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Q : 7) Elongation of a bar due to its selfweight is computed is computed by _____. Where L-length of the bar, E-Young's modulus of elasticity and Wtotal weight the bar material

Daily Class – 8:00 PM

A : WL/8E

- **B** : WL²/2E
- **C : WL/4E**
- **D** : WL/2E



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Q : 8) What will be the sludge volume index (SVI) if 100 ml of sludge collected in 30 mins on drying weight 800 mg?

- A:115
- **B:78**
- **C**:100
- D:125



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The pH value of sewage sludge is, in general, neutral at 7.0. Slightly higher values are typical in digested sludge or sludge in the methanogenic phase of anaerobic digestion while PS and sludge in the acidogenic phase show slightly lower values. Q : 10) For the sludge digestion system to work effectively, the pH of the sludge should be between:

- A:8.5-10
- B:6.5-7.4
- C:10-12
- D:3.5-5.5



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- Q:11) What does chemical oxygen demand (COD) indicate?
- A : Biodegradability of the waste water
- **B** : Strength of a sewage
- C : Age of the sewage
- D : Potential for recycling of the wastewater



- Q : 12) Which of the following characterizes biochemical treatments of sewage effluents?
- A : Oxidation
- **B**: Sulphonification
- **C** : Chlorination
- D : Redox



- Q:13) For the clamped-free column, the effective length is equal to:
- A : 0.7 times the actual length
- **B** : The actual length
- C: 0.5 times the actual length
- D : Twice the actual length



- Q:14) In the case of a triangular section, the shear stress is maximum at the:
- A : Height of h/2
- B: Height of 2h/3
- **C** : Neutral axis
- **D** : Centre of gravity



- Q : 15) Removal of excess chlorine resulting from super chlorination, in part, or completely, is called:
- A: Re-chlorination
- **B** : De-chlorination
- **C** : Pre-chlorination
- **D** : Post-chlorination



- Q:16) When does contra flexure point occur on a beam?
- A : When bending moment changes its sign.
- **B** : When shear force is constant.
- C : When bending moment is maximum.
- D : When shear force is zero after changing its sign.



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Q:17) The best method for controlling taste and odor problems in water is through _____ process.

- A : Oxidation
- **B** : Reduction
- **C** : Hydration
- **D** : Coagulation



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- Q : 18) What is the section modulus for a rectangular beam of size 200 mm × 350 mm?
- $A: 5.6 \times 10^{6} \text{ mm}^{3}$
- $B: 4.08 \times 10^{6} \text{ mm}^{3}$
- $C: 4.34 \times 10^{6} \text{ mm}^{3}$
- D: $5.21 \times 10^{6} \text{ mm}^{3}$



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Q : 20) The deflection of the centre of the simply supported beam carrying point load at the centre is given by:

- A : -5WL²/38EI
- **B** : -WL³/48EI
- C:-WL²/24EI
- **D** : -WL³/3EI



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Q : 21) A cylinder is considered to be a 'thin cylinder', if the thickness to internal diameter of the cylindrical shell is:

- A : Less than 1/10
- **B** : less than 1/20
- C : Greater than 1/20
- D : Greater than 1/10



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Q : 22) The effective size of the sand particles used un the top layer of slow sand filter is in the range of:

A: 0.45 to 0.70 mm

B: 0.20 to 0.30 mm

C: 0.40 to 0.60 mm

D: 0.35 to 0.55 mm



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Daily Class – 8:00 PM

- Q:24) As per Indian railway standards, the width of the broad gauge is:
- A : 1676 mm
- B:1000 mm
- C: 1435 mm
- D:1524 mm







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Q : 25) The load per unit rail length required to produce one unit depression in the rail bottom is called modulus.

- A : Ballast
- **B** : Elastic
- C : Track
- D:Shear



- Q : 26) The first Indian railway train started in the year _____ and travelled between _____.
- A: 1875; Kachiguda and Secunderabad
- B: 1850; Bombay and Pune
- C: 1880; Delhi and Agra
- D: 1853; Bombay and Thane



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Daily Class – 8:00 PM

- Q : 27) Which of the following alignments is normally NOT used in mountain regions.
- A : Zigzag alignment
- **B** : Horizontal plane alignment
- **C** : Spiral alignment
- D : Switch-back alignment



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EARTHWORK

The minimum widths of formation recommended for different gauges are shown in table:

Gauge	Minimum width of embankment		Minimum width of cutting		Remarks
	Single	Double	Single	Double	
Broad Gauge (B.G)	610 cm	1082 cm	549 cm	1021 cm	122 cm extra width is to be provided in case of the formation in cutting for the side drains.
Metre Gauge (M.G)	488 cm	884 cm	427 cm	827 cm	
Narrow Gauge (N.G)	370 cm	732 cm	335 cm	701 cm	

Q : 28) The standard formation width of single line broad gauge in embankment in Indian railways is:

- A : 6.10 m
- B:4.27 m
- C:5.40 m
- D:4.88 m



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Q : 29) What will be the dry weight (in kN/m^3) for a saturated soil. Given that moisture constant (w) = 35% and specific gravity of soil (G_s) = 2.5?

A : 11.08 kN/m³

B: 13.58 kN/m³

C: 10.68 kN/m³

D:12.08 kN/m³



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Q : 30) If a broad gauge track is laid with wooden sleepers with a sleeper density of M + 7, spacing pf sleeper is 68 cm and the width of the sleeper is 25.4 cm, then the depth of the ballast cushion would be:

A : 21.3 cm

B:23.0 cm

C:24.0 cm

D:22.5 cm



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Q:31) What is the reason for preferring triaxial shear test over direct shear test?

A : Accurate measurement of pore water pressure and change in volume is not possible during the test.

B : Stress distribution on the failure plane is non-uniform

C : The test provides better correlation for effective stress of angle of friction

D : Test can be performed under all three drainage conditions with complete control.



- Q: 32) Which of the following is a requirement from a railway sleeper?
- A : It should have sabotage and theft features.
- B : It should hold the rails in their correct gauge and alignment.
- C : It should give a firm and even support to the rails.
- D : It should transfer the load evenly from the rails to a wider area of the ballast.



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Q : 33) The coefficient of curvature from the grain size distribution curve is given by: D_{30}^2 $D_{60} D_{10}$ **B** : $\frac{D_{30}}{2}$ D_{10} D_{60} D_{10} D



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Q : 34) The stability of the formation slope railway line is generally determined by the the _____ method.

A : Least square

B : Rankine's

C : Mohr circle

D : Slip circle



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Q:35) The distance between the gauge faces of the stock rail and the tongue rail at the heel of the switch is called:

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- A : Heel divergence
- **B** : Switch angle
- **C** : Flange way clearance
- D : Throw of the switch



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- Q:36) The function of a fish plate is to hold two rails together in:
- A : Vertical plane only
- B : Both the horizontal and vertical planes
- C: Oblique plane only
- **D** : Horizontal plane only



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Q: 37) The relative density of granular soils is given by the relation:

$$A: \frac{e_{min} - e}{e_{max} + e_{min}} \times 100$$

$$B: \frac{e_{max} + e}{e_{max} - e_{min}} \times 100$$

$$C: \frac{e_{max} - e}{e_{max} - e_{min}} \times 100$$

$$D: \frac{e_{max} - e}{e_{max} - e} \times 100$$



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- Q:38) As per Indian railway standards, the length of rail used in broad gauge is:
- A : 10 m
- B : 11 m
- C : 13 m
- D : 12 m



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Q : 39) The Mohr-coulomb failure criterion, which is defined by shear strength (s) consisting of effectibe normal stress (σ'), cohesion (c') and effective stress angle of friction (φ'), is given by:

- A : s = c' tan $\varphi' + \sigma'$
- B : s = c' + σ' tan ϕ'
- C : s = c' σ' tan ϕ'
- $\mathsf{D}:\mathsf{s}=\sigma'+\mathsf{c'tan}\;\varphi'$



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Q : 40) According to standard test method ASTM D-4318, the moisture content (the liquid limit of a soil) is determined by Casagrande's liquid device, at which a groove closure of ______ occurs at _____ blows.

A : 12.7 mm, 25

B: 12.7 mm, 20

C:11.7 mm, 20

D:11.7 mm, 25



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Q : 41) In a modified proctor test for compaction of soils, the mass of the rammer is of _____ and dropped at a height of _____.

A : 2.6 kg; 310mm

B: 4.89 kg; 450 mm

C: 2.6 kg; 450 mm

D: 4.89 kg; 310 mm



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Daily Class – 8:00 PM

Sensitivity	Soil Type
0 - 1	Insensitive
1 - 2	Little Sensitive
2 - 4	Normal Sensitive
4 - 8	Sensitive
8 - 16	Extra Sensitive
> 16	Quick Clays

Q : 42) For a soil, if the sensitivity value varies from 2.0 to 4.0, then such a soil is these soils are classified as:

- A: Moderately sensitive
- **B: Extra sensitive**
- **C: Sensitive**
- **D: Little sensitive**



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Q : 43) According to Rankine's formula, the minimum depth of foundation (h) computed with gross bearing capacity (p), density of soil (γ) and angle repose (φ) is:

- A: h = (p/ γ) [(1-sin φ)/(1+tan φ)]²
- B: h = $(\gamma/p) [(1-\sin \varphi)/(1+\sin \varphi)]^2$
- C: h = (p/ γ) [(1+sin φ)/(1-tan φ)]²
- D: h = (p/ γ) [(1-sin φ)/(1+sin φ)]²



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Q : 44) If the capillary rise in a soil A with an effective size of 0.02 mm was 60 cm, then what would be the capillary rise in the similar soil B with an effective size of 0.04 mm?

A: 40 cm

- B: 35 cm
- C: 20 cm
- D: 30 cm



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Q:45) Lime stabilization is most commonly used for stabilizing:

A: Clays

B: Cement

C: Sands

D: Bitumen



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Q: 47) According to Terzaghi's bearing capacity theory for foundations, a foundations is shallow if:

- A: Depth is greater than 2 times the width
- **B: Depth is greater than width**
- C: Depth is less than or equal to width
- D: Depth is greater than or equal to 2 times the width



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Q : 48) Unified soil classification system is almost similar to _____ classification. A: IS soil B: MIT C: Textural

D: AASHTO



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Q:49) Which one of the following is a DEMERIT of triaxial test?

A: The consolidation of the specimen is isotropic in the test but anisotropic in the field.

B: The stress distribution on the failure plane is uniform.

C: The pore pressure and volumetric changes can be measured directly.

D: The specimen is free to fail on the weakest plane.



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- Q : 50) For flow-through soils, the flow is laminar when the Reynold number is:
- A: Less than unity
- B: Less than 2000
- C: Greater than 2000
- **D: Greater than unity**



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Q : 51) The liquid limit is determined from Casagrande apparatus. The apparatus consists of a semispherical brass cup that is repeatedly dropped onto a hard rubber base from a height of:

- A: 15 mm
- B: 5 mm
- C: 20 mm
- D: 10 mm



- Q : 52) The load per unit area of the foundation at which shear failure in soil occurs is called the:
- **A: Shear resistance**
- **B:** Punching shear failure
- **C: Degree of consolidation**
- **D: Ultimate bearing capacity**

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