

make concrete pervious and decreases its strength.

468. Fineness modulus is-

- (a) the ratio of fine aggregates to coarse aggregate
- (b) the ratio of fine aggregates to total aggregate
- (c) an index which gives the mean size of the aggregates used in a mix
- (d) None of the above

BPSC AE Pre 2018

Ans. (c) : Fineness modulus of sand (fine aggregate) is an index number which represents the mean size of the particles in sand. It is calculated by performing sieve analysis with standard sieves. The cumulative percentage retained on each sieve is added and divided by 100 gives the value of fineness modulus.

469. Which of the following tests is not a test for

c) Cement concrete
topping of thickness
25 mm

and below

471. If characteristic compressive strength at 28 days is 40 N/mm^2 and the standard deviation is 5 N/mm^2 , the target strength at 28 days for concrete mix proportioning

- (a) 40 N/mm^2 (b) 45 N/mm^2
(c) 43.25 N/mm^2 (d) 48.25 N/mm^2

APPSC AE 2016 (Mains)

Ans. (d) : The target mean strength is given as :

$$\begin{aligned} f_m &= f_{ck} + 1.65\sigma \\ &= 40 + 1.65 \times 5 \\ &= 48.25 \text{ N/mm}^2 \end{aligned}$$

Ans. (b) : Water-cement ratio is the ratio based on weight of materials to be used. It is defined as ratio of weight of water to weight of cement. Its minimum value should be 0.38.

477. The most commonly used admixture which increases the workability of concrete is called as

- (a) Plasticizers (b) Retarders
(c) Accelerators (d) Air entraining agents

TNPSC AE 2018

Ans. (a) : Admixture are added to concrete mix to modify one or more properties of the concrete. For eg.

(i) **Plasticizers:-** used to increase workability with decrease in water content therefore increasing compressive strength.

(ii) **Retarder:-** It delays the setting time of cement paste.

(iii) **Accelerators:-** It increases rate of hydration of cement, reduces the setting time eg. CaCl_2

(iv) **Air entraining agents:-** It causes air to be entrapped in form of tiny bubbles in mortar or concrete during mixing to increase workability and resistance to freezing and thawing eg. Aluminium powder.

By adding cement, sand and lime. High lime content in mortar leads to reduction in workability & less cohesion. Lime is added for economical purposes.

479. Which of the following coarse aggregate requires minimum cement paste?

- | | |
|-------------|---------------|
| (a) Rounded | (b) Irregular |
| (c) Angular | (d) Flaky |

[HPPSC AE 2016]

Ans. (a) : Rounded coarse aggregate have minimum surface area for given volume, hence they require least amount of cement paste.

crushed gravel sand.

482. Which of the following aggregate should not be used in the manufacture of concrete as it exhibits alkali-aggregate reaction ?

- | | |
|---------------|------------------|
| (a) Basalt | (b) Granite |
| (c) Limestone | (d) All of these |

Karnataka PSC AE 2015 Paper - II

Ans. (c) : The alkali-aggregate reaction (AAR) is the reaction between active silica constituents of the aggregate and alkalies, i.e. Na_2O and K_2O present in the cement.

The reactive forms of silica generally occur in the aggregates obtained from traps, opal lime, andesite, siliceous limestone and certain types of sandstones.

The lime stone (CaCO_3) exhibits alkali aggregate reaction in concrete.

| particle size.

~~487.~~ Which of the following grades of concrete is recommended by BIS for moderate exposure condition ?

(a) M10

(b) M15

(c) M20

(d) M25

GPSC AE Class (1&2) Paper - 2 2017
Rajasthan JEN (Degree) Shift - II 2016

Ans. (d) : According to BIS –
(Reinforced Concrete)

| S.N. | Conditions | Minimum Cement content Kg/m ³ | Maximum free water cement Ratio | Minimum Grade of Concrete |
|------|----------------|---|--|---------------------------------|
| 1 | Mild | 300 | 0.55 | M20 |
| 2 | Moderate | 300 | 0.50 | M25 |
| 3 | Severe | 320 | 0.45 | M30 |
| 4 | Very Severe | 340 | 0.45 | M35 |
| 5 | Extreme | 360 | 0.40 | M40 |

488 Which of the following shows a

489. Slump and compaction factor are two different measure of workability of concrete. For a slump of 0 to 20, what is the equivalent range of compaction factor?

(a) 0.4-0.7

(b) 0.7-0.9

(c) 0.7-0.8

(d) 0.6-0.8

JPSC AE (Pre) 2019

Ans. (c) : For slump value of 0 to 20, the CF would be 0.78 and workability is categorized as very low.

490. What is the amount of water required for a

So, water quantity = $0.60 \times 342.86 = 205.7 \text{ kg} = 205.7 \text{ liter}$

491. As per IS code of practice, concrete should be cured at :

(a) 35°C

(b) 25°C

(c) 27°C

(d) 50°C

JPSC AE (Pre) 2019

TSGENCO 2015

Ans. (c) : As per BIS (IS:516) the compressive strength of a concrete mix is determined by curing concrete cubes (150mm) for 28 days at temperature of $27^\circ\text{C} (\pm 2^\circ\text{C})$

492. The ratio of modulus of rupture to direct

~~499.~~ As per IS code provision the tolerance on placing of reinforcements in a structural member having effective depth more than 200 mm shall be :

(a) ± 20 mm

(b) ± 15 mm

(c) ± 10 mm

(d) ± 25 mm

Rajasthan JEN (Degree) 2016

Ans. (a) As per IS code provision the tolerance on placing of reinforcements in a structural member having effective depth more than 200 mm shall be ± 20 mm.

503. Match List-I (Admixtures) with List-II (Chemicals) and select the correct answer using the options given below:

List-I**List-II**

P. Water-reducing admixture

1. Sulphonated melanin formaldehyde

Q. Air-entraining agent

2. Calcium chloride

R. Super plasticizer

3. Lignosulphonate

S. Accelerator

4. Neutralized vinsol resin

- | | P | Q | R | S |
|-----|---|---|---|---|
| (a) | 2 | 4 | 1 | 3 |
| (b) | 1 | 3 | 4 | 2 |
| (c) | 3 | 4 | 1 | 2 |
| (d) | 3 | 4 | 2 | 1 |

GPSC AE (CLASS 1 & 2) 2019

Ans : (c) :

- Accelerator \rightarrow CaCl_2 (Calcium Chloride)
- Super plasticizers \rightarrow Sulphonated melanin, formaldehyde (It increases strength)
- Water reducer \rightarrow Lignosulphonate (It increases strength as water content is reduced)
- Air entrainment \rightarrow Neutralized Vinsol resin. It improves workability, durability & plasticity but reduces strength.

504. Why is super plasticizer added to concrete?

reduces strength.

504. Why is super plasticizer added to concrete?

- (i) To reduce the quantity of mixing water
 - (ii) To increase workability
 - (iii) To reduce the quantity of cement
 - (iv) To increase early age strength
- (a) (i) and (iv) (b) (i), (ii) and (iv)
(c) (iii) and (iv) (d) (i), (ii), (iii) and (iv)

GPSC AE (CLASS 1 & 2) 2019

Ans : (d) : Super plasticizer are which can reduce the water content as water/cement ratio remain same and can increase workability at same water/cement ratio and reduce cement and provide early strength.

A

M10 → Plinth & base of road

508. In which of the following, the concrete is dropped from a height to measure its workability

- (a) Slump Test (b) Vee Bee test
(c) Compaction factor test (d) Flow test

GPSC AE (CLASS 1 & 2) 2019

Ans : (c) : The concrete is dropped from a height to measure its workability in compaction factor test.

- Slump test → Very high to medium workability
- Compaction factor test → Medium to low workability

509 What is the most desirable form of coarse

interlocking both.

511. Consider the following strength of concrete:

- (i) Cube strength
- (ii) Cylinder strength
- (iii) Split-tensile strength
- (iv) Modulus of rupture

The correct sequence in increasing order of the strength is

- (a) (iii), (iv), (ii), (i)
- (b) (iv), (iii), (ii), (i)
- (c) (iii), (iv), (i), (ii)
- (d) (iv), (iii), (i), (ii)

GPSC AE (CLASS 1 & 2) 2019

Ans : (a) : Ratio of cylinder strength to cube strength is $0.77 - 0.96 \approx 0.85$

512 What kind of ...

Segregation → Stability of mix

518. If creep coefficient for concrete at 7 days is K_1 and 28 days is K_2 then

(a) $K_1 > K_2$

(b) $K_1 < K_2$

(c) $K_1 = K_2$

(d) $K_1 \leq K_2$

Gujarat PSC AE 2017

Ans : (a)

| Time | Creep coefficient |
|---------|-------------------|
| 7 days | 2.2 |
| 28 days | 1.6 |
| 1 year | 1.1 |

platforms etc.

520. The development of hair-like cracks usually in an irregular pattern caused by the shrinkage of concrete surface is called as

- | | |
|----------------|--------------|
| (a) Blistering | (b) Cracking |
| (c) Crazing | (d) Laitance |
| (e) Grinning | |

CGPSC AE 2014 Shift-I

Ans. (c) : Crazing in concrete is the development of a network of fine random crack's or fissures on the surface of concrete caused by shrinkage of the surface layer.

531. The ratio of compressive strength of fully saturated material to that of same material when dry is called—
(a) Load factor

- (b) Compaction factor
- (c) Coefficient of hardness
- (d) Coefficient of softening

Gujarat PSC AE (N.W.R.) 2020

Ans. (d) : The ratio of compressive strength of fully saturated material to that of same material when dry is called Coefficient of softening.

532 Aerated concrete is produced by addition of—

aluminum powder.

533. Which is the correct order for the given materials (samples 10 cm in height) in terms of their specific strength?

- (i) Concrete (25 MPa strength for 10 cm cube; Density 2.40 gm/cm^3)
 - (ii) Steel (250 MPa strength for 5 cm dia tube, 5 mm thickness; Density 7.85 gm/cm^3)
 - (iii) Bamboo (30 MPa strength for 5 cm dia pole, 5 mm thickness; Density 0.80 gm/cm^3)
 - (iv) Wood (20 MPa strength for 10 cm cube; Density 0.70 gm/cm^3)
- (a) Concrete > Steel > Bamboo > Wood
 - (b) Steel > Concrete > Wood > Bamboo
 - (c) Steel > Bamboo > Wood > Concrete
 - (d) Steel > Bamboo > Concrete > Wood

Gujarat PSC AE (N.W.R.) 2020

Ans. (c) : Correct order for the given material in terms of their specific strength.

Steel > Bamboo > wood > concrete specific strength
= $\frac{\text{compressive / tensile strength}}{\text{density}}$

535. Light weight concrete is also known as
- (a) low concrete
 - (b) lean concrete
 - (c) transparent concrete
 - (d) cellular concrete

Maharashtra PSC Paper-I 2012

Ans : (d) Low density cellular concrete also known as light weight cellular concrete.

536

is the quantity of cement required

when the water inside the concrete freezes and expanded so it is added to control expansion.

550. Choose the correct combination :

- | | |
|----------------|---------------------|
| 1. Retarder | P. Fly Ash |
| 2. Accelerator | Q. Superplasticizer |
| 3. Pozzolana | R. Gypsum |
| 4. Workability | S. Calcium chloride |
- (a) 1-R, 2-S, 3-P, 4-Q
(b) 1-S, 2-R, 3-P, 4-Q
(c) 1-R, 2-P, 3-S, 4-Q
(d) 1-R, 2-S, 3-Q, 4-P

KPSC AE 2020

Ans. (a) :

- | | |
|----------------|--------------------|
| 1. Retarder | → Gypsum |
| 2. Accelerator | → Calcium chloride |
| 3. Pozzolana | → Fly ash |
| 4. Workability | → Superplasticizer |

551 Grading of concrete is

(b) By the feeding arrangement to concrete in the
i.e. Tilting (T), Nontilting (NT) & Reversing (R)

555. The durability of concrete is proportional to :

- (a) Sand content
- (b) Water-cement-ratio
- (c) Cement-aggregate ratio
- (d) Aggregate-water ratio

Nagaland PSC CTSE 2017 Paper-I

Ans. (c) : Volume changes due to difference in thermal properties of Aggregate and cement paste.

556. The minimum ...

Ans. (d) : Consolidation of concrete should be done immediately after placing.

560. Segregation in concrete result in:

- (a) Surface scaling
- (b) Honey combing
- (c) All of the given options
- (d) Porous layer

DMRC AM 2017

Ans. (c) : Segregation in concrete result in :

- Honey combed concrete
- Porous layers in concrete
- Surface scaling in concrete.

Q. 564 (C)

564. The minimum cement content (kg/m^3) for a pre-specified strength of concrete (using standard notations) premised on 'free water-cement ratio' will be as

(a) $1 - \frac{C}{1000S_c} - \frac{W}{1000}$

(b) $\frac{\text{Water Content}}{\text{Water Cement ratio}}$

(c) $\text{Water Content} \times \text{Water Cement ratio}$

(d) $\frac{100F}{C + F}$

ESE 2019

Ans. (b)

$$\left[\text{Free-water-cement} = \frac{\text{Water Content}}{\text{Water Cement ratio}} \right]$$

565. Permeability in concrete is studied by using

irect

566. Which of the following methods will help in reducing segregation in concrete?

1. Not using vibrator to spread the concrete
 2. Reducing the continued vibration
 3. Improving the cohesion of a lean dry mix through addition of a further small quantity of water
- (a) 1, 2 and 3 (b) 1 and 2 only
(c) 1 and 3 only (d) 2 and 3 only

ESE 2019

Ans. (a) : Segregation can be reduced by preventing over-vibration, using good design mixes, avoiding dropping concrete from heights, avoiding excess water etc.

Continuous vibration increases the chances of segregation and in lean dry mix; small quantity of water can improve the cohesion among the ingredients because of which segregation chance reduces.

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567. In handling air-entraining admixtures the beneficial amount of entrained air depends upon certain factors like

1. Type and quantity of air-entraining agent
 2. Water-cement ratio of the mix
 3. Strength of aggregates
 4. Extent of compaction of concrete
- (a) 1, 2 and 3 only (b) 1, 2 and 4 only
(c) 1, 3 and 4 only (d) 1, 2, 3 and 4

ESE 2019

Ans. (b)

- The beneficial amount of entrained air depends on the workability requirement of the concrete mix.
- Air-entraining admixture cause small stable bubbles of air to form uniformly through a concrete mix.
- Entrained air depends upon certain factors like
 - Type and grading of aggregate.
 - Influence of compaction.
 - Type of cement.
 - Mixing time and temperature
 - Water cement ratio of the mix.

Strength of aggregates does not have any bearing on the workability of concrete.

2019

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571. Consider the following statements :

1. Rich mixes are less prone to bleeding than lean ones
2. Bleeding can be reduced by increasing the fineness of cement

Which of the above statements is/are correct?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

ESE 2018

Ans. (c)

- Use of more cement at the same water content rich mixes are formed, rich mixes bleed less than lean mixes.
- Bleeding is decreased by increasing the fineness of cement or adding calcium chloride to cement.
- Reduction in bleeding is obtained by the addition of pozzolans or of aluminium powder.

represented as a percentage of the amount method for saturation of the same temperature.

580 Which of the following tests compares the dynamic modulus of elasticity of samples of concrete?

- (a) Compression test
- (b) Ultrasonic pulse velocity test
- (c) Silt test
- (d) Tension test

ISRO Scientist/Engineer 2020

Ans. (b) : An Ultrasonic pulse velocity test is an in-situ, nondestructive test to check the quality of concrete and natural rock.

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2020

| | |
|-------------|---------|
| Medium sand | 2.6-2.9 |
| Coarse sand | 2.9-3.2 |

- 615.** The cement and water slurry coming on the top and setting on the surface is called :
- (a) Crazing (b) Efflorescence
(c) Sulphate deterioration (d) Laitance

ESE 2020

Ans. (d) : Concrete laitance is a layer of weak and non-durable cement and fine particles originated from aggregate. These materials are moved upward due to movement of moisture (bleeding) through concrete because of the presence of too much mixing water

Cause of concrete laitance

- Too much mixing water
- Over working or over manipulating concrete surface
- Improper finishing
- Job traffic
- Poor curing regime

616. Which of the following tests is used for

1. Slump cone test
2. Compaction factor test
3. Vee Bee consistometer test
4. Flow table test

617. Polymer concrete is most suitable for :

- (a) Sewage disposal works
- (b) Mass concreting works
- (c) Insulating exterior walls of an air-conditioned building
- (d) Road repair works

ESE 2020

Ans. (a) : Polymer cement concrete is a composite concrete that consists of synthetic polymer with in the binding material. Polymer concrete has advantages of higher properties, low energy requirements and low labour cost.

It is also called as Polymer Portland Cement Concrete (PPCC) or latex-modified concrete (LMC)

Uses of PPCC

- Helps in corrosion protection
- Used as repair material in old and new buildings
- Much useful where quick repair is required for heavy duty substrates such as bridge of heavy vehicle load.
- Used for making artificial stone tiles.

Thus, low permeability and corrosive resistance of the concrete makes it suitable in the construction of sewage disposal works.

618. For aggregate ratio of order of _____, the

generally higher than that of moist cured concrete.

625. The ratio of tensile strength to compressive strength of concrete is about

(a) $\frac{1}{10}$

(b) $\frac{1}{2}$

(c) $\frac{1}{20}$

(d) $\frac{1}{5}$

GPSC Poly. Tech. Lect. 2016

Ans. (a) : There is no standard linear ratio between tensile strength and compressive strength of concrete.

Tensile strength of concrete is $\frac{1}{10}$ of compressive strength of concrete. If we are using M20 then its compressive strength is 20 N/mm² and tensile strength is 2 N/mm².

626. Super-plasticizers are-

(a) Additives applied to bitumen to achieve a low melting point

(b) Water-reducing admixtures for concrete

increase.

628. To make one cubic meter of 1:2:4 by volume concrete, the volume of coarse aggregate required is

(a) 0.95 m^3

(b) 0.85 m^3

(c) 0.75 m^3

(d) 0.65 m^3

Punjab PSC Sub divisional Engineer 2014

TNPSC AE 2012

Ans. (b) : 1 m^3 of dry concrete = 1.54 m^3 of wet concrete

M15 = 1:2:4 = 1 + 2 + 4 = 7

$$\frac{\text{Dry volume of concrete}}{\text{Wet volume of concrete}} = 1.54$$

$$\text{Volume of cement} = 1.54 \times \frac{1}{7} \text{ m}^3$$

$$\text{Volume of cement} = 0.22 \text{ m}^3$$

$$\text{Volume of sand} = 1.54 \times \frac{2}{7} = 0.44 \text{ m}^3$$

$$\text{Volume of aggregate} = 1.54 \times \frac{4}{7} = 0.88 \text{ m}^3 \approx 0.85 \text{ m}^3$$

629 Tensile strength of concrete is _____

h
or
e:

638. Separation of water or water sand cement from
a freshly concrete is knows

(a) segregation

(b) flooding

(c) bleeding

(d) creeping

GWSSB AAE 2015

638. The stress strain curve of concrete in compression is obtained by testing the cylindrical specimen under
- (a) Uniform rate of strain
 - (b) Uniform rate of stress
 - (c) Constant stress condition
 - (d) Constant strain condition

GOA PSC Assistant Prof. 2020

Ans. (b) : The stress strain curve of concrete in compression is obtained by testing the cylindrical specimen under Uniform rate of stress.

655. If P, Y and Z are the weights of the cement, fine aggregates, and coarse aggregates respectively and W/C is the water cement ratio, the minimum quantity of water to be added to first batch, is obtained by the equation.

- (a) $0.1 P + 0.3 Y + 0.1 Z = (W/C) \times P$
- (b) $0.2 P + 0.5 Y + 0.1 Z = (W/C) \times P$
- (c) $0.3 P + 0.1 Y + 0.01 Z = (W/C) \times P$
- (d) $0.5 P + 0.3 Y + 0.01 Z = (W/C) \times P$

APPSC AEE 2012

Ans. (a) : The minimum quantity of water added to first batch = 10% of cement content + 30% of fine aggregate + 10% of coarse aggregate

$$(W/C) \times P = 0.1P + 0.3Y + 0.1Z$$

Where,

P = Weight of the cement

Y = Weight of the fine aggregates

Z = Weight of the coarse aggregates

656. A badly mixed cement concrete results in

FOR THE STRUCTURE ALSO.

662. In shotcreting, what is the purpose of accelerating chemical?

- (a) To adjust the workability of shotcrete
- (b) To accelerate the initial strength gain
- (c) To provide better finish to shotcrete
- (d) To improve the bonding between substrate and shotcrete

UPPCL AE 2015

Ans. (b) : The purpose of accelerating chemical in shotcreting is to accelerate the initial strength gain.

663. The batching accuracy (in %) of water used for mixing concrete should be within :

- (a) ± 2
- (b) ± 1
- (c) ± 5
- (d) ± 3

UPPCL AE 2015

Ans. (d) : The batching accuracy of aggregate, cement and water used for mixing of concrete should be $\pm 3\%$ and the admixture by 5% of the batch quantity.

664. A concrete pump of 1000

the plasticity is lost with time due to
loss of moisture due to evaporation.

673. The ratio of 28 days minimum compressive strength of mortar grade M1 to M2 is
- (a) 3.0 (b) 0.67
(c) 1.5 (d) 0.33

GPSC AE June 2019

Ans. (c) : As per IS 1905-1987 Table-1, the minimum 28 days compressive strength of mortar grade

$$M_1 = 3 \text{ N/mm}^2$$

$$M_2 = 2 \text{ N/mm}^2$$

So,
$$\frac{M_2}{M_1} = \frac{3}{2} = 1.5$$

674. For a concrete mix ratio of 1 : 2 : 4 the

~~685.~~ While testing the compressive strength of cement concrete, the correct standard conditions (viz temperature, age, humidity and size of the specimen) to be maintained as per IS are

- (a) $27 \pm 3^{\circ}\text{C}$, 28 days, 90% and 15 cm cube
- (b) $26 \pm 2^{\circ}\text{C}$, 28 days, 80% and 15 cm cube
- (c) $25 \pm 1^{\circ}\text{C}$, 14 days, 75% and 10 cm cube
- (d) $27 \pm 3^{\circ}\text{C}$, 7 days, 70% and 10 cm cube

GPSC AE Dec 2018

Ans. (a) : While testing the compressive strength of cement concrete, temperature = $27 \pm 3^{\circ}\text{C}$, age of testing = 28 days, humidity = 90%, size of cube specimen = $15\text{ cm} \times 15\text{ cm} \times 15\text{ cm}$

(3) Quality of concrete in relation to requirements.

693. Which of the following is not a property of high performance concrete?

- (a) High early strength
- (b) High abrasion resistant
- (c) High modulus of elasticity
- (d) High permeability

GPSC AE January 2018

698. The most undesirable properties of water used for making concrete of mortar are:

- ## GPSC AE January 2018

600 How are concrete mixers specified?

711. What is the limiting value of Los Angeles abrasion value (in%) for wearing courses when these aggregates are to be used for concrete making?

(a) 40

(b) 30

(c) 35

(d) 45

NPCC AE 2017

Ans. (b) : 30% is the limiting value of Los Angeles abrasion value for wearing courses when these aggregates are to be used for concrete making.

compressive strength of 5 MPa.

714. Vee-see time for low workability as per IS standard is

(a) 2-5 secs

(b) 5-10 secs

(c) 10-15 secs

(d) 15-20 secs

WBPSA AE 2014

Ans. (b) : Vee- see time for various workability as per IS standard is –

| | |
|---------------|-----------|
| Extremely low | > 20 sec |
| Very low | 12–20 sec |
| Low | 6– 12 sec |
| Medium | 3 – 6 sec |
| High | 0 – 3 sec |

715 Minimum thickness of lean concrete layer

721. An aggregate is said to be flaky; if its least dimension is less than

- (a) $\frac{3}{4}$ of mean dimension
- (b) $\frac{3}{5}$ of mean dimension
- (c) $\frac{2}{4}$ of mean dimension
- (d) $\frac{5}{8}$ of mean dimension

WBPSA AE (MCD) 1998

Ans. (b) : The least lateral dimension of flaky aggregate (thickness) should be less than 0.6 times the mean dimension or $\frac{3}{5}$ of mean dimension.

Flaky aggregate generally orient in one plane with water and air voids underneath.

723. Membrane curing of concrete is adopted

- (a) Indian climate
- (b) when time for curing is limited
- (c) when structure is heavily reinforced
- (d) when mass production is done in factories

WBPSA AE (Common) 1998

Ans. (a) : In membrane curing concrete layer is kept covered by a water proof membrane which is kept in contact with concrete for one week. The membrane prevents evaporation of water from concrete.

the seawater.

- 728.** Self-compacting concrete is characterized by
- (a) high powder component
 - (b) high water-powder ratio
 - (c) cementations materials upto 30%
 - (d) rough surface finish

Ans. (a) : Self-compacting concrete is characterized by its ability to flow into the formwork under its own weight and without segregating and high powder component.

Ans. (b) : The average specific gravity of coarse aggregate varies from 2.6 to 2.8

731. Ultrasonic Pulse Velocity Test to measure the strength of concrete is

- I. Used to obtain estimate of concrete strength of finished concrete elements.
- II. Used to measure strength of wet concrete

III. A non-destructive test.

Which of the above statement are correct?

- (a) I and III (b) II and III
(c) I and II (d) I, II and III

RPSC AE (GWD) 2014

Ans : (a) Ultrasonic Pulse Velocity Test–

1. A non-destructive test
2. The strength and quality of concrete or rock is assessed by measuring the velocity of an ultrasonic pulse passing through a concrete or natural rock formation.

6.

Timber and Wood Based Products

732. Dry Rot and Wet Rot are the

- (a) Defects of timber
(b) Disease of timber
(c) Characteristics of timber
(d) Structure of timber

RPSC A En. 2013

Ans : (b) Diseases of timber–

Dry Rot– It is decomposition of felled timber caused by the action of various fungi. The fungus reduces fibres to fine powder, and the timber loses its strength.

Wet Rot– When timber is subjected to alternate wet and dry conditions, decomposition of tissues takes place. This is not caused by fungal attack. In a living tree, it is set up by the access of water through wounds in the bark and causes the decomposition of sap and fibres of the tree.

733. Consider the following methods of preservation

735. Radial splits in timber originating from bark and narrowing towards the pith are known as-

Rajasthan VP ITI 2018

UKPSC(Urban engineering)-2011

OR

The radial splits which are wider on the outside of the log and narrower towards the pith are known as:-

- | | |
|------------------|----------------|
| (a) Heart shakes | (b) Cup shakes |
| (c) Star shakes | (d) Rind galls |

UKPSC A.E. Paper II - 2013

RPSC LECTURE - 2011

ESE 1999, 2012

Ans : (c) Star shakes are radial splits wider on the surface of tree and become narrower as they move towards centre. They are caused by severe frost or by severe heat of sun.

Heart shake Occurs in nearly all over natural timber, being more frequent in Hard woods than in conifers. Cup or ring shake result from the pulling a part of two or more growth rings, It is one of the most serious defects to which sound timber is subjected to as it reduces the Technical properties of wood.

736. Seasoning of timber

about 10 - 12%.

~~737.~~ The strength of timber is maximum in a direction-

- (a) parallel to grains
- (b) 45° to grain
- (c) perpendicular to grains
- (d) same in all directions

GPSC AE (CLASS 1 & 2) 2019

Punjab PSC Sub divisional Engineer 2014

UPPSC State Eng. A.E. 2011

UK Combined A.E. Paper 2007

ESE 1995, 2000, 2006

Ans : (a) The strength of timber is maximum when load applied is parallel to grain and it is minimum when load applied is perpendicular to grain.

in colour and heavy weight.

739. Timber can be made more fire resistant by-

- (a) dipping and steeping process
- (b) sir Abel's process
- (c) seasoning
- (d) hot and cold open tank treatment

JPSC AE (Pre) 2019

Haryana PSC AE 2017

Rajasthan AE (Nagar Nigam) 2016

UPPSC State Eng. A.E. 2003

ESE 2009, 2013

Ans : (b) Sir Abel's process is a method of making timber fire resistant in which timber surface is cleaned and is coated with a diluted solution of sodium silicate (Na_2SiO_3). After that a cream like paste of slaked lime is applied on it. Finally a concentrated solution of silicate of Soda is applied on timber surface.

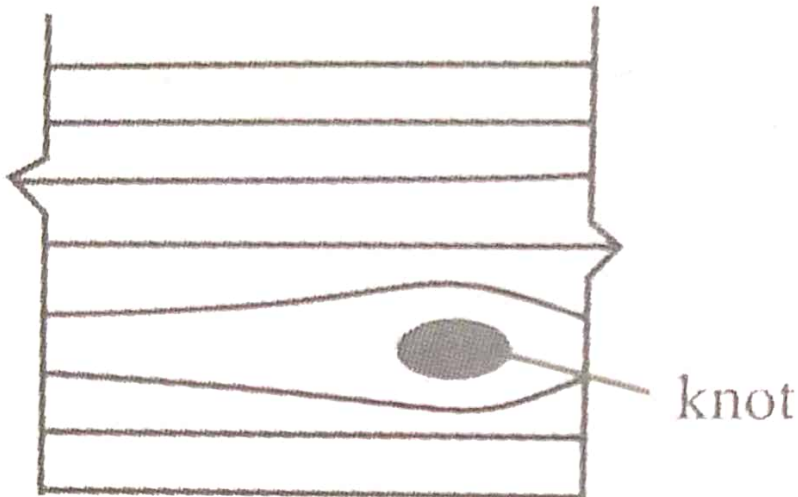
742. **Knots in timber are**

- (a) defects caused by crushing fibres
- (b) splits radiating from the centre
- (c) speckled stains
- (d) signs of branches cut-off

[Uttarakhand Combined State AE Paper II 2007]

Ans : (d)

- These are base of branches where fiber are interconnect.
- It is also developed when branches cut-off from timber.

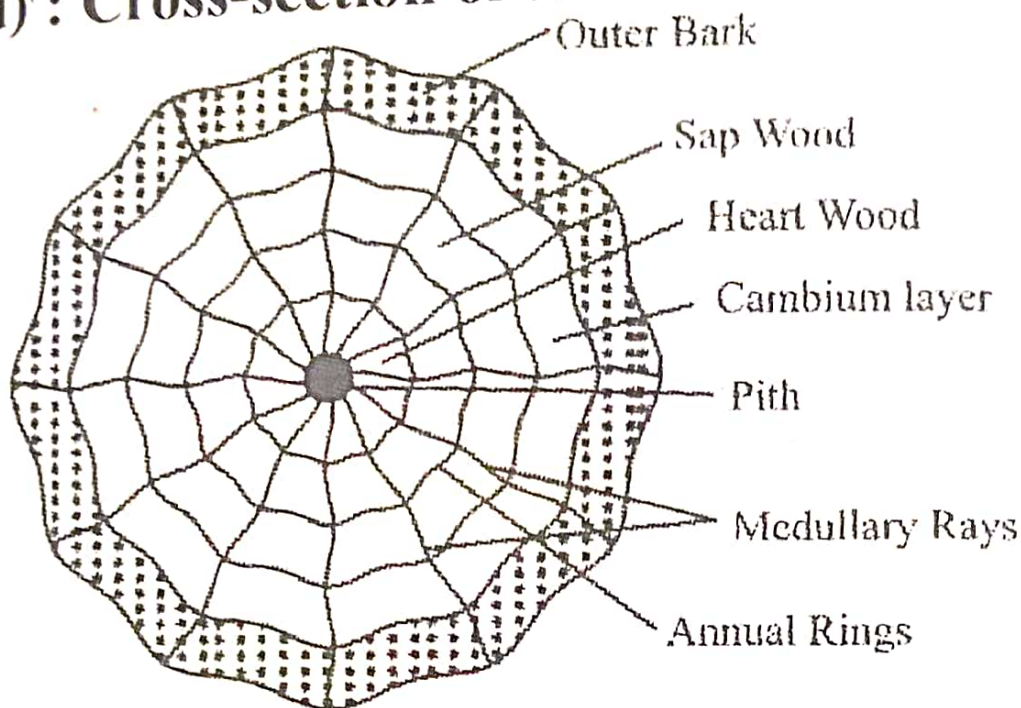


to direct shocks or impacts. ...
woods varies from 7 to 14 kg/cm².

744. A thin layer of fresh sap lying between sap wood and inner bark is :
- (a) Heart wood
 - (b) Pith
 - (c) Outer bark
 - (d) Cambium layer

LMRC AM 2018

Ans. (d) : Cross-section of a tree :



- (a) **Pith** : The innermost central portion or core of the tree is called the pith or medulla.
- (b) **Heart wood** : The inner annual rings surrounding the pith is known as heart wood. It is usually dark in colour.
- (c) **Outer bark** : It consists of cells of wood fibres.
- (d) **Cambium layer** : The thin layer of sap between sap wood and inner bark is known as cambium layer.

(iv) Structure - Resinous and split easily

747. A timber whose thickness is less 50 mm and breadth is greater than 150 mm is called :

- (a) balk
- (b) board
- (c) plank
- (d) batten

DMRC AM 2020

Ans. (b) :

(i) **Board** : Thickness is less than 50 mm and breath is greater than 150 mm.

(ii) **Balk** : Cross-section is greater than 50 mm \times 50 mm and length may be greater than 200 mm.

(iii) **Batten** : Thickness lies 50 to 100 mm and breadth lies 125 to 175 mm

(iv) **Plank** : Thickness is less than 50 mm an breadth is greater than 50 mm.

748. A long-sawn timber piece with parallel sides