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Section : **Structural Engineering**

Q.1

LOK test is used for assessing which of the following properties of concrete

- A. Durability
- B. Chloride penetration
- C. Strength of concrete
- D. Hardness of concrete

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : **5834932708**

Q.2 Which one of the following is matched correctly

- A. Pratt Truss – Large span
- B. Warren Truss – Small span
- C. Quadrangle Truss – Medium Pitch
- D. Scissor Truss – Steep Slope

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : **5834932737**

Q.3 For linear elastic frame, if stiffness matrix is doubled with respect to the existing stiffness matrix, the deflection of the resulting frame will be

- A. Twice the existing value
- B. Half the existing value
- C. The same as existing value
- D. Indeterminate value

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : **5834932742**

Q.4 Euler's dimensional number related to this following

- A. Internal force and gravity
- B. Viscous force and internal force
- C. Viscous flow and buoyancy force
- D. Pressure & inertial force

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932703

Q.5 Electrostatic precipitators are used as pollution control device for the separation of

- A. SO₂
- B. NO_x
- C. Hydrocarbon
- D. Particulate matter

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932713

Q.6 If water is flowing through a pipe of 10cm diameter under pressure of 30N/cm² and mean velocity of 10 m/s, the kinetic head will be

- A. 20.4 m
- B. 5.1 m
- C. 0.204 m
- D. 0.101 m

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932704

Q.7 Short term elastic modulus of M25 grade concrete is _____ N/m².

- A. 2.5×10^3
- B. 2.5×10^4
- C. 2.5×10^5
- D. 2×10^4

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932729

Q.8 Carryover moment at end B due to moment 'M' applied at end A for the given beam is

- A. -M
- B. +M/2
- C. +M
- D. 0



Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : 5834932744

Q.9 When the ratio of L_y/L_x is less than 2, then slab behaves as an

- A. Two way slab
- B. One way slab
- C. Both
- D. None

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : 5834932722

Q.10 In column analogy method, the area of an analogous column for a fixed beam of span L and flexural rigidity EI is taken as

- A. L/EI
- B. $L/2EI$
- C. $L/4EI$
- D. $L/8EI$

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : 5834932743

Q.11 Match the following.

- | | |
|--|-----------------------------------|
| 1. CST (Constant Strain Triangle) element | P. Six noded triangular element |
| 2. LST (Linear Strain Triangle) element | Q. Three noded triangular element |
| 3. QST (Quadratic Strain Triangle) element | R. Ten noded triangular element |
- A. 1 Q, 2 P, 3 R
B. 1 P, 2 Q, 3 R
C. 1 R, 2 P, 3 Q
D. 1 R, 2 Q, 3 P

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932719

Q.12 Which of the following causes fatigue in a structure

1. Maximum Stress
2. Residual stress
3. Large number of loading cycles
4. Wide range of stress variation

Select the correct answer using the codes given below.

- A. 1 & 2
B. 3 & 4
C. 2, 3 & 4
D. 1, 2 & 4

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932736

Q.13 The order for the flexibility matrix for a structure is,

- A. Equal to the number of redundant forces
- B. More than the number of redundant forces
- C. Less than the number of redundant forces
- D. Equal to the number of redundant forces plus three

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932745

Q.14 Intermediate vertical stiffeners are provided in plate girders to

- A. Eliminate the web buckling
- B. Eliminate the local buckling
- C. Transfer concentrated loads
- D. Prevent excessive deflection

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932735

Q.15 The limiting depth of neutral axis for grade of steel Fe500, Elastic modulus of steel E
= 2×10^5 MPa is

- A. 0.479
- B. 0.456
- C. 0.5313
- D. 0.356

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932727

Q.16 The compacting factor test of cement concrete determines its

- A. Strength
- B. Porosity
- C. Degree of compaction under loads
- D. Workability

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932709

Q.17 Instability in a structure due to lateral loads cause

- A. Sliding
- B. Overturning
- C. Both A & B
- D. None

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932723

Q.18 The degree of static indeterminacy up to which the column analogy method can be used is

- A. 2
- B. 3
- C. 4
- D. Unrestricted

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932746

Q.19 Cup & Cone fracture is considered as an indication of fracture

- A. Brittle
- B. Ductile
- C. Fatigue
- D. Plastic

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932730

Q.20 The nominal shear stress can be calculated by the expression where shear force is given by ' V_u ', ' b_w ' is the width of beam, ' d ' is the effective depth of beam and ' D ' is the overall depth of the beam.

- A. $\tau_v = V_u / (b_w * d)$
- B. $\tau_v = V_u * (b_w * d)$
- C. $\tau_v = V_u / (b_w * D)$
- D. $\tau_v = V_u * (b_w * D)$

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932720

Q.21 For which case there is an oscillatory motion

- A. Over damped system
- B. Under damped system
- C. Critically damped system
- D. Undulated damped system

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932747

Q.22 Which of the following methods of structural analysis is a force method

- A. Three moment equation
- B. Slope deflection method
- C. Column analogy method
- D. Moment distribution method

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932741

Q.23 Minimum number of battens required in a built-up column are

- A. 2
- B. 3
- C. 4
- D. 6

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932733

Q.24 In lever of third order, load W, effort P and fulcrum F are oriented as follows

- A. W between P and F
- B. F between W and P
- C. P between W and F
- D. None of the above

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932706

Q.25 The settling velocity of a particle in a sedimentation tank depends on

- A. Depth of tank
- B. Surface area of tank
- C. Both depth and surface area of tank
- D. None of the above

Ans  1. A
 2. B
 3. C
 4. D

Question ID : 5834932750

Q.26 Splices for compression members are designed as

- A. Short column
- B. Intermediate column
- C. Long column
- D. Depending upon its thickness

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932734

Q.27 A negative base pressure or non-contact zone at the base of footing is encountered when the loading eccentricity 'e' value is ____

- A. $< L/6$
- B. $= L/6$
- C. $> L/6$
- D. None of the above

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932726

Q.28 Which of the following module of Finite element Analysis is used to determine the natural frequency.

- A. Static analysis
- B. Thermal analysis
- C. Modal analysis
- D. All of the above

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932717

Q.29 Centre of pressure on an inclined plane is

- A. At the centroid
- B. Above centroid
- C. Below centroid
- D. Meta centre

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932702

Q.30 Surkhi is added to lime mortar to

- A. Prevent shrinkage
- B. Decreased setting time
- C. Increase bulk
- D. Impart hydraulicity

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932710

Q.31 A splitting tensile Test is performed on a cylinder of diameter 'D' and length 'L'. If the ultimate load is 'P', then the splitting tensile strength of concrete is given by

- A. $\frac{P}{(\pi DL)}$
- B. $\frac{2P}{(\pi DL)}$
- C. $\frac{4PL}{(\pi D^3)}$
- D. $\frac{2PD}{(\pi L^3)}$

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932711

Q.32 If a spring of mass 30 kg has a spring constant of 15 N/m, then its time period is ____.

- A. 6.3 s
- B. 8.9 s
- C. 5.03 s
- D. 2.8 s

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932748

Q.33 From the following, which type of element is not be used in two dimensional problems

- A. Tetrahedron
- B. Quadrilateral
- C. Parallelogram
- D. Rectangle

Ans ☒ 1. A

☒ 2. B

☒ 3. C

☒ 4. D

Question ID : 5834932718

Q.34 The slenderness ratio of a web of beam section from diagonal buckling consideration is given by

- A. d/t_w
- B. $2.45 d/t_w$
- C. $85 d/t_w$
- D. $67 d/t_w$

Ans ☒ 1. A

☒ 2. B

☒ 3. C

☒ 4. D

Question ID : 5834932738

Q.35 Which graph can be used to describe oscillations?

- A. Displacement – Time graph
- B. Displacement – Length graph
- C. Amplitude – Time graph
- D. Time – invariant graph

Ans ☒ 1. A

☒ 2. B

☒ 3. C

☒ 4. D

Question ID : 5834932749

Q.36 The unit weight of soil at zero air voids depends on

- A. Specific gravity
- B. Water content
- C. Unit weight of water
- D. All the above

Ans ☒ 1. A

☒ 2. B

☒ 3. C

☒ 4. D

Question ID : 5834932714

Q.37 According to Indian standards, the increase in compressive strength of high alumina cement concrete at 6 months, beyond 28 days compressive strength is

- A. zero
- B. 10%
- C. 15%
- D. 20%

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932707

Q.38 For a beam, if fundamental equations of statics are not sufficient to determine all the reactive forces at the supports, the structure is said to be

- A. Determinate
- B. Statically determinate
- C. Statically indeterminate
- D. None of the above

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932705

Q.39 The acceptable limit for the safety & serviceability requirements before failure occurs is called

- A. Working state
- B. Limit state
- C. Ultimate state
- D. Plastic state

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932731

Q.40 For reversal of stress, the most suited bolt is

- A. black
- B. turned
- C. friction grip
- D. Ordinary

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932732

Q.41 If all the reactions acting on a planar system are concurrent in nature, then the system is

- ☐ A. Can't say
- ☐ B. Essentially stable
- ☐ C. Essentially unstable
- ☐ D. None of these

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : 5834932740

Q.42 Skempton's pore pressure coefficient (β) for a saturated soil is

- ☐ A. 1
- ☐ B. zero
- ☐ C. between 0 and 1
- ☐ D. greater than 1

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : 5834932751

Q.43 The suitable method of forecasting population for a young and rapidly increasing city is

- ☐ A. Arithmetical increase method
- ☐ B. Geometrical increase method
- ☐ C. Incremental increase method
- ☐ D. Graphical method

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : 5834932712

Q.44 The collapse load of a propped cantilever of span 'L', subjected to uniformly distributed load is

- ☐ A. $0.414 M_p/L$
- ☐ B. $0.586 M_p/L$
- ☐ C. $7.67 M_p/L$
- ☐ D. $11.656 M_p/L$

Ans ☒ 1. A
☒ 2. B
☒ 3. C
☒ 4. D

Question ID : 5834932739

Q.45 The effective modulus of elasticity used for computing initial plus creep deflection is given by _____. Where E_c is the elastic modulus of concrete and θ is creep co-efficient.

- A. $E_c/(1 - \theta)$
- B. $E_c/(1 + 2\theta)$
- C. $E_c/(1 + \theta)$
- D. $E_c/(\theta - 1)$

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932725

Q.46 If the water content of a fully saturated soil mass is 100%, then the voids ratio of the sample is

- A. Less than specific gravity of soil
- B. Equal to specific gravity of soil
- C. Greater than specific gravity of soil
- D. Independent of specific gravity of soil

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932715

Q.47 A soil has a bulk density of 22 KN/ cum and water content of 10%. The dry density of soil is

- A. 18.6 KN/ cum
- B. 20.0 KN/ cum
- C. 22.0 KN/ cum
- D. 23.2 KN/ cum

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932716

Q.48 Limiting span/effective depth ratio for simply supported beams for span up to 10 m is

- A. 26
- B. 20
- C. 7
- D. 15

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932724

Q.49 Splitting tensile strength f_{ct} of a concrete cylinder with diameter = 100 mm, length = 200 mm, when a load of 10 kN is applied is equal to _____.

- A. π
- B. π^{-1}
- C. $\pi/2$
- D. $2/\pi$

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932728

Q.50 Minimum thickness of RCC wall suggested as per IS 456

- A. 100 mm
- B. 75 mm
- C. 150 mm
- D. 125 mm

Ans  1. A

 2. B

 3. C

 4. D

Question ID : 5834932721