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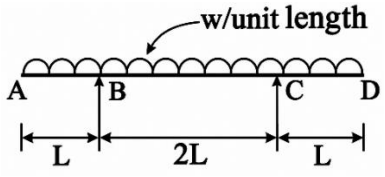
|| आपकी सफलता, हमारी प्रतिबद्धता ||

1. Answer B
Solution
Vicat apparatus is used for determining the Normal Consistency, Initial Setting Time and Final Setting Time of cement.
Fineness of cement is determined using Sieve Method and Blaine's Air. (Permeability Test.)

2. Answer B
Solution
Addition of stone powder is done in self-compacting concrete to decrease the effects of segregation.

3. Answer B
Solution
(i) are endogenous trees — Incorrect: Conifers are exogenous trees (they grow outward by adding annual rings). Endogenous trees (such as bamboo, palm, and cane) grow inward.
(ii) grow outwards — Correct: Exogenous trees like conifers increase in bulk and diameter by adding new layers of wood outward beneath the bark.
(iii) have pointed needle like leaves — Correct: Conifers are characterized by acicular, needle-like or scale-like leaves that help minimize water loss.

4. Answer A
Solution
As per IS 1077 (Common Burnt Clay Building Bricks — Specification), bricks are classified into different classes (such as Class 3.5, 5, 7.5, 10, 12.5, 15, 17.5, 20, 25, 30 and 35) solely on the basis of their average compressive strength (minimum values in N/mm^2).
Water absorption and dimensional tolerances are specified as physical/quality requirements that the bricks of a given class must satisfy (limits on absorption typically $\leq$20% by mass after 24-hour immersion for most classes, with some variation; dimensional tolerances of the order of ±3% or as tabulated for length, width and height). These are acceptance criteria rather than the basis used to designate the class itself.
(The older informal "first/second/third class" grading used on sites considers appearance, soundness, etc., but the formal IS classification is strength-based.)
Thus only statement (i) is correct.

5. Answer A
Solution


Due to symmetry,
$R_B = 2W \times L$
$R_C = 2W \times L$
B.M at centre
$M = 1 \times W2L \times L - 1 \times W2L \times L = 0$

6. Answer A
Solution
Dungarpur and Banswara are part of the middle Mahi basin.
डूँगरपुर और बाँसवाड़ा मध्य-माही बेसिन के भाग हैं।

7. Answer C
Solution
Near Sendra station, located in Pali district, one finds a diversity of serpentine rock formations.
पाली जिले में स्थित सेन्दड़ा स्टेशन के पास सर्पाकार चट्टानों की आकृति में विविधता पाई जाती है।

8. Answer D
Solution
It enters Rajasthan and flows through Hanumangarh, Talwara, Anupgarh, and Suratgarh.
The Ghaggar River crosses the international border from the Sri Ganganagar district, and upon reaching Pakistan—near the city of Fort Abbas—it becomes known as the Hakra. The river eventually enters the Bahawalpur district of Pakistan, where it disappears into the sand dunes.
It is situated within the Ganganagar and Hanumangarh districts of Rajasthan, as the Ghaggar basin spans across Ganganagar (60.62%) and Hanumangarh (39.38%).
यह राजस्थान में प्रवेश करती है और हनुमानगढ़, तलवाड़ा, अनूपगढ़ और सूरतगढ़ से होकर बहती है।
घग्गर नदी श्री गंगानगर जिले से अंतर्राष्ट्रीय सीमा पार करती है और पाकिस्तान में फोर्ट अब्बास शहर के पास इसका नाम हकरा हो जाता है। यह नदी आखिरकार पाकिस्तान के बहावलपुर जिले में प्रवेश करती है जहाँ यह रेत के टीलों में खो जाती है।
यह राजस्थान के गंगानगर और हनुमानगढ़ जिलों में स्थित है क्योंकि घग्गर बेसिन गंगानगर (60.62%) और हनुमानगढ़ (39.38%) में पड़ता है।

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9. Answer C
Solution
'Kartik heat' occurs due to a sharp rise in temperature during the withdrawal of the monsoon; it typically takes place in the month of October.
कार्तिक हीट मानसून निवर्तन के समय तापमान में तेजी से वृद्धि के कारण उत्पन्न होती है। जिसका समय अक्टूबर माह होता है।

10. Answer A
Solution
Aridisols—
Arid / Sandy
Found in arid climates
The second most prevalent soil type
Suborders / Subgroups— Camborthids, Calcorthids, Salorthids, and Paleorthids
Distribution: Jalore, Pali, Churu, Jhunjhunu, Sikar, Jodhpur, Nagaur
एरीडीसॉल-
शुष्क / बलुई
शुष्क जलवायु में
दूसरी सबसे ज्यादा पायी जाने वाली मृदा
उपवर्ग / उपसमूह- केम्बो ऑर्थिड्स, कैल्सी ऑर्थोड्स, सेलोथिड्स और पेली ऑर्थीड्स
विस्तार:-जालौर, पाली, चुरू, झुन्झुनूं, सीकर, जोधपुर, नागौर

11. Answer D
Solution
The shear stress developed at free end i.e., at A is zero.

12. Answer B
Solution
D_{se} =r – 3
= (2 + 1) – 3 = 0
D_{si} = 3 × c
C : number of closed loops
= 3 × 4 = 12
Force releases = – 3
Static indeterminacy (D_s) = 0 + 12 – 3 = 9

13. Answer B
Solution
$$\tan\theta = \frac{L}{L}$$
$$\therefore \theta = 45°$$
$$\therefore \sin\theta = \cos\theta = \frac{1}{\sqrt{2}}$$
At joint B, $\Sigma F_y = 0$
W=F_{AB} × sin45°
$$W\sqrt{2} = F_{AB}$$
$$F_{AB} = W\sqrt{2}$$ (tension)

14. Answer C
Solution
Distribution of moments.
$$M_{OA} : M_{OB} : M_{OC} : M_{OD}$$
$$\frac{4EI}{L_1} : \frac{3EI}{L_2} : \frac{3EI}{L_3} : 0$$
$$\frac{4EI}{2L} : \frac{3EI}{L} : \frac{3EI}{L} : 0$$
$$2 : 3 : 3 : 0$$

15. Answer D
Solution
Given:
Average load acting, f_m = 20 kN/m
Standard deviation, $\sigma = 2.3$
Characteristic load, $f_{ck} = f_m + 1.645 \times \sigma$
$= 20 + 1.645 \times 2.3 = 23.8\,kN/m$

16. Answer B
Solution
b = 300 mm
D = 600 mm
f_{ck} = 20 N/mm^2
f_y = 415 N/mm^2
$f_{cr} = 0.7\sqrt{f_{ck}} = 0.7\sqrt{20} = 3.13\,MPa$
Cracking moment $M = \frac{f_{cr}}{y_t} I_{gg}$
$$= \frac{3.13}{\left(\frac{600}{2}\right)} \times \left(\frac{300 \times 600^3}{12}\right)$$
$$= 56.3\,kN-m$$

17. Answer D
Solution
(i) Overloading of end bolts: In a long bolted joint, the shear force is not distributed equally among all bolts. The end bolts carry a disproportionately higher share of the load compared to the inner bolts, making them prone to early failure.
(ii) Large grip length of bolts: When the grip length (total thickness of connected plates) becomes very large, the bolts undergo significant bending stresses in addition to direct shear. This reduces their overall shear capacity.
(iii) Packing plates in excess of 6 mm: If packing plates thicker than 6 mm are introduced in a joint, the eccentricity of the load increases. This introduces additional bending and prying moments, which directly reduces the shear strength of the bolts.

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18. Answer D

Solution

Expected Time (t_e): In Project Evaluation and Review Technique (PERT) analysis, the duration of an individual activity follows a Beta distribution. The expected time represents the mean (average) of this distribution. By standard textbook convention in civil engineering and project management, the vertical ordinate drawn through the expected time is considered to divide the total area under the probability density curve into two equal halves (each representing 50% probability).

Most Likely Time (t_m): This represents the mode (the highest peak of the curve). It only divides the area equally if the distribution is perfectly symmetrical.

Optimistic (t_o) and Pessimistic (t_p) Times: These represent the extreme lower and upper bounds of the activity duration, respectively

19. Answer A

Solution

Latest Start Time (LST) of an activity is calculated as its Latest Finish Time (LFT) minus its duration (t_{ij}).

During the backward pass in Critical Path Method (CPM) network analysis, the LST is determined by taking into account the latest finish times and the maximum constraints from succeeding nodes or preceding nodes, making the LST always greater than or equal to the latest event time of the preceding node (tail event

20. Answer A

Solution

Located in the north-western part of Rajasthan, this region relies heavily on irrigation.

Region: Sri Ganganagar, Hanumangarh, and Bikaner

राजस्थान के उत्तर – पश्चिमी भाग में स्थित है इस क्षेत्र में सिंचाई की प्रमुख भूमिका है।

क्षेत्र : श्रीगंगानगर, हनुमानगढ़ और बीकानेर

21. Answer B

Solution

Buffaloes – Murrah, Mehsana, Surti, Bhadawari, and Jafarabadi

Sheep – Chokla, Magra, Jaisalmeri, Nali, Pugal, Marwari, Malpura, Sonadi/Chanothar, and Kheri

Goats – Jamnapuri, Barwari, Parbatsari, Jhakhrana, Marwari, Lohi, Shekhawati, and Sirohi

Camels – Bikaneri, Jaisalmeri, Nachna, Gomth, Jodhpuri, Kachhi, Mewari, Kerupal, and Alwari

भैंस - मुर्राह, मेहसाना, सुरती, भदावरी और जाफराबादी

भेड़ - चौकला, मगरा, जैसलमेरी, नाली, पूगल, मारवाड़ी, मालपुरा, सोनाड़ी / चनोथर, खेरी

बकरियाँ - जमनापुरी, बड़वारी, परबतसरी, झखराना, मारवाड़ी, लोही, शेखावाटी और सिरोही

ऊँट - बीकानेरी, जैसलमेरी, नाचना, गोमठ, जोधपुरी, कच्छी, मेवाड़ी, केरुपाल और अलवरी

22. Answer C

Solution

Geo-Heritage Sites – 12 locations in Rajasthan have been declared as Geo-Heritage Sites by the Geological Survey of India. These are:

1. Ramgarh Meteorite Crater – Ramgarh (Baran)
2. Zawar (Udaipur)
3. Great Boundary Fault, Satur (Bundi)
4. Stromatolites, Jhamar Kotra (Udaipur)
5. Stromatolites, Bhojunda (Chittorgarh)
6. Jodhpur Malani Group Igneous Rocks (Jodhpur)
7. Akal Wood Fossil Park (Jaisalmer)
8. Gosunda – Rajpura Dariba (Rajsamand)
9. Nepheline Syenite (Kishangarh)
10. Welded Tuff (Jodhpur)
11. Sendra Granite (Pali)
12. Bar Conglomerate (Sedimentary Rocks), Pali

जियो हेरिटेज साइट (Geo-Heritage Site)- राजस्थान के 12 स्थलों को भारतीय भू-वैज्ञानिक सर्वेक्षण विभाग में जियो हेरिटेज साइट घोषित किया गया है, ये है-

1. रामगढ़ उल्कापिण्ड क्रेटर-रामगढ़ (बारां)
2. जावर (उदयपुर)
3. ग्रेट बाउण्ड्री फाल्ट, सातूर (बूंदी)
4. स्ट्रोमेटोलाईट, झामर कोटड़ा (उदयपुर)
5. स्ट्रोमेटोलाईट, भोजुण्डा (चित्तौड़गढ़)
6. जोधपुर मालानी ग्रुप आग्नेय चट्टाने (जोधपुर)
7. आकल वुड फॉसिल पार्क (जैसलमेर)
8. गोसाग राजपुरा दरीबा (राजसमंद)
9. नेफलाइन साइनाइट (किशनगढ़)
10. वेल्डेड टफ (जोधपुर)
11. सेंदड़ा ग्रेनाइट (पाली)
12. बर कांग्लोमेरेट (अवसादी चट्टानें), पाली

23. Answer A
Solution
Both A and R are correct, and R is the correct explanation of A.
A और R दोनों सही है और R, A की सही व्याख्या है।

24. Answer A
Solution
The Desert Development Programme was first initiated in 1977–78. It was a major programme implemented by the Ministry of Rural Development, Government of India.
Objectives: Controlling desertification, reclaiming land in arid regions (such as the Thar Desert), enhancing livelihood opportunities, and preventing environmental imbalance.
राष्ट्रीय मरुस्थल विकास कार्यक्रम पहली बार 1977-78 में प्रारंभ किया गया था। यह ग्रामीण विकास मंत्रालय, भारत सरकार द्वारा चलाया गया एक प्रमुख कार्यक्रम था।
उद्देश्य : मरुस्थलीकरण पर नियंत्रण, थार जैसे शुष्क क्षेत्रों में भूमि का सुधार, आजीविका के अवसर बढ़ाना, पर्यावरणीय असंतुलन को रोकना

25. Answer A
Solution
The head loss for sudden expansion is

$$h_{L,exp} = \frac{(U_1 - U_2)^2}{2g} \text{ but } A_1U_1 = A_2U_2$$

or $\frac{U_2}{U_1} = \frac{A_1}{A_2}$

Thus, $h_{L,exp} = \frac{U_1^2}{2g}\left(1 - \frac{U_2}{U_1}\right)^2 = \frac{U_1^2}{2g}\left(1 - \frac{A_1}{A_2}\right)^2$

26. Answer B
Solution
Gradually varied steady flow
Depth changes slowly with distance while discharge remains constant in time.
Classic example: the back-water curve that forms upstream of a dam (or any mild obstruction).
Rapidly varied steady flow
Depth changes abruptly over a short distance while the flow is still steady.
Classic example: a hydraulic jump that forms at the toe of a spillway or downstream of a sluice gate.
Gradually varied unsteady flow
Both depth and discharge change gradually with time and distance.
Classic example: the propagation of a flood wave in a natural river.
Rapidly varied unsteady flow
Depth changes abruptly and the flow is also unsteady.
Classic example: surge (positive or negative) waves travelling in a canal.

27. Answer B
Solution:
Apply Froude Model law (Fr)

or $\frac{V}{\sqrt{gL_m}} = \frac{V_p}{\sqrt{g.L_p}}$

$\frac{L_m}{L_p} = \frac{1}{25}$

$\frac{V_m}{V_p} = \sqrt{\frac{L_m}{L_p}} = \frac{1}{5}$ or $V_m = \frac{1}{5} = 0.2\,m/s$

28. Answer A
Solution:

$$\text{Form factor} = \frac{\text{Average width of the basin}}{\text{Axial length of the basin}}$$

$= \frac{B}{l} = \frac{A/l}{l} = \frac{A}{l^2}$

$= \frac{2}{(0.5)^2}$

$= 8$

29. Answer D
Solution
Following are the main causes of water-logging
Excessive rainfall in the area
Flat ground profile
Seepage of water from canals and the adjoining lands
Improper drainage of surface runoff
Excessive irrigation

30. Answer D
Solution
BOD removal efficiency = 79%
Efficiency of primary treatment = 35%
Raw BOD $= 200\,mg/l$

BOD removal efficiency $= \frac{y_i - y_e}{y_i} \times 100$

$79 = \frac{(100-35)\times 200 - y_e}{(100-35)\times 200} \times 100$

$102.7 = 130 - y_e$

$y_e = 27.3\ mg/l$

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31. Answer B

Solution

We know that

$$\frac{V_2}{V_1} = \frac{100-P_1}{100-P_2}$$

$$= \frac{100-96}{100-93}$$

= 0.5714

% Volume reduction =

$$(1-\frac{V_2}{V_1})\times 100 = (1-0.5714)\times 100 = 42.86\%.$$

32. Answer D

Solution

Dry Soil: A two-phase system consisting only of soil solids and air. Since there is no moisture present, all voids are completely filled with air (Degree of saturation, (S = 0%)

Saturated Soil: A two-phase system consisting only of soil solids and water. The volume of water matches the volume of voids, meaning all voids are completely filled with water (Degree of saturation, (S = 100%)

Partly Saturated Soil: A three-phase system consisting of soil solids, air, and water. The **void** spaces are shared and occupied by both air and water (0% < S < 100%).

33. Answer C

Solution:

$$Q = KiA$$

$$Q = K\times\left[\frac{h}{L}\right]\times\frac{\pi}{4}d^2$$

$$\frac{300\times 10^3}{4\times 60} = K\times\left[\frac{70}{100}\right]\times\frac{\pi}{4}(100)^2$$

$$\Rightarrow K = 0.227\,mm/s$$

34. Answer B

Solution:

Sum of interior angles = (2N - 4) × 90°

Bad ranging is a cumulative error.

35. Answer A

Solution:

$$\alpha' = \left(\frac{S}{nD}\right)\times 206265$$

$$S = \frac{\alpha nD}{206265}$$

$$= \frac{30\times 2\times 150}{206265}$$

$$= 0.0436 = 0.044\ m$$

36. Answer D

Solution

The Banswara Forest Division has the largest area of teak forests. Teak trees reach a height of 9 to 13 meters.

बाँसवाड़ा वन संभाग में अधिकतम सागौन वन क्षेत्र है। सागौन पेड़ों की ऊँचाई 9 से 13 मीटर होती है।

37. Answer B

Solution

- Ramgarh Vishdhari – the second-largest tiger reserve in Rajasthan.
- Sariska is a wildlife sanctuary.
- There are a total of 26 wildlife sanctuaries in Rajasthan.
- राजस्थान की दूसरी सबसे बड़ी बाघ परियोजना - रामगढ़ विषधारी
- सरिस्का एक अभयारण्य है।
- राजस्थान में कुल 26 वन्यजीव अभयारण्य है।

38. Answer B

Solution

Rajiv Gandhi Environment Protection Award (instituted in 2012; presented on 5th June, World Environment Day)

Institutional category: ₹5 lakh

Municipalities: ₹3 lakh

Individual category: ₹2 lakh

राजीव गाँधी पर्यावरण संरक्षण पुरस्कार (प्रारम्भ-वर्ष 2012 से प्रदान - 5 जून विश्व पर्यावरण दिवस पर)

संस्था वर्ग में- 5 लाख रुपए

नगरपालिका - 3 लाख रुपए

व्यक्ति वर्ग में -2 लाख रुपए

39. Answer B

Solution

The Indira Gandhi Canal Project was formerly known as the 'Rajasthan Canal Project'. In its second phase, a 256 km stretch was constructed, extending from Pugal Head to Mohangarh in Jaisalmer.

इंदिरा गाँधी नहर परियोजना का पूर्व नाम 'राजस्थान नहर परियोजना' था। इसके द्वितीय चरण में पूंगल हैड से जैसलमेर के मोहनगढ़ तक 256 किमी. तक निर्माण किया गया।

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40. Answer B
Solution
Under the MoU signed on February 17, 2024, water from the Yamuna River will be supplied to the Churu, Sikar, and Jhunjhunu districts—for irrigation and drinking purposes—via an underground pipeline originating from the Hathnikund Barrage in Haryana.
17, फरवरी, 2024 के किये गये एमओयू के तहत हरियाणा के हथनीकुंड बैराज से भूमिगत पाइपलाइन के माध्यम से यमुना नदी का पानी चूरू, सीकर, झुंझुनूं जिलों को सिंचाई व पेयजल हेतु मिलेगा।

41. Answer D
Solution
Atal Bhujal Yojana: The Atal Bhujal Yojana was launched on April 1, 2020, with the collaboration of the Government of India and the World Bank (on a 50 : 50 cost-sharing basis). It is being implemented in seven states—Haryana, Gujarat, Karnataka, Maharashtra, Rajasthan, Uttar Pradesh, and Madhya Pradesh—with the objective of arresting the decline in groundwater levels and improving groundwater management.
अटल भू-जल योजना : अटल भू-जल योजना भारत सरकार एवं विश्व बैंक के सहयोग से (50 : 50 प्रतिशत) देश के सात राज्यों क्रमश: हरियाणा, गुजरात, कर्नाटक, महाराष्ट्र, राजस्थान, उत्तरप्रदेश एवं मध्यप्रदेश राज्यों में भू-जल के गिरते स्तर को रोकने, भू-जल के बेहतर प्रबन्धन हेतु 1 अप्रैल 2020 से लागू की गई है।

42. Answer C
Solution
Rajasthan's first greenfield airport is under construction at Shambhupura, Kota. There are also proposals to build an airport at Kolana (Jhalawar) and a greenfield airport at Kotkasim (Bhartrihari Nagar).
राजस्थान का पहला ग्रीन फील्ड एयरपोर्ट शम्भुपुरा, कोटा में निर्माणाधीन है। कोलाना (झालावाड़) में हवाई अड्डा एवं कोटकासिम (भर्तृहरि नगर) में ग्रीनफिल्ड एयरपोर्ट बनाया जाना प्रस्तावित है।

43. Answer B
Solution
A magazine titled 'Manavadhikar Sandesh' (Human Rights Message) is published quarterly by the State Human Rights Commission.
राज्य मानवाधिकार आयोग द्वारा 'मानवाधिकार संदेश' नामक पत्रिका त्रैमासिक रूप से प्रकाशित की जाती है।

44. Answer D
Solution
Mohanlal Sukhadia / मोहनलाल सुखाड़िया - Dr. Sampurnanand / डॉ. सम्पूर्णानन्द
Shiv Charan Mathur / शिवचरण माथुर - Om Prakash Mehra / ओमप्रकाश मेहरा
Haridev Joshi / हरिदेव जोशी - Vasant Rao Patil / वसंत राव पाटिल
Vasundhara Raje / वसुंधरा राजे - Madan Lal Khurana / मदन लाल खुराना

45. Answer B
Solution
Gopal Krishna Vyas - Former Chairperson, State Human Rights Commission (2021–24)
गोपाल कृष्ण व्यास - पूर्व राज्य मानवाधिकार आयोग का अध्यक्ष 2021-24

46. Answer A
Solution:
A. Central Road fund (CRF) - 1929
B. Indian Road Congress (IRC) - 1934
C. Motor Vehicle ACT - 1939
D. Nagpur Road Congress – 1943

47. Answer C
Solution:
Radius of the curve = 400 m
Maximum super Elevation e = 6%
N = 150
Design speed = 80 kmph
Total width of the curve = 7.7 m
Length of Transition curve W.r.t super Elevation criteria

$$L_s = eN(W + W_e)$$

$$L_s = 0.06 \times 150 \times (7.7)$$

$$= 69.3 \approx 70 \text{ m}$$

48. Answer B
Solution
Plutonic rocks are always formed from the cooling of magma at great depths below the surface of the earth. (TRUE)
Explanation: Plutonic rocks (intrusive igneous rocks) form deep within the Earth's crust where magma cools very slowly, allowing large, well-defined crystals to grow (phaneritic texture). Granite and gabbro are classic examples.

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Poiklitic texture is characterized with the entire constituents being present in glassy form. (FALSE)

Explanation: A texture where the entire rock consists of glass (no mineral crystals) is called a glassy texture (holohyaline), typical of volcanic rocks like obsidian.

What Poiklitic texture actually is: It is a crystalline texture where larger crystals (oikocrysts) enclose smaller, randomly oriented crystals (chadacrysts) of another mineral.

Lopoliths are defined as concordant igneous bodies associated with natural basins... inclined towards a common centre. (TRUE)

Explanation: Lopoliths are large, saucer-shaped plutons that are concordant (parallel to the bedding planes of the surrounding rock). They form when magma is injected into a structural basin, causing the weight of the magma to sag the underlying sedimentary layers toward a central low point.

49. Answer C

Solution

(i) Pumping technique
(ii) Hydro valve method
(ii) Toggle bags method
(iv) Bagged Concrete Method
(v) Tremie method
(vi) skip method
(vii) Pneumatic valve method

50. Answer C

Solution

Flaky and angular aggregates have a higher surface-to-volume ratio, more voids, and greater internal friction. This reduces the mobility of the mix, making the concrete *less* workable.

Rounded and cubical aggregates have a lower surface area, fewer voids, and lower frictional resistance, allowing the particles to slide past each other easily and resulting in higher workability.

51. Answer D

Solution

i. **In the capillary zone water is under tension: True.** Water in the capillary zone (above the water table) is held by surface tension forces and exists under negative pore water pressure (tension).
ii. **Constant head permeability test is used to determine permeability in clayey soils: False.** The constant head permeability test is used for coarse-grained soils (like sands and gravels) with high permeability. A falling/variable head permeability test is used for fine-grained or clayey soils.
iii. **A soil having lesser permeability gives higher discharge: False.** According to Darcy's Law (Q = kiA), discharge (Q) is directly proportional to the coefficient of permeability (k). Therefore, lower permeability results in lower discharge.
iv. **The effective stress increases due to capillary zone: True.** The negative pore pressure (tension) in the capillary zone reduces the pore water pressure, which in turn increases the effective stress in the soil.

52. Answer C

Solution

Active earth pressure develops when a retaining wall moves away from the backfill. The soil mass is allowed to expand (stretch) horizontally and its horizontal stress falls to the active state.

Passive earth pressure develops when the wall moves towards the backfill. The soil is compressed horizontally and its horizontal stress rises to the passive state.

53. Answer D

Solution

$h_1 = .20 - 0.12 = 0.08\,m$

$h_2 = 0.20\,m$

$(\rho_1) = 1000\,kg/m^3$

$(\rho_m) = 13600\,kg/m^3$

$\therefore P_A + \rho_1 g h_1 = \rho_m g h_2$

$P_A + 1000 \times 9.81 \times 0.08 = 13600 \times 9.81 \times 0.20$

$P_A = 25898.4\,N/m^2$

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54. Answer D

Solution

Given

Pipe diameter at the inlet = d

Velocity of the fluid at the inlet = V

Pipe diameter at the outlet (d_2) = 0.5d

Velocity at the exit = V_2

From the equation of continuity, a V = a_2 V_2

$$\frac{\pi}{4}d^2v = \frac{\pi}{4}\times\left(\frac{1}{2}d\right)^2\times v_2$$

$$\frac{\pi}{4}d^2v = \frac{\pi}{4}\times\frac{1}{4}d^2\times v_2$$

$$\boxed{v_2 = 4v}$$

55. Answer B

Solution

Statement A is correct: A Global Positioning System (GPS) device or GPS-enabled receiver directly calculates and displays true north (or true heading/course over ground).

Statement B is correct: To find true north using a magnetic compass, you must know the local magnetic declination (the angular difference between true north and magnetic north) to adjust your reading properly.

56. Answer B

Solution

g_1 =+1.6%

g_2= -0.8%

(r) = 0.2%

(L) = 20 m

$$(l) = \frac{g_1 - g_2}{r}\times L$$

$$= \frac{(+1.6)-(-0.8)}{0.2}\times 20 = \frac{2.4}{0.2}\times 20$$

12 × 20 = 240 m

57. Answer C

Solution

The traffic signal 'STOP' sign comes under regulatory signs (also known as mandatory signs

58. Answer D

Solution

Statement (i) is incorrect: The main function of a Bituminous Surface Dressing is to prevent (not support) the infiltration of surface water into the pavement structure.

Statement (ii) is correct: It serves as a thin protective wearing course or maintenance coat.

Statement (iii) is incorrect: The main function of a Seal Coat is to develop or improve (not reduce) a skid-resistant texture, along with waterproofing and sealing minor cracks.

Statement (iv) is correct: A seal coat enlivens an existing dry or weathered bituminous surface by sealing it and preventing oxidation.

59. Answer C

Solution

given

Critical speed ratio (Y) = 0.6

According to Webster's formula

Optimal signal cycle $C_0 = \frac{1.5L+5}{1-Y}$

Total damage per cycle (L) = 2n + R

Number of steps (n) = 2

L = 2 × 2 + 10 = 14

$$C_0 = \frac{1.5\times 14+5}{1-0.6} = 65\,\text{sec}$$

60. Answer A

Solution

S1: "The minimum number of longitudinal bars provided in a RCC column shall be six in rectangular columns and eight in circular columns." -> False (It should be 4 for rectangular, 6 for circular).

S2: "The minimum number of longitudinal bars in the helically reinforced RCC column must be six." -> True (IS 456:2000 specifies at least 6 bars).

61. Answer C

Solution

According to Section 8(d) of the Rajasthan Panchayati Raj Act, 1994, "any resolution relating to matters entrusted to the Gram Sabha under this Act shall be passed by a majority of the members present and voting at a meeting of the Gram Sabha."

राजस्थान पंचायती राज अधिनियम 1994 की धारा 8 (घ) के अनुसार 'ग्राम सभा को इस अधिनियम के अधीन सौंपे गये विषयों से संबंधित कोई भी संकल्प ग्राम सभा की बैठक में उपस्थित और मत देने वाले सदस्यों के बहुमत से पारित किया जाना होगा।'

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62. Answer D
Solution
The head of a municipal corporation is the 'Mayor', the head of a municipal council is the 'Sabhapati' (Chairperson), and the head of a municipality is the 'Chairman'.
नगर निगम का अध्यक्ष 'महापौर (मेयर)', नगर परिषद् का अध्यक्ष 'सभापति' तथा नगर पालिका का अध्यक्ष 'अध्यक्ष (चेयरमैन)' होता है।

63. Answer D
Solution
In Rajasthan, an Election Commission (single-member) was constituted by the Governor (on 1 July 1994).
राजस्थान में राज्यपाल द्वारा निर्वाचन आयोग (एक सदस्यीय) का गठन (1 जुलाई 1994) किया गया है।

64. Answer A
Solution
In exercise of the powers conferred by sub-section (3) of Section 1 of the Rajasthan Right to Public Services Act, 2011 (Act No. 23 of 2011), the State Government brought the Act into force with effect from 14th November, 2011.
राजस्थान लोक सेवाओं के प्रदान करने की गारंटी अधिनियम, 2011 (2011 का अधिनियम संख्या 23वाँ) की धारा 1 की उप-धारा (3) की प्रदत्त शक्तियों का प्रयोग करते हुए राज्य सरकार द्वारा 14 नवम्बर, 2011 से प्रवृत्त (लागू) किया गया।

65. Answer C
Solution
A is correct, but R is not. The language of the Nagari inscription (424 CE) is Sanskrit, and its script is Nagari. It is currently housed in the Ajmer Museum.
A सही है लेकिन R सही नहीं है। नगरी शिलालेख (424 ई.) की भाषा संस्कृत और लिपि नागरी है। वर्तमान में यह अजमेर संग्रहालय में स्थित है।

66. Answer A
Solution
To evade the Mughals and organize the war effort, Maharana Pratap shifted his base from Gogunda to Kumbhalgarh.
मुगलों से बचकर युद्ध का प्रबन्ध करने के लिए महाराणा प्रताप ने अपना ठिकाना गोगुन्दा से कुंभलगढ़ स्थानांतरित किया था।

67. Answer B
Solution
'Japan Day' was observed in Bharatpur on August 16–17, 1945, under the leadership of Maharaja Brijendra Singh.
'Birbal Day': July 17
जापान दिवस महाराजा बृजेन्द्र सिंह के नेतृत्व में भरतपुर में 16-17 अगस्त, 1945 ई. को मनाया गया था।
बीरबल दिवस : 17 जुलाई

68. Answer D
Solution
The Ranakpur Prashasti contains the genealogy of the rulers of Mewar. It describes the titles and victories of Rana Kumbha, alongside those of Bapa and Kalbhoj.
रणकपुर प्रशस्ति में मेवाड़ शासकों का वंशक्रम मिलता है। इसमें बापा व कालभोज के साथ राणा कुम्भा को विरूदों और विजयों का वर्णन किया गया है।

69. Answer A
Solution
At Ahar, baked bricks (bricks fired in a kiln) were not used, whereas at Gilund, they were used extensively.
आहड़ में पक्की ईंटों (आग में पकाई हुई ईंटे) का उपयोग नहीं हुआ है, जबकि गिलूण्ड में इनका प्रचुर उपयोग हुआ है।

70. Answer A
Solution
Correct chronological order—Siwana (954 CE), Gagron (11th century), Junagarh (1485 CE), Churu (1739 CE)
सही कालक्रम-सिवाणा (954 ई.), गागरोण (11वीं शताब्दी), जूनागढ़ (1485 ई.), चूरू (1739 ई.)

71. Answer A
Solution
As per standard codal provisions for detailing reinforcement in concrete (such as SP 34: 1987, Clause 4.1):
Statement 1 is correct: The standard general requirement dictates that reinforcement must have a minimum clear cover of 20 mm or the diameter of the bar, whichever is greater, to protect against standard environmental exposure and ensure structural bonding.
Statement 2 is correct: At each end of a reinforcing bar, the concrete cover must not be less than 25 mm, nor less than twice the diameter of the bar.
Statement 3 is correct: The nominal or clear cover thickness must be increased when the concrete surfaces are exposed to harmful chemical actions (such as soil contaminants, acids, saline atmosphere, or sulfates) to safeguard the internal steel from corrosion.

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72. Answer D

Solution

Lateral-torsional buckling (LTB) is an instability failure mode that occurs in long, laterally unrestrained flexural members (such as I-shaped steel beams) subjected to bending about their major axis. When a beam bends, the compression flange tends to buckle sideways like a slender column, and because it is connected to the tension flange and web, this lateral movement causes the cross-section to twist simultaneously

73. Answer D

Solution

Elements of a Plate Girder: A plate girder is a built-up I-beam section designed to carry heavy loads over long spans. Its components typically include a web plate (I), flange angles and flange cover plates (II), intermediate and bearing stiffeners (III), and web/flange splices (V) to join plates over long distances.

Not Elements of a Plate Girder:

Lug angles (IV) are short angles used to reduce the length of the connection of a main tension member to a gusset plate.

Gusset plates (VI) are thick sheets of steel used to connect beams, girders, and trusses together at structural joints.

74. Answer D

Solution

Cement Grouting of Concrete / Surface Grouting: According to standard construction guidelines (such as IS 1200 Part 2), cement grouting applied over a concrete surface area or road metal is measured in square meters m^2

75. Answer C

Solution

Demineralisation (Ion Exchange): This process uses cation-exchange and anion-exchange resins (or deionizers) to remove dissolved mineral salts and ionic contaminants from water. Cations are exchanged for hydrogen (H+) ions and anions are exchanged for hydroxyl (OH-) ions, producing pure water [H_2O].

Electrodialysis: Uses an electric potential and ion-selective membranes to move salt ions out of the water.

Freezing: Separates ice crystals from brine through controlled freezing and washing processes.

Reverse Osmosis: Uses high hydrostatic pressure to force water molecules through a semi-permeable membrane while trapping dissolved salt ions.

76. Answer D

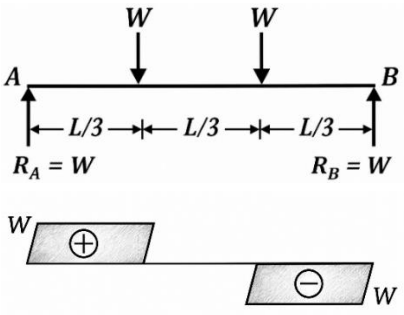
Solution

Statement A is CORRECT: The primary objective of secondary (biological) wastewater treatment is to coagulate and remove non-settleable colloidal solids and stabilize the dissolved (soluble) organic matter. Microorganisms (primarily bacteria) feed on these organic compounds, breaking them down into simpler end-products and biomass.

Statement B is INCORRECT: Biological treatment *is* explicitly capable of removing nutrients like nitrogen and phosphorus. This is achieved via specialized biological processes such as Nitrification/Denitrification (for nitrogen removal) and Enhanced Biological Phosphorus Removal (EBPR) using Phosphorus Accumulating Organisms (PAOs).

77. Answer D

Solution



SF in middle third = $R_A - W = W - W = 0$

78. Answer A

Solution

The maximum shear stress across a solid circular section is 4/3 (or 1.33) times the average shear stress

79. Answer A

Solution

The permissible stresses in a weld shall not exceed allowable stress for the parent metal.

80. Answer D

Solution

To avoid the failure of plate element locally before the entire member fails in compression IS-800 recommends the thickness of members to be taken in terms of length and it provides for thickness in terms of outstands.

81. Answer C

Solution

ϕ where is diameter of reinforcing bar, σ_s is the S stress in the bar at a section and τ_{bd} is bond stress

The development length L_d is given by

$$L_d = \frac{\phi\sigma_s}{4\tau_{bd}}$$

where, ϕ = nominal diameter of the bar

σ_s = stress in bar at the section considered at design load, and

σ_{bd} = design bond stress

here, for deformed bars the values of τ_{bd}, shall be increased by 60 percent {as per Cl 26.2.1.1 IS 456 : 2000}

$$L_d = \frac{\phi\sigma_s}{4(1.6\ \tau_{bd})} = \left(\frac{\phi\sigma_s}{6.4\tau_{bd}}\right)$$

82. Answer A

Solution

In pre-tensioning process of the prestressing members, the prestressing force is obtained due to bond strength in between concrete and steel.

So the tendon must have perfect bond with the concrete.

83. Answer C

Solution

Ultrasonic pulse velocity test is a non-destructive test used to estimate the strength of hardened concrete.

84. Answer B

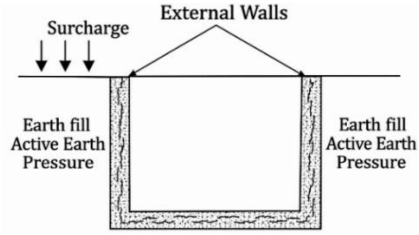
Solution

The colour of concrete changes on heating from grey to light pink at about 300°C. The pink darkens with further rise in temperature and attains maximum intensity at 600°C, then begins to lighten. Proper curing can minimize the shrinkage of cement concrete.

85. Answer B

Solution

Cross - sectional view of under-ground ware house



The external walls of an underground ware house are subjected to active earth pressure, so there design would be similar to a retaining wall with or without surcharge.

86. Answer A

Solution

Tahnesha – gold work on brass

Koftgari – gold work on iron

तहनिशा- पीतल पर सोने का कार्य

कोफ्तगिरी- लोहे पर सोने का कार्य

87. Answer C

Solution

Tapara – A lidded basket made of split cane, used by the Kalbelia community to keep snakes.

Barand – A thin, boat-shaped bamboo implement used by the Bhil community for threshing 'sanwa' (a type of millet).

टपारा-कालबेलियों द्वारा साँप रखने की बेंत की खपच्चियों से बनी एक ढक्कनदार पिटारी टपारा कहलाती है।

बरण्ड-भीलों के द्वारा सांवां झाड़ने हेतु काम में लिया जाने वाला पतली नाव की आकृति का बाँस।

88. Answer D

Solution

The Shitaleshwar Mahadev Temple was built in 689 CE.

The influence of the Mahamaru style can be seen in the Sun Temple, Harihar Temple, and Mahavir Temple at Osian, as well as in the Kalika Temple at Chittorgarh and the temple at Abhaneri.

शीतलेश्वर महादेव मंदिर 689 ई. में निर्मित है।

ओसियाँ का सूर्यमंदिर, हरिहर व महावीर मंदिर; चित्तौड़ का कालिका मंदिर व आभानेरी मंदिर पर महामारू शैली का प्रभाव देखने को मिलता है।

89. Answer A

Solution

Followers of the Charandasi tradition hold the 'Shrimad Bhagavatam' in reverence.

चरणदासी सम्प्रदाय के अनुयायी 'श्रीमद्भागवत' में श्रद्धा रखते है।

90. Answer B

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Solution

Kanhad De - Prabandh / कान्हड़ दे – प्रबंध - Padmanath / पद्मनाथ

Ganga Lahari / गंगा लहरी- Prithviraj Rathore / पृथ्वीराज राठौड़

Prithviraj Raso / पृथ्वीराज रासो - Chand Bardai / चंद बरदाई

Bisaldev Raso / बीसलदेव रासो - Narpati Nalh / नरपति नाल्ह

91. Answer D

Solution

Stream function $\psi = 3x^2 - y^3$

$$v = \frac{\partial \psi}{\partial x} = 6x$$

$$v = \left.\frac{\partial \psi}{\partial x}\right|_{2,2} = 12$$

$$u = \frac{-\partial \psi}{\partial y} = 3y^2$$

$$u = \left.\frac{-\partial \psi}{\partial y}\right|_{2,2} = 12$$

Resultant velocity, $V = \sqrt{u^2 + v^2}$

$= \sqrt{12^2 + 12^2}$

$= 16.97 \simeq 17$

92. Answer D

Solution

Bernoulli's equation is applicable for flow -

(1) along a stream line

(2) for steady flow

(3) for incompressible flow

(4) when the effect of viscosity is neglected

93. Answer C

Solution

Rehbock formula gives the expression for discharge over a rectangular suppressed weir as follows

$$Q = \frac{2}{3}\left(0.605 + 0.08\frac{H}{Z} + \frac{0.001}{H}\right)\sqrt{2g}BH^{3/2} \quad \text{... (i)}$$

Francis found that due to end contraction the effective width of the nappe is reduced by 0.1 H. The effective length of the weir (L – 0.1 nH)

$$Q = \frac{2}{3}C_d\sqrt{2g}(L - 0.1nH)H^{3/2} \quad \text{... (ii)}$$

Cippoletti notch (or weir) is a trapezoidal notch which gives discharge equal to the discharge that would pass over a rectangular notch. It is done to counter balance the end contraction.

Discharge over cippoletti weir is given by

$$Q = \frac{2}{3}C_d\sqrt{2g}LH^{3/2} \quad \text{... (iii)}$$

Linear proportional weir is a sutro weir The discharge over the weir is given by

$$Q = K\left(H - \frac{a}{3}\right) \quad \text{.....(iv)}$$

94. Answer C

Solution

Fluorides upto 1 mg/l, helps to prevent dental cavities. Hence, its absence may cause dental caries.

Lead in excess is toxic to many organs and tissues including heart, bones, kidney intestines, reproductive and nervous system. Hence, it should not be greater than 0.05 mg/l. Excess lead causes anaemia.

Nitrates in general is not harmful as it is fully oxidized. But too much of nitrate affects infants because it causes Methemoglobinemia or blue baby disease.

Iodide deficiency causes goitre.

Hence, correct option is (c).

95. Answer D

Solution

The settling velocity of discrete particle is given by Newton or Stoke's equation. It is proportional to square of particle diameter. If Stokes law is followed by settling particles i.e. if Re < 1.

$V_s \propto d^2$

Setting velocity will become four times when its diameter is doubled.

96. Answer B

Solution

As concentration of organic matter is a prime indicator of the degree of water pollution, statement I is correct.

To analyze the amount of organic matter present in water, we try to define various terms

(i) Chemical oxygen demand (COD): It is the amount of oxygen required to oxidize both

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biodegradable and non-biodegradable organics.

(ii) Biochemical oxygen demand (BOD): It is the amount of O_2 required to oxidize the biodegradable organic matter present in water.

(iii) Total organic carbon (TOC): It is another method of expressing the organic matter in terms of carbon content.

Thus as BOD, COD & TOC are used to determine the concentration of organic matter present in a given water sample, they are important parameters of water pollution. Hence statement 2 is also correct.

As COD Biodegradable organics + non-biodegradable organics and BOD = Biodegradable organics only, thus COD is always greater than BOD.

Now, to find TOC, let us take an example where organic matter consist of glucose and benzene (say)

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

$$C_6H_6O_6 + 7.5O_2 \rightarrow 6CO_2 + 3H_2O$$

Thus, oxygen required to oxidize the organic matter is 6 × 16 × 2 = 192 g for glucose and 7.5 × 16 × 2 = 240g for benzene whereas TOC is 6 × 12 = 72g for glucose & 6 × 12 = 72 g for benzene respectively.

Hence, we see that generally TOC is less than both BOD & COD.

Hence, generally we can say that COD > BOD > TOC

Thus statement 3 is wrong.

Hence correct option is (b)

97. Answer D

Solution

$P_m = 42.16\ D^{0.475}$

P_m = extreme rainfall depth in cm

D= duration in hours.

98. Answer B

Solution

Assume ϕ - index greater than 1 cm/hr because no option is less than 1 cm/hr.

Iteration 1:

Total precipitation =

$$\frac{1}{2}\times(1.6)+\frac{1}{2}\times 3.6+\frac{1}{2}\times 5.0+\frac{1}{2}\times 2.8+\frac{1}{2}\times 2.2 = 7.6\,\text{cm}$$

[1cm/hr will not be considered as value is less than ϕ-index assumed]

Runoff = 3.2cm

ϕ-index = $\frac{7.6-3.2}{2.5} = 1.76\,\text{cm/h} > 1.6\,\text{cm/h}$

It implies 1.6 cm/h rainfall ineffective. So, exclude 1 cm/h and 1.6 cm/h both.

Iteration 2:

Similarly, total precipitation = 1.8 + 2.5 + 1.4 + 1.1 = 6.8 cm

Runoff = 3.2cm

ϕ-index = $\frac{6.8-3.2}{2} = 1.8\,\text{cm/h}$

So, ϕ-index = 1.8 cm/h

99. Answer B

Solution

Sheep foot rollers are considered most suitable for compacting clayey soils. They consist of a hollow drum with a large number of small projections (known as feet) on its surface. These projections penetrate the soil during rolling operations and cause compaction. The drum can be filled with water or sand to increase the mass. The rollers compact the soil by a combination of tamping and kneading action. Pressure applied on the soil or efficiency depends upon weight of roller and number of feet in contact with the ground at a time.

100. Answer C

Solution

Both methods are laboratory methods used to determine coefficient of permeability of soils.

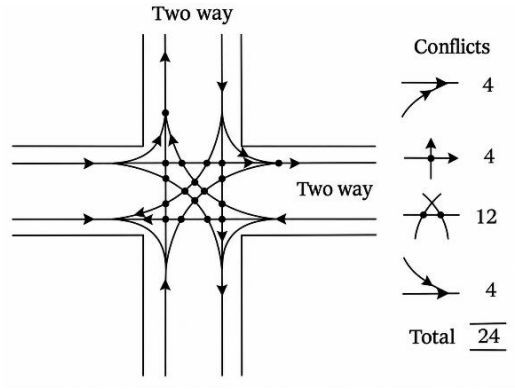
101. Answer A

Solution

$$Q_{\text{required}} = \frac{3000\times 10^4 \times 173\times 10^{-3}}{30\times 24\times 3600} = 2\,\text{m}^3/\text{sec}$$

102. Answer C

Solution



On right angled road intersection with two-way traffic the total number of conflict points are 24. This consists of 16 crossing conflicts which are major conflict point. The merging and diverging conflicts are considered as minor conflicts. numbering 4 in each case.

103. Answer A

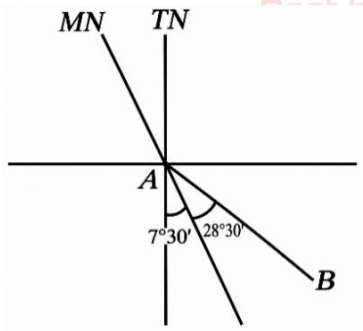
Solution

Impact test is designed to evaluate the toughness of stone or the resistance of the aggregates to fracture under repeated impact.

A metal hammer of weight 13.5-14 kg having free fall from a height of 38 cm is arranged to drop through vertical guides and 15 blows are given to the test specimen.

104. Answer A

Solution



True bearing of line AB = 28°30' + 7°30'= 36° or S36° E

105. Answer C

Solution

$h = 0.0673 \times d^2$

$h = 0.0673 \times 40^2$

$h = 107.68m$

106. Answer B

Solution

Seepage Analysis: In the design of earth dams, computing the amount of seepage loss and determining the position of the phreatic line (line of seepage) through the cross-section (not longitudinal section) are crucial to ensure stability and prevent internal erosion or piping. **Incorrect Options:**

(a) The seepage line is studied in the **cross-section**, not the longitudinal section.

(c) The seepage line should **remain well within** the downstream face (it must not cut or emerge on the downstream slope, which would cause sloughing and failure).

(d) Seepage loss through the dam should be **minimum**, not maximum.

107. Answer B

Solution

In secondary consolidation of soil volume change takes place at constant effective stress which is similar to creep phenomenon, in which deformation takes place at constant applied stress.

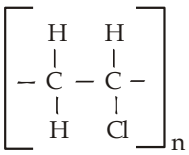
108. Answer B

Solution

PVC = poly vinyl chloride

it is a synthetic plastic polymer which is produced by polymerization of vinyl chloride its chemical formula is $[-CH_2-CHCl-]_n$

PVC is a thermoplastic material.



109. Answer B

Solution

Trestle scaffolding is typically used inside buildings for repairs and maintenance works at a height of up to 5m. It is a working platform supported by movable ladders and is most commonly used by bricklayers and plasterers.

110. Answer D

Solution

In the 'Suvatiyo' folk song, Bhil women send messages to their husbands through a parrot; meanwhile, the 'Moriyo' folk song is sung by a girl who is betrothed but not yet married.
सुवटियों लोकगीत में भील महिलाएँ तोते के माध्यम से अपने पति के पास संदेश भेजती है। जबकि मोरियो लोक गीत उस लड़की द्वारा गाया जाता है जिसकी सगाई हो चुकी है परन्तु शादी होना बाकी है।

111. Answer D
Solution
People from Rajasthan who were martyred in the freedom struggle –

Balmukund Bissa	Jodhpur	June 19, 1942
Sagarmal Gopa	Jaisalmer	April 04, 1946
Birbal Singh	Bikaner	July 01, 1946

स्वतंत्रता संग्राम में शहीद हुए राजस्थानी –

बालमुकुन्द बिस्सा	जोधपुर	19 जून, 1942
सागरमल गोपा	जैसलमेर	04 अप्रैल, 1946
बीरबल सिंह	बीकानेर	01 जुलाई, 1946

112. Answer B
Solution
Rajputana Princely States Council, Ajmer: Established in 1928 in Ajmer as a branch of the All India Princely States People's Council, the Rajputana Princely States Council was founded by individuals including Vijay Singh Pathik, Ramnarayan Chaudhary, Kesari Singh Barhath, and Damodar Lal Rathi. Its first session was held in Ajmer on November 23–24, 1928, and was presided over by Amritlal Sheth.
राजपूताना देशी राज्य परिषद, अजमेर : अखिल भारतीय देशी राज्य लोक परिषद की एक शाखा के रूप में राजपूताना देशी राज्य परिषद की स्थापना 1928 ई. में विजयसिंह पथिक, रामनारायण चौधरी, केसरी सिंह बारहठ, दामोदर लाल राठी आदि के द्वारा अजमेर में की गई। इसका प्रथम अधिवेशन अजमेर में 23-24 नवम्बर, 1928 ई. को हुआ, जिसका सभापतित्व अमृतलाल सेठ ने किया।

113. Answer A
Solution
When A.G.G. George Patrick Lawrence marched from Ajmer with an army, he too faced defeat at a place called Chelawas on September 18, 1857. In this battle, the Political Agent for Jodhpur, Monck Mason, was also present alongside A.G.G. George Patrick Lawrence. After killing Monck Mason, the revolutionaries hung his head at the gate of the fort of Auwa.
ए.जी.जी. जॉर्ज पैट्रिक्स लॉरेन्स अजमेर से सेना लेकर गया तो उसे भी चेलावास नामक स्थान पर 18 सितम्बर, 1857 के दिन हार का सामना करना पड़ा। इस युद्ध में जोधपुर का पॉलिटिकल एजेन्ट मोकमैसन भी ए.जी.जी. जॉर्ज़ पैट्रिक्स लॉरेन्स के साथ था। मोकमैसन को मारकर क्रांतिकारियों ने उसका सिर आउवा के किले के दरवाजे पर लटका दिया।

114. Answer C
Solution
In the third phase, Udaipur was merged into eastern Rajasthan on April 18, 1948, and the resulting entity was named 'Sanyukt Rajasthan' (United Rajasthan). Udaipur was designated as its capital, the ruler of Udaipur, Bhupal Singh, was appointed as the 'Rajpramukh' (Head of State), and Manikyalal Verma was named the Prime Minister. It was inaugurated by Jawaharlal Nehru on April 18.
तृतीय चरण में पूर्व राजस्थान में उदयपुर का 18 अप्रैल, 1948 को विलय कर इसे 'संयुक्त राजस्थान' नाम दिया। इसकी राजधानी उदयपुर, राजप्रमुख उदयपुर शासक भूपालसिंह व प्रधानमंत्री माणिक्यलाल वर्मा बनाए गए। इसका उद्घाटन 18 अप्रैल को जवाहरलाल नेहरू ने किया।

115. Answer B
Solution
As per IS 1893 (Part 1), India is divided into four seismic zones:
Zone II
Zone III
Zone IV
Zone V
(Zone I was merged into Zone II in the revised code.)

116. Answer A
Solution
As per traditional recommendations in IS 800 (widely followed in design of angle purlins for roof trusses with slope 30°):
Depth of angle purlin L/45
Width of angle purlin L/60
In IS 800 : 2007, overall depth of purlin should be greater than 100t and not less than L/45.
Reference: IS 800 : 2007 (Purlin design recommendations) + older practice from IS 800 : 1984

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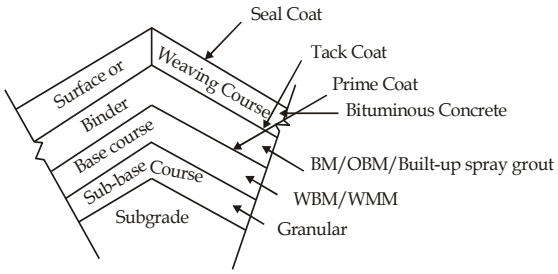
117. Answer B

Solution

The softening point of various bitumen grades generally lies between 35°C to 70°C. Softening point of bitumen to be used for road construction at a place where the maximum temperature is 40°C should be greater than the 40°C.

118. Answer A

Solution



The top of the ground on which foundation of road rests is subgrade.

119. Answer C

Solution

Polar coordinates are primarily used for creating lines at specific angles and distances.

120. Answer C

Solution

In 2D drawing, work is performed relative to the X and Y axes. The Z-axis is not used.

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