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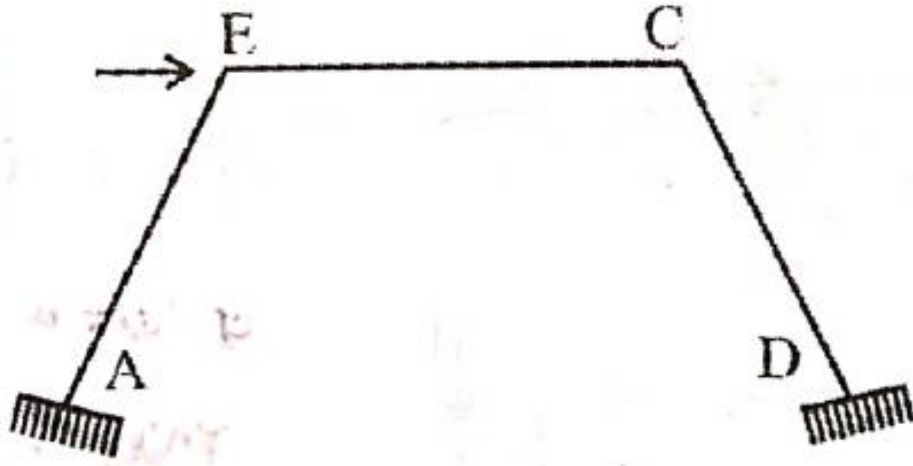
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Q) The degree of kinematic indeterminacy of the rigid frame with clamped ends at A and D as shown in the figure is



A: 7

B: 5

C: 6

D: 4

Q) The fixed end moment of uniform beam of span L and fixed at the ends subjected to central point load P is

A: $PL/2$

B: $PL/8$

C: $PL/12$

D: $PL/16$

Q) Match List-I with List-II and select correct answer using the codes given in the list.

List - I	List - II
A. Slope deflection method	1. Force Method
B. Moment distribution method	2. Displacement Method
C. Method of three moments	
D. Castigliano's second theorem	

1. A – 3, B – 2, C – 1, D – 4

2. A – 1, B – 2, C – 4, D – 3

3. A – 2, B – 4, C – 3, D – 1

4. A – 3, B – 1, C – 2, D – 4

Q) The number of simultaneous equations to be solved in the slope deflection method is equal to

A: The degree of static indeterminacy

B: The degree of kinematic indeterminacy

C: The number of joints in the structure

D: The number of member in the structure

Q) In a linear elastic structural element

A: Stiffness is directly proportional to flexibility

B: Stiffness is inversely proportional to flexibility

C: Stiffness is equal to flexibility

D: Stiffness and flexibility are not related

Q) The ratio of the stiffness of a beam at the near end when the far end is hinged to the stiffness of the beam at the near end when the far end is fixed is

A: $1/2$

B: $3/4$

C: 1

D: $4/3$

Q) The plan of a map was photo copied to a reduced size such that a line originally 100 mm, measures 90 mm. The original scale of the plan was 1:1000. The revised scale is

A: 1:900

B: 1:1111

C: 1:1121

D: 1:1221

Q) The type of surveying in which the curvature of the earth is taken into account is called:

A: Geodetic surveying

B: Plane surveying

C: Preliminary surveying

D: Topographical surveying

Q) The rise and fall method for obtaining the reduced levels of points provides is check on:

A: Intermediate sight and back sight

B: Only back sight

C: Fore sight, back sight and intermediate sight

D: Only foresight

Q) Match the List-I (tool/instrument) with List-II (method of surveying) and select the correct answer using the codes in lists:

List - I	List - II
A. Alidade	1. Chain surveying
B. Arrow	2. Levelling
C. Bubble tube	3. Plane table
D. Stadia hair	4. Theodolite surveying

1. A – 3, B – 2, C – 1, D – 4

2. A – 1, B – 2, C – 4, D – 3

3. A – 2, B – 4, C – 3, D – 1

4. A – 3, B – 1, C – 2, D – 4

Q) In a closed loop traverse of 1 km total length the closing errors in departure and latitude are 0.3 m and 0.4 m, respectively. The relative precision of this traverse will be

A: 1:5000

B: 1:4000

C: 1:3000

D: 1:2000

Q) Anallatic lens provided in a tacheometer is

A:Concave lens

B: Convex lens

C: Planoconvex lens

D: Plane lens

Q) The tangential method of tacheometry is

A: Slower than stadia method

B: Faster than stadia hair method

C: Preferred as involves less computations to get reduced distance

D: Preferred as chances of operational error are less compared to stadia

Q)Rolled steel tubes are referred by their

A: Outer diameter

B: Inner diameter

C: Average diameter

D: Outer radius

Q) The flexural tensile strength of M-25 grade of concrete in (N/mm²) as per IS 456:2000 is

A: 3 N/mm²

B: 3.5 N/mm²

C: 4 N/mm²

D: 4.5 N/mm²

Q) IS 456:1978, recommends to provide certain minimum steel in a RCC beam

A: To ensure compression failure

B: To avoid rupture of steel in case a flexural failure occurs

C: To hold the stirrups steel in position

D: To provide enough ductility to the beam

Q) Which one of the following set of values gives the minimum clear cover (in mm) for the main reinforcements in the slab, beam column and footing respectively according to IS 456: 1978?

A: 20, 25, 30, 75

B: 5, 15, 25, 50

C: 15, 25, 40, 75

D: 25, 15, 20, 75

Q) The permissible bending tensile stress in concrete for vertical wall of an RC water tank made of M25 concrete is

A: 8.5 N/mm²

B: 6.0 N/mm²

C: 2.5 N/mm²

D: 1.8 N/mm²

Q) A prestressed concrete beam has a cross section with the following properties

Area $A = 46,400 \text{ m}^2$

$I = 75.8 \times 10^7 \text{ mm}^4$

$Y_{\text{bottom}} = 244 \text{ mm}, Y_{\text{top}} = 156 \text{ mm}$

It is the subjected to a prestressing force and eccentricity 'e' so as to have a zero stress at the top fibre. The value of 'e' is given by

A: 66.66 mm

B: 66.95 mm

C: 104.72 mm

D: 133.33 mm

Q) The loss of prestress due to elastic shortening of concrete is least in

A: One wire pre-tensioned beam

B: One wire post-tensioned beam

C: Multiple wire pre-tensioned beam with sequential cutting of wires

D: Multiple wire post-tensioned beam subjected to sequential prestressing

Q) The percentage loss of prestress due to anchorage slip of 3 mm in a concrete beam of length 30 m which is post-tensioned by a tendon with an initial stress of 1200 N/mm² and modulus of elasticity equal to 2.1×10^5 N/mm² is

A: 0.0175

B: 0.175

C: 1.75

D: 17.5

Q) Which one of the following is categorized as a long term loss of prestress in a prestressed concrete member.

A: Loss due to elastic shortening

B: Loss due to friction

C: Loss due to relaxation of strands

D: Loss due to anchorage slip

Q) Bacteriological examination of drinking water for Escherichia coli (E.coli) is performed because

A: They are pathogenic causing intestinal diseases

B: Their presence indicates viral contamination of water

C: They are used as indicator organism for probable presence of pathogens

D: They represent unique indicator organism for sewage pollution

Q) MPN index is measure of

A: Coliform bacteria

B: BOD₅

C: Dissolved oxygen content

D: Hardness

Q) Most of the turbidity meters work on the scattering principle. The turbidity value so obtained is expressed in

A: CPU

B: FTU

C: JTU

D: NTU

Q) Zero hardness of water is achieved by:

A: Using lime soda process

B: Excess lime treatment

C: Ion exchange method

D: Using excess alum dosage

Q) The presence of hardness in excess of permissible limit causes

A: Cardio-vascular problems

B: Skin discolouration

C: Calcium deficiency

D: Increased laundry expenses

Q) A surface water treatment plant operates round the clock with a flow rate of $35 \text{ m}^3/\text{min}$. The water temperature is 15°C and jar testing indicated an alum dosage of 25 mg/l with flocculation at GT value of 4×10^4 producing optimal results. The alum quantity required for 30 days (in kg) of operation of the plant is

A: 23700 kg

B: 15200 kg

C: 45320 kg

D: 37800 kg

Q) The drop manholes are provided in sewerage system when there is

A: Change in alignment of sewer line

B: Change in size of sewers

C: Change in the elevation of ground level

D: Change from gravity system to pressure system

Q) High COD to BOD ratio of an organic pollutant represents

A: High biodegradability of the pollutant

B: Low biodegradability of the pollutant

C: Presence of free oxygen for aerobic decomposition

D: Presence of toxic material in the pollutant

Q) A single rapid test to determine the pollution status of river water is

A: Biochemical oxygen demand

B: Chemical oxygen demand

C: Total organic solids

D: Dissolved oxygen

Q) The absorbent most commonly used in water and waste treatment is

A: Sand of grain size from 0.1 to 2 mm

B: Activated carbon granules of size 0.1 to 2 mm

C: Ordinary wood shavings of fine size

D: Coal-tar

Q) Chlorine is sometimes used in sewage treatment

A: To avoid flocculation

B: To increase biological activity of bacteria

C: To avoid bulking of activated sludge

D: To help in grease separation

Q) The domination micro organisms in an activated sludge process reactor are

A: Aerobic heterotrophs

B: Anaerobic heterotrophs

C: Autotrophs

D: Phototrophs

Q) From the following sewage treatment options, the largest land for a given discharge will be needed for:

A: Trickling filter

B: Anaerobic pond

C: Oxidation ditch

D: Oxidation pond

Q) The dispersion of pollutants in atmosphere is maximum when

A: Environmental lapse rate is greater than adiabatic lapse rate

B: Environmental lapse rate is less than adiabatic rate

C: Environmental lapse rate is equal to adiabatic lapse rate

D: Maximum mixing depth is equal to zero

Q) Two primary air pollutants are

A: Sulphur oxide and ozone

B: Nitrogen oxide and peroxyacetyl nitrate

C: Sulphur oxide and hydrocarbon

D: Ozone and peroxyacety nitrate

Q) The reference pressure used in the determination of sound pressure level is

A: 20μ Pa

B: 20μ dB

C: 10μ Pa

D: 10μ dB

Q) The design flood for a culvert should be preferably

A: The probable maximum flood

B: Obtained from statistical considerations say a flood of 50 years return period

C: The highest observed flood

D: Obtained from a flood formula

Q) If, for a fluid in motion, pressure at a point is same in all directions, then the fluid is

A: A real fluid

B: A Newtonian fluid

C: AN ideal fluid

D: A non-Newtonian fluid

Q) According to Robert Hooke, stress is directly proportional to strain within:

A: Proportional limit

B: Elastic limit

C: Yield point

D: Ultimate stress

Q) Jhama bricks are

A: Well burnt having smooth and even surface

B: Slightly over burnt having rough surface

C: Under burnt and can be easily broken

D: Over burnt with irregular shape

Q) Which one of the following slows down or retards the setting action of cement

A: Sulphur trioxide

B: Alkaline

C: Calcium sulphate

D: Magnesia

Q) The void ratio and specific gravity of a soil are 0.65 and 2.72 respectively. The degree of saturation (in percent) corresponding to water content of 20% is

A: 65.3

B: 20.9

C: 83.7

D: 54.4



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