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RSSB JE 2026

HYBRID TEST SERIES

SOLUTION

Paper ID

503

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॥ आपकी सफलता, हमारी प्रतिबद्धता ॥

1. Answer B

Solution

Paint mainly consists of pigment and vehicle. The vehicle is the liquid portion of paint in which the pigment is dispersed. It carries the pigment and helps the paint spread uniformly over the surface.

- Pigment: Provides colour and opacity.
- Vehicle: Liquid part of the paint; carries/binds the pigment.
- Solvent: Adjusts viscosity and improves workability.
- Drier: Accelerates the drying of paint.

2. Answer D

Solution

Water varnish is generally used for varnishing maps, pictures, photographs, and similar delicate surfaces. It provides a protective transparent coating without significantly affecting their appearance.

Hence, Water varnish is the correct answer.

3. Answer C

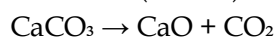
Solution

Ideally, the bedroom at south-west brings good health and prosperity for the home owner and enhances longevity.

4. Answer A

Solution

Statement 1 is correct. Quick lime (CaO) is obtained by the calcination of comparatively pure limestone (CaCO₃).



Statement 2 is incorrect. Lime that can set and harden under water is called hydraulic lime, not fat lime. Fat lime requires exposure to air for setting and does not set under water.

Hence, Statement 1 is correct and Statement 2 is incorrect.

5. Answer A

Solution

Statement I – Correct: The specific surface or fineness of cement can be determined by the Blaine air permeability method.

- Statement II – Correct: The Le Chatelier apparatus is used to determine the soundness of cement, particularly expansion due to excess free lime.

- Statement III – Incorrect: As per IS 269, the permissible insoluble residue for OPC is not 1.5%; the specified limit is higher than this value.

Reason: As per IS 269 : 2015, for Ordinary Portland Cement (OPC 33, 43 and 53 grades), the insoluble residue shall not be more than 5% by mass, not 1.5%. BIS specifically revised this requirement to maximum 5%.

6. Answer B

Solution

When the rise of an arch is more than the span, then the arch is called as venetian arch.

7. Answer B

Solution

- Statement I – Correct: Fine grinding increases the specific surface area of cement, resulting in faster hydration and hence higher early strength.
- Statement II – Incorrect: Decreasing the lime content does not increase early strength. Adequate lime is required for the formation of strength-producing compounds, particularly C₃S.
- Statement III – Correct: Burning the raw materials at a higher temperature promotes better clinker formation and the formation of C₃S (tricalcium silicate), which is mainly responsible for early strength.
- Statement IV – Incorrect: Gypsum is primarily added to control the setting time of cement. Increasing its quantity does not produce high early strength and excess gypsum may adversely affect cement properties.

Therefore, fine grinding and burning at higher temperatures contribute to high early strength.

8. Answer B

Solution

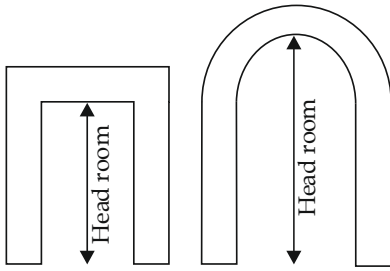
- Statement 1 – Correct: Hydration starts immediately when water comes in contact with cement particles. The cement compounds begin reacting with water and form hydration products.
- Statement 2 – Correct: Hydration of OPC is an exothermic reaction, which means heat is released during the chemical reaction between cement and water. This heat is called heat of hydration.

Therefore, both statements are correct.

9. Answer B

Solution

Arches require strong abutment (walls) to withstand the arch thrust.



10. Answer A

Solution

Approximate heat of hydration values are:

- $C_2S \approx 260 \text{ J/g}$ – Lowest
- $C_4AF \approx 420 \text{ J/g}$
- $C_3S \approx 500 \text{ J/g}$
- $C_3A \approx 865 \text{ J/g}$ – Highest

Therefore, increasing order of heat of hydration is:

$C_2S < C_4AF < C_3S < C_3A$

11. Answer D

Solution

The approximate percentage of major oxides in Ordinary Portland Cement is:

- Al_2O_3 (Alumina): 3–8%
- SiO_2 (Silica): 17–25%
- CaO (Lime): 60–65%

Therefore, in increasing order of percentage:

$Al_2O_3 < SiO_2 < CaO$

12. Answer B

Solution

The best and the common material to be used as damp-proofing material is bitumen because it is economical and easy to use.

13. Answer C

Solution

Statement (i) – True: Extrusive (volcanic) igneous rocks are formed when molten material reaches the Earth's surface and cools rapidly. Due to rapid cooling, these rocks generally have a fine-grained texture.

Statement (ii) – True: Plutonic (intrusive) igneous rocks are formed when large masses of magma cool and solidify slowly at considerable depths below the Earth's surface. Slow cooling allows the formation of large mineral crystals, producing a coarse-grained texture.

Therefore, both statements (i) and (ii) are true.

14. Answer C

Solution

- Pine wood: Its bulk density is approximately $500\text{--}600 \text{ kg/m}^3$.
- Granite: Being a dense natural stone, its bulk density is approximately $2500\text{--}2700 \text{ kg/m}^3$.
- Brick: The bulk density of common brick is approximately $1600\text{--}1800 \text{ kg/m}^3$.
- Sand: Its bulk density generally lies around $1450\text{--}1650 \text{ kg/m}^3$.

15. Answer A

Solution

Cork flooring ensure a near noiseless floor. Use in theaters and libraries.

16. Answer D

Solution

- Base : It forms the main body of paint and provides durability, hardness and protection to the painted surface.
- Vehicle : It acts as a carrier/binder for the pigment and facilitates the uniform spreading of paint over the surface.
- Solvent : It is used to adjust/reduce the viscosity of paint to obtain the required consistency for application.
- Pigment : It is primarily responsible for providing colour and opacity to the paint.

17. Answer D

Solution

- Alumina (20–30%): Provides plasticity to brick earth and makes moulding easier.
- Silica (50–60%): Prevents shrinkage, cracking and warping and gives strength to bricks.
- Oxides of iron (5–6%): Impart the characteristic red colour and contribute to hardness and strength.
- Alkalis (<10%): Present only in a small quantity; excess alkalis may cause efflorescence and deformation during burning.

18. Answer B

Solution

A roof laid at an angle of less than 10° to the horizontal is known as flat roof. It may be RCC, reinforced brick work or precast concrete. Flat roofs are useful at places where rain fall is moderate. For less rain fall.

19. Answer B

Solution

- Heart shakes : These develop between the annual rings and partially separate them.
- Ring shakes : These cracks spread from pith to sapwood, generally following the direction of medullary rays.
- Star shakes : These completely separate the annual rings.
- Cup shakes : These cracks extend from the outer/bark side towards the sapwood.

20. Answer C

Solution

- Bloating : Caused by the presence of excess carbonaceous matter and sulphur in brick clay, producing a spongy/swollen mass.
- Efflorescence : Caused by the presence of soluble alkaline salts (alkalis) in bricks.
- Chuffs : Caused when rainwater falls on hot bricks, resulting in deformation of their shape.
- Blisters : Blisters can be caused by air imprisoned during moulding.

21. Answer C

Solution

The pitch normally provided for conjugated galvanized iron (GI) sheet is 1/3 to 1/6.

22. Answer B

Solution

Metamorphic → Gneiss, Laterite, marble, murum, Quartzite, slate etc.

Igneous → Basalt, trap and granite.

Sedimentary → Kankar, chalk, limestone, sandstone, shale.

23. Answer C

Solution

- Marble : Ornamental work, flooring, etc.
Marble can take a good polish and has an attractive appearance; hence, it is widely used for ornamental works and flooring.
- Slate : Damp-proofing, flooring, roofing, etc.
Slate has low water absorption and can be split into thin sheets, making it suitable for roofing, flooring and damp-proofing.
- Limestone : Raw material for cement
Limestone is the principal calcareous raw material used in cement manufacture.
- Compact sandstone : Fire-resistant masonry

Compact sandstone has comparatively good fire resistance and is used for fire-resistant masonry.

24. Answer B

Solution

Float calculations in A-O-N networks is Same as A-O-A networks

25. Answer B

Solution

Steps of manufacturing of bricks.

Unsoiling → Digging → Weathering → Blending → Tempering

26. Answer A

Solution

Tolerance in width = ± 3 mm

Tolerance in length = ± 6 mm

To check the tolerance limit of brick, we follow dimension test which is given in IS 1077: 20 bricks are randomly selected of standard size of good quality.

27. Answer C

Solution

$$\text{Cost slope} = \frac{\text{Crash cost} - \text{Normal cost}}{\text{Normal time} - \text{Crash time}}$$

28. Answer A

Solution

- Portland pozzolana cement Requires longer curing time than Ordinary Portland cement.
- Sulphate-resisting Portland cement - Ordinary Portland cement with less than 5% tricalcium aluminate.
- Portland slag cement - Contains 25 to 60% slag which offers good sulphate resistance.
- Hydrophobic cement has characteristic as grinding the clinkers with oleic acid.

29. Answer A

Solution

- Lime : Imparts strength
Lime is the principal constituent of cement and contributes mainly to strength.
- Alkalis : Cause efflorescence and staining
Excess alkalis may lead to efflorescence and staining.
- Alumina : Influences setting property
Alumina helps in quick setting of cement.
- Iron oxide : Imparts colour
Iron oxide gives cement its greyish colour and also assists in clinker formation



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30. Answer A

Solution

$$F_{ID} = (EST)_{10} - (LFT)_3 - t_{ij} = 40 - 25 - 10 = 5$$

31. Answer A

Solution

Timber have greater strength along direction parallel to grain and much weaker along direction perpendicular to grain. Ratio of modulus of elasticity in a direction perpendicular to the grain to that in direction parallel to the grain is in

$$\text{between } \frac{1}{20} \text{ to } \frac{1}{12}$$

32. Answer C

Solution

$$Z = \frac{T_s - T_E}{\sigma}$$

$$1.647 = \frac{T_s - 60}{3}$$

$$T_s = 64.94$$

33. Answer A

Solution

IS: 1708-1969= Method of testing of small specimen of timber.

IS: 1141-1958- Classification of timber for seasoning purpose.

IS: 399-1963 Classification of commercial timbers and their zonal distribution.

IS: 4970-1973 = Key for identification of commercial timber

34. Answer A

Solution

Grinning is due to the imperfect opacity of the paint film even after the final coat. The background and its defects can be clearly visible in such a case.

35. Answer B

Solution

Contractor	Variation $\sigma^2 = \left(\frac{t_p - t_0}{6} \right)^2$
P	1.778
Q	1
R	2.25
S	2.25

Contractor Q is more certain as its variance is minimum.

36. Answer C

Solution

Mastic asphalt is used in water proofing because it can be used at any surface and having long lasting protection. Mastic asphalt is easy to use

37. Answer C

Solution

Bullet proof glass is made of thick glass sheet sandwiched by a layer of vinyl plastic.

38. Answer A

Solution

- Dumper is explicitly categorized under transporting equipment.
- Skimmer, Dipper shovel, Clam shell are classified under excavating equipment.

39. Answer D

Solution

Example of thermoplastics-

- (i) PVC (ii) Polyethylene
- (iii) Polystyrene (iv) Polyvinyl Acetate

Example of thermo settings-

- (i) Bakelite (ii) Epoxy
- (iii) Melamine (iv) Polyester

40. Answer C

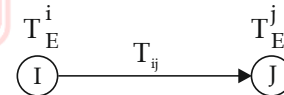
Solution

The temperature range in a cement kiln is 1300°C to 1500°C.

41. Answer C

Solution

Total float :



$$EST = T_E^i, EFT = T_E^i + T_{ij}$$

$$LST = T_L^j - T_{ij}, LFT = T_L^j$$

- Float is difference between maximum time available and actual time required for the completion of the activity.
- $FT = (\text{Maximum available time}) - (\text{Actual time required})$
- Maximum available time we can get when activity starts at earliest start time and finish by latest finish time i.e.,
- Maximum available time = $LFT - EST$
- Actual time required for performing an activity is the estimated activity time t_{ij}

$$F_T = LFT - EST - T_{ij}$$

$$F_T = T_L^j - t_E^i - t_{ij}$$

$$F_T = (T_L^j - t_{ij}) - t_E^i$$

$$F_T = LST - EST$$

Or

$$F_T = T_L^i - (T_E^i + t_{ij})$$

$$F_T = LFT - EFT$$

42. Answer A

Solution

As per IS 4031 (Part 6) 1988 mould size should be 70.6 mm. (7.06 cm cube) conforming to IS 1008 : 1982.

43. Answer D

Solution

1 bage cement = 0.035 m³

Density of cement = 1440 kg/m³

1 m³ - 1440 kg

0.035 m³ - 1440 × 0.035 = 50.4 kg cement in each bag.

1000

Number of bag in 1 tonnes = $\frac{1000}{50.4} = 19.84$

= 20 bag

44. Answer B

Solution

Critical path is shortest duration needed and longest duration permissible. Critical path method does not take resources limitations into account.

45. Answer D

Solution

According to IS 4031 Part-5. The initial setting time test is conducted on cement by gauging the cement with 0.85 times the water required to give a paste of normal consistency.

46. Answer C

Solution

Property of cement	Apparatus
Specific gravity	Le - chatelier's flask
Setting time	Vicat's appartus
Soundness	(a) Le-chatelier method (b) Autoclave method
Finesses	(a) Sieve method do (b) Air - permeability method (Nurse and Blaine's method) (c) Wagner turbidimeter test

47. Answer B

Solution

- In the resource levelling process activities are rescheduled such that maximum demand of resources requirement does not exceed the limit of availability of resources.

- During this process at first re-arrangement of activities having floats is done. Even if by doing so, resource requirement is more than availability of resources, then duration of some activities is increased such that resource requirement of these activities is reduced. Hence project duration might get increased during the process of resource levelling.

48. Answer A

Solution

According to IS 1077-1992 Cl 7.2 water absorption shall not be more than 20% by weight upto class 12.5 and 15% by weight for higher class.

49. Answer D

Solution

- Common building bricks shall have a minimum crushing strength of 35 kg/cm² when tested as per IS 1077.
- The size of modular brick including mortar is 20×10×10cm³.

50. Answer A

Solution

Tower crane- High industrial plant

Floating crane - Hydraulic structure

Mobile crane - Railway electrification

Gantry crane- Longitudinal and lateral movement of load.

51. Answer A

Solution

The maximum bulking of sand is likely to occur at a moisture content of 5%.

Moisture%	%Bulking		
	Fine sand	Medium sand	Coarse sand
1	16	8	6
2	26	16	12
3	32	22	15
4	36	27	17
5	38	29	18
6	37	28	18
8	35	26	16
10	32	22	12
12	28	19	8
15	22	12	2
17	18	7	0
20	9	0	0
27	0	0	0

52. **Answer A**

Solution

English bond is more compact and is stronger and hence provided for heavy load on masonry.

53. **Answer D**

Solution

- Crawler mounted bulldozer weight is less in comparison of wheel mounted bulldozer.
- It is efficient to drive on rough surface.

54. **Answer B**

Solution

Cambium layer in timber is between inner bark and sap wood. Heartwood is dead portion of tree and does not take part in the tree growth. Heartwood is used for all engineering works.

55. **Answer C**

Solution

- Statement 1 – Correct: The initial setting time of OPC should not be less than 30 minutes.
- Statement 2 – Correct: The final setting time of OPC should not be more than 600 minutes (10 hours).
- Statement 3 – Incorrect: Normal consistency of OPC is not 10%. It is generally around 26–30% water by mass of cement and is determined experimentally using the Vicat apparatus.

56. **Answer C**

Solution

Silent features about bar chart:

- (1) Simple to draw and easy to understand
- (2) No trained/skill personnel required to draw bar chart.
- (3) Progress achieved at site can be expressed in terms of percentage.
- (4) It does not show interdependencies among activities
- (5) It does not depicts critical and non critical activities.
- (6) It does not enables crashing i.e. cost optimization.

57. **Answer D**

Solution

- Pozzolana has no cementing value itself but has property of combining with lime to produce a stable lime-pozzolana compound which has definite cementitious properties.

- Free lime is thus removed and resistance to chemical attack increase. It has low heat evolution, used in places of mass concrete such as dams.

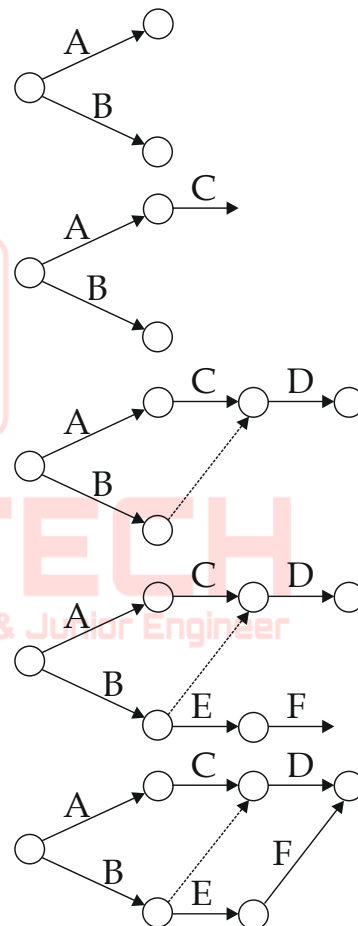
58. **Answer A**

Solution

Calcium chloride acts as an acclerator which increases the rate of hydration reaction in cement that is why its use in slow hardening cement proves more effective than in rapid hardening cement which already have high rate of reaction.

59. **Answer B**

Solution



60. **Answer A**

Solution

The dry rot occurs where there is no free circulation of air. The other causes are unseasoned wood and improper storage. The most favourable conditions for the rapid growth of fungus responsible for dry rot are absence of sunlight, dampness, presence of sap, stagnant air and warmth. Therefore lack of ventilation is the best choice.

61. Answer A

Solution

Dimensional changes in wood occurs due to variation in the moisture content of the wood with atmospheric condition. Any drying of wood below the fibre saturation point result in shrinkage. If a dry piece of timber is kept in saturated atmosphere timber absorbs water from air up to about 15% of its weight. This water goes into the cell walls which tend to swell up.

62. Answer B

Solution

- In PERT analysis time estimates of activities follow β distribution.
- As there is not much information about the activities the 3 time estimates are taken which can be left skewed or right skewed.

63. Answer A

Solution

Coniferous trees have distinct annular rings and straight grains which makes them suitable for tension member.

64. Answer B

Solution

- The actual (standard modular) size of a brick is: $190 \text{ mm} \times 90 \text{ mm} \times 90 \text{ mm} = 19 \text{ cm} \times 9 \text{ cm} \times 9 \text{ cm}$
- When the 10 mm mortar joint is included, its nominal size becomes: $200 \text{ mm} \times 100 \text{ mm} \times 100 \text{ mm} = 20 \text{ cm} \times 10 \text{ cm} \times 10 \text{ cm}$

Hence, the standard actual size of brick is $19 \text{ cm} \times 9 \text{ cm} \times 9 \text{ cm}$.

65. Answer A

Solution

- PERT do not consider resource availability.
- In CPM, to calculate activity time, total cost of each activity is considered
- WBS is a deliverable oriented grouping of project elements that organizes and defines the total scope of the project.
- For interfaces, the senior managements involvement is considered to decide the target dates.

66. Answer A

Solution

Assertion (A) – True:

Efflorescence appears as a white crystalline deposit on the surface of brickwork. It occurs when water dissolves soluble salts present in bricks or mortar, carries them to the surface, and then evaporates, leaving the salts behind.

Reason (R) – True:

Burnt clay bricks may contain soluble salts, particularly sulphates of sodium, potassium, magnesium and calcium.

These soluble salts are responsible for the formation of efflorescence during cycles of wetting and drying.

Therefore, both Assertion and Reason are true, and Reason correctly explains the Assertion.

67. Answer D

Solution

The strength of brick masonry is dependent both on the type of mortar and brick.

68. Answer D

Solution

The test before which consistency test is required are:

- Initial and final setting time tests at water content 0.85P.
- Compressive strength test at water content of combined weight of 1 : 3 cement and Ennore (standard) sand mix.
- Sound test by Le Chatelier apparatus at 0.78P for free lime soundness.

69. Answer B

Solution

Thermoplastic is a polymer which becomes pliable or mouldable above a specific temperature and returns to a solid state upon cooling.

70. Answer A

Solution

- Standards are the vertical members of scaffolding.
- Ledgers are the horizontal members at right angle to the standard and parallel to the wall braces are fixed diagonally on the standards putlogs are placed on the horizontal member (i.e. ledgers) at right angle to the walls, one end of which is held in wall.

71. Answer D

Solution

Weight and strength properties of timber are greatly influenced by moisture content. Therefore the strength values and weight obtained are usually standardized at 12% moisture content.

72. Answer C

Solution

As per NBC 2005, buildings are classified in 9 groups-

- | | |
|------------------|----------------|
| A. Residential | B. Educational |
| C. Institutional | D. Assembly |
| G. Industrial | E. Business |
| H. Storage | F. Mercantile |
| I. Hazardous | |

73. Answer : C

Solution

Shoring : A temporary structure to support unsafe structure during repairs

Scaffolding : A temporary structure used to support a work; crew and material to aid in the construction, maintenance and repairs of building, bridges and all other non-made structure.

Underpinning : A process of strengthening of foundation of newly structure or existing structure.

74. Answer A

Solution

Blast furnace slag composition

CaO	:	42.4%
SiO ₂	:	32.3%
Al ₂ O ₃	:	13.3%
Fe ₂ O ₃	:	0.3%
MgO	:	6.4%
SO ₃	:	2.1%

75. Answer C

Solution

Cornice- It is any horizontal decorative molding which is provided at the junction of wall and ceiling or any two horizontal structure.

Coping- It is a covering of stone, concrete, brick or terracotta placed on the expose top of wall to prevent seepage of water.

Parapet- It is barrier which is an extension of the wall at edge of roof terrace, balcony walkway or other structure

76. Answer B

Solution

1. Compressive strength of brick: It depends upon composition of clay and burning. According to I.S. Code compressive strength of brick should not be less than 35 kg/cm².
2. Modulus of rupture or flexural strength: Brick should have ability to resist bending.
3. Fire resistance: A good brick should be able to withstand temperature up to 1500°F or 816°C.

77. Answer A

Solution

Dormer window-Vertical window provides on sloping roof such window provides ventilation lighting to the enclosed space, below the roof and at the same time improve the appearance of the building.

78. Answer C

Solution

Most of the stones possess the specific gravity in the range of 2.4 to 2.8

79. Answer D

Solution

Operational classification of door-

- Swinging door are shutters are hung to door frame on hinges fixed to one side of shutter, so the swing on vertical axis.
- Folding or Accordion door are used singly or as folding. Partitions so that two room may be used together as a single room or separately at top guide at bottom.
- Glaze is a type of panel which can be used in any type of door.

80. Answer C

Solution

The specific gravity of commonly available OPC is 3.15