Concrete Technology_Past Question Collection

1. Too wet concrete many cause:

[Civil Er. 6th 2079/02/21]

A. weakness of concrete
B. Excessive laitance
C. Segregation
D. All of these

Correct Answer: D

Explanation:

a) Weakness of concrete: Excess water increases porosity, reducing strength and durability.

b) Excessive laitance: A watery mix can cause a weak layer of cement and fines to rise to the surface.

c) Segregation: Overly wet concrete may separate, with aggregates sinking and water rising.

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2. Which of the following acts as a retarder for the concrete?

[Civil Er. 6th 2079/02/21]

A. Calcium chloride
B. Calcium lignosulphonate
C. Aluminium
D. None of these

Correct Answer: B

Explanation:

Among the options provided, B. Calcium lignosulfonate acts as a retarder in concrete.

Retarders are admixtures that slow down the setting time of concrete, allowing for extended workability and proper placement.

A. Calcium chloride: This compound functions as an accelerator in concrete, speeding up the hydration process and reducing setting time. It's commonly used in cold weather conditions to achieve high early strength.

B. Calcium lignosulfonate: Derived from wood pulp, calcium lignosulfonate is commonly used as a retarder in concrete. It slows down the hydration process, extending the setting time, which is beneficial in hot weather conditions or when delays in finishing are anticipated.

C. Aluminum: Aluminum is not typically used as a retarder or accelerator in concrete.

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3. If target mean strength of concrete is fm, and characteristic cube strength of concrete is fck which of following is true?
[Civil Er. 6th 2079/02/21]

A. fm > fck
B. fck > fm
C. fm = fck
D. None of these

Correct Answer: B

Explanation:

✔ The target mean strength must exceed the characteristic strength to ensure that even with variability, the concrete meets the required f4? with 95% confidence.

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4. The shrinkage of concrete is due to change in:

[Civil Er. 6th 2079/02/21]

A. Length
B. Cross sectional area
C. Volumes
D. Surface area

Correct Answer: C

Explanation:

Shrinkage is fundamentally a volumetric change caused by moisture loss or chemical processes.

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5. The lower water-cement ratio in concrete produces:

[Civil Er. 6th 2079/02/21]

A. More density
B. Small creep and shrinkage
C. More bond
D. All of these

Correct Answer: D

Explanation:

✔ A lower w/c ratio simultaneously improves density, reduces creep/shrinkage, and strengthens bonds.

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6. Vicat's apparatus is used for:

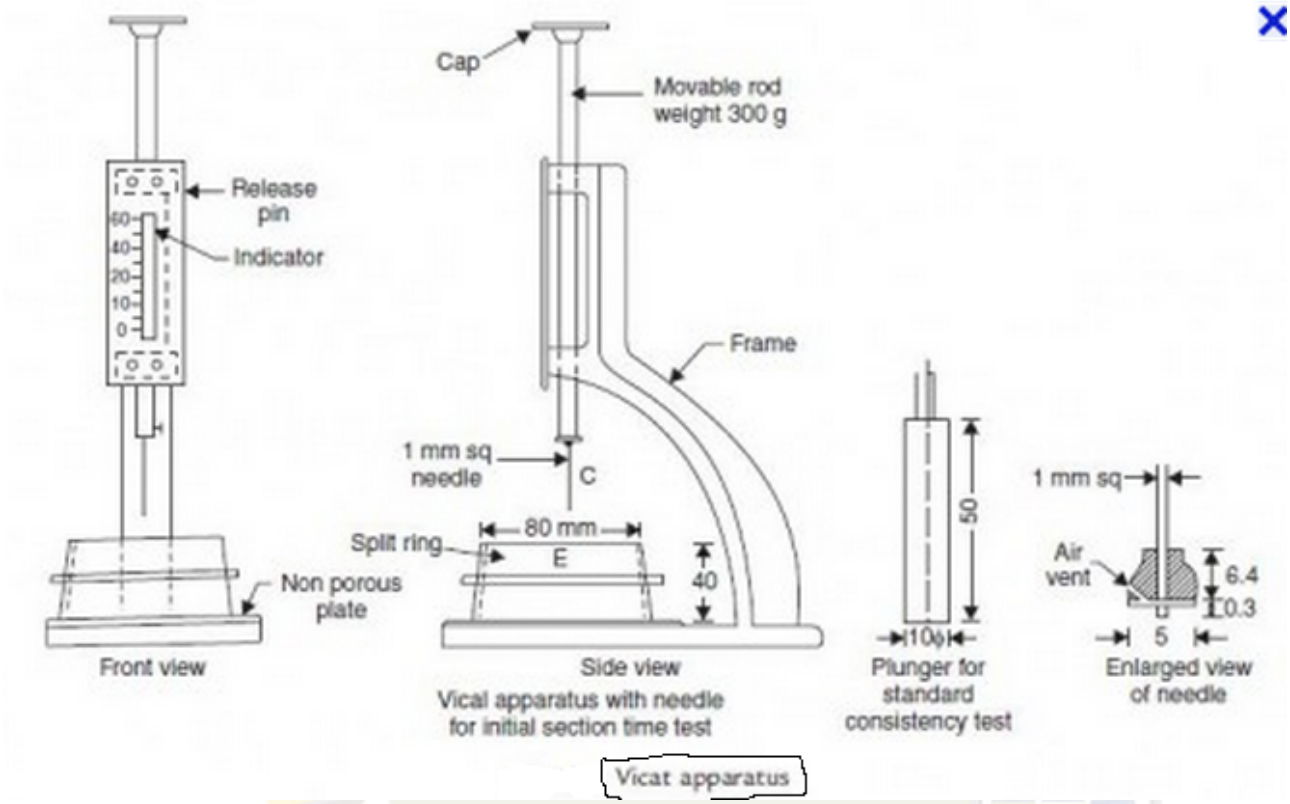
[Civil Er. 6th 2079/02/21]

A. Fineness test
B. Consistency test

C. Compressive strength test

D. Soundness test

Correct Answer: B



Explanation:

✔ Vicat's apparatus primarily determines the water content for normal consistency.

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7. The permanent deformation of concrete with time under steady load is called:

[Civil Er. 6th 2079/02/21]

A. Viscoelasticity

B. Viscidity

C. Creep

D. Relaxation

Correct Answer: C

Explanation:

✔ Creep is the time-dependent, permanent deformation of concrete under sustained stress. It is critical in long-term deflection calculations and prestress loss analysis.

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8. The operation of removing humps and hollows of uniform concrete surface, is known as:
[Civil Er. 6th 2079/02/21]

A. Floating
B. Screeding
C. Troweling
D. Finishing

Correct Answer: B

Explanation:

✔ This is the initial leveling operation where a straightedge (screed) is drawn across the concrete to remove excess material and fill depressions, creating a uniform grade.

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9. Density of concrete :
[Civil Er. 6th 2079/02/21]

A. Increase with a decrease in the size of the aggregate.
B. Is independent of the size of aggregate
C. Increase with increase in the size of the aggregate
D. All of the above

Correct Answer: C

Explanation:

✓ Larger aggregate → less surface area

✓ Less surface area → less cement paste required

✓ Less paste → fewer voids (cement is less dense also)

✓ Fewer voids → higher compactness

✓ Higher compactness → higher density

Note: In "Mass Concrete" (like dams), very large aggregate sizes (up to 150mm) are used specifically to achieve high density and lower heat of hydration.

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10. For ensuring quality of concrete works, the aggregate used should be: [Civil Er. 6th 2079/02/21]

A. Single sized aggregate
B. Two sized aggregate
C. Graded aggregate
D. Coarse aggregate

Correct Answer: C

Explanation:

✔ A blend of coarse, medium, and fine aggregates (e.g., sand + gravel) ensures optimal packing and workability. This is the standard practice for quality concrete.

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11. Which material acts as a binding agent and provides cohesion to the concrete mixture?
[civil er. 7th level 2080/10/27]

A. Water
B. Aggregate
C. Admixture
D. Cement

Correct Answer: D

Explanation:

➤ Cement undergoes hydration to form calcium silicate hydrate (C-S-H gel), which binds aggregates and solidifies the mix.

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12. Concrete strength is generally tested using.....
[civil er. 7th level 2080/10/27]

A. Ultrasonic waves
B. Impact test
C. Compressive strength test
D. Flexural strength test

Correct Answer: C

Explanation:

➤ The standard method (e.g., ASTM C39/IS 516) involves crushing cylindrical or cubic specimens in a compression machine to determine ultimate load-bearing capacity.

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13. In pre-stressed concrete, what is the purpose of pre-tensioning tendons before casting?
[civil er. 7th level 2080/10/27]

A. To increase the volume of the concrete
B. To improve the fire resistance of the concrete
C. To reduce the overall strength of the concrete
D. To counteract the future applied loads

Correct Answer: D

Explanation:

➤ Pre-tensioning creates compressive stresses in the concrete to offset future tensile stresses from loads (e.g., bridges, beams).

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14. High workability is required if structure is.....

[civil er. 7th level 2080/10/27]

A. Thick and heavily reinforced
B. Thin and lightly reinforced
C. Thick and lightly reinforced
D. All of the above

Correct Answer: A

Explanation:

➤ Heavy rebar congestion (e.g., beam-column joints) and thick sections require high workability to ensure proper compaction around steel and avoid honeycombing.

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15. Admixtures which cause early strength, early setting, and hardening of concrete are called.....

[Civil Er. 7th Level 2080/10/27]

A. Workability admixtures
B. Accelerators
C. Retarders
D. Air entraining agents

Correct Answer: B

Explanation:

➤ Chemicals like calcium chloride ($CaCl_2$) or nitrates accelerate hydration, achieving the described effects.

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16. Separation of coarse aggregates from mortar during transportation, is known as.....

[Civil Er. 7th Level 2080/10/27]

A. Bleeding
B. Creeping
C. Segregation
D. Shrinking

Correct Answer: C

Explanation:

➤ Segregation refers to the separation of constituent materials in concrete, leading to non-uniform composition.

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17. Consistency of standard cement paste test is done with the help of..... and Los Angeles Machine is used to test the aggregate for ..... [Civil Er. 7th Level 2080/10/27]

A. Le-Chatelier apparatus & crushing strength
B. Vicat's apparatus & abrasion resistance
C. Abraham's scale and impact value
D. Slump test & water absorption

Correct Answer: B

Explanation:

The only accurate combination is:

➤ Vicat's apparatus for cement paste consistency.

➤ Los Angeles machine for aggregate abrasion resistance.

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18. High strength concrete is defined purely on the basis of..... [Civil Er. 7th Level 2080/10/27]

A. Compressive strength
B. Poor strength
C. Tensile strength
D. Good strength

Correct Answer: A

Explanation:

Compressive strength is the universal benchmark in concrete technology

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19. Which property of concrete refers to its resistance to cracking and deformation due to temperature changes and drying shrinkage? [Civil Er. 7th Level 2080/10/27]

A. Density
B. Porosity
C. Elasticity
D. Durability

Correct Answer: D

Explanation:

✔ Durability includes design strategies to mitigate shrinkage and thermal stresses (e.g., low w/c ratio, proper curing, air-entrainment for freeze-thaw resistance).

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20. What does the 'curing' of concrete involve? [Civil Er. 7th Level 2080/10/27]

A. Mixing the concrete ingredients
B. Adding chemical admixtures
C. Exposing the concrete to high temperatures
D. Maintaining adequate moisture and temperature for hydration

Correct Answer: D

Explanation:

Curing involves:

➤ Moisture retention: Prevents water loss (e.g., wet coverings, curing compounds).

➤Temperature control: Avoids thermal stress (ideal range: 10–25°C).

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21. Special features of the prestressed concrete is:
[2073/11/2 वि.एण्ड आ.]

A. The shear capacity of concrete is increased
B. The dead load is reduced
C. The elimination of cracking and fatigue
D. All of the above

Correct Answer: D

Explanation:

Other features are :

* Minimum grade of concrete for pre- tensioned member is M40 and for post tensioned member is M35.

* The losses of pre stress due to various reasons are 15-20 % in post tension and 20 - 25% in pre - tension.

* Pre-stress concrete reduces 50% of concrete for the same design load as compared to normal concrete of same grade.

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22. Compared to ordinary Portland cement, the ultimate strength of the Pozzolana Portland cement is....
[Civil Er. Koshi Province 2080/10/27]

A. Same

B. More
C. Less
D. Very much less

Correct Answer: B

Explanation:

Portland Pozzolana cement contains clinker (similar to OPC), which is mixed with pozzolanic material like fly ash, volcanic ash, or rice husk ash.

* It is not siliceous material and used in marine and sea in mass concreting because pozzolanic reaction helps reduce the permeability of concrete, improving resistance to aggressive environmental conditions such as chlorides, sulfates, and acids.
* Amount of pozzolana material is 10- 30 %
* PPC generally has a slightly lower initial setting time and compressive strength compared to OPC, but over time, it achieves comparable or even superior strength.

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23. The most commonly used retarder in cement is .....
[Civil Er. Koshi Province 2080/10/27]

A. Gypsum
B. Calcium chloride
C. Aluminum Sulphate
D. None of the above

Correct Answer: A

Explanation:

Retarder is a substance or chemical additive that delays the setting or hardening time of cement.

Commonly used retarder is gypsum.

Calcium chloride is commonly used accelerator.

24. What does the 'curing' of concrete involve?
[Civil Er. Koshi Province 2080/10/27]

A. Mixing the concrete ingredients
B. Adding chemical admixtures
C. Exposing the concrete to high temperatures
D. Maintaining adequate moisture and temperature for hydration

Correct Answer: D

Explanation:

Curing in concrete refers to the process of maintaining adequate moisture, temperature, and time conditions to allow the concrete to achieve its desired strength and durability. Curing is important because concrete gains strength due to chemical reaction between water and cement, known as hydration of cement.

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25. High strength concrete is defined purely on the basis of.....
[Civil Er. Koshi Province 2080/10/27]

A. Compressive strength
B. Poor strength
C. Tensile strength
D. Good strength

Correct Answer: A

Explanation:

Plain concrete is strong in resisting compressive load but weak in tension so, high strength concrete is defined purely on the basis of compressive strength.

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26. Consistency of standard cement paste test is done with the help of..... and Los Angeles Machine is used to test the aggregate for .....

[Civil Er. Koshi Province 2080/10/27]

A. Le-Chatelier apparatus & crushing strength
B. Vicat's apparatus & abrasion resistance
C. Abraham's scale and impact value
D. Slump test & water absorption

Correct Answer: B

Explanation:

Le-Chatelier apparatus - Soundness test

Vicat's apparatus - Consistency test and setting time

universal testing machine (UTM) or compression testing machine - Compressive strength.

Abraham's scale - Degree of workability

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27. Separation of coarse aggregates from mortar during transportation, is known as.....

[Civil Er. Koshi Province 2080/10/27]

A. Bleeding
B. Creeping
C. Segregation
D. Shrinking

Correct Answer: C

Explanation:

Separation of coarse aggregate from concrete - Segregation

Separation of water from concrete - Bleeding

Strain due to constant load - creeping

Shrinkage occurs due to evaporation of water.

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28. High workability is required if structure is.....

[Civil Er. Koshi Province 2080/10/27]

A. Thick and heavily reinforced
B. Thin and lightly reinforced
C. Thick and lightly reinforced
D. All of the above

Correct Answer: A

Explanation:

Workability in concrete means the degree of easiness with which the freshly mixed concrete can be manipulated, placed, compacted, and finished without segregation or excessive bleeding.

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29. In pre-stressed concrete, what is the purpose of pre-tensioning tendons before casting?

[Civil Er. Koshi Province 2080/10/27]

A. To increase the volume of the concrete
B. To improve the fire resistance of the concrete
C. To reduce the overall strength of the concrete
D. To counteract the future applied loads

Correct Answer: D

Explanation:

Prestress in concrete - The process of introducing internal forces (tension or compression) into a concrete element before it is subjected to external loads. This is done to improve the structural performance of concrete and ensure that it can carry loads more efficiently.

✓ Types of Prestress

1) Pre- tensioning - In pre-tensioning, the steel tendons (also known as prestressing steel or prestressing strands) are stretched (tensioned) before the concrete is poured.

2) Post - tensioning - In post-tensioning, the steel tendons are placed in ducts (tubes) within the concrete form before the concrete is poured, but they are not tensioned until after the concrete has hardened and gained sufficient strength

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30. Concrete strength is generally tested using.....
[Civil Er. Koshi Province 2080/10/27]

A. Ultrasonic waves
B. Impact test
C. Compressive strength test
D. Flexural strength test

Correct Answer: C

Explanation:

✔ Primary Metric: Compressive strength is the key benchmark for concrete quality (e.g., M20, M30 grades).

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31. Which material acts as a binding agent and provides cohesion to the concrete mixture?
[Civil Er. Koshi Province 2080/10/27]

A. Water
B. Aggregate
C. Admixture
D. Cement

Correct Answer: D

Explanation:

Water - Lubrication and hydration of cement

Aggregate - Inert material

Cement - Binding agent and provides cohesion to concrete

Admixture - A material added to the mix of cement, water, and aggregates to enhance or modify the properties of the resulting concrete

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32. Most commonly used material for accelerating hardening of the concrete is:

[2073/11/2 वि.एण्ड आ.]

A. Sodium chloride
B. Calcium chloride
C. Potassium chloride
D. Aluminum chloride

Correct Answer: B

Explanation:

✔ Calcium chloride ($CaCl_2$) is the most widely used accelerator in concrete as it significantly speeds up hydration, reducing setting time and increasing early strength (1-3 days), though its use is limited in reinforced concrete due to corrosion risks; alternatives like non-chloride accelerators are preferred for steel-reinforced structures

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33. Removal of formworks for vertical sides of concrete beams may be done after...

[2073/11/2 वि.एण्ड आ.]

A. 2 days of concreting
B. 7 days of concreting
C. 14 days of concreting

D. 21 days of concreting

Correct Answer: A

Explanation:

Removal of formwok

Vertical side of beam - 2 days

Beam soffit - 7 days

Bottom slab of span 4.6 m or more - 14 days

Beam bottom over 6 m span - 21 days

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34. In prestressed concrete structures, the prestressing of the concrete is done to compensate the stress- caused by:
[2073/11/2 वि.एण्ड आ.]

A. Dead load
B. Working loads
C. Live loads
D. Dynamic loads

Correct Answer: B

Explanation:

➤ Prestressing compensates for all service-level stresses, including dead loads (self-weight), live loads (occupancy/traffic), and dynamic loads (wind/earthquakes), collectively termed "working loads."

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35. The correct quantity of water required for a particular concrete mix does not depend upon:
[2073/11/2 वि.एण्ड आ.]

A. Mix proportion
B. Aggregate grading
C. Method of compaction
D. Load to be applied

Correct Answer: D

Explanation:

The correct quantity of water required for a particular concrete mix depend upon Mix proportion, Aggregate grading and method of compaction.

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36. The strength of concrete is directly proportional to [2073/11/2 वि.एण्ड आ.]

A. Cement water ratio
B. Water cement ratio
C. Sand cement ratio
D. Water aggregate ratio

Correct Answer: A

Explanation:

Not considering other factors,

Cement increases → Strength increases

Water decreases → Strength decreases

So strength directly proportional to cement water ratio.

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37. The entrained air in concrete. [2073/11/2 वि.एण्ड आ.]

A. increases workability

B. Decreases workability
C. Increases strength
D. None of the above..

Correct Answer: A

Explanation:

Air entrainment in concrete refers to the deliberate introduction of tiny, stable air bubbles into the concrete mix.

* It increases workability.
* Improved Freeze-Thaw durability.
* Reduction of Surface Scaling.

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38. While compacting the concrete by a mechanical vibrator, the slump should not exceed
[2073/11/2 वि.एण्ड आ.]

A. 2.5 cm
B. 5.0 cm
C. 7.5 cm
D. 10 cm

Correct Answer: B

Explanation:

while compacting by mechanical vibrator, slump should not exceed 50 mm because of risk of segregation, loss of mix homogeneity and excessive water content.

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39. Slump test is done for
[2073/11/2 वि.एण्ड आ.]

A. Clay
B. Sand
C. Concrete
D. Lime

Correct Answer: C

Explanation:

Consistency test is not done for clay, lime and sand.

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40. Vicat's apparatus is used to test the following property of concrete: [2073/11/2 वि.एण्ड आ.]

A. Fineness
B. Soundness
C. Consistency
D. Compressive strength

Correct Answer: C

Explanation:

✔ Vicat's apparatus measures the standard consistency of cement paste (not concrete) by determining the water content required for a 10mm plunger penetration (per ASTM C187/IS 4031). This ensures uniform testing conditions for setting time and strength.

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41. Which grade of concrete is normally used for slabs and beams? [2073/11/2 वि.एण्ड आ.]

A. 1:1:4
B. 1:2:6
C. 1:3:6
D. 1:2:4

Correct Answer: D

Explanation:

For reinforced concrete - M15 but it has been changed to M20 in code.

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42. Prestressing to a large extent removes the disadvantages which a conventional reinforced concrete structure suffers as compared to a comparable

[2073/10/25 Civil Er. Sanitary]

A. Steel structure
B. Plain concrete structure
C. Composite structure
D. Reinforced concrete structure

Correct Answer: D

Explanation:

✔ Prestressed concrete bridges the gap between reinforced concrete and steel by offering higher strength-to-weight ratios, longer spans, and reduced cracking—key advantages steel traditionally held over conventional reinforced concrete

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43. Water cement ratio is,

[2073/10/25 Civil Er. Sanitary]

A. Volume of water to that of cement
B. Weight of water to that of cement
C. Weight of water to that of concrete
D. Both A and B

Correct Answer: D

Explanation:

✔ The water-cement ratio (w/c) in concrete is the ratio of the weight of water to the weight of cement used in the mix. It is a crucial factor influencing the strength,

durability, and workability of concrete.

➤ Both volume and weight expression can be used for expressing the water cement ratio.

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44. Shrinkage in concrete can be reduced by using [2073/10/25 Civil Er. Sanitary]

A. Low water cement ratio
B. Less cement in the concrete
C. Pre saturated aggregate
D. All of the above

Correct Answer: D

Explanation:

Shrinkage increases due to :

* More cement content in concrete.

* More water content.

* In sufficient curing

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45. The resistance of an aggregate to wear is known as [2073/10/25 Civil Er. Sanitary]

A. Shear value
B. Crushing value
C. Abrasion value
D. Impact value

Correct Answer: C

Explanation:

shear strength/value - The ability of concrete to resist shear stresses without failing or

cracking under load.

Crushing strength/value - Ability of concrete to resist compressive forces without failing.

Impact strength/value - Measure of toughness

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46. The most commonly used admixture which prolongs the setting and hardening time is:
[2073/10/25 Civil Er. Sanitary]

A. Calcium chloride
B. Sodium silicate
C. Gypsum
D. All of the above

Correct Answer: C

Explanation:

Gypsum (calcium sulfate) is the primary retarder added to cement during manufacturing (3-5% by weight) to delay setting time by controlling rapid C3A hydration,

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47. After casting an ordinary cement concrete-on drying
[2073/10/25 Civil Er. Sanitary]

A. Expands
B. Mix
C. Shrinks
D. None of the above

Correct Answer: C

Explanation:

Shrinkage in concrete after drying occurs due to the loss of water from the hardened concrete, which leads to a reduction in its volume.

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48. Air entrainment in the concrete increases:
[2073/10/25 Civil Er. Sanitary]

A. Workability
B. Strength
C. The effects of temperature variations
D. The unit weight

Correct Answer: A

Explanation:

Air entrainment in concrete increases workability not strength.

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49. An impermeable concrete is produced by
[2073/10/25 Civil Er. Sanitary]

A. Proper compaction
B. Proper mixing
C. Proper curing
D. All of the above

Correct Answer: D

Explanation:

Impermeable concrete is a type of concrete that has a very low permeability that it is resistant to the passage of water, air, and other fluids through its structure.

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50. As the cement sets and hardens it generates heat. This is called
[2073/10/25 Civil Er. Sanitary]

A. Latent heat
B. Sensible heat
C. Heat of hydration
D. Heat of vaporization

Correct Answer: C

Explanation:

The heat energy released during the chemical reaction between cement and water is known as heat of hydration.

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51. The concrete may attain its 100 percent compressive strength after [2073/10/25 Civil Er. Sanitary]

A. 14 days
B. 28 days
C. 1 year
D. 3 years

Correct Answer: B

Explanation:

➤ Concrete typically attains its 100% compressive strength after 28 days of curing under standard conditions. This is the standard timeframe used for testing and specifying the compressive strength of concrete in construction practices.

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52. With the increase in moisture content, the bulking of sand [Civil Er. 2073/11/16 General]

A. Increases
B. Decreases
C. First increases to a certain maximum value and then decreases.

D. First decreases to a certain minimum value and then increases.

Correct Answer: C

Explanation:

➤ Bulking of sand refers to the increase in volume of sand due to the formation of water films around sand particles when moisture is added.

➤ Initially, as moisture content rises, the volume of sand increases (due to surface tension holding particles apart).

➤ At a certain point (around 4-6% moisture content), bulking reaches its maximum.

➤ Beyond this, further water addition fills the voids, causing the sand particles to come closer, and the volume decreases.

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53. The approx ratio of the strength of the cement concrete of 7 days to that of 28 days is
[Civil Er. 2073/11/16 General]

A. 0.65
B. 0.85
C. 1.0
D. 1.15

Correct Answer: A

Explanation:

Strength of concrete with age

3 days - 40%

7 days - 65 %

21 days - 90 %

28 days - 100%

90 days (3 months) - 115%

180 days (6 months) - 120%

360 days (12 months) - 130 %

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54. Increase in the-moisture content in concrete

[Civil Er. 2073/11/16 General]

A. Does-not change the strength
B. Reduces the strength
C. Increases the strength
D. All of the above

Correct Answer: B

Explanation:

Increase in moisture content may increase bleeding, segregation and decrease strength.

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55. The most commonly used admixture which prolongs the setting and hardening time is

[Civil Er. 2073/11/16 General]

A. Calcium chloride
B. Sodium silicate
C. Gypsum
D. All of the above

Correct Answer: C

Explanation:

✔ Gypsum is used as retarding agent

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56. The ratio of various ingredients (cement, sand, aggregates) in concrete of grade M200, is

[Civil Er. 2073/11/16 General]

A. 1:2:4
B. 1:3:6
C. 1:1.5:3
D. 1:1:2

Correct Answer: C

Explanation:

M10- 1:3:6

M15- 1:2:4

M20 - 1:1.5:3

M25 - 1:1:2

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57. Cube test is used to determine

[Civil Er. 2073/11/16 General]

A. Compressive strength of concrete
B. Tensile strength of concrete
C. Water cement ratio
D. None of the above

Correct Answer: A

Explanation:

➤ The cube test is a standard laboratory method to determine the compressive strength of hardened concrete.

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58. The minimum grade of concrete prescribed for prestressed construction is

[Civil Er. 2073/11/16 General]

A. M40 for post-tensioned systems
B. M30 for pre-tensioned systems
C. M40 for pre-tensioned systems
D. M55 for post-tensioned systems

Correct Answer: C

Explanation:

M40- pre - tension

M35 - post -tesion

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59. The process of keeping concrete moist for several days after finishing is called

[Civil Er. 2073/11/16 General]

A. Peeing
B. Casting
C. Setting
D. Curing

Correct Answer: D

Explanation:

➤ Curing is the process of maintaining adequate moisture and temperature in freshly placed concrete for a specified period (typically 7–28 days) to ensure proper hydration of cement and achieve optimal strength/durability.

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60. Separation of course aggregate from mortar during transportation is known as

[Civil Er. 2071/11/19 Highway]

A. bleeding
B. creeping
C. segregation
D. shrinkage

Correct Answer: C

Explanation:

➤ Segregation refers to the separation of coarse aggregates from the mortar (cement-sand mix) due to improper handling, vibration, or transportation, leading to non-uniform concrete.

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61. The chemistry of concrete is essentially the chemistry of the reaction between

[Civil Er. 2071/11/19 Highway]

A. Cement and aggregate
B. Water and aggregate
C. Cement and water
D. Aggregate and air

Correct Answer: C

Explanation:

Aggregate is inert material so there is always reaction between cement and water in concrete during curing and setting period.

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62. Workability of concrete is inversely proportional to

[Civil Er. 2071/11/19 Highway]

A. time of transit

B. water cement ratio
C. cement in the mix
D. air in the mix

Correct Answer: A

Explanation:

✔ As the time of transit (duration between mixing and placing) increases, workability decreases due to:

➤ Loss of moisture (evaporation or absorption by aggregates).

➤Initial setting of cement, which stiffens the mix.

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63. The most effective admixture to concrete for retarding the setting time is the addition of:
[Civil Er. 2071/11/19 Highway]

A. white lime
B. soap solution
C. bitumen
D. sugar

Correct Answer: D

Explanation:

✔ Sugar (even in small quantities, e.g., 0.05–0.1% by weight of cement) is a highly effective retarding admixture. It delays the hydration of cement, prolonging both initial and final setting times.

➤ Used in hot weather or long-distance transportation to prevent premature stiffening.

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64. The process of hardening the concrete lay keeping its surface moist is

known as

[Civil Er. 2071/11/19 Highway]

A. placing
B. wettings
C. curing
D. compacting

Correct Answer: C

Explanation:

✔ Curing is the process of maintaining adequate moisture and temperature in freshly placed concrete for a specified period (typically 7–28 days) to ensure:

➤ Complete hydration of cement, which enhances strength and durability.
➤ Prevention of cracking due to rapid moisture loss.

---

65. Slump test is done for

[Civil Er. 2071/11/19 Highway]

A. clay
B. sand
C. lime
D. concrete

Correct Answer: D

Explanation:

➤ The slump test measures the workability (consistency and fluidity) of fresh concrete.
➤ It indicates how easily concrete can be placed, compacted, and finished without segregation.

---

66. Concrete is generally reinforced by bars made of
[Civil Er. 2071/11/19 Highway]

A. cast iron
B. high carbon steel
C. low carbon steel
D. mild steel

Correct Answer: D

Explanation:

* High carbon steel (0.3-0.8 carbon content medium carbon steel, 0.8-1.5 in High carbon steel) is much brittler than mild steel, it is stronger but its ductility is lower.

* Low carbon (less than 0.15 carbon content) is ductile and easy to shape, it does not possess the high strength required for most reinforced concrete.

* Cast iron (2-4 % carbon content) is brittle in nature and used in water pipes, sewers, sanitary fittings etc.

---

67. Strain in concrete at zero stress is called
[Civil Er. 2071/11/19 Highway]

A. creep loss
B. relaxation
C. shrinkage
D. lateral stress

Correct Answer: B

Explanation:

Strain due to zero stress - relaxation

strain due to constant load - creep

Stain due to drying/evaporation of water in concrete - shrinkage

---

68. The appearance of a watery scum on the surface of concrete after compaction is known as:
[Civil Er. 2071/11/10 B & Arch]

A. Hydration
B. Bleeding
C. Grinning
D. Curing

Correct Answer: B

Explanation:

➤ Bleeding refers to the separation of water from the concrete mix, causing a thin layer of water (watery scum) to rise to the surface after compaction and before setting.

---

69. The most commonly used admixture which prolongs the setting and hardening time is
[Civil Er. 2071/11/10 B & Arch]

A. Gypsum
B. Calcium chloride
C. Sodium silicate
D. All of the above

Correct Answer: A

Explanation:

✔ Gypsum (Calcium sulfate, $CaSO_4 \cdot 2H_2O$) is added to cement during manufacturing (typically 3–5% by weight) to regulate the setting time.

➤ It delays the rapid hydration of C3A (Tricalcium aluminate), preventing flash setting and ensuring workability.

---

70. Increase in the moisture content in concrete
[Civil Er. 2071/11/10 B & Arch]

A. Reduces strength
B. Increases the strength
C. Does not change the strength
D. All of the above

Correct Answer: A

Explanation:

✔ Concrete strength depends critically on the water-cement (w/c) ratio.

✔ Higher moisture content (beyond the optimal mix design) leads to:

➤ Increased porosity: Excess water evaporates, leaving voids that weaken the concrete.

➤ Reduced bond strength: Diluted cement paste forms weaker bonds with aggregates.

---

71. The creep coefficient is the ratio of ultimate creep and elastic strain after
[Civil Er. 2071/11/10 B & Arch]

A. 7 days in 2.2
B. 28 days in 1.6
C. 365 days in 1.1
D. All of the above

Correct Answer: D

Explanation:

✔ Creep increases over time but stabilizes after years. The coefficient varies with the age of loading:

➤ 7 days: Higher creep (coefficient ~2.2) due to immature concrete.
➤ 28 days: Common reference age (coefficient ~1.6).
➤ 365 days: Near-ultimate creep (coefficient ~1.1).

---

72. The chemical ingredient of cement which provides quick setting property to the cement is:
[Civil Er. 2071/11/10 B & Arch]

A. Lime
B. Silica
C. Alumina
D. Iron oxide

Correct Answer: C

Explanation:

Lime (CaO 60-65%)- controls strength and soundess.

Silica (SiO2 17-25%) - Gives strength and excess of it setting.

Alumina (Al2O3 3-8 %) - Provides quick setting and excess of it lower the strength.

Ferrous oxide (Fe2O3 0.5-6%) - Gives colour and helps in fusion of different ingredients.

---

73. The maximum particle size of coarse aggregate is:
[Civil Er. 2071/11/10 B & Arch]

A. 45mm

B. 55mm
C. 65mm
D. 75mm

Correct Answer: D

Explanation:

The maximum particle size for fine aggregate in most concrete mixes is 4.75 mm.

---

74. Water cement ratio is, usually, expressed in:
[Civil Er. 2071/11/10 B & Arch]

A. Litres of water required per bag of cement
B. Litres of water required per kg of cement
C. Both A and B
D. None of these

Correct Answer: A

Explanation:

The **water/cement ratio** is usually expressed in litres of water required per bag of cement. Therefore, the answer is (a).

- The water-cement ratio is the ratio of the weight of water (including surface moisture of aggregates) to the weight of cement used in the concrete mix.

- It can also be expressed as the number of liters of water **per 50 kg sack of cement**.

---

75. The concrete having slump of 6.5 cm, is said to be [Civil Er. 2071/11/10 B & Arch]

A. Dry
B. Earth moist
C. Semi-plastic
D. Plastic

Correct Answer: D

Explanation:

In slump test, slump value :

0-25 % - Very low and dry

25-50% - Low and semi plastic

50- 75% - Medium and plastic

75- 100% - Good and Super plastic

---

76. The grade of concrete not recommended by IS: 456, is [Civil Er. 2071/11/10 B & Arch]

A. M100
B. M400
C. M300
D. M500

Correct Answer: D

---

77. The concrete mix which causes difficulty in obtaining a smooth finish, is known to possess..

[Civil Er. 2071/11/10 B & Arch]

A. Segregation
B. Bleeding
C. Hardness
D. Internal friction

Correct Answer: C

Explanation:

A harsh mix of concrete is a concrete mix that has poor workability, making it difficult to handle, place, or compact effectively.

In question, hardness option is given so it can be taken as synonym of harsh mix.

---

78. The purpose of reinforcement in prestressed concrete is

[Civil Er. 2071/11/10 B & Arch]

A. To provide adequate bond stress
B. To resist tensile stress
C. To impart initial compressive stress in concrete
D. All of the above

Correct Answer: C

Explanation:

✔ The main objective of reinforcement in prestressed concrete is to introduce initial compressive stress into the concrete before service loads are applied. This counteracts tensile stresses during loading, improving durability and strength.

---

79. Curing time for concrete can be reduced by the use of:

[Civil Er. 2071/11/14 Hydropower]

A. aluminum
B. Calcium chloride
C. Common salt
D. Sugar

Correct Answer: B

Explanation:

Curing time reduced means accelerating the setting time i.e accelerator

Commonly used accelerator is calcium chloride.

---

80. For the construction of thin R.C.C. structures, the type of cement to be avoided, is

[Civil Er. 2071/11/14 Hydropower]

A. Ordinary Portland Cement
B. rapid hardening Cement
C. Low heat Cement
D. Blast furnace slag Cement

Correct Answer: D

Explanation:

The hydration of slag is slower because it reacts more gradually with water compared to OPC, which leads to delayed hardening.

But in thin reinforced cement concrete (RCC) sections, achieving early strength is crucial to support the load and avoid early cracking or deformation. So blast furnace slag cement is avoided.

---

81. Longer period of curing a Concrete, ensures better

[Civil Er. 2071/11/14 Hydropower]

A. Volume stability
B. Strength
C. wear resistance and durability
D. All of the above

Correct Answer: D

Explanation:

Longer period of curing is important to achieve all the properties of concrete given above in question.

---

82. Minimum grade of Concrete to be used in reinforced concrete is [Civil Er. 2071/11/14 Hydropower]

A. M 15
B. M 20
C. M 10
D. M25

Correct Answer: B

Explanation:

✔ As per IS 456:2000 (Indian Standard for Plain and Reinforced Concrete), the minimum grade of concrete for reinforced concrete (RCC) work is M20.

---

83. Prestress loss occurs [Civil Er. 2071/11/14 Hydropower]

A. only in post-tensioned beams.
B. only in pre-tensioned beams
C. both in pre-tensioned and post tensioned beams
D. None of the above

Correct Answer: C

Explanation:

Pre - tensioning loss - 20- 25 %

post - tensioning loss - 15 - 20%

Loss due to anchor set or loss due to prestress transfer does not occur in post -tensioning.

---

84. Strength of cement concrete primarily depends upon [Civil Er. 2071/11/14 Hydropower]

A. quality of water
B. quantity of aggregate
C. quantity of cement
D. Water-Cement ratio

Correct Answer: D

Explanation:

According to Abrams' Water-Cement Ratio Law in concrete for given condition of test concrete strength of well compacted concrete with good workability depend upon water-cement ratio (w/c ratio)

---

85. A concrete sample having a slump of 6.5 is said to be [Civil Er. 2071/11/14 Hydropower]

A. dry
B. earth moist
C. semi plastic
D. plastic

Correct Answer: D

Explanation:

✔ 6.5 cm slump falls under the "plastic" range, as per standard classifications:

➤ 0–2.5 cm: Dry mix (stiff, e.g., pavements).

➤ 3–5 cm: Earth moist (low workability).

➤ 5–10 cm: Plastic (medium workability, ideal for most RCC work).

➤ >10 cm: Flowing (highly fluid, e.g., pumped concrete).

---

86. Placing of concrete should preferably be done at a temperature of
[Civil Er. 2071/11/14 Hydropower]

A. 0° C
B. 27 + 2° C
C. 20° C
D. 23° C

Correct Answer: B

Explanation:

Datum temperature for maturity by Plowman - -11.7 degree Celsius

---

87. The use of super plasticizers permit the reduction of water to the extent up to
[Civil Er. 2071/11/14 Hydropower]

A. 10%
B. 30%
C. 20%
D. 40%

Correct Answer: B

Explanation:

➤ Superplasticizers (high-range water reducers) are chemical admixtures that disperse

cement particles more efficiently, allowing significant water reduction without compromising workability.

---

88. The flexural strength of concrete is determined by means of a [Civil Er. 2071/11/14 Hydropower]

A. beam test
B. Cube test
C. slump test
D. shear test

Correct Answer: A

Explanation:

A beam test for flexural strength, also known as a transverse beam test is a procedure used to determine how a material bends or flexes.

---

89. Gypsum is used as an admixture in cement grouts for [Civil Er. 2071/11/02 General]

A. accelerating the setting time
B. retarding the setting time
C. increasing the plasticity
D. reducing the grout shrinkage

Correct Answer: B

Explanation:

➤ Gypsum ($CaSO_4 \cdot 2H_2O$) is added to cement or grouts primarily to retard the setting time. It controls the rapid hydration of tricalcium aluminate (C_3A), preventing flash setting and ensuring workability.

---

90. Strength of concrete increases with:

[Civil Er. Irrigation 2069/11/08]

A. increase in water cement ratio
B. increase in fineness of cement
C. decrease in curing time
D. none of the above

Correct Answer: B

Explanation:

The fineness of cement plays a significant role in determining the strength and performance of concrete.

Finer cement particles have a larger surface area per unit mass. When cement is grounded more finely, it provides a greater surface area for hydration reactions with water. This leads to more efficient hydration, which is crucial for the development of strength in concrete.

---

91. Tensile strength of concrete is measured by

[Civil Er. 2071/11/02 General]

A. Direct tension test in the universal testing machine
B. Applying compressive load along the diameter of the cylindering
C. Applying third point loading on a prism,
D. Applying tensile load along the diameter of the cylinder

Correct Answer: B

Explanation:

Tensile strength can found out by any one of the following methods.

✓ Direct Tension Test (IS 5816:1999) – Uniaxial tensile force applied to a concrete specimen until failure. Rarely used due to difficulty in uniform loading and alignment.

✓ Split Cylinder Test (Brazilian Test) (IS 5816:1999) – Cylindrical concrete specimen placed horizontally in a compression testing machine. Load applied along vertical diameter induces indirect tensile stress, causing splitting failure. Commonly used due to simplicity and reliability.

✓ Flexural Strength Test (Modulus of Rupture Test) (IS 516:1959) – Load applied at the one third points of a beam specimen. Determines concrete's ability to resist bending. Important for pavements and slabs under flexural stress.

---

92. For a constant water cement ratio decrease in aggregate cement ratio causes

[Civil Er. 2071/11/02 General]

A. Increase in workability
B. Decrease in workability
C. No change in workability
D. Rapid hardening

Correct Answer: A

Explanation:

For constant water cement ratio means, quantity of cement is constant
so in aggregate cement ratio, only aggregate quantity is changed or decreased which increases the workability.

---

93. Shrinkage in concrete can be reduced by using:

[Civil Er. 2071/11/02 General]

A. low water cement ratio
B. less cement in the concrete
C. presaturated aggregate
D. all of the above

Correct Answer: D

Explanation:

➤ To minimize shrinkage, use low w/c ratio, optimized cement content, and pre-wet aggregates together. This holistic approach addresses multiple shrinkage mechanisms (drying, autogenous, thermal).

---

94. When the concrete mix is too wet it caused:
[Civil Er. 2071/11/02 General]

A. Segregation
B. Low density
C. Excess laitance at the top
D. All of the above

Correct Answer: D

Explanation:

➤ Avoid overwatering concrete to prevent segregation, low density, and laitance. Maintain the specified water-cement ratio for optimal strength and durability.

---

95. Higher-workability of concrete is required if the structure is
[Civil Er. 2071/11/02 General]

A. Made with cement concrete
B. Thick and reinforced
C. Thin and heavily reinforced.

D. Thick and heavily reinforced

Correct Answer: D

Explanation:

➤ For thick, heavily reinforced structures, high-workability concrete ensures proper compaction and structural integrity. Adjust mix design (e.g., superplasticizers) to balance flow and strength.

---

96. The batching of concrete is done by measurement of its constituents: [Civil Er. 2071/11/02 General]

A. by volume
B. by weight
C. Both A and B
D. None of the above

Correct Answer: C

Explanation:

Batching is process of measuring and mixing the ingredients (such as cement, aggregates, water, and admixtures) by weight or volume in specific proportions to produce concrete of the desired quality.

---

97. Polymer concrete is an aggregate bound with a polymer binder instead of [Civil Er. 2071/11/02 General]

A. Sand
B. Portland cement
C. White cement
D. Pozzolano

Correct Answer: B

Explanation:

Polymer concrete is a type of concrete in which the usual cement binder is replaced by a polymer resin which serves as the binding agent.

---

98. Compaction by vibratory roller is the best method of compaction in case of

[Civil Er. 2071/11/02 General]

A. Moist silty sand
B. Well graded dry sand
C. Clay of medium compressibility
D. Silt of high compressibility

Correct Answer: B

Explanation:

Granular Soils (Sand, Gravel): Vibratory rollers, smooth drum rollers, or plate compactors.

Cohesive Soils (Clay, Silt): Sheep foot roller, padfoot rollers, jumping jacks, or static rollers.

Asphalt: Vibratory rollers, tandem rollers, pneumatic rollers, or smooth drum rollers.

Tight Spaces: Plate compactors, jumping jacks,

---

99. For reinforced concrete, the aggregate is:

[Civil Er. 2071/11/16]

A. Sand
B. Gravel
C. Crushed rock
D. all of the above

Correct Answer: D

Explanation:

Sand - Fine aggregate

Gravel, crushed rock - coarse aggregate

---

100. The commonly used raw material in the production of cement is: [Civil Er. 2071/11/16]

A. slate
B. sand stone
C. lime stone
D. basalt

Correct Answer: C

Explanation:

Limestone is the main raw material for production of cement.

---

101. The slump test of concrete is used to measure its: [Civil Er. 2071/11/16]

A. consistency
B. mobility
C. homogeneity
D. all of the above

Correct Answer: A

Explanation:

➤ The slump test primarily measures the consistency (relative fluidity or stiffness) of fresh concrete, indicating its workability.

---

102. The entrained air in concrete: [Civil Er. 2071/11/16]

A. increases workability
B. decreases workability
C. decreases resistance of the concrete
D. increases the strength of the concrete

Correct Answer: A

Explanation:

Tiny air bubbles act as lubricants, improving workability by reducing friction between particles.

---

103. The recommended value of Slump in mm for RCC footing without vibration is within the range of:
[Civil Er. 2071/11/16]

A. 10 to 25
B. 26 to 50
C. 50 to 75
D. 40 to 115

Correct Answer: C

Explanation:

Slump value 50 -75 % in slump test is medium and plastic type.

---

104. For the same design load the weight of concrete in pre-stressed concrete as compared to ordinary concrete can be reduce by:
[Civil Er. 2071/11/16]

A. 10%
B. 20%
C. 30%

D. 50%

Correct Answer: D

Explanation:

Prestress reduces 50% of concrete for same design load as compared to normal concrete of same grade.

---

105. The process of mixing, transporting, placing and compacting of concrete using ordinary Portland Cement should not take more than: [Civil Er. 2071/11/16]

A. 30 minutes
B. 40 Minutes
C. 60 Minutes
D. 90 Minute

Correct Answer: A

Explanation:

➤ As per IS 456:2000 (Indian Standard) and ACI 318 (American Concrete Institute), the total time from mixing to compacting of OPC-based concrete should not exceed 30 minutes in normal conditions.

➤ Beyond this, initial setting begins, reducing workability and compromising bond strength.

---

106. Higher workability of concrete is required if the structure is: [Civil Er. 2071/11/16]

A. made with cement concrete

B. thick reinforced
C. Thin and heavily reinforced
D. Thick and heavily reinforced

Correct Answer: D

Explanation:

➤ Higher workability (e.g., 75–150 mm slump) is essential for concrete to flow easily into complex, congested reinforcement and fully fill thick sections without segregation or honeycombing.

---

107. The maximum quantity of water per 50 kg of water in M15 grade concrete is:

[Civil Er. 2069/10/08 Sanitary]

A. 10 litres
B. 32 litres
C. 15 litres
D. 14 litres

Correct Answer: B

Explanation:

As per IS 456:2000, the maximum water-cement (w/c) ratio for M15 grade concrete is 0.6.

For 50 kg of cement (1 bag), the maximum water allowed is:

Water=50 kg×0.6=30 liters(since 1 kg water ˜ 1 liter)

.

---

108. Concrete is unsuitable for compaction by a vibration if it is:
[Civil Er. 2071/11/16]

A. dry
B. earth moist
C. semi-plastic
D. plastic

Correct Answer: D

Explanation:

➤ Dry concrete cannot be properly vibrated. Ensure mixes have at least earth-moist consistency (≥3 cm slump) for effective compaction. Adjust mix design or methods if stiffness is unavoidable.

---

109. Separation of water or water sand cement from freshly poured concrete is known as:
[Civil Er. 2071/11/16]

A. bleeding
B. creeping
C. segregation
D. flooding

Correct Answer: A

Explanation:

➤ Bleeding refers to the separation of water (or a watery cement-sand mixture) from freshly placed concrete, causing it to rise to the surface. This occurs due to the settling of heavier aggregates and the inability of the mix to retain all the water.

---

110. The grade of concrete M15 means that compressive strength of 15 cm

cube after 28 days is:

[Civil Er. 2071/11/16]

A. 100 kg/cm2
B. 150 kg/cm2
C. 200 kg/cm2
D. 250 kg/cm2

Correct Answer: B

Explanation:

M15 - 15 N/mm2 or 150 kg/cm2

---

111. Most commonly used method of prestressing used for factory production is:

[Civil Er. 2071/11/16]

A. long line method
B. Freyssinet system
C. Magnel-Blaton System
D. Lee-macall system

Correct Answer: B

Explanation:

Types of Pre- tensiong Method

~ Long line method/ Hoyer system - In this method, a series of steel tendons (cables or wires) are stretched along a long casting bed or mold. In this method several members can be produced in one line and also it is economical and most commonly used.

~ Freyssinet system : It was the first method to be introduced for both pre- tensioning and post - tensioning (mostly pretension) . High strength steel wires of 5mm or 7mm

diameter numbering 8, 12 or 16 or 24 are grouped into one cable. Cable is inserted in duct and stretched.

~ Mangel - Blaton system : In Freyssinet system, several wires are stretched at a time while in Mangel- Blaton system, two wires are stretched at a time.

~ Gifford - Udal system : This is single wire system and each wire is stressed independently using double acting jack

~ Lee-macall system : This method is used to pre stress steel bars. The diameter of bar is 12mm and 28 mm provided with threads and inserted in the performed ducts.

---

112. High temperature:
[Civil Er. 2071/11/16]

A. increases the strength of concrete
B. decreases the strength of concrete
C. has no effect on the strength
D. None of the above

Correct Answer: B

Explanation:

When concrete is exposed to high temperatures, especially above 100°C (212°F), the strength of the concrete can begin to decrease. This is because the heat accelerates the rate of hydration, but the excessive temperature can cause the hydration products to break down, weakening the bond between the cement particles and aggregates.

---

113. If the various concrete ingredients i.e cement sand and aggregates are in the ratio of 1:1.5 :3, the grade of concrete is:

[Civil Er. 2071/11/16]

A. M 100
B. M 150
C. M 200
D. M 250

Correct Answer: C

Explanation:

✔ The ratio 1:1.5:3 (cement:sand:aggregates) by volume is a nominal mix for M20 grade concrete (equivalent to M200 in some standards, where "M200" denotes 20 MPa compressive strength).

---

114. The concrete having a slump of 6.5 cm is said to be:
[Civil Er. 2071/11/16]

A. dry
B. earth moist
C. semi-plastic
D. plastic

Correct Answer: D

Explanation:

A 6.5 cm slump falls under the "plastic" range, as per standard workability classifications:

➤ 0–2.5 cm: Dry (stiff, e.g., pavements).
➤ 3–5 cm: Earth moist (low workability).
➤ 5–10 cm: Plastic (medium workability, ideal for most RCC work).
➤ >10 cm: Flowing (highly fluid, e.g., pumped concrete).

---

115. The approximate ratio of the strength of cement concrete of 7 days to that of 29 days:
[Civil Er. 2070/11/12 B & Arch.]

A. 0.15
B. 0.10
C. 0.65
D. 0.75

Correct Answer: C

Explanation:

➤ Concrete typically achieves ~65% of its 28-day compressive strength by 7 days under standard curing conditions (per IS 456 and ACI 318).

---

116. The proportion of M150 grade of concrete is:
[Civil Er. 2070/11/12 B & Arch.]

$A. 1 : 3 : 6$

$B. 1 : 4 : 8$

$C. 1 : 1\frac{1}{2} : 2$

$D. 1 : 2 : 4$

Correct Answer: D

Explanation:

➤ M150 (equivalent to M15 in Indian standards) is a nominal mix with a proportion of 1:2:4 (cement:sand:aggregates by volume).

➤ This mix achieves a characteristic compressive strength of 15 MPa at 28 days under proper curing.

---

117. Prestressed concrete means:

[Civil Er. 2070/11/12 B & Arch.]

A. tensile stress induced in concrete before loading
B. tensile stress induced in steel before loading
C. compressive stress induced in steel before loading
D. compressive stress induced in concrete before loading

Correct Answer: D

Explanation:

➤ Prestressed concrete involves inducing compressive stress in the concrete before it bears structural loads. This is achieved by tensioning steel tendons (wires/bars) that, when released, transfer compression to the concrete.

---

118. To obtain a very high strength concrete, use very fine grained:

[Civil Er. 2070/11/12 B & Arch.]

A. barite
B. magnetite
C. granite
D. volcanic scoria

Correct Answer: C

Explanation:

✔ Granite is a hard, dense, and fine-grained igneous rock that provides excellent mechanical strength and durability when used as an aggregate in concrete.

➤ Its low porosity and high crushing strength make it ideal for high-performance mixes (e.g., M60+).

---

119. To prevent segregation the maximum height of placing concrete is:
[Civil Er. 2070/11/12 B & Arch.]

A. 100 cm.
B. 150 cm
C. 200 cm
D. 250 cm

Correct Answer: B

---

120. Efflorescence in concrete is caused due to an excess of:
[Civil Er. 2070/11/12 B & Arch.]

A. alumina
B. iron oxide
C. silica
D. Alkalies

Correct Answer: D

Explanation:

Efflorescence in concrete is the white, powdery substance that often appears on the surface of concrete when water-soluble salts are brought to the surface through capillary action and evaporate, leaving the salts behind.

---

121. The chemical action between cement and water, is technically known as:
[Civil Er. 2070/11/12 B & Arch.]

A. dehydration
B. carbonation
C. calcination

D. hydration

Correct Answer: D

---

122. The slump of concrete to be used in reinforced concrete should be: [Civil Er. 2070/11/12 B & Arch.]

A. 0-20 mm
B. 50-125 mm
C. 30-75 mm
D. 100-155 mm

Correct Answer: B

---

123. Curing of concrete ensures better: [Civil Er. 2070/11/12 B & Arch.]

A. strength
B. wear resistance
C. water tightness and durability
D. all the above.

Correct Answer: D

---

124. The cement mortar mix generally used for masonry work: [Civil Er. 2070/11/12 B & Arch.]

A. 1:4
B. 1:7
C. 1:2
D. 1:3

Correct Answer: A

Explanation:

~ 1 :4 Mortar (Cement: Sand)

This mix is used for lighter masonry work, such as non-load-bearing walls, and can also be used for plastering work.
Strength: It offers good workability and is less expensive than a 1:3 mix, though it is slightly weaker.

~ 1:3 Mortar (Cement: Sand)

Strength: It provides good strength and is suitable for normal construction work where moderate load-bearing is required.

---

125. Modulus of elasticity of concrete improved by:
[Civil Er. 2070/11/12 B & Arch.]

A. age
B. high water cement ratio
C. shorter curing period
D. all of the above

Correct Answer: A

Explanation:
The modulus of elasticity of concrete increases with age primarily due to the ongoing hydration process and the development of strength in the material over time.

---

126. Common sugar can be used to:
[Civil Er. 2070/11/12 B & Arch.]

A. delay the setting time of concrete
B. accelerate the setting time of cement
C. increase the strength of concrete
D. none of the above

Correct Answer: A

Explanation:

Sugar acts as a retarder when added to the concrete mix. A retarder is a substance that slows down the chemical reaction between cement and water (hydration), thereby delaying the setting time of the concrete.

---

127. For making good concrete, aggregate should be in a: [Civil Er. 2070/11/12 B & Arch.]

A. bone dry condition
B. surface dry condition
C. saturated condition
D. none of the above

Correct Answer: B

Explanation:

~ The dry condition of aggregates is important to maintain the correct water-cement ratio and ensure the accuracy of the mix design.

~ Wet aggregates can lead to excessive water in the mix, which weakens the concrete, affects workability, and can result in poor curing, shrinkage, and cracking. Using dry aggregates ensures better control over the properties of concrete, such as strength, workability, and durability, and helps in achieving a more uniform and high-quality finished product.

---

128. The aggregates of the following shape have minimum voids:
[Civil Er. 2070/11/12 B & Arch.]

A. irregular
B. angular
C. rounded
D. flaky

Correct Answer: C

Explanation:

✓ Rounded aggregates: 32% to 33% voids
✓ Irregular aggregates: 35% to 37% voids
✓ Angular aggregates: 38% to 45% voids

~ Rounded aggregates have the least voids, providing better packing efficiency, while angular aggregates have the highest void content, requiring more water for lubrication.

---

129. Which of the following cements is expected to have the highest compressive strength after 3 days?
[Civil Er. 2070/11/12 B & Arch.]

A. ordinary Portland cement
B. rapid hardening cement
C. high alumina cement
D. sulphate resisting cement

Correct Answer: B

Explanation:

Rapid hardening cement is that it develops a high early strength compared to OPC. RHC strength at 3 days is same as the 7 days strength of ordinary Portland cement.

~ The proportion of C3S in RHC is more.

~ It is not used in mass concrete construction.

~ This type of cement is used in road construction.

---

130. Nominal mix of concrete may be used for concrete of: [Civil Er. Highway 2070/11/10]

A. M25 or higher
B. M20 or lower
C. M20 or higher
D. M25 or lower

Correct Answer: B

Explanation:

According to IS: 456-2000, the concrete mixes have been designated into 7 grades.

M5, M7.5, M10, M15, M20 - Nominal mix/ ordinary concrete

M25, M30, M35, M40, M45, M50, M55 - Standard concrete

M60, M65, M70, M75, M80 - High strength concrete

---

131. The grade of concrete M150 means that compressive strength of a 15 cm cube after 28 days [Civil Er. Highway 2070/11/10]

A. 250 kg/cm2
B. 100 kg/cm2
C. 150 kg/cm2
D. 200 kg/cm2

Correct Answer: C

Explanation:

✔ The grade M150 denotes that the concrete has a characteristic compressive strength of 150 kg/cm² (≈15 MPa) at 28 days, tested on a 15 cm cube as per standard procedures (e.g., IS 516).

---

132. Workability of concrete by slump test is expressed in:
[Civil Er. Highway 2070/11/10]

A. mm/hr
B. mm
C. mm2
D. mm3

Correct Answer: B

Explanation:

After filling the slump cone with freshly mixed concrete in three layers as per specification, slowly and carefully lift the slump cone vertically without disturbing the concrete inside and the cone should be removed in one smooth motion.
Once the cone is removed, the concrete will settle or slump down. Measure the difference between the height of the cone and the height of the slumped concrete (the distance from the top of the cone to the top of the slumped concrete).

So unit of slump value in slump test is mm.

~ Slump test is suitable - high and medium workability.
~ Compaction factor test (CF test) - low workability and performed in laboratory.
~ Vee -Bee test - for very low workability.

---

133. The unit weight of plain cement concrete is taken as :
[Civil Er. Highway 2070/11/10]

A. 26 kN/m3
B. 16 kN/m3
C. 19 kN/m3
D. 24 kN/m3

Correct Answer: D

Explanation:

✔ The standard unit weight of PCC is 24 kN/m³ (≈2,400 kg/m³), as per engineering references (e.g., IS 875).

---

134. Slump test is done for:
[Civil Er. Highway 2070/11/10]

A. soil
B. concrete
C. lime
D. sand

Correct Answer: B

Explanation:

✔ The slump test measures the workability (consistency and fluidity) of fresh concrete. It indicates how easily the concrete can be placed and compacted.

---

135. The commonly used materials in cement production is:
[Civil Er. Highway 2070/11/10]

A. granite
B. lime stone
C. slate
D. sand stone

Correct Answer: B

Explanation:

✔ Limestone (calcium carbonate, $CaCO_3$) is the key ingredient in cement production, providing the necessary lime (CaO) during calcination in the kiln.

---

136. Curing period is minimum for concrete using:
[Civil Er. Highway 2070/11/10]

A. slag cement
B. rapid hardening cement
C. ordinary portland cement
D. low heat cement

Correct Answer: B

Explanation:

Rate of gaining strength is high in Rapid hardening cement thus curing period is minimum for concrete using RHC.

---

137. When water leaks out of the joints of shuttering in which fresh concrete has been poured, the defect likely in cement concrete is:
[Civil Er. Highway 2070/11/10]

A. laitance
B. no setting
C. segregation
D. honey combing

Correct Answer: D

Explanation:

When water leaks out of the joints of shuttering (formwork) during the pouring of fresh concrete, it typically indicates the occurrence of bleeding and then segregation which ultimately leads to honey combing

---

138. If the slump of concrete mix is 70 mm, its workability is considered to be:

[Civil Er. Highway 2070/11/10]

A. high
B. very low
C. low
D. medium

Correct Answer: D

Explanation:

✔ 70 mm slump falls under the "medium" workability range, as per standard classifications:

➤ 0–25 mm: Very low (stiff mixes, e.g., pavements).
➤ 25–50 mm: Low (e.g., lightly reinforced slabs).
➤ 50–100 mm: Medium (typical for most RCC work like beams/columns).
➤ 100–150 mm: High (fluid mixes, e.g., pumped concrete).

---

139. The maximum particle size of coarse aggregates in a concrete mix should not be bigger than :

[Civil Er. Highway 2070/11/10]

A. 75 mm
B. 45 mm
C. 55 mm
D. 65 mm

Correct Answer: A

Explanation:

✔ As per IS 456:2000, the maximum size of coarse aggregates in concrete should not

exceed:

➤ 1/4th of the minimum thickness of the member (e.g., 20 mm for a 80 mm thick slab).

➤ 75 mm (absolute upper limit for general construction).

---

140. While reinforced concrete can withstand different types of stresses, plain cement concrete is good for taking:
[Civil Er. Highway 2070/11/10]

A. shear stress
B. tensile stress
C. compressive stress
D. all of these

Correct Answer: C

Explanation:

Plain cement concrete - Only compressive stress

Reinforcement - Tensile stress

Reinforced cement concrete - Both compressive and tensile stress

---

141. Nominal mix of concrete may be used for concrete of:
[Civil Er. 2070/11/11 Highway]

A. M25 or higher
B. M20 or lower
C. M20 or higher
D. M25 or lower

Correct Answer: B

Explanation:

✔ A nominal mix uses fixed volume ratios (e.g., 1:2:4 for M15) without rigorous strength calculations. It's suitable for low-strength concrete where precise control isn't critical.

---

142. The high strength of rapid hardening cement at early stage is due to its : [Civil Er. 2070/11/11 Highway]

A. higher content of tricalcium
B. finer grading
C. burning at high temp.
D. increased lime cement

Correct Answer: D

Explanation:

The main reasons for the early strength of Rapid Hardening Cement (RHC) are its higher C_3S content, finer grinding, higher alite content, increased lime content and faster hydration reactions, which result in rapid setting and early strength gain.

---

143. The grade of concrete M150 means that compressive strength of a 15 cm cube after 28 days
[Civil Er. 2070/11/11 Highway]

A. 250 kg/cm2
B. 100 kg/cm2
C. 150 kg/cm2
D. 200 kg/cm2

Correct Answer: C

Explanation:

✔ The grade M150 indicates that the concrete has a characteristic compressive strength

of 150 kg/cm² (equivalent to 15 MPa) when tested on a 15 cm cube after 28 days of curing, as per standards like IS 516.

---

144. Workability of concrete by slump test is expressed in:
[Civil Er. 2070/11/11 Highway]

A. mm/hr
B. mm
C. mm2
D. mm3

Correct Answer: B

Explanation:

➤ The slump test measures workability by assessing the vertical settlement (slump) of fresh concrete in millimeters (mm) after removing the slump cone.

---

145. The unit weight of plain cement concrete is taken as :
[Civil Er. 2070/11/11 Highway]

A. 26 kN/m3
B. 16 kN/m3
C. 19 kN/m3
D. 24 kN/m3

Correct Answer: D

Explanation:

➤ The typical unit weight of PCC is 24 kN/m³ (≈2,400 kg/m³), as per engineering standards like IS 875 (Part 1).

✔ This accounts for the combined density of cement, sand, and aggregates in a

standard mix.

---

146. Bulking of sand is maximum if moisture content is approximately : [Civil Er. 2070/11/11 Highway]

A. 15%
B. 4%
C. 7%
D. 10%

Correct Answer: B

Explanation:

The bulking of sand is maximum when the moisture content is around 5% to 8% by weight of the sand. This moisture content corresponds to the point where the water molecules have coated the sand particles effectively, creating the maximum repulsion between the particles and leading to the greatest volume increase.

---

147. Slump test is done for: [Civil Er. 2070/11/11 Highway]

A. soil
B. concrete
C. lime
D. sand

Correct Answer: B

Explanation:

The slump test is a standard method to measure the workability (consistency and fluidity) of fresh concrete. It indicates how easily the concrete can be placed, compacted, and finished.

---

148. The commonly used materials in cement production is:
[Civil Er. 2070/11/11 Highway]

A. granite
B. lime stone
C. slate
D. sand stone

Correct Answer: B

Explanation:

✔ Limestone (calcium carbonate, $CaCO_3$) is the essential ingredient in cement production. It provides the necessary lime (CaO) when heated in a kiln, which is critical for forming cement clinker.

---

149. Curing period is minimum for concrete using:
[Civil Er. 2070/11/11 Highway]

A. slag cement
B. rapid hardening cement
C. ordinary portland cement
D. low heat cement

Correct Answer: B

Explanation:

➤ Rapid hardening cement gains strength faster than ordinary Portland cement (OPC) due to finer grinding and higher C_3S content. Thus, it requires a shorter curing period (typically 3–7 days vs. 7–14 days for OPC).

---

150. When water leaks out of the joints of shuttering in which fresh concrete has been poured, the defect likely in cement concrete is:

[Civil Er. 2070/11/11 Highway]

A. laitance
B. no setting
C. segregation
D. honey combing

Correct Answer: A

Explanation:

➤ Laitance is a weak, milky layer of cement and fine particles that rises to the surface of concrete when excess water leaks out through formwork joints. It results in a porous, crumbly surface with low durability.

---

151. If the slump of concrete mix is 70 mm, its workability is considered to be:
[Civil Er. 2070/11/11 Highway]

A. high
B. very low
C. low
D. medium

Correct Answer: D

Explanation:

✔ 70 mm slump falls under the "medium" workability range, as per standard classifications:

➤ 0–25 mm: Very low (stiff, e.g., pavements).
➤ 25–50 mm: Low (e.g., lightly reinforced slabs).
➤ 50–100 mm: Medium (ideal for most RCC work like beams/columns).
➤ >100 mm: High (flowable, e.g., pumped concrete).

---

152. The maximum particle size of coarse aggregates in a concrete mix should not be bigger than :
[Civil Er. 2070/11/11 Highway]

A. 75 mm
B. 45 mm
C. 55 mm
D. 65 mm

Correct Answer: A

Explanation:

✔ As per IS 456:2000, the maximum size of coarse aggregates in concrete should not exceed:

➤ 1/4th of the minimum member thickness (e.g., 20 mm for an 80 mm slab).

➤ 75 mm (absolute upper limit for general construction).

---

153. While reinforced concrete can withstand different types of stresses, plain cement concrete is good for taking:
[Civil Er. 2070/11/11 Highway]

A. shear stress
B. tensile stress
C. compressive stress
D. all of these

Correct Answer: C

Explanation:

✔ PCC is strong in compression but weak in tension and shear due to its brittle nature and lack of reinforcement.

---

154. The minimum period before strinking vertical formwork to columns, walls,beams, in normal circumstances, shall not be less than:
[Civil Er. 2070/11/08 General]

A. 14 days
B. 7 days
C. 3 days
D. 16-24 hours

Correct Answer: D

Explanation:

➤ As per IS 456:2000, vertical formwork (columns, walls) can typically be removed 16–24 hours after pouring if:

✔ The concrete has achieved sufficient strength to support its own weight (usually ~3.5 MPa).
✔Ambient conditions (temperature, curing) are normal.

---

155. The curing of concrete means:
[Civil Er. 2070/11/08 General]

A. spraying of air over concrete
B. spraying of sand over concrete
C. spraying of water over concrete
D. all of the above

Correct Answer: C

Explanation:

✔ Curing is the process of maintaining adequate moisture and temperature in freshly placed concrete to ensure proper hydration of cement, which enhances strength and durability.

➤Spraying/misting water is a common curing technique to prevent moisture loss, especially in hot/dry conditions.

---

156. Inert material of a cement concrete mix is:
[Civil Er. 2070/11/08 General]

A. water
B. cement
C. aggregate
D. none of these

Correct Answer: C

Explanation:

~ Inert materials do not participate in the hydration process (the chemical reaction between cement and water that forms hardened concrete). They do not contribute to the formation of the primary strength-giving compounds in concrete, such as calcium silicate hydrate (C-S-H).

~ Aggregates (sand, gravel, or crushed stone) are the most common inert materials in concrete. They provide bulk, structure, and volume to the concrete but do not contribute directly to the chemical hardening process.

---

157. The grade of concrete generally not used in the reinforced concrete is:
[Civil Er. 2070/11/08 General]

A. M40
B. M20
C. M15
D. M10

Correct Answer: D

Explanation:

~ Modern design codes and standards (such as IS 456: 2000 in India for reinforced concrete) typically specify M20 (or higher) concrete for reinforced concrete structures.

~ M10 concrete does not meet the minimum strength requirements set by these standards for structural elements that carry live loads and other critical stresses.

---

158. Dropping of concrete would cause:
[Civil Er. 2070/11/08 General]

A. disintegration
B. splitting
C. segregation
D. bleeding

Correct Answer: C

Explanation:

Dropping of concrete causes separation of constituent of concrete which is known as segregation.

---

159. Proper batching ensures:
[Civil Er. 2070/11/08 General]

A. strength
B. workability
C. durability
D. all of the above

Correct Answer: D

Explanation:

Proper batching in concrete refers to the accurate and controlled process of measuring

and combining the ingredients of concrete (such as cement, water, fine aggregates, and coarse aggregates) in the correct proportions, as per the specified mix design.

This process ensures the production of high-quality, durable, and consistent concrete that meets the required strength and workability standards.

---

160. Curing of concrete at high temperature results in:
[Civil Er. 2070/11/08 General]

A. increase in ultimate strength
B. decrease in ultimate strength
C. cracking of concrete
D. early development of ultimate strength

Correct Answer: B

Explanation:

When concrete is cured at a high temperature, it can cause a number of issues, including:

~ Drying: The concrete dries faster, which can lead to cracking if left unchecked.

~ Evaporation: Water in the concrete evaporates before it's fully cured which can weaken the concrete and cause shape abnormalities.

~ Strength: The concrete may be stronger at first, but weaker after 28 days. This is due to the microstructure of the concrete, which is affected by the high

---

161. Disadvantage of very high strength concrete are:
[Civil Er. 2070/11/08 General]

A. low compressive strength
B. uneconomical
C. low shear strength
D. low shear strength along with increased creep and shrinkage

Correct Answer: D

Explanation:

Very high-strength concrete (VHSC), typically defined as concrete with a compressive strength greater than 60 MPa offers benefits like reduced material volume, smaller structural sections, and higher load-bearing capacity.

However, there are several disadvantages to using VHSC like low strength along with creep and shrinkage, lower workability, higher cost, difficulty in achieving uniformity

---

162. The ratio of different ingredients (cement, sand, and aggregates) in concrete mix of grade M20 can be nominally specified as: [Civil Er. 2070/11/08 General]

A. 1:1:2
B. 1:1.5:3
C. 1:2:4
D. 1:3:6

Correct Answer: B

Explanation:

➤ The standard nominal mix ratio for M20 grade concrete (characteristic strength of 20 MPa at 28 days) is 1:1.5:3 (cement:sand:coarse aggregates by volume).

---

163. The minimum particle size of fine aggregate in a concrete mix should not be less than:

[Civil Er. 2070/11/08 General]

A. 0.0075 mm
B. 0.075 mm
C. 0.75 mm
D. 0.45 mm

Correct Answer: B

Explanation:

Generally minimum size of fine aggregate is 0.075 mm and maximum size is 4.75 mm

---

164. gypsum is added to cement for:

[Civil Er. 2070/11/08 General]

A. providing high strength
B. controlling initial setting time
C. lowering the clinkering temperature
D. all of the above

Correct Answer: B

Explanation:

Gypsum is retardar which delays the setting time of cement.

---

165. For M20 concrete the section needs to be redesigned if the shear stress exceeds:

[Civil Er. 2069/10/08 Sanitary]

A. 1.5 N/mm2
B. 1.65 N/mm2
C. 1.8 N/mm2

D. 2.0 N/mm2

Correct Answer: C

Explanation:

Maximum shear stress as per 456: 2000,

M15 - 1.6 N/mm2

M20- 1.8 N/mm2

M25 - 1.9 N/mm2

M30 - 2.2 N/mm2

M35- 2.3 N/mm2

M40- 2.5 N/mm2

---

166. The cube strength of concrete used for prestressed member should not be less than:

[Civil Er. 2069/10/08 Sanitary]

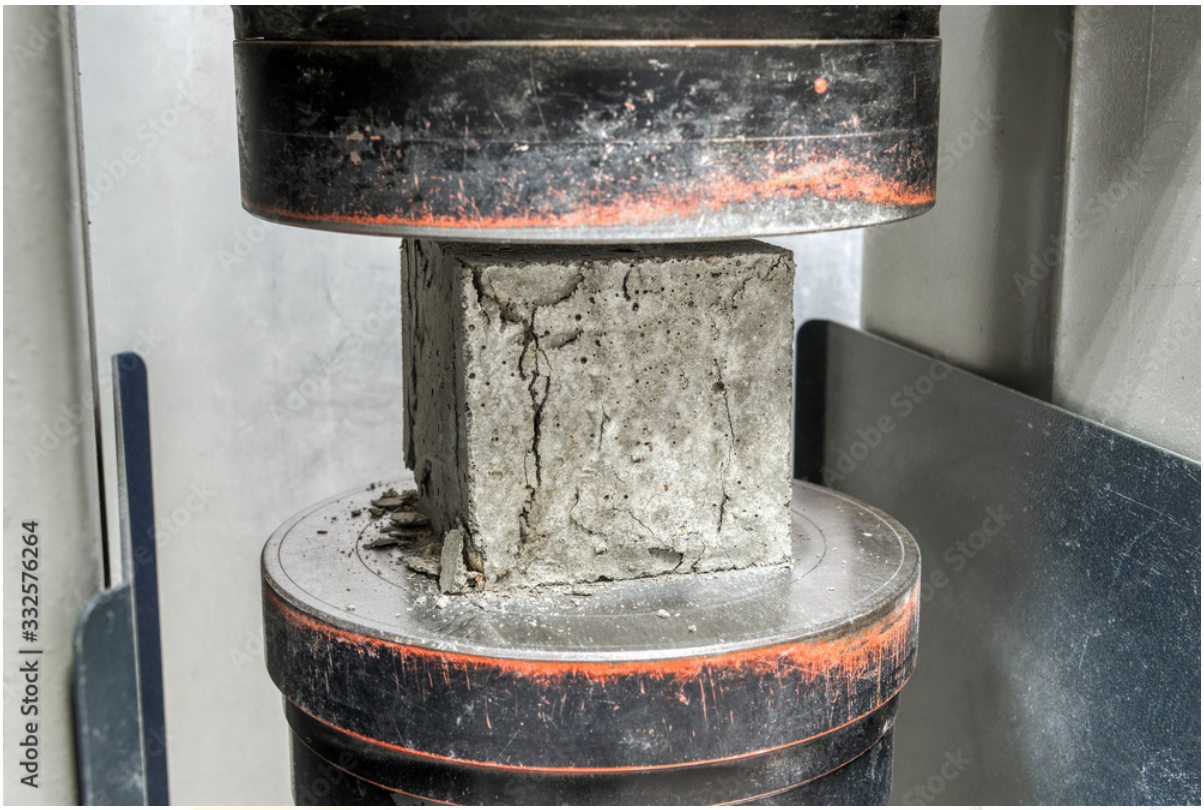
$A. 15 N/mm^2$

$B. 25 N/mm^2$

$C. 35 N/mm^2$

$D. 50 N/mm^2$

Correct Answer: C



Explanation:

As per IS 1343 (1980): Code of Practice for Prestressed member

Minimum concrete grade for pre -tensioned member is M40 and for post-tensioned is M30, here none of the option matches. In general for pre-stressing strength should not be less than M30 but since not in option M35 being the closest highest one. We choose this as the answer.

---

167. If Es, and Ec, are the elastic modulai of steel and concrete, then the modular ratio, 'm' is defined as:
[Civil Er. 2069/10/08 Sanitary]

$A. \frac{E_S}{E_C}$

$B. \frac{E_C}{E_S}$

$C. \frac{1}{E_C E_S}$

$D. \frac{E_S}{2E_C}$

Correct Answer: A

Explanation:

✔ The modular ratio (m) is the ratio of the elastic modulus of steel (Es) to the elastic modulus of concrete (Ec).

---

168. A good quality concrete should be:
[Civil Er. 2069/10/08 Sanitary]

A. chemically inert
B. sufficiently strong
C. durable
D. all of the above

Correct Answer: D

Explanation:

A good quality concrete should have all the above properties.

---

169. Prestress loss due to friction occurs:
[Civil Er. 2069/10/08 Sanitary]

A. only in post tensioned beam
B. only in pre tensioned beam
C. in both of the above
D. none of the above

Correct Answer: A

Explanation:

Pre stress loss due to friction occurs in post- tensioning while pre - stress loss due to

achorage slip occur in pre - tensioning.

Prestress loss due to friction occurs exclusively in post-tensioned concrete members. In these systems, tendons are tensioned within ducts embedded in hardened concrete. Friction between the tendons and the duct surfaces during tensioning leads to a reduction in the prestressing force along the tendon's length. This phenomenon does not occur in pre-tensioned members, where tendons are tensioned before the concrete is cast, eliminating friction-related losses during the prestressing process.

Pre-Tensioning Losses

- **Elastic Shortening**: Concrete shortens as it compresses under prestress.
- **Creep**: Long-term deformation of concrete under constant stress.
- **Shrinkage**: Reduction in concrete volume over time.
- **Relaxation of Steel**: Loss of tension in steel tendons over time.

Post-Tensioning Losses

- **Friction**: Loss due to friction between tendons and concrete.
- **Anchorage Slip**: Loss at the anchor points.
- **Elastic Shortening**: Similar to pre-tensioning, but less significant if cables are pulled simultaneously.
- **Creep and Shrinkage**: Similar to pre-tensioning.
- **Relaxation of Steel**: Similar to pre-tensioning.

Pre-Tensioned Concrete	Post-Tensioned Concrete
Tendons are tensioned before casting the concrete.	Tendons are tensioned after the concrete has hardened.
Typically used for precast elements in factories.	Suitable for both factory precasting and on-site construction.
Ideal for smaller, transportable elements like beams and slabs.	Used for larger spans like bridges and high-rise buildings.
More durable as tendons are bonded with concrete.	Durability depends on anchorage and sheathing protection.

More economical as no sheathing is required.	Costlier due to sheathing and anchorage systems.

---

170. Separation of water from a freshly mixed concrete is known as:
[Civil Er. 2069/10/08 Sanitary]

A. creeping
B. flooding
C. bleeding
D. segregating

Correct Answer: C

Explanation:

➤ Bleeding refers to the separation of water (or a watery cement-sand mixture) from freshly placed concrete, causing it to rise to the surface. This occurs due to the settling of heavier aggregates and the inability of the mix to retain all the water.

---

171. For the construction of cement concrete floor the maximum permissible sizes of aggregate is :
[Civil Er. 2069/10/08 Sanitary]

A. 4 mm
B. 6 mm
C. 8 mm
D. 10 mm

Correct Answer: D

Explanation:

➤As per IS 456:2000, the maximum permissible size of coarse aggregate for cement concrete floors is 10 mm. Smaller aggregates ensure:

✔ Smooth finish (critical for flooring).

✔ Reduced cracking due to better particle distribution.

---

172. Use of water in excess or less than the specified water cement ratio in concrete will result in:
[Civil Er. 2069/10/08 Sanitary]

A. less workability
B. improved workability
C. severe cracks
D. decreased strength

Correct Answer: D

Explanation:

✔ Excess Water:

➤ Increases workability temporarily but reduces strength (due to higher porosity from evaporation).

Causes segregation/bleeding, weakening the concrete.

✔ Insufficient Water:

➤Leads to poor hydration, resulting in low strength and cracks from incomplete bonding.

---

173. The concrete mix not recommended by IS 456-2000 for structural use is:
[Civil Er. 2069/10/08 Sanitary]

A. M 15

B. M 20
C. M 25
D. M 40

Correct Answer: A

Explanation:

According to modern code of IS 456 :2000, minimum concrete grade for structural use is M20.

---

174. The breaking up of cohesion in a mass of concrete is called: [Civil Er. 2069/10/08 Sanitary]

A. workability
B. bleeding
C. seggregation
D. creeping

Correct Answer: C

Explanation:

Seeping of water from concrete - Bleeding

Breaking of cohesion of mass concrete- Segregation

---

175. The compound of Portland cement, which reacts immediately with water and sets first is: [Civil Er. 2069/10/08 Sanitary]

A. tricalcium silicate
B. dicalcium silicate
C. tri calcium aluminate
D. none of the above

Correct Answer: C

Explanation:

➤ C_3A ($3CaO \cdot Al_2O_3$) reacts immediately with water, causing flash set if uncontrolled.

➤ Gypsum is added to cement to retard C_3A's rapid reaction.

---

176. The setting of the time when each operation is to be started and finished is known as:
[Civil Er. 2069/10/08 Sanitary]

A. demand
B. scheduling
C. decision making
D. contracting

Correct Answer: B

Explanation:

Among above option, only scheduling is related to time setting from start to end of project.

---

177. Slump value for mass concrete should range between :
[Civil Er. 2069/10/02 General]

A. 0 - 25 mm
B. 25 - 50 mm
C. 50 - 100 mm
D. 100 - 150 mm

Correct Answer: B

Explanation:

✓ Road construction: 20 to 40 mm

✓ Parapets, piers, slab, beams, columns, and walls: 40 to 50 mm

✓ Concrete for canal lining: 70 to 80 mm

✓ Normal R.C.C. work: 50 to 120 mm

✓ Mass concrete: 25 to 50 mm

✓ Concrete to be vibrated: 10 to 25 mm

---

178. The behaviour of cement concrete under instantaneous load is: [Civil Er. 2069/10/02 General]

A. elastic
B. plastic
C. visco-elastic
D. brittle

Correct Answer: C

Explanation:

The viscoelastic properties of concrete is behavior under stress, where concrete exhibits both viscous and elastic characteristics, meaning it can deform under load (elastic) and resist time-dependent deformation (viscous). In real-world applications, concrete's behavior under load isn't purely elastic or purely viscous—it's a combination of both.

---

179. The ratio of tensile to compressive strength of concrete is: [Civil Er. 2069/10/02 General]

A. 0.025
B. 0.04
C. 0.30

D. 0:10

Correct Answer: D

Explanation:

The tensile strength of concrete is 1/10th of compressive strength.

---

180. The percentage of voids in cement is approximately :
[Civil Er. 2069/10/02 General]

A. 25%
B. 35%
C. 40%
D. 50%

Correct Answer: C

Explanation:

In cement paste (after mixing with water but before full hydration), the void percentage could range from 20% to 40%, depending on factors like the water-cement ratio and hydration conditions. In most places and books we see 40 %. So answer is 40 %

---

181. Strength of concrete increases with :
[Civil Er. 2069/10/02 General]

A. decrease in size of aggregate
B. decrease in water cement ratio
C. increase in water cement ratio
D. decrease in coarse aggregate.

Correct Answer: B

Explanation:

According to Abrams' Law, as the water-cement ratio decreases, the strength increases exponentially, up to a point where the mix becomes too stiff to properly hydrate and work with.

---

182. Workability of concrete is directly proportional to:
[Civil Er. 2069/10/02 General]

A. aggregate cement ratio
B. time of transit
C. grading of the aggregate
D. all of the above

Correct Answer: C

Explanation:

Grading refers to the distribution of particle sizes in the aggregate mix, specifically the proportions of fine aggregates (sand) and coarse aggregates (gravel or crushed stone) of different sizes due to which workability increases.

---

183. Slump test in concrete is used for:
[Civil Er. 2069/10/02 General]

A. viscosity
B. strength
C. workability
D. all of the above

Correct Answer: C

Explanation:

➤ Measures the workability (ease of mixing, placing, and compacting) of fresh concrete.

➤ Indicated by the slump value (e.g., 25–75 mm for medium workability).

---

184. The entrained air in concrete:
[Civil Er. 2069/10/02 General]

A. increase the strength
B. decreases the strength
C. decreases the workability
D. increases the workability

Correct Answer: D

Explanation:

✔ Effect of Entrained Air:

➤ Tiny air bubbles act as lubricants, improving workability by reducing friction between particles.

✔ Strength Impact:

➤ Decreases compressive strength (~5% air reduces strength by 10–20%), but this wasn't an option in the context of the question.

---

185. The ratio of various ingredients (cement, sand and aggregates).in concrete of grade M200, is
[Civil Er. 2069/10/02 General]

A. 1:2:4
B. 1:3:6
C. 1:1.5:3
D. 1:1:2

Correct Answer: C

Explanation:

➤ The standard nominal mix for M20 grade concrete (20 MPa strength) is 1:1.5:3 (cement:sand:aggregates by volume).

---

186. Workability of concrete is directly proportional to:
[Civil Er. 2068/12/07 B & Arch.]

A. aggregate cement ratio
B. time of transit
C. grading of the aggregate
D. all of the above

Correct Answer: C

Explanation:

Workability of concrete is directly proportional to grading of aggregates.

Workability of concrete is inversely proportional to time of transit.

---

187. Choose the incorrect statement:
[Civil Er. 2069/10/02 General]

A. admixture accelerate hydration
B. admixture make concrete water proof
C. admixture make concrete acid proof
D. none of the above

Correct Answer: D

Explanation:

Admixtures are chemicals or materials added to concrete in small quantities to alter or enhance its properties, both in the fresh and hardened states. The primary functions of admixtures are to improve the workability, strength, durability, and other function of admixture are given in above options.

---

188. The process adopted for expelling the entrapped air from the concrete is known as:
[Civil Er. Irrigation 2069/11/08]

A. consolidation
B. Compaction
C. hardening
D. mixing

Correct Answer: B

Explanation:

~ Compaction is the process of densifying a freshly mixed material (like concrete or soil) by reducing the air voids or spaces between the particles through mechanical effort. This process is primarily achieved by applying external forces such as vibration, rolling, or tamping.

~ Consolidation is the process where settling of particles occurs in a material (typically concrete or soil) over time due to the weight of the material itself or external pressure.

---

189. With the increase in moisture content, the bulking of sand:
[Civil Er. Irrigation 2069/11/08]

A. increases
B. decreases
C. first increases to a certain maximum value and then decreases
D. first decreases to a certain minimum value and then increases

Correct Answer: C

Explanation:

✔ Initial moisture causes sand particles to form water films, pushing them apart → volume increases (bulking).

✔ Beyond 4–6% moisture, water fills voids → particles settle → volume decreases.

---

190. While compacting the concrete by a mechanical vibrator, the slump should not exceed :
[Civil Er. Irrigation 2069/11/08]

A. 2.5 cm
B. 5.0 cm
C. 7.5 cm
D. 10 cm

Correct Answer: B

Explanation:

➤ For effective vibration, slump should not exceed 5 cm (50 mm) to prevent segregation (coarse aggregates sinking, paste rising).

---

191. Higher workability of concrete is required if the structure is:
[Civil Er. Irrigation 2069/11/08]

A. made from cement and concrete
B. thick and lightly reinforced
C. thin and heavily reinforced
D. thick and heavily reinforced

Correct Answer: D

Explanation:

➤ High Workability Needs:

✔ Thick sections: Require fluidity to fill deep forms.

✔Heavy reinforcement: Needs flowable concrete to encapsulate rebar fully.

---

192. Efflorescence in cement is caused due to an excess of:
[Civil Er. Irrigation 2069/11/08]

A. alumina
B. iron oxide
C. silica
D. alkalis

Correct Answer: D

Explanation:

Efflorescence is a phenomenon where water-soluble salts migrate to the surface of concrete, mortar, or masonry and crystallize, leaving a white, powdery deposit on the surface. It is caused due to excess of alkalies in cement.

---

193. The leveling operation that removes humps and hollows and give a truly uniform concrete surface is called:
[Civil Er. Irrigation 2069/11/08]

A. compacting
B. trowelling
C. floating
D. screeding

Correct Answer: D

Explanation:

Screeding - Levelling operation that removes humps and hollows and give truly uniform surface.

Troweling - Troweling is the final step in the process of finishing concrete or mortar surfaces, typically performed after the concrete has been placed, leveled, and compacted.

---

194. Age factor for permissible compressive stress in concrete after six months is:
[Civil Er. Irrigation 2069/11/08]

A. 1.10
B. 1.15
C. 1.20
D. 1.30

Correct Answer: C

Explanation:

✔ The age factor accounts for strength gain over time. After 6 months, concrete's permissible compressive stress increases by 1.15 times its 28-day strength (as per IS 456:2000).

---

195. In case of hand mixing of concrete, the extra cement to be added is:
[Civil Er. Irrigation 2069/11/08]

A. 5%
B. 15%
C. 10%
D. 20%

Correct Answer: C

Explanation:

✔ Hand mixing is less efficient, so 10% extra cement is added to compensate for

potential inconsistencies in uniformity and strength.

---

196. Workability of concrete increased due to an excess of:
[Civil Er. Irrigation 2069/11/08]

A. water
B. round aggregate
C. cement
D. all of the above

Correct Answer: D

Explanation:

➤ Factors Increasing Workability:

a) Water: Lubricates the mix (but weakens strength if excessive).

b) Round aggregates: Reduce friction vs. angular aggregates.

c) Cement: Finer particles improve fluidity (but costlier).

---

197. The property of the ingredients to separate each other while placing the concrete is called:
[Civil Er. Irrigation 2069/11/08]

A. segregation
B. compaction
C. shrinkage
D. bulking

Correct Answer: A

Explanation:

➤ Segregation is the separation of coarse aggregates from the mortar (cement-sand mix) due to improper handling, vibration, or placement.

Effects: Weakens concrete, causes honeycombing.

Prevention: Proper mix design, avoid excessive free fall (>1 m).

---

198. Calcium chloride used as an admixture in concrete is:

[Civil Er. 2069/10/06 Highway]

A. An accelerator
B. a retarder
C. a water proofing compound
D. none of the above

Correct Answer: A

Explanation:

Calcium chloride - Accelerator

Gypsum - Retardar

---

199. Curing:

[Civil Er. 2069/10/06 Highway]

A. reduces the shrinkage of concrete
B. preserves the properties of concrete
C. prevents the loss of water by evaporation
D. all of the above

Correct Answer: D

Explanation:

Curing reduces shrinkage of concrete, prevents the loss of water by evaporation, preserves the properties of concrete.

---

200. Slump test of concrete is a measure of its :

[Civil Er. 2069/10/06 Highway]

A. consistency
B. compressive strength
C. tensile strength
D. impact value

Correct Answer: A

Explanation:

➤ The slump test measures consistency (workability) of fresh concrete, not strength.

• Procedure: Fill a slump cone, lift it, and measure
• settlement (e.g., 50 mm = medium workability).

---

201. High temperature:

[Civil Er. 2069/10/06 Highway]

A. increase the strength of concrete
B. decreases the strength of concrete
C. has no effect on the strength of concrete
D. none of the above

Correct Answer: B

Explanation:

~ Concrete gains strength through the chemical reaction between cement and water, known as hydration.

~ At elevated temperatures, this process can be accelerated initially, leading to faster but less complete hydration. However, when temperatures rise too high, the hydration process becomes incomplete, which results in the formation of less strong hydration products (such as calcium silicate hydrate, or C-S-H). This incomplete hydration weakens the cement paste and reduces the overall strength of the concrete.

202. The minimum percentage chemical ingredient of cement is :
[Civil Er. 2069/10/06 Highway]

A. magnesium oxide
B. iron oxide
C. aluminium
D. lime

Correct Answer: A

Explanation:

Lime (CaO) - 60- 65 %

Silica (SiO2) - 17- 25%

Alumina (Al2O3) - 3-8%

Ferous Oxide (Fe2O3) - 0.5 - 6%

Magnesium Oxide (MgO) - 0.5 - 4%

---

203. The concrete having a slump of 6.5 cm, is said to be:
[Civil Er. 2069/10/06 Highway]

A. dry
B. earth moist
C. semi-plastic
D. plastic

Correct Answer: D

Explanation:

➤ 6.5 cm slump falls under "plastic" workability (50–100 mm range), ideal for most RCC work.

---

204. The resistance of an aggregate to wear is known as:

[Civil Er. 2069/10/06 Highway]

A. shear resistance
B. crushing resistance
C. abrasion resistance
D. impact value

Correct Answer: C

Explanation:

➤ Abrasion resistance measures an aggregate's ability to withstand wear (e.g., in pavements).

Test: Los Angeles abrasion test (per IS 2386).

---

205. Low heat cement is preferred for:
[Civil Er. 2069/10/06 Highway]

A. slabs
B. columns
C. dams
D. foundation

Correct Answer: C

Explanation:

~ Low heat cement is used in large-scale concrete structures like dams or other mass concrete applications because it helps manage and mitigate the heat of hydration.

~ This heat can accumulate and cause significant temperature differences between the interior and exterior of the structure. The heat of hydration can lead to thermal cracking and less durable.

---

206. The approximate value of the ratio between direct tensile strength and flexural strength is:
[Civil Er. 2069/10/06 Highway]

A. 1.00
B. 0.75
C. 0.60
D. 0.50

Correct Answer: D

Explanation:

Tensile Strength: Tensile strength is the resistance of a material to tension (pulling or stretching).

Flexural Strength: Flexural strength (or modulus of rupture) refers to the ability of a material to resist bending or flexural stresses.

In concrete, tensile strength is usually lower because concrete is inherently weak in tension. Cracking begins in concrete when it is subjected to direct tensile stresses.

---

207. The cube strength of the concrete used for pre-stressed member should not be less than:
[Civil Er. 2069/10/06 Highway]

A. 10 Mpa
B. 25 Mpa
C. 35 Mpa
D. 40 Mpa

Correct Answer: D

Explanation:

➤ As per IS 1343:2012 the minimum grade for pre-tensioned prestressed concrete.

---

208. Workability of the concrete for the given water content is good, if aggregate used are:
[Civil Er. 2068/11/12 Irrigation]

A. irregular aggregate
B. round aggregate
C. flaky aggregate
D. regular aggregate

Correct Answer: B

Explanation:

For workability of concrete - round aggregates

---

209. The cold bent test is conducted in a steel bar to determine:
[Civil Er. 2068/11/12 Irrigation]

A. bending without fracture
B. bending without curvature
C. bending at 90 degrees
D. none of the above

Correct Answer: C

Explanation:

~ The steel bar is subjected to a cold bending process, meaning it is bent at room temperature (no heating is involved). The bar is usually bent around a specific radius (often a multiple of the bar's diameter), and the bending is typically done using a mechanical or manual bending machine.

~ The bar is bent 180 degrees (or sometimes 135 or 90 degrees, depending on the test specification) around a mandrel or die.

---

210. Common admixtures include:

[Civil Er. 2068/11/12 Irrigation]

A. fly ash
B. accelerating admixtures
C. air entraining and mixtures
D. all of the above

Correct Answer: D

Explanation:

a) Fly ash: A pozzolanic admixture that improves workability and durability.

b) Accelerating admixtures: Speed up setting (e.g., calcium chloride).

c) Air-entraining admixtures: Enhance freeze-thaw resistance.

---

211. If the slump of a concrete mix is 60 mm its workability is:

[Civil Er. 2068/11/12 Irrigation]

A. very low
B. low
C. medium
D. high

Correct Answer: C

Explanation:

➤ 60 mm slump falls under medium workability (50–100 mm range), ideal for most reinforced concrete work.

---

212. Slump strength of a concrete is a measure of its :

[Civil Er. 2068/11/12 Irrigation]

A. consistency
B. compressive strength
C. tensile strength
D. impact value

Correct Answer: A

Explanation:

✔ The slump test measures consistency (workability) of fresh concrete, not strength.

➤ Misconception Alert: "Slump strength" is a misleading term; slump indicates flowability, not compressive/tensile strength.

---

213. For the same design load, the weight of concrete in a prestressed concrete as compared to ordinary reinforced concrete is less by: [Civil Er. 2068/11/12 Irrigation]

A. 25%
B. 33%
C. 50%
D. 66%

Correct Answer: B

Explanation:

✔ Prestressed concrete is ~33% lighter than RCC for the same load due to:

➤ Higher material efficiency: Pre-compression allows thinner sections.

➤ Reduced dead load: Less concrete needed.

---

214. To get ultra high strength concrete: [Civil Er. 2068/11/12 Irrigation]

A. compaction by pressure and helical binding
B. polymerization in concrete
C. reactive powder concrete
D. all of the above

Correct Answer: D

Explanation:

a) Compaction by pressure/helices: Densifies concrete (e.g., pressed concrete).

b) Polymerization: Adds resins for ultra-high strength (e.g., polymer-modified concrete).

c) Reactive powder concrete (RPC): Uses fine powders and fibers for 150+ MPa strength.

---

215. The steel mold used for slump test is in the form of [Civil Er. 2068/11/12 Irrigation]

A. cube
B. cylinder
C. frustum of a cone
D. triangular

Correct Answer: C

Explanation:

➤ The slump test uses a frustum-shaped mold (top diameter: 10 cm, bottom: 20 cm, height: 30 cm) to measure concrete workability.

---

216. Approximate final setting time of quick-setting cement is: - [Civil Er. 2068/11/12 Irrigation]

A. 5 min
B. 15 min
C. 30 min
D. I hour

Correct Answer: C

Explanation:

✔ Quick-setting cement (e.g., used for repairs) has an extremely short final setting time of ~5 minutes.

Standard Portland cement: Sets in ~10 hours (final setting time).

---

217. The initial and final setting time of quick setting cement are: [Civil Er. 2068/11/12 Irrigation]

A. 10 min and 30 min
B. 15 min and 45 min
C. 5 min and 30 min
D. 25 min and 55 min

Correct Answer: C

Explanation:

Types of cement	Initial setting time	Final setting time
Ordinary Portland cement	30 minutes	10 hours
Rapid hardening cement	30 minutes	10 hours
High alumina cement	30 minutes	10 hours
Quick setting cement	5 minutes	30 minutes.
Low heat cement:	1 hour	10 hours
Sulfate resisting cement	30 minutes	10 hours
Portland slag cement	30 minutes	10 hours
Super sulphate cement	4 hr	4hr 30 minutes

---

218. The amount of cement required for 1 m3 mortar (1:6):

[Civil Er. 2068/11/12 Irrigation]

A. 165 kg
B. 265 kg
C. 365kg
D. 465 kg

Correct Answer: B

Explanation:

Mortar ratio is 1:6, ie 1 part of cement and 6 part of sand.

Let assume mortar quantity is 1m3

The sum of cement and sand gives a 7 parts(1+6)

So cement required is (1/7)*1.3 =0.186m3

(Where 1.3 is dry to wet volume constant which includes wastage also)

If u want in kg multiply it by density of cement ie 1440*0.186= 267.84 kg

---

219. The function of aggregates in concrete to behave as :

[Civil Er. 2068/12/07 B & Arch.]

A. binding material
B. catalyst
C. filler
D. none of the above

Correct Answer: C

Explanation:

✔ Aggregates (60–75% of concrete volume) act as:

➤ Fillers: Reduce cost by displacing cement.

➤ Reinforcement: Improve compressive strength and durability.

---

220. The strength and quality of concrete depends on:
[Civil Er. 2068/12/07 B & Arch.]

A. grading of aggregates
B. surface area of aggregates
C. shape of the aggregates
D. all of the above

Correct Answer: D

Explanation:

Strength of concrete depend on all of the given properties of aggregates.

---

221. The ratio of cement, sand and aggregate in nominal M20 concrete mix is:
[Civil Er. 2068/12/07 B & Arch.]

A. 1:2:4
B. 1:1.5:3
C. 1:1:2
D. 1:3:6

Correct Answer: B

Explanation:

➤ M20 concrete (20 MPa strength) uses a 1:1.5:3 ratio (cement:sand:aggregates by volume).

---

222. An aggregate having all the pores filled with water but having dry surface is called:

[Civil Er. 2068/12/07 B & Arch]

A. saturated surface dry aggregate
B. moist aggregate
C. dry aggregate
D. surface dried aggregate

Correct Answer: A

Explanation:

Very very dry aggregates - The aggregate which do not contain any moisture either in the pores or on the surface is known as very very dry aggregates.

Dry aggregates - The aggregates which contain some moisture in its pores but having their surface dry is known as dry aggregate.

Saturated surface dry aggregates - The aggregate of which all the pores are filled completely with water but having their surface just dry is known as saturates surface dry aggregates.

Wet or moist aggregates - The aggregates whose all the pores are filled with water also having their surface wet is wet or moist aggregates.

---

223. The best method of curing the concrete is:

[Civil Er. 2068/11/26 Highway]

A. heat curing
B. membrane curing

C. water curing
D. steam curing

Correct Answer: C

Explanation:

~ A curing membrane - Liquid applied to the surface of freshly poured concrete. These membranes can be either membrane-forming or membrane-releasing agent.

~ Heat curing is a technique used to accelerate the curing process of concrete by applying heat to the freshly poured concrete.

~ Steam curing is a specialized method used to accelerate the curing process of concrete, primarily in the production of precast concrete products. It involves exposing freshly poured concrete to hot steam, which raises the temperature of the concrete and accelerates the chemical reaction (hydration) between water and cement, helping the concrete gain strength more quickly.

~ Water curing : water curing can be done by different methods like ponding, Sprinkling, Plastic sheeting, spray system.

Best method among above method is water curing.

---

224. The time interval for which the cement products remain in plastic condition is, known as:
Civil Er. 2068/11/26 Highway]

A. reaction time
B. hardening time

C. curing time
D. setting time

Correct Answer: D

Explanation:

✔Setting time is the period when cement paste remains plastic (workable) before hardening.

➤ Initial setting: ~30 minutes (cement loses plasticity).

➤ Final setting: =10 hours (fully hardened).

---

225. Separation of the constituent materials of concrete is known as:
[Civil Er. 2068/11/26 Highway]

A. mixing
B. segregation
C. bleeding
D. batching

Correct Answer: B

Explanation:

➤ Segregation is the separation of coarse aggregates from the mortar during handling or placement.

---

226. When the effect of creep is more pronounced, the static modulus of elasticity will get affected more seriously:
[Civil Er. 2068/11/26 Highway]

A. at zero stresses
B. at lower stresses

C. at medium stresses
D. at higher stresses

Correct Answer: D

Explanation:

✔ Creep (time-dependent deformation under load) affects the static modulus of elasticity more severely at higher stresses due to microcracking and bond degradation.

---

227. The compressive strength of an ordinary Portland cement (1:3 cement mortar cube) after 7 days test should not be less than [Civil Er. 2068/11/26 Highway]

A. 275 kg/cm2
B. 110 kg/cm2
C. 175 kg/cm2
D. 220 kg/cm2

Correct Answer: C

Explanation:

The preliminary test is repeated if the difference of compressive strength of three test specimen exceeds - 15 kg/cm2

The 28 days cube strength of mass concrete using aggregates of maximum size 5 cm for gravity dams should be below 200 kg/cm2

---

228. The strength of concrete increases with decreases in: [Civil Er. 2068/11/12 Irrigation]

A. size of aggregate
B. moisture content.

C. water cement ratio
D. aggregate cement ratio

Correct Answer: C

Explanation:

The relationship between the w/c ratio and strength is represented by an empirical power law equation, which shows a non-linear decrease in strength as the w/c ratio increases. The most commonly used empirical equation is:

$$fc = A \times (n^{1/w/c})$$

Where:

fc = compressive strength of concrete.
A = constant depending on mix design and curing conditions.
n = usually between 2 and 3 (empirical constant derived from experimental data).

Thus there is indirect relation between strength of concrete and water cement ratio.

---

229. Le-chatelier apparatus is used to perform:
[Civil Er. 2068/11/26 Highway]

A. soundness test
B. fineness test
C. consistency test
D. compressive strength test

Correct Answer: A

Explanation:

➤ The Le Chatelier apparatus tests cement soundness (ability to resist volume change due to free lime/magnesia).

---

230. The material having particle size varying from 0.002 to 0.06 mm is termed as:
[Civil Er. 2068/11/26 Highway]

A. sand
B. silt
C. clay
D. none of the above

Correct Answer: B

Explanation:

less the 0.002 mm size - clay

0.002 - 0.06 mm - silt

0.06 -4.75 mm - sand

---

231. Slump test of concrete is measure of its:
[Civil Er. 2068/11/26 Highway]

A. impact value
B. consistency
C. compressive strength
D. tensile strength

Correct Answer: B

Explanation:

The slump test measures workability/consistency, not strength.

---

232. The development of first 28 days strength is on account of the hydration of:

[Civil Er. 2068/11/26 Highway]

A. tetra calcium alumino Territe
B. dicalcium silicate
C. tricalcium silicate
D. tricalcium aluminate

Correct Answer: C

Explanation:

Tri calcium silicate - Early strength

Di calcium silicate - Ultimate strength

Tri calcium aluminate - Early setting

---

233. The concrete, in which preliminary tests are performed for designing the mix is called:

[Civil Er. 2068/11/26 Highway]

A. ordinary concrete
B. rich concrete
C. controlled concrete
D. lean concrete

Correct Answer: C

Explanation:

Higher proportion of Cement than other ingredients - rich concrete

Lesser proportion of Cement than other ingredients - lean concrete

---

234. The most useless aggregate is, whose surface texture is:

[Civil Er. 2068/11/26 Highway]

A. porous
B. smooth
C. glossy.
D. granular

Correct Answer: C

Explanation:

A glossy texture in concrete is generally considered undesirable in most concrete applications because it compromise the performance, durability, and safety of the concrete.

---

235. To obtain very high strength concrete, use very fine grained:
[Civil Er. 2068/11/26 Highway]

A. volcanic scoria
B. granite
C. magnetite
D. barite

Correct Answer: B

Explanation:

Use of very granite fine powder enhances the strength, durability, and workability of concrete, and can also provide economic and environmental benefits when used in certain applications.

---

236. Permissible compressive strength of M200 concrete grade is
[Civil Er. 2068/11/14 Hydropower]

A. 250 kg/cm^2
B. 200 kg/cm^2
C. 100 kg/cm^2
D. 130 kg/cm^2

Correct Answer: B

Explanation:

➤ M200 concrete has a characteristic compressive strength of 200 kg/cm² (20 MPa) at 28 days.

---

237. What is a graded aggregate?

[Civil Er. 2068/11/14 Hydropower]

A. it has particles of all sizes
B. it has particles between 4 mm - 6 mm
C. it has particles between 10 mm 15 mm
D. it has particles between 2 mm - 5 mm

Correct Answer: A

Explanation:

➤ A graded aggregate contains a well-proportioned mix of particle sizes to minimize voids and enhance packing density.

---

238. Separation of ingredients from concrete during transportation is known as:

[Civil Er. 2068/11/14 Hydropower]

A. creep
B. bleeding
C. shrinkage

D. segregation

Correct Answer: D

Explanation:

✔ Segregation occurs when ingredients separate during transportation/vibration.

---

239. The advantage of reinforced concrete,
[Civil Er. 2068/11/14 Hydropower]

A. more rigidity due to monolithic character
B. fire resisting and more durability
C. less maintenance cost
D. all of the above.

Correct Answer: D

Explanation:

✔ RCC advantages: Monolithic rigidity, fire resistance, durability, and low maintenance.

---

240. Which of the grade of concrete generally not used in R.C.C. work?
[Civil Er. 2068/11/14 Hydropower]

A. lower than M 15
B. lower than M 25
C. lower than M 40
D. lower than M 60

Correct Answer: A

Explanation:

For RCC work greater than M15 grade is only used i.e. minimum grade for RCC work

is M20

---

241. The purpose of reinforcement in prestressed concrete is :
[Civil Er. 2068/11/14 Hydropower]

A. to provide adequate bond stress
B. to resist tensile stress
C. to impart initial compressive stress in concrete
D. all of the above

Correct Answer: C

Explanation:

In prestressed concrete member steel wires/tendons/reinforcement are stretched either before concreting or after concreting to impart initial compressive stress in concrete. Due to prestressing, the concrete deflect upward which compensate deflection due to working loads.

---

242. Strength of the concrete increases with:
[Civil Er. 2068/11/14 Hydro power]

A. increase in water cement ratio
B. increase in fineness of cement
C. decrease in curing time
D. increase in curing time

Correct Answer: B

Explanation:

➤ The fineness of cement affects hydration rate,and in turn , the strength.Increasing fineness causes an increased rate of hydration,high strength,and high heat generation.By increase in fineness we get more surface area due which we get better paste which led to

dense bonding and better packing which results into increase in strength.

---

243. The ratio of various ingredients (cement, sand, aggregate) in concrete of grade M200 is

[Civil Er. 2068/11/14 Hydropower]

A. 1:2:4
B. 1:3:6
C. 1:1 1/2:3
D. 1:1:2

Correct Answer: C

Explanation:

➤ M200 (equivalent to M20 in Indian standards) has a nominal mix ratio of 1:1.5:3.

➤ This achieves a characteristic compressive strength of 20 MPa (200 kg/cm²) at 28 days.

---

244. Slump test of concrete is a measure of its

[Civil Er. 2068/11/14 Hydropower]

A. consistency
B. compressive strength
C. tensile strength
D. impact value

Correct Answer: A

Explanation:

➤ The slump test is a simple field test used to measure the workability (consistency) of fresh concrete. It indicates how easily the concrete flows and is placed without

segregation.

---

245. Workable concrete for beam and slab is obtained with allowable slump : [Civil Er. 2068/11/14 Hydropower]

A. 20-30 mm
B. 12-25 mm
C. 50-100 mm
D. 75 150 mm.

Correct Answer: C

Explanation:

➤ Slump Range for Beams/Slabs: 50–100 mm is ideal for reinforced concrete work (beams, slabs, columns) as it balances workability (easy placement and compaction) and stability (minimizes segregation).

---

246. If water cement ratio is more,
[Civil Er. 2068/11/14 Hydropower]

A. the durability of the concrete will be more
B. the durability of the concrete will be less
C. the durability of the concrete will not be affected.
D. none of the above

Correct Answer: B

Explanation:

✔ Water-Cement (w/c) Ratio directly impacts concrete's strength and durability.

➤Higher w/c ratio (excess water) leads to:

•Increased porosity after evaporation, causing cracks and permeability.

•Reduced resistance to chemical attacks (e.g., sulfates, chlorides) and freeze-thaw cycles.

➤Lower w/c ratio improves density and longevity.

---

247. Minimum grade of concrete to be used in reinforced concrete is:
[Civil Er. 2068/11/03 General]

A. M 15
B. M 20
C. M 10
D. M 25

Correct Answer: B

Explanation:

✔ IS 456:2000 mandates M20 as the minimum grade for reinforced concrete to ensure:

➤ Adequate bond strength between steel and concrete.

➤ Resistance to environmental exposure (e.g., corrosion).

---

248. If fineness modulus of sand is 2.5, it is graded as:
[Civil Er. 2068/11/03 General]

A. very fine
B. fine
C. medium
D. Coarse

Correct Answer: B

Explanation:

Fineness modulus Aggregates

2.2- 2.6 ~ Fine

2.6-2.9 ~ Medium

2.9 -3.2 ~ Coarse

---

249. The mixture of different ingredients of cement for its manufacture is burnt at:

[Civil Er. 2068/11/03 General]

A. 1000°C
B. 1200° C
C. 1400° C
D. 1600°C

Correct Answer: C

Explanation:

Generally burning temperature of ingredients of mixture of cement is 1300 - 1500 degree Celsius.

---

250. Which of the following chemical should be added to reduce the curing time of concrete ?

[Civil Er. 2068/11/03 General]

A. sodium chloride
B. calcium chloride
C. potassium.
D. magnesium

Correct Answer: B

Explanation:

~ Reduce curing time which means accelerator .

~ Calcium chloride is commonly used accelerator.

---

251. In vicat's apparatus test, the diameter of vicat plunger is: [Civil Er. 2068/11/03 General]

A. 5 mm
B. 10 mm
C. 15 mm
D. 20 mm

Correct Answer: B

Explanation:

✔ Vicat Apparatus tests cement setting time (initial/final).

➤ Plunger diameter: 10 mm (standard as per IS/ASTM).

➤ Purpose: Measures penetration depth to determine setting time.

---

252. Permissible compressive strength of M200 concrete grade is [Civil Er. 2068/11/14 Hydropower]

A. 250 kg/cm^2
B. 200 kg/cm^2
C. 100 kg/cm^2
D. 130 kg/cm^2

Correct Answer: B

Explanation:

➤M200 denotes characteristic compressive strength of 20 MPa (≈ 200 kg/cm²) at 28 days.

Conversion: 1 MPa ≈ 10 kg/cm².

---

253. What is a graded aggregate?

[Civil Er. 2068/11/14 Hydropower]

A. it has particles of all sizes
B. it has particles between 4 mm - 6 mm
C. it has particles between 10 mm 15 mm
D. it has particles between 2 mm - 5 mm

Correct Answer: A

Explanation:

✔Graded Aggregate contains a well-proportioned mix of particle sizes (fine to coarse) to:

➤Minimize voids, enhance packing density, and improve workability.

➤ Optimize strength and reduce cement requirement.

---

254. Separation of ingredients from concrete during transportation is known as:

[Civil Er. 2068/11/14 Hydropower]

A. creep
B. bleeding
C. shrinkage
D. segregation

Correct Answer: D

Explanation:

➤ Segregation refers to the separation of coarse aggregates from the cement paste during handling or transportation, leading to non-uniform concrete.

---

255. The advantage of reinforced concrete,

[Civil Er. 2068/11/14 Hydropower]

A. more rigidity due to monolithic character
B. fire resisting and more durability
C. less maintenance cost
D. all of the above.

Correct Answer: D

Explanation:

✔Reinforced concrete (RCC) combines concrete's compressive strength and steel's tensile strength, offering:

a) Monolithic rigidity: Acts as a single unit under loads.

b) Fire resistance & durability: Concrete protects steel from fire/corrosion.

c) Low maintenance: Long service life with minimal upkeep.

---

256. Which of the grade of concrete generally not used in R.C.C. work?
[Civil Er. 2068/11/14 Hydropower]

A. lower than M 15
B. lower than M 25
C. lower than M 40
D. lower than M 60

Correct Answer: A

Explanation:

✔IS 456:2000 specifies M20 as the minimum grade for RCC .

➤ Grades below M15 (e.g., M10) are used for plain concrete (non-structural).

➤ Higher grades (M25–M60+) are common in RCC for heavy loads/special conditions.

257. The purpose of reinforcement in prestressed concrete is :

[Civil Er. 2068/11/14 Hydropower]

A. to provide adequate bond stress
B. to resist tensile stress
C. to impart initial compressive stress in concrete
D. all of the above

Correct Answer: C

Explanation:

✔ Prestressed concrete uses high-tension tendons to:

a) Provide bond stress: Ensures steel-concrete adhesion.

b) Resist tensile stress: Counters external loads.

c) Impart initial compression: Pre-loads concrete to counteract future tension.

---

258. Strength of the concrete increases with:

[Civil Er. 2068/11/14 Hydropower]

A. increase in water cement ratio
B. increase in fineness of cement
C. decrease in curing time
D. increase in curing time

Correct Answer: B

Explanation:

➤ The fineness of cement affects hydration rate,and in turn , the strength.Increasing fineness causes an increased rate of hydration,high strength,and high heat generation.By increase in fineness we get more surface area due which we get better paste which led to dense bonding and better packing which results into increase in strength.

---

259. The ratio of various ingredients (cement, sand, aggregate) in concrete of grade M200 is

[Civil Er. 2068/11/14 Hydropower]

A. 1:2:4
B. 1:3:6
C. 1:1 1/2:3
D. 1:1:2

Correct Answer: C

Explanation:

✔ M200 concrete (characteristic strength = 20 MPa) typically uses a 1:2:4 mix ratio (cement:sand:aggregate).

1 part cement provides binding.

2 parts sand fills voids.

4 parts coarse aggregate ensures strength.

---

260. Slump test of concrete is a measure of its

[Civil Er. 2068/11/14 Hydropower]

A. consistency
B. compressive strength
C. tensile strength
D. impact value

Correct Answer: A

Explanation:

✔ The slump test measures workability (consistency) of fresh concrete.

• Higher slump = more fluidity.

• Lower slump = stiffer mix.

261. A high strength concrete is a high performance concrete with compressive strength greater than :
[Civil Er. 2068/11/14 Hydropower]

A. 30 Mpa
B. 40 Mpa
C. 50 Mpa
D. 60 Mpa

Correct Answer: D

Explanation:

High strength concrete - greater than 60 MPa and water cement ratio around 0.35

---

262. Workable concrete for beam and slab is obtained with allowable slump :
[Civil Er. 2068/11/14 Hydropower]

A. 20-30 mm
B. 12-25 mm
C. 50-100 mm
D. 75 150 mm.

Correct Answer: C

Explanation:

✔ Beams/slabs require moderate workability (50–100 mm slump) for:

➤ Easy placement around reinforcement.
➤ Proper compaction without segregation.

---

263. If water cement ratio is more,
[Civil Er. 2068/11/14 Hydropower]

A. the durability of the concrete will be more
B. the durability of the concrete will be less
C. the durability of the concrete will not be affected.
D. none of the above

Correct Answer: B

Explanation:

✔ Higher w/c ratio increases porosity, reducing:

➤ Durability (more permeable to chemicals/water).

➤ Strength (weaker bond between particles).

---

264. The major loss of pre-stress is caused due to:
[Civil Er. 2068/11/09 Sanitary]

A. creep and shrinkage of concrete
B. relaxation of steel
C. slip in anchorage
D. all of the above

Correct Answer: D

Explanation:

✔ Pre-stress loss occurs due to:

a) Creep & shrinkage: Long-term deformation of concrete.

b) Relaxation of steel: Tendons lose tension over time.

c) Slip in anchorage: Mechanical losses during anchoring.

---

265. If concrete grade is M2o, then what could be the modular ratio?
[Civil Er. 2068/11/09 Sanitary]

A. 7.00
B. 7.08
C. 9.08
D. 13.33

Correct Answer: D

Explanation:

Modular ratio = 280/(3* \sigma cbc)

= 280/(3*7)

= 13.33

---

266. While compacting the concrete by a-mechanical vibrator, the slump should not exceed :
[Civil Er. 2068/11/09 Sanitary]

A. 2.5 cm
B. 5.0 cm
C. 7.5 cm
D. 10 cm

Correct Answer: B

Explanation:

✔ When compacting concrete with a mechanical vibrator, the slump should not exceed 5 cm (50 mm).

➤ Reason: Higher slump may cause segregation (separation of aggregates) under vibration.

➤ Ideal Range: 25–50 mm for vibrated concrete ensures proper compaction without defects.

---

267. Abrams water/cement ratio law states that the strength of concrete is only dependent upon water/cement ratio provided:
[Civil Er. 2068/11/09 Sanitary]

A. the mix is hot
B. the Portland cement is used
C. the mix is workable
D. the mix is dry

Correct Answer: C

Explanation:

✔ Abrams' Law states that concrete strength depends solely on the water-cement (w/c) ratio, provided:

➤ The mix is workable (can be placed and compacted properly).
➤ Assumption: Cement hydration is complete (no excess water or dryness).

---

268. Creep is defined as the increase in strain under:
[Civil Er. 2068/11/09 Sanitary]

A. maximum stress
B. minimum stress
C. sustained stress
D. medium stress

Correct Answer: C

Explanation:

➤ Creep is the gradual increase in strain (deformation) under sustained stress over time.
➤ Critical in long-term structural behavior (e.g., bridges, high-rises).

---

269. The free moisture in the fine aggregate used in the concrete results in: [Civil Er. 2068/11/09 Sanitary]

A. increase in weight
B. decrease in weight
C. bulking of volume
D. dryness of concrete

Correct Answer: C

Explanation:

✔ Free moisture in fine aggregates (sand) causes bulking:

➤ Water forms a film around particles, increasing apparent volume.

➤ Impacts batching accuracy (must account for bulking in mix design).

---

270. The durability of concrete is proportional [Civil Er. 2068/11/09 Sanitary]

A. sand content
B. water cement ratio
C. aggregate ratio
D. cement aggregate ratio

Correct Answer: D

Explanation:

➤ Durability is inversely proportional to the water-cement ratio:

➤ Lower w/c ratio ? Denser, less permeable concrete ? Better resistance to weathering/chemicals.

---

271. The process of mixing, transporting, placing and compacting concrete using ordinary Portland cement should not take more than:
[Civil Er. 2068/11/09 Sanitary]

A. 30 minutes
B. 40 minutes
C. 60 minutes
D. 75 minutes

Correct Answer: A

Explanation:

✔ The total time for mixing, transporting, placing, and compacting ordinary Portland cement concrete should not exceed 30 minutes.

➤ Reason: After 30 minutes, initial setting begins, reducing workability and compromising bond strength.

➤ Exception: Retarders can extend this time, but the standard limit is 30 minutes.

---

272. If the slump of concrete mix is 60 mm, its workability is:
[Civil Er. 2068/11/09 Sanitary]

A. low
B. medium
C. high
D. very high

Correct Answer: B

Explanation:

✔ Slump Classification:

➤ 0–25 mm: Low (e.g., pavements).

➤ 50–100 mm: Medium (beams, slabs).

➤ 100–150 mm: High (pumped concrete).

➤ >150 mm: Very high (self-compacting concrete).

---

273. Plain cement concrete is strong in taking:
[Civil Er. 2068/11/09 Sanitary]

A. tensile stress
B. compressive stress
C. shear stress
D. all of the above

Correct Answer: B

Explanation:

✔Plain concrete is strong in compression but weak in:

➤Tension (requires reinforcement).

➤ Shear (depends on compressive strength).

---

274. The removal of excess air after placing concrete helps in increasing the strength of concrete by:
[Civil Er. 2068/11/09 Sanitary]

A. 15 to 20%
B. 20 to 30%
C. 30 to 50%
D. 50 to 70%

Correct Answer: C

Explanation:

✔Removing entrapped air (via vibration or rollers) increases density, boosting

strength by 15–20%.

➤ Mechanism: Fewer voids → Better particle bonding → Higher strength.

---

275. The function of aggregates in concrete is to serve as:

[Civil Er. 2068/11/09 Sanitary]

A. binding material
B. catalyst
C. filler
D. all of the above

Correct Answer: C

Explanation:

✔ Aggregates (60–75% of concrete volume) primarily act as:

➤ Filler: Reduce cost and shrinkage by displacing cement paste.

➤ Strength contributor: Provide bulk and load-bearing capacity.

---

276. Reduction in aggregate cement ratio while keeping W/C ratio constant causes:

[Civil Er. 2067/12/10]

A. decrease in workability.
B. workability is not affected
C. increase in workability
D. none of the above

Correct Answer: C

Explanation:

Decreasing aggregate cement ratio keeping water cement ratio constant means, only

aggregate is decreased due to which workability increases.

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277. Low water-cement ratio in concrete

[Civil Er. 2067/12/10]

A. increases the compressive strength
B. improves the frost-resistance of concrete
C. reduces the permeability of concrete
D. all of the above

Correct Answer: D

Explanation:

a) Increases compressive strength:

Less water reduces porosity, creating a denser matrix with stronger bonds between cement particles and aggregates.

b) Improves frost resistance:

Lower porosity minimizes water retention, reducing freeze-thaw damage (water expansion in pores causes cracking).

c) Reduces permeability:

Fewer capillary pores mean less water/chemical penetration, enhancing durability against corrosion and sulfate attack.

---

278. The concrete mix of grade M25 means that the compressive strength of 15 cm cubes at 28 days after mixing is

[Civil Er. 2067/12/10]

A. 15 N/mm2
B. 20 N/mm2
C. 25 N/mm2
D. 30 N/mm2

Correct Answer: C

Explanation:

✔ M25 denotes the characteristic compressive strength of concrete, measured as:

➤ 25 N/mm² (MPa) at 28 days, tested on 15 cm × 15 cm × 15 cm cubes.

---

279. The process of proper and accurate measurement of concrete ingredients for uniformity of proportion is known as: [Civil Er. 2067/12/10]

A. batching
B. grading
C. mixing
D. none of the above

Correct Answer: A

Explanation:

✔Batching refers to the process of measuring concrete ingredients (cement, sand, aggregate, water) accurately to ensure uniform proportions in the mix.

Methods:

➤Volume batching (using boxes, buckets) – Less precise.

➤Weight batching (using scales) – More accurate and preferred for quality control.

---

280. Modulus of rupture of concrete is a measure of:

[Civil Er. 2067/12/10]

A. flexural tensile strength
B. direct tensile strength
C. compressive strength
D. none the above

Correct Answer: A

Explanation:

➤ The modulus of rupture (MOR) measures the flexural tensile strength of concrete, i.e., its ability to resist bending or cracking under tensile stress.

✔ Test Method: Conducted via a third-point loading test on a concrete beam (as per ASTM C78 or IS 516).

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281. The concrete having a slump of 6.5 cm, is said to be:
[Civil Er. 2067/12/10]

A. dry
B. earth moist
C. semi plastic
D. plastic

Correct Answer: D

Explanation:

✔ Slump of 6.5 cm (65 mm) falls under the plastic consistency range for concrete workability.

✔Plastic mixes are highly workable and ideal for:

➤ Reinforced concrete (beams, slabs, columns).

➤ Pumped concrete.

---

282. Concrete gains strength due to:
[Civil Er. 2067/12/10]

A. chemical reaction of cement with sand and coarse aggregate
B. evaporation of water from concrete
C. hydration of cement
D. all the above

Correct Answer: C

Explanation:

➤ Primary Mechanism: Concrete gains strength through hydration of cement, a chemical reaction where cement particles react with water to form calcium silicate hydrate (C-S-H) gel and other compounds.

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283. Surface vibrator is effective only when the thickness of concrete does not exceed
[Civil Er. 2067/12/10]

A. 5 cm
B. 10 cm
C. 15 cm
D. 20 cm

Correct Answer: D

Explanation:

In construction, a surface vibrator is used to vibrate freshly poured concrete surfaces to ensure that the concrete settles properly, eliminating air pockets and ensuring a smooth, dense finish.
