

SSC JE CBT 1 Civil Memory Based Quiz

Q.1 Consider the following statements:

Perforated bricks are preferred in construction since

- 1. they are lighter
- 2. they are stronger than 1st class bricks
- 3. they have heat-insulating properties
- 4. they are cheaper and need less mortar

Which of these statements are correct?

- A. 1, 2, 3 and 4
- B. 2 and 3 only
- C. 1 and 3 only
- D. 3 and 4 only

Answer: C

Sol: Perforated bricks are preferred in construction because they are lighter and have heat-insulating properties. They are not as strong as first-class bricks, and they are not necessarily cheaper or require less mortar. Perforated bricks are made by pressing clay into a mold with holes in it. The holes make the bricks lighter and allow air to circulate through them, which helps to keep them cool. Perforated bricks are often used in buildings where insulation is important, such as homes and offices.

Q.2 Which of the following is/are the objectives of road sign?

- i. Promote road safety
- ii. Promote efficient movement of vehicles
- iii. Increase design speed
- iv. Calculate traffic volume
- v. Provide warning for safe movement

- A. Both iii and v
- B. Only i, ii and v
- C. Only i
- D. i, ii, iii and v

Answer: B

Sol: **Promote road safety** → Helps prevent accidents by informing and warning drivers.
Promote efficient movement of vehicles → Guides drivers for smoother traffic flow, minimizing delays.
Provide warning for safe movement → Warning signs alert drivers about curves, junctions, crossings, etc.

Q.3 How much is the covering capacity (in m²/L) of oil base paints per coat.

- A. 10 – 15
- B. 2 – 5
- C. 5 – 10
- D. 15 – 30

Answer: A

Sol: The covering capacity of point is the amount of surface area that can be covered by one coat a point. It is measured in m²/L.
Oil based paints: it has a high covering capacity, typically ranging from 10 – 15 m²/L.
Latex paints: it has a low covering capacity than oil-based paint, typically ranging from 5 – 10 m²/L.
Primers: Primers typically have a low covering capacity, typically ranging from 2 – 5 m²/L.

- Q.4** Arrange the following process in order with context to water purification:
- a- Disinfection
 - b- Filtration
 - c- Coagulation
 - d- Sedimentation
 - e- Flocculation
- A. c, e, d, b, a
B. e, c, d, b, a
C. a, b, c, d, e
D. c, e, b, d, a

Answer: A

Sol: The correct sequence is :
Coagulation, Flocculation, Sedimentation, Filtration, Disinfection
Coagulation is the destabilization of colloids by addition of chemicals that neutralize the negative charges by rapid mixing. The chemicals are known as coagulants; usually have higher valence cationic salts (Al³⁺, Fe³⁺ etc.). Coagulation is a chemical process.
Flocculation is the agglomeration of destabilized particles into large size particles known as floc by slow mixing which can be effectively removed by sedimentation or flotation.
Filtration is done to remove the remaining inorganic particles which cannot be removed by coagulation aided sedimentation and after that disinfection is done by addition of Chlorine to kill pathogens.

- Q.5** What is the specific gravity of ordinary portland cement?
- A. 3.15
B. 3.10
C. 3.00
D. 3.17

Answer: A

Sol: Ordinary Portland Cement (OPC) generally has a specific gravity of 3.15, which means it is 3.15 times heavier than water. This value is standard because the major cement compounds (C₃S, C₂S, C₃A, C₄AF) have densities around this range.

- Q.6** Consider the following statements:

The effect of an air entrainment in concrete is to

- 1. decrease resistance to freezing & thawing
- 2. Increase workability
- 3. Increase resistance against chemical attack
- 4. Decrease permeability.

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

Answer: C

Sol: Air-entraining admixture: It is facilitating the development of a system of microscopic air bubbles within concrete during mixing.
The admixture affects following properties:
(1) Increase resistance to freezing & thawing
(2) Increase workability.
(3) Increase resistance to chemical attack.
(4) Reduce strength

(5) Reduce unit weight

Q.7 Given below are methods of compaction:

- 1. Vibration technique
- 2. Flooding the soil
- 3. Sheep foot roller
- 4. Tandem roller
- 5. Heavy weights dropped from a height

The methods suitable for cohesionless soils include

- A. 1, 2 and 3
- B. 2, 3 and 4
- C. 1, 2 and 5
- D. 3, 4 and 5

Answer: C

Sol: Cohesionless soil can be compacted by vibration, flooding and dropping hammer from height. Sheet foot roller and tandom roller are used to compacted cohesive soil.

Q.8 Consider the following statements with respect to splices in steel tension members and identify the correct answer.

Statement A: Splices in tension members are used to join two sections when a joint is to be provided, i. e. these replace the members at the joint where it is cut.

Statement B: As per IS specifications, the splice connections should be designed for a force of at least 0. 9 times the member design capacity in tension.

- A. Statement B is correct and A is incorrect
- B. Both statements are correct
- C. Both statements are incorrect
- D. Statement A is correct and B is incorrect

Answer: D

Sol: Statement A:

Splices in steel tension members are indeed provided to join two pieces of the same member when: the member length exceeds the rolling/transportation limit, or a joint is required at an intermediate location.

In effect, the splice “replaces” the continuity of the member at the cut/joint location and transfers the tensile force across the joint.

So, Statement A is correct.

Statement B:

As per IS code provisions (IS 800), splices in tension members are generally designed to develop the full design strength/capacity of the member in tension, i.e. 100%, not just 0.9 times.

The statement that the splice “should be designed for at least 0.9 times the member design capacity in tension” is therefore not correct.

Q.9 In surface water treatment, the correct sequence of unit operation is

- (i) Clariflocculation
- (ii) Aeration
- (iii) Filtration
- (iv) Disinfection

- A. (i), (ii), (iii), (iv)
- B. (ii), (i), (iii), (iv)
- C. (iii), (i), (ii), (iv)
- D. (ii), (iii), (iv), (i)

Answer: B

Sol:

The sequence of the process in the water treatment plant.

Aeration → Coagulation → Flocculation → Sedimentation → Filtration → Chlorination

Aeration

- Strips and oxidizes taste and odor, causing volatile organics and gases, and iron and manganese.
- Aeration systems include gravity aerators, spray aerators, diffusers, and me erators.

- Coagulation:
- Coagulation is the process in which certain chemicals termed coagulants are added to neutralize the negative protective charge present over the suspended particles so as to increase the opportunity of contact between the neutralized particles and a sticker precipitate resulting in the formation of a bigger size particle.
- Flocculation:
- It is a process in which neutralized particles are getting intimate contact with each other and with a sticky precipitate resulting in the formation of bigger size particles that can get easily settle in the following sedimentation tank In order to increase the opportunity to combine between the particles, slow mixing is also induced in this process.
 - Clariflocculator is a combination of flocculation and clarification in a single tank. It has two concentric tanks where the inner tank serves as a flocculation basin and the outer tank serves as a clarifier.
- Sedimentation:
- It is the process of removal of suspended particles from the water
 - The entire theory of sedimentation is based upon a single parameter termed Specific gravity.
 - In this process, particles are allowed to settle in the tank due to their own weight and then get removed.
- Filtration:
- Filtration is most often a policing step to remove flocks or smaller un-sedimented particles.
 - Filtration also removes dissolved organic matter, dissolved minerals, and microorganisms.
- Chlorination:
- Chlorination is the most popular method of disinfection, in which disinfection is done with the help of chlorine.

Q.10 Find the correct statement regarding the assumption of limit state design under compression member as per IS 456:2000.

- A. The maximum compressive strain in concrete in axial compression is 0.02.
- B. The minimum compressive strain in concrete in axial compression is 0.002.
- C. The maximum compressive strain in concrete in axial compression is 0.002.
- D. The minimum compressive strain in concrete in axial compression is 0.0002.

Answer: C

Sol: As per **IS 456:2000**, Clause 38.1 (Limit State of Collapse – Compression):

- ☐ For **short axially loaded compression members**, the **maximum compressive strain in concrete** is taken as **0.002** under axial compression **without eccentricity**.
- ☐ This value is used for designing **columns and compression members** under **pure axial load**.

Q.11 Convert the direction of a line PQ measured in whole circle bearing system, 75° 30', into quadrantal bearing system.

- A. N 75° 30' W
- B. N 255° 30' E
- C. N 255° 30' W
- D. N 75° 30' E

Answer: D

Sol: Whole-circle bearing (WCB) is measured clockwise from north.
Given: $\alpha = 75^{\circ}30'$

Since $0^{\circ} \leq \alpha \leq 90^{\circ}$, the quadrant is I.

Quadrantal bearing = N $75^{\circ}30'$ E
Conversion rules (WCB α to Quadrantal Bearing):

- $\alpha \in [0^{\circ}, 90^{\circ}] \Rightarrow \text{Q.B.} = \text{N } \alpha \text{ E}$
- $\alpha \in (90^{\circ}, 180^{\circ}] \Rightarrow \text{Q.B.} = \text{S } (180^{\circ} - \alpha) \text{ E}$
- $\alpha \in (180^{\circ}, 270^{\circ}] \Rightarrow \text{Q.B.} = \text{S } (\alpha - 180^{\circ}) \text{ W}$
- $\alpha \in (270^{\circ}, 360^{\circ}) \Rightarrow \text{Q.B.} = \text{N } (360^{\circ} - \alpha) \text{ W}$

Q.12 Consider the following statements with respect to compass surveying and identify the correct answer.
Statement A: The direction of a survey line measured using a prismatic compass is called magnetic bearing.
Statement B: The direction of a survey line measured using a surveyor compass is called arbitrary bearing.

- A. Statement A is correct and B is incorrect
- B. Both statements are incorrect
- C. Statement B is correct and A is incorrect
- D. Both statements are correct

Answer: A

Sol: Arbitrary Bearing

The horizontal angle made by a survey line with respect to an arbitrary meridian that passes through one of its endpoints.

True Bearing

The horizontal angle measured clockwise between the true meridian and the survey line.

Azimuth

The horizontal direction of a line expressed as a compass bearing measured clockwise from the north.

Arbitrary Meridian

Any convenient, fixed direction chosen from a survey station toward a well-defined permanent object.

Used for small-area surveys or for determining relative directions in a small traverse.

Grid Meridian

In national or large-scale surveys, the true meridian through a centrally located point is taken as a common reference for the entire region. This reference meridian is known as the Grid Meridian.

Q.13 For a transition curve, the shift S of a circular curve is given by:
Where, R is the radius of circular curve and L is the length of transition curve.

- A. $\frac{L}{24R^2}$
- B. $\frac{L^2}{24R}$
- C. $\frac{24R^2}{L^2}$
- D. $\frac{24R^2}{L^2}$

Answer: B

Sol: Shift of Transition Curve

The shift is defined as the lateral distance by which the circular curve is displaced inward to accommodate the transition curve.

Mathematically, the shift *S* is given by:

$$S = \frac{L_s^2}{24R}$$

Where:

L_s = Length of the transition curve

R = Radius of the circular curve

Q.14 Coulomb's equation for shear strength is given by:

Where, c-unit cohesion

s-shear strength

σ-total stress

φ-angle of shearing resistance

- A. $c = s + \sigma \tan \phi$
- B. $s = \sigma + c \tan \phi$
- C. $s = \sigma - c \tan \phi$
- D. $c = s - \sigma \tan \phi$

Answer: D

Sol: Coulomb’s equation (Mohr–Coulomb failure criterion):

$$s = c + \sigma \tan \phi$$

Where:

s = shear strength of the soil

c = cohesion (kN/m²)

σ = normal stress on the failure plane (kN/m²)

ϕ = angle of shearing resistance (°)

Q.15 Consider the following statements kiln seasoning of timber results in

- (A) Reduced density
- (B) Reduced life
- (C) Dimensional stability

Which of these statements is/are correct?

- A. a, b and c
- B. a only
- C. b and c
- D. a and c

Answer: D

Sol: Seasoning of timber is done to remove the sap from the timber.

Kiln seasoning of timber results in-

Reduce density of timber

Increases the life of timber

Provide dimensional stability

Reduce the weight

Reduce the shrinkage and warping

The moisture content in a well-seasoned timber is about 10-12%.
