Program: **BE Civil Engineering**

Curriculum Scheme: **Revised 2016**

Examination: **Third Year** Semester: **V**

Course Code: **CEC501** Course Name: **Structural Analysis-II**

Time: 1 hour Max. Marks: 50

Note to the students: All the Questions are compulsory and carry equal marks.

Q1.	The number of independent displacement components at a rigid beam-column joint of a plane frame is
Option A:	One
Option B:	Two
Option C:	Three
Option D:	Four
Q2.	A pin-jointed plane frame with (m) members, (j) joints & (r) reactions, is unstable if
Option A:	(m + r) < 2j
Option B:	(m + r) = 2j
Option C:	(m + r) > 2j
Option D:	(m + j) >3r
Q3.	Internal work of displacement multiplied by incremental load over the total loads and over the volume is known as
Option A:	Kinetic energy
Option B:	Potential energy
Option C:	Complementary energy
Option D:	Resilience
Q4.	For a simply supported beam of flexural rigidity (EI), with span "L", point load "W" at center, the central deflection is?
Option A:	$(WL^3)/48EI$
Option B:	$(WL^2)/48EI$
Option C:	$(WL^4)/48EI$
Option D:	$(WL)/48EI$
Q5.	When axial deformations are neglected in analysis of frames under temperature stresses, which condition is considered?
Option A:	Area of AFD =0
Option B:	Area of BMD=0
Option C:	Coefficient of thermal expansion =0
Option D:	Change in temperature = 0
Q6.	In Clapeyron's Theorem of Three Moments, with standard notations, A_1

	represents area of first BMD on left side, then what is represented by x_1?
Option A:	Deflection at point below the load
Option B:	Span from the left end.
Option C:	Centroid distance of first BMD from left end of the span.
Option D:	Point of Contra-flexure measured from left
Q7.	Flexibility method is
Option A:	Displacement method
Option B:	Energy method
Option C:	Force method
Option D:	Strain energy method
Q8.	The flexibility coefficient of free end of the cantilever (Length L & flexural rigidity EI) with the coordinate as a unit moment at the free end, is
Option A:	(L/EI)
Option B:	(L^2/EI)
Option C:	(L^3/EI)
Option D:	(L^4/EI)
Q9.	If a spring has force (P) & deformation (Δ), it's flexibility is
Option A:	P / Δ
Option B:	Δ /P
Option C:	P X Δ
Option D:	P^2 Δ
Q10.	The stiffness matrix of an element is given as $\frac{2EI}{L}\begin{bmatrix}2 & 1\\1 & 2\end{bmatrix}$. Then Flexibility matrix is
Option A:	$\frac{L}{5EI}\begin{bmatrix}2 & -1\\-1 & 2\end{bmatrix}$
Option B:	$\frac{L}{6EI}\begin{bmatrix}2 & -1\\-1 & 2\end{bmatrix}$
Option C:	$\frac{L}{2EI}\begin{bmatrix}2 & 1\\1 & 2\end{bmatrix}$
Option D:	$\frac{L}{3EI}\begin{bmatrix}2 & -1\\-1 & 2\end{bmatrix}$
Q11.	Which of the following equation is used in Stiffness matrix method? Where [F] = External Force, [PL]= Forces in fully restrained structure, [S] = Stiffness matrix, [Δ] = Unknown displacement
Option A:	[F]=[PL]-[S][Δ]
Option B:	[Δ]=[PL]+[S][F]

Option C:	[Δ]=[F]+[S][PL]
Option D:	[F]=[PL]+[S][Δ]
Q12.	Free moment diagram for a span AB of length 3m carrying UDL of 10 kN/m is
Option A:	Triangle with maximum ordinate 7.5 kNm
Option B:	Symmetric Parabola with maximum ordinate 11.25 kNm
Option C:	Symmetric Parabola with maximum ordinate 28.7 kNm
Option D:	Triangle with maximum ordinate 15 kNm
Q13.	A two span continuous beam ABC has left support A as fixed support, B and C are roller supports. If the beam is to be analyzed by slope deflection method, what are the unknowns to be determined?
Option A:	θ_a & θ_b
Option B:	θ_a & θ_c
Option C:	θ_a
Option D:	θ_b & θ_c
Q14.	A continuous beam ABC has A and C as fixed supports and B is the intermediate roller support. It carries a UDL of 30kN/m in span AB and 20kN/m in span BC. Span AB = BC = L. EI is constant throughout the section. What will be the slope deflection equation for M_{ba} (M_{fba} is the fixed end moments)?
Option A:	M_{fba}+2EI/L(2θ_A+θ_B-3Δ/L)
Option B:	M_{fba}+2EI/L(θ_A+2θ_B-3Δ/L)
Option C:	M_{fba}+2EI/L(θ_A+θ_B-3Δ/L)
Option D:	M_{fba}+2EI/L(2θ_A+θ_B-2Δ/L)
Q15.	What is stiffness?
Option A:	When a moment is applied at one end of a member allowing rotation of that end and fixing the far end, some moment develops at the far end also.
Option B:	The ratio of moment shared by a member to the applied moment at the joint
Option C:	Moment required to rotate an end by unit angle (1 radian) when rotation is permitted at the end.
Option D:	The ratio of carry over moment to applied moment
Q16.	Displacement factor in Kani's method
Option A:	$-\frac{1}{2}(\frac{k}{\in k})$
Option B:	$-\frac{3}{2}(\frac{k}{\in k})$
Option C:	$\frac{1}{2}(\frac{k}{\in k})$
Option D:	$\frac{3}{2}(\frac{k}{\in k})$

Q17.	A propped cantilever of span (L) is subjected to a concentrated load at mid-span. If M_p is plastic moment capacity of beam, then the value of collapse load will be
Option A:	$12M_p/L$
Option B:	$8M_p/L$
Option C:	$6M_p/L$
Option D:	$4M_p/L$
Q18.	Plastic analysis is applicable to a structure made of which one of the following?
Option A:	Ductile & brittle materials
Option B:	Any structural material
Option C:	Brittle material only
Option D:	Ductile material only
Q19.	The moment capacity at a section of plastic hinge equals
Option A:	Yield moment
Option B:	Zero
Option C:	Fully plastic moment
Option D:	Twice the yield moment
Q20.	Portal frames are frequently used in a building to
Option A:	Transfer vertical forces
Option B:	Transfer moment
Option C:	Transfer horizontal forces
Option D:	Transfer horizontal force applied at top of frame to foundation
Q21.	What is the degree of static indeterminacy of a simple portal frame whose both ends are fixed?
Option A:	Zero
Option B:	One
Option C:	Two
Option D:	Three
Q22.	How many slope deflection equations are available for a three span continuous beams
Option A:	3
Option B:	6
Option C:	4
Option D:	8
Q23.	The size of the flexibility matrix for a simple portal frame with one end fixed & other end roller- supported is
Option A:	(1 x 1)
Option B:	(2 X2)
Option C:	(3 X3)
Option D:	(4 X 4)

Q24.	Theorem of least work is also known as
Option A:	Castigliano's first theorem
Option B:	Castigliano's second theorem
Option C:	Principle of virtual work
Option D:	Betty's theorem
Q25.	In moment distribution method, at a joint, if distribution factor for one member is 0.4, what is the distribution factor for the other member at the same joint?
Option A:	0.6
Option B:	0.5
Option C:	0.2
Option D:	0.4

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Answer Keys:

Question	**Correct Option** (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	C
Q2.	A
Q3.	C
Q4	A
Q5	A
Q6	C
Q7	C
Q8.	A
Q9.	B
Q10.	B
Q11.	D
Q12.	B
Q13.	D
Q14.	B
Q15.	C
Q16.	B
Q17.	C
Q18.	D

Q19.	C
Q20.	C
Q21.	D
Q22.	B
Q23.	A
Q24.	B
Q25.	A