:	8.65 m
Option D:	4.5 m
12.	A three hinged circular arch of span 21 m and has a rise of 4 m. Find the radius of the circle.
Option A:	16.75 m
Option B:	15.15 m
Option C:	15.78 m
Option D:	16.15 m
13.	A suspension cable passes over a frictionless pulley, in which
Option A:	Tension in the main cable is twice of tension in the Anchor cable
Option B:	Tension in the main cable is half of tension in the anchor cable
Option C:	Tension in the main cable is thrice of tension in the anchor cable.
Option D:	Tension in the main cable is equal to tension in the anchor cable.
14.	A suspension cable 140 m span and 14 m central dip carries a load of 1 kN/m. Find the bending moment at the dip of the cable?
Option A:	150 kN-m
Option B:	Zero
Option C:	200 kN-m
Option D:	130 kN-m
15.	A train of concentrated load as shown in figure moves from left to right on a simply supported girder of span 16 m. Determine Absolute maximum bending moment. 

Option A:	644.6 kN-m
Option B:	544.6 kN-m
Option C:	744.6 kN-m
Option D:	844.6 kN-m
16.	Muller Breslau Principle in structural analysis is used for
Option A:	Drawing Influence line diagram for any force function
Option B:	Writing virtual work equation
Option C:	Superposition of load effect
Option D:	Writing Bending moment Equation
17.	What is the nature of Influence line diagram for Statically Determinate Structures
Option A:	Hyperbola
Option B:	Cubic
Option C:	Linear
Option D:	Parabola
18.	A Cast iron column of hollow circular section 200 mm external diameter, thickness of metal is 20 mm, length 5m has to take load of 100 kN at an eccentricity of 20 mm from the geometrical axis. Find Direct stress developed in the section.
Option A:	10.61 N/mm^2
Option B:	8.84 N/mm^2
Option C:	9.84 N/mm^2
Option D:	13.61 N/mm^2
19.	In symmetrical section (Symmetrical with respect to both axes), the shear Centre
Option A:	Coincides with the centroid of the cross section
Option B:	Lies outside the cross section
Option C:	Lies at the edge of the section
Option D:	Lies in the section but does not coincides with the centroid of the cross section
20.	Asymmetrical bending of beams is a possibility in structural elements like
Option A:	Floor and roof beams covering a rectangular hall
Option B:	Main girders in a bridge deck
Option C:	Purlins in a roof truss
Option D:	Column- beam joint in a framed structure

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	Analyze the rigid jointed frame as shown in figure. Draw AFD, SFD and BMD. BC = 5 m 
B	It is required to evaluate the slope and deflection at point D in terms of EI for the beam shown in figure. 
C	A three hinged parabolic arch of span 20 m and rise 4 m carries uniformly distributed load of 20 kN/m on the left half of the span. Analyze the arch and deduce the maximum positive and negative bending moment in the arch. Also find out radial shear force and normal thrust at a section 5m from the extreme left-hand support.

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Four-point loads 10, 15, 20 and 20 kN have center to center spacing of 2 m between consecutive, and they traverse a girder of 30 m span from left to right with 20 kN load leading. Calculate the maximum bending moment and shear force at 8 m from the left support.
B	Using unit load method, calculate horizontal displacement of roller support (E) for a rigid jointed frame. E = 2 x 10^5 MPa and I = 5 x 10^8 mm^4

	
C	A cast iron column of hollow circular section 200 mm external diameter, thickness of metal 20 mm, length 5 m, has to take a load of 150 kN at an eccentricity of 20 mm from the geometrical axis. If the ends are fixed, calculate the maximum and minimum stresses induced in the section.

University of Mumbai

Examination 2021 under cluster __ (Lead College: __KJSIEIT____)

Examinations Commencing from 1 June 2021

Program: **Civil Engineering**

Curriculum Scheme: Rev - 2019

Examination: SE Semester IV

Course Code: CEC404 and Course Name: Building Materials & Concrete Technology

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.(2 marks each)**
1.	Some stones, has obtained from the quarry, possess a smooth surface and hence such a stone surface is termed as the _____
Option A:	Scabbling finish
Option B:	Self-faced finish
Option C:	Axed finish
Option D:	Punched finish
2.	When stones are placed right across the wall at a regular interval is known as
Option A:	Backing
Option B:	Hearting
Option C:	Through stone
Option D:	Support
3.	Which of the following is not a feature of second class bricks?
Option A:	Have small irregularities
Option B:	Water absorption is between 20-25%
Option C:	Rectangular in shape
Option D:	Free from cracks
4.	What is the problem with using flyash bricks?
Option A:	Efflorescence
Option B:	Costly
Option C:	Expand
Option D:	Not sound proof
5.	In concrete masonry, a hollow concrete block has a core-void area greater than _____ of the gross area
Option A:	20%
Option B:	15%
Option C:	30%
Option D:	25%
6.	Chromatic glass is used in:
Option A:	ICU and meeting room
Option B:	Aquariums
Option C:	Mobile screen protectors
Option D:	Floors

7.	The quality of timber does not depend upon:
Option A:	Maturity of tree
Option B:	Time of felling
Option C:	Type of tree
Option D:	Size of tree
8.	How can the quality of timber be checked via sound?
Option A:	Timber struck by hammer
Option B:	Timber tapped by hand
Option C:	Timber knocked by chisel
Option D:	Two timber pieces struck together
9.	At roof slab level over the DPC, _____ are provided.
Option A:	Tiles
Option B:	Concrete
Option C:	P.C.C
Option D:	Rubber sheet
10.	For DPC at plinth level, which grade of concrete is used?
Option A:	M10
Option B:	M20
Option C:	M25
Option D:	M15
11.	The _____ are popularly known as the white ants though they are in no way related to the ants.
Option A:	Termites
Option B:	Ants
Option C:	Bugs
Option D:	Beatles
12.	The entry of _____ termites into buildings takes place through cracks or fissures of even 0.5 mm thickness in concrete and masonry, floor joints, etc.
Option A:	Ground nesting
Option B:	Non subterranean
Option C:	Drywood
Option D:	White ants
13.	Polymer Cement Mortar (PCM) is used primarily for:
Option A:	Repairing concrete structure
Option B:	Stone masonry
Option C:	Tile masonry
Option D:	Brick masonry
14.	The guidelines for preparation for mortar is given in:
Option A:	IS 4455
Option B:	IS 2250-1981
Option C:	IS 3350-1981

Option D:	IS 5567
15.	The function of _____ is to make the paint thin so that it can be easily applied on the surface.
Option A:	Pigment
Option B:	Solvent
Option C:	Carrier
Option D:	Base
16.	Which of the following methods of inspection uses high frequency of sound waves for the detection of flaws in the castings?
Option A:	Penetrant test
Option B:	Radiography
Option C:	Pressure test
Option D:	Ultrasonic inspection
17.	Which process comes after batching in manufacture process of concrete?
Option A:	Transportation
Option B:	Placing
Option C:	Mixing
Option D:	Compacting
18.	_____ is used as a final coat for surfaces of X-Ray rooms.
Option A:	Gypsum plaster
Option B:	Barium plaster
Option C:	Granite plaster
Option D:	Marble plaster
19.	What is the average particle size of cement?
Option A:	15 microns
Option B:	45 microns
Option C:	75 microns
Option D:	100 microns
20.	The specific gravity for sand is:
Option A:	2.65
Option B:	2.7
Option C:	2.75
Option D:	2.8

Q2.	**Solve any Four out of Six. 5 marks each**
A	What do you understand by soundness of cement? What factors are responsible for unsoundness of cement?
B	Write a short note on the cellular light weight concrete block.
C	What is meant by workability of concrete? How is it tested?
D	Draw the lay out plan of a RMC plant. Enlist the various components of RMC plant.
E	What are the characteristics of good oil paints?
F	Briefly explain Ultrasonic Pulse Velocity test.

Q3.	Solve any Four out of Six 5 marks each
A	What are the defects in timber? Describe briefly.
B	What is bulking of sand? How does it affect concrete mix?
C	Define water-cement ratio. How does it influence concrete strength?
D	What is the minimum grade of concrete, to be used, specified by IS: 456–2000? How surface moisture of aggregates is accounted for in the mix design?
E	What is retarder and accelerator? Write their uses.
F	Briefly explain Rebound Hammer test.

University of Mumbai

Examination 2021 under cluster __ (Lead College: __KJSIEIT_____)

Examinations Commencing from 1 June 2021

Program: **Civil Engineering**

Curriculum Scheme: Rev - 2019

Examination: SE Semester IV

Course Code: CEC 405 and Course Name: Fluid Mechanics 2

Time: 2 hour Max. Marks: 80

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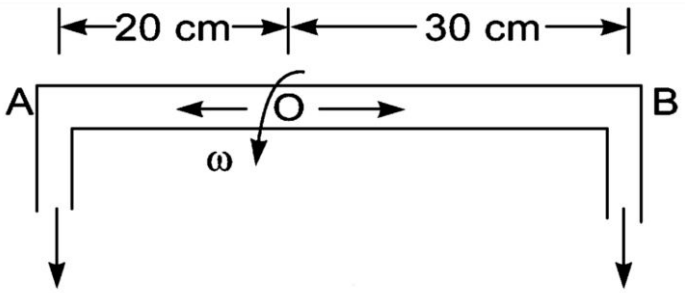
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1	Major losses in a flow through pipe are due to:
Option A:	Sudden expansion
Option B:	Exit
Option C:	Gradual bend in pipe
Option D:	Friction
2	What is the meaning of (du/dy) in the equation $\tau = \mu \frac{du}{dy}$
Option A:	change in horizontal distance with velocity
Option B:	change in velocity with vertical distance
Option C:	change in velocity with change in vertical distance
Option D:	change in vertical distance with change in velocity
3	For a smooth boundary for a turbulent flow in a pipe $\frac{k}{\delta'}$ value should be:
Option A:	equal to 0.25
Option B:	equal to 6
Option C:	more than 6
Option D:	less than 0.25
4	When the axis of the body is parallel to the direction of the fluid flow,
Option A:	Drag force is zero
Option B:	Lift force is maximum
Option C:	Lift force is zero
Option D:	Drag force is maximum
5	When Reynold's Number is 4023, the flow is:
Option A:	Transitional
Option B:	Laminar

Option C:	Turbulent
Option D:	Mixed
6	F.dt = d(mv) is called as,
Option A:	Impulse momentum equation
Option B:	Darcy Weisbach equation
Option C:	Momentum Thickness equation
Option D:	Moment of momentum equation
7	The distance from the boundary of a solid body measured in y-direction to the point, where the velocity of the fluid is approximately equal to 0.99 times the free stream velocity (U) of the fluid is called as:
Option A:	Laminar Sub-layer
Option B:	Transitional layer
Option C:	Turbulent layer
Option D:	Boundary layer
8	In water hammer phenomenon, valve is said to be suddenly closed when,
Option A:	T < 2L/C
Option B:	T > 2L/C
Option C:	2T > L/C
Option D:	L > 2T/C
9	Rayleigh's method for determining expression for a variable is used when the variable is:
Option A:	dependent on more than 4 variables
Option B:	dependent on 10 to 11 variables
Option C:	dependent on up to 3 to 4 variables
Option D:	dependent on 22 to 23 variables
10	Which are the following are fundamental dimensions useful in Fluid Mechanics of Civil Engineering?
Option A:	Temperature, Dynamic viscosity, Length
Option B:	Length, Temperature, Time
Option C:	Length, Mass, Time
Option D:	Density, Mass, Dynamic viscosity
11	Hydraulic Gradient Line is:
Option A:	equal to total head minus kinetic head
Option B:	equal to total head plus kinetic head
Option C:	equal to kinetic head plus datum head
Option D:	equal to pressure head plus kinetic head

12	What are the dimensions of kinematic viscosity?
Option A:	$M^2L^{-1}T^3$
Option B:	LT^{-2}
Option C:	L^2T^{-1}
Option D:	T^2L
13	What is the ratio of Maximum velocity and the average velocity for a laminar flow between two parallel plates when both plates are at rest?
Option A:	0.50
Option B:	0.67
Option C:	1.50
Option D:	2.50
14	The moment of momentum equation is used for
Option A:	water hammer phenomenon
Option B:	design of syphon pipe system
Option C:	studying drag and lift forces
Option D:	analysis of flow problems in turbines and centrifugal pumps
15	In an equivalent pipe, Dupuit's equation is given by:
Option A:	$\frac{L}{d} = \frac{L_1}{d_1^5} + \frac{L_2}{d_2^5} + \frac{L_3}{d_3^5}$
Option B:	$\frac{L}{d^5} = \frac{5L_1}{d_1^5} + \frac{5L_2}{d_2^5} + \frac{5L_3}{d_3^5}$
Option C:	$\frac{L}{d^5} = \frac{L_1}{d_1^5} + \frac{L_2}{d_2^5} + \frac{L_3}{d_3^5}$
Option D:	$\frac{5L}{d^5} = \frac{L_1}{d_1^5} + \frac{L_2}{d_2^5} + \frac{L_3}{d_3^5}$
16	A flat plate 1.5 m x 1.5 m moves at 50km/hour in stationary air of density 1.15kg/m3. If the co-efficients of drag and lift are 0.15 and 0.75, respectively, what are the values of: 1]. The lift force, 2]. The drag force.
Option A:	187.20N, 37.44N respectively
Option B:	165.23N, 54.23N respectively
Option C:	123.87N, 76.21N respectively
Option D:	398.67N, 45.98N respectively
17	For 3 pipes connected in series, the total head loss (H) will be:
Option A:	Head loss in pipe 1-Head loss in pipe 2+Head loss in pipe 3
Option B:	Head loss in pipe 1+Head loss in pipe 2+Head loss in pipe 3
Option C:	Head loss in pipe 2+Head loss in pipe 3-Head loss in pipe 1
Option D:	Head loss in pipe 3+Head loss in pipe 1-Head loss in pipe 2

18	A pipe-line carrying water has an average height of irregularities projecting from the surface of the boundary of the pipe as 0.15mm. The shear stress developed is 4.9 N/m2. The kinematic viscosity of water is 0.01 stokes. What type of boundary is it?
Option A:	Transitional
Option B:	Smooth
Option C:	Rough
Option D:	Mixed
19	What is the name of the given equation $\frac{p_1 - p_2}{\rho g} = h_f = \frac{32\mu \bar{u} L}{\rho g D^2}$
Option A:	Euler's equation
Option B:	Bernoulli's equation
Option C:	Navier Stokes equation
Option D:	Hagen Poisueilli's equation
20	What is the condition of maximum power transmission through a nozzle?
Option A:	H = hf/3
Option B:	H+hf = 3
Option C:	hf = H-3
Option D:	hf = H/3

Q2.	**Solve any Two Questions out of Three** **10 marks each**
A	A horizontal pipeline 40m long is connected to a water tank at one end and discharges freely into the atmosphere at the other end. For the first 25m of its length from the tank, the pipe is 150mm diameter and its diameter is suddenly enlarged to 300mm. The height of water level in the tank 10m above the center of the pipe. Considering all losses of head which occur, determine the rate of flow. Take f = 0.01 for both sections of the pipe. Draw HGL and TEL.
B	A man weighing 100 kgf descends to the ground from an aeroplane with the help of a parachute against the resistance of air. The velocity with which the parachute, which is hemispherical in shape, comes down is 25m/s. Find the diameter of the parachute. Assume C_D= 0.5 and density of air = 1.25 kg/m^3.
C	A lawn sprinkler with two nozzles of diameter 5mm each is connected across a tap of water as shown in the given figure. The nozzles are at a distance of 30cm and 20cm from the center of the tap. The rate of flow of water through tap is 120cm^3/s. The nozzles discharge water in the downward direction. Determine the angular speed at which the sprinkler will rotate free.

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	For a laminar flow through circular pipe, prove that the ratio of maximum velocity to the average velocity is equal to 2.
B	A rough pipe is of diameter 10cm. The velocity at a point 4 cm from the wall is 30% more than the velocity at a point 2cm from the pipe wall. Determine the average height of roughness.
C	Three reservoirs A, B and C are connected by a pipe system as shown in the following figure. Find the discharge into or from reservoir B and C if the rate of flow from reservoir A is 60 liters/s. Find the height of water level in the reservoir C. Take f = 0.006 for all pipes.