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|| आपकी सफलता, हमारी प्रतिबद्धता ||

1. Answer D

Solution

The Ahar civilization is also known as "Tamravati Nagari" or the "Banas Culture."

It is situated near Udaipur, along the banks of the Banas River.

Copper-smelting furnaces and slag have been found here.

Therefore, it is classified as a Copper Age civilization.

Very few stone tools have been found here.

The primary tools were made of copper.

Copper sheets, bangles, and beads have been discovered at the site.

The Ahar civilization belongs to the Copper Age/Bronze Age.

No iron was found here.

आहड़ सभ्यता को "ताम्रवती नगरी" या "बनास संस्कृति" भी कहते हैं।

यह उदयपुर के पास बनास नदी किनारे स्थित है।

यहाँ ताँबा गलाने की भट्टियां और slag/कचरा मिला है।

इसलिए इसे ताम्रयुगीन सभ्यता कहते हैं।

यहाँ पत्थर के औजार बहुत कम मिले हैं।

मुख्य औजार ताँबे के थे।

ताँबे की चादरें, चूड़ियाँ, मनके यहाँ से मिले हैं।

आहड़ सभ्यता ताम्रयुग/कांस्ययुग की है।

यहाँ लोहा नहीं मिला।

2. Answer D

Solution

Rairh, Tonk

Malava Janapada – A renowned Janapada of ancient India

Coin-minting facility + vast quantities of iron artifacts

Nagar (Nainwa): Malava coins were found here too, but not a massive collection of iron

Nagari (Madhyamika): Capital of the Shivi Janapada; coins in the Greek style were found here

रैढ़, टोंक

मालव जनपद - प्राचीन भारत का एक प्रसिद्ध जनपद

सिक्के ढालने की टकसाल + लोहे की विशाल सामग्री

नगर (नैनवां): यहाँ भी मालव सिक्के मिले, पर लोहे का विशाल संग्रह नहीं

नगरी (मध्यमिका): शिवि जनपद की राजधानी थी, यहाँ यूनानी शैली के सिक्के मिले

3. Answer B

Solution

Location: Hanumangarh, Ganganagar

The Yaudheyas were not a monarchy.

They followed a republican system.

The inscription "Yaudheya Gana" is found on their coins.

They were worshippers of Lord Kartikeya.

Temples and coins dedicated to Kartikeya have been discovered.

They also worshipped Goddess Chamunda Devi.

स्थान: हनुमानगढ़, गंगानगर

यौधेय राजतंत्रात्मक नहीं थे।

ये गणतंत्रात्मक प्रणाली अपनाते थे।

"यौधेय गण" सिक्कों पर भी लिखा मिलता है।

ये भगवान कार्तिकेय के उपासक थे।

कार्तिकेय के मंदिर और सिक्के मिले हैं।

साथ ही माता चामुंडा देवी की पूजा भी करते थे।

4. Answer C

Solution

Jaipur – Major Eden

Mewar – Major Showers

Bharatpur – Major Morrison

Kota – Major Burton

The most violent rebellion took place in Kota.

Major Burton and his two sons were killed.

Important Note

In 1857, the rulers of most princely states in Rajasthan sided with the British.

Major rebellions occurred only in Kota, Auwa, Neemuch, and Erinpura.

जयपुर - मेजर ईडन

मेवाड़ - मेजर शॉवर्स

भरतपुर - मेजर मॉरिसन

कोटा - मेजर बर्टन

कोटा में सबसे भीषण विद्रोह हुआ।

मेजर बर्टन और उनके 2 बेटों की हत्या कर दी गई।

Important Note

1857 में राजस्थान की अधिकांश रियासतों के शासक अंग्रेजों के साथ थे।

सिर्फ कोटा, आउवा, नीमच, एरिनपुरा में बड़ा विद्रोह हुआ।

5. Answer A

Solution

Faisal Ali Khan – Dundlod Thikana

Location: Dundlod, Shekhawati region

Role in 1857: Very few feudal lords in Rajasthan rebelled against the British.

Faisal Ali Khan was one of them.

He sent military assistance to Mirza Mughal, the son of the Mughal Emperor Bahadur Shah Zafar of Delhi.

फैजल अली खान - डुंडलोद ठिकाना

स्थान: डुंडलोद, शेखावाटी क्षेत्र

1857 में भूमिका: राजस्थान में बहुत कम सामंत थे जिन्होंने अंग्रेजों के खिलाफ विद्रोह किया।

फैजल अली खान उनमें से एक था।

इसने दिल्ली के मुगल बादशाह बहादुर शाह जफर के बेटे मिर्जा मुगल को सैन्य सहायता भेजी।

6. Answer B

Solution

Treaties of 1817-18

Reason: To avoid the attack of Marathas and Pindaris, the princely states of Rajasthan made a "subsidiary treaty" with the British.

Name of the treaty: "Subsidiary Alliance".

First: Karauli - 9 Nov 1817

Kota - 26 Dec 1817

Kishangarh – 07 April 1818

1817-18 की संधियाँ

कारण: मराठों और पिण्डारियों के आक्रमण से बचने के लिए राजस्थान की रियासतों ने अंग्रेजों से "सहायक संधि" की

संधि का नाम: "अधीनस्थ मैत्री संधि" / Subsidiary Alliance.

पहली: करौली - 9 Nov 1817

कोटा - 26 Dec 1817

किशनगढ़ – 07 April 1818

7. Answer D

Solution

Kudan Massacre – April 25, 1935 AD

Shekhawati Farmers' Movement

Katrathal Conference – April 25, 1934 AD

Presided over by: Kishori Devi

The largest conference of women farmers

Hindoli Conference – October 5, 1936 AD

Held in Bundi State

Govindpura Massacre – July 13, 1923 AD

Begu Farmers' Movement

कुदन हत्याकाण्ड - 25 अप्रैल, 1935 ई.

शेखावाटी किसान आंदोलन।

कटराथल सम्मेलन - 25 अप्रैल, 1934 ई.

अध्यक्ष: किशोरी देवी।

महिला किसानों का सबसे बड़ा सम्मेलन।

हिंडोली सम्मेलन - 5 अक्टूबर, 1936 ई.

बूंदी राज्य में हुआ।

गोविन्दपुरा हत्याकाण्ड – 13 July 1923 ई.

बेंगू किसान आंदोलन

8. Answer C

Solution

Chandkhedi and Mandawari were other major centers of the Bengu farmers' movement.

चाँदखेड़ी एवं मण्डावरी

बेंगू किसान आंदोलन के अन्य प्रमुख केंद्र थे

9. Answer B

Solution

Meena Sudhar Samiti (Meena Reform Committee) 1944

Formation: In Jaipur, 1944 AD

Objectives: Eradicating social evils within the Meena community; promoting education; advocating for alcohol prohibition; and preventing child marriage.

Members

Lakshminarayan Jharwal

Banshidhar Sharma

Rajendra Kumar 'Ajay'

मीणा सुधार समिति 1944

गठन: 1944 ई. में जयपुर में

उद्देश्य: मीणा समाज में सामाजिक कुरीतियाँ दूर करना, शिक्षा, शराबबंदी, बाल विवाह रोकना

सदस्य

लक्ष्मीनारायण झरवाल

बंशीधर शर्मा

राजेन्द्र कुमार अजेय

10. Answer B

Solution

7 Stages of the Integration of Rajasthan – Chronology

Matsya Union – 18 March 1948

Alwar + Bharatpur + Dholpur + Karauli + Neemrana

Rajpramukh: Udaybhan Singh

United Rajasthan Union – 25 March 1948

Kota + Bundi + Jhalawar + Tonk + Dungarpur + Banswara + Shahpura + Kishangarh + Pratapgarh + Kushalgarh.
Rajpramukh: Bhim Singh
United Rajasthan – 18 April 1948
United Rajasthan Union + Udaipur.
Rajpramukh: Bhupal Singh.
Prime Minister: Manikya Lal Verma
Greater Rajasthan – 30 March 1949
United Rajasthan + Jaipur + Jodhpur + Bikaner + Jaisalmer. Rajpramukh: Sawai Man Singh.
Prime Minister: Hiralal Shastri
Merger of Matsya Union – 15 May 1949
Merger of Sirohi – 26 January 1950
Rajasthan Union – 1 November 1956
Ajmer-Merwara + Abu-Delwara + Sunel Tappa included.
राजस्थान एकीकरण के 7 चरण – कालक्रम
मत्स्य संघ - 18 मार्च 1948
अलवर + भरतपुर + धौलपुर + करौली + नीमराणा
राजप्रमुख: उदयभान सिंह
संयुक्त राजस्थान संघ - 25 मार्च 1948
कोटा + बूंदी + झालावाड़ + टोंक + डूंगरपुर + बांसवाड़ा + शाहपुरा + किशनगढ़ + प्रतापगढ़ + कुशलगढ़।
राजप्रमुख: भीम सिंह
संयुक्त राजस्थान - 18 अप्रैल 1948
संयुक्त राजस्थान संघ + उदयपुर।
राजप्रमुख: भूपाल सिंह।
प्रधानमंत्री: माणिक्य लाल वर्मा
वृहत्तर राजस्थान - 30 मार्च 1949
संयुक्त राजस्थान + जयपुर + जोधपुर + बीकानेर + जैसलमेर।
राजप्रमुख: सवाई मान सिंह।
प्रधानमंत्री: हीरालाल शास्त्री
मत्स्य संघ का विलय - 15 मई 1949
सिरोही का विलय - 26 जनवरी 1950
राजस्थान संघ - 1 नवंबर 1956
अजमेर-मेरवाड़ा + आबू-देलवाड़ा + सुनेल टप्पा जुड़े।

11. Answer D

Solution

United Rajasthan - 18 April 1948
Rajpramukh: Bhupal Singh - Udaipur
Prime Minister: Manikya Lal Verma
संयुक्त राजस्थान - 18 अप्रैल 1948
राजप्रमुख: भूपाल सिंह - उदयपुर
प्रधानमंत्री: माणिक्य लाल वर्मा

12. Answer B

Solution

Region/Mandal	Founder	Year
A. Sirohi	Gokul Bhai Bhatt	1939
B. Banswara	Bhupendranath Trivedi	1943
C. Kushalgarh	Bhanwarlal Nigam	1942
D. Pratapgarh	Amritlal Payak	1945

जनमण्डल	संस्थापक	वर्ष
A. सिरोही	गोकुल भाई भट्ट	1939
B. बांसवाड़ा	भूपेन्द्रनाथ त्रिवेदी	1943
C. कुशलगढ़	भंवरलाल निगम	1942
D. प्रतापगढ़	अमृतलाल पायक	1945

13. Answer D

Solution

Gentleman's Agreement – 17 Sep 1942 AD
Terms between Jaipur Prime Minister Mirza Ismail and Hiralal Shastri
Responsible governance will be established in Jaipur.
Jaipur state will not help the British
Jaipur Prajamandel can hold peaceful dharna, procession, demonstration etc. :
Jaipur Prajamandal can give shelter to a rebel of British India and the Jaipur state will not arrest him.
जेन्टलमैन एग्रीमेंट – 17 Sep 1942 ई.
जयपुर के प्रधानमंत्री मिर्जा इस्माइल और हीरालाल शास्त्री के बीच शर्तें
जयपुर में उत्तरदायी शासन की स्थापना की जाएगी।
जयपुर रियासत अंग्रेजों की सहायता नहीं करेगी
जयपुर प्रजामंडेल शांतिपूर्ण धरना, जुलुस, प्रदर्शन इत्यादि कर सकता है। :
जयपुर प्रजामंडल ब्रिटिश भारत के विद्रोही की शरण दे सकता है तथा जयपुर रियासत उसे गिरफ्तार नहीं करेगी।

14. Answer A

Solution

Agivana – 1932
The first political newspaper in the Rajasthani language
Editor: Jai Narayan Vyas
Place: Published from Beawar
Objective: To foster political consciousness and promote the Praja Mandal movement
आगीवाणा – 1932
प्रथम राजनैतिक समाचार-पत्र राजस्थानी भाषा में
संपादक: जयनारायण व्यास
स्थान: ब्यावर से प्रकाशित
उद्देश्य: राजनैतिक चेतना और प्रजामंडल आंदोलन को बढ़ावा देना

15. Answer B

Solution

Achar Sudharini Sabha – Dholpur

Founder: Jwala Prasad Jigyasu – 1910

Objective: To eradicate social evils such as child marriage, the 'purdah' system, and extravagant funeral feasts (mrityu-bhoj).

Activities: Promotion of education and social reform.

आचार सुधारिणी सभा – धौलपुर

संस्थापक: ज्वाला प्रसाद जिज्ञासु – 1910

उद्देश्य: सामाजिक कुरीतियों, बाल विवाह, पर्दा प्रथा, मृत्युभोज आदि को दूर करना

कार्य: शिक्षा का प्रचार और समाज सुधार

16. Answer C

Solution

Rastapal Incident – June 19, 1947

Location: Rastapal village, Dungarpur

Martyr: Veerbala Kalibai – a 13-year-old Bhil girl.

She stepped forward to save her teacher, Nanabhai, and was martyred.

Teacher Nanabhai Khant was also martyred,

Teacher Sengabhai was injured.

रास्तापाल काण्ड - 19 जून 1947

स्थान: रास्तापाल गांव, डूंगरपुर

शहीद:वीरबाला कालीबाई - 13 साल की भील बालिका।

गुरु नानाभाई को बचाने के लिए खुद आगे आ गई और शहीद हो गई

गुरु नानाभाई खांट भी शहीद हुए,

अध्यापक सेंगाभाई घायल हुए

17. Answer B

Solution

A rare Lingodbhava idol of Lord Shiva was discovered on the Harshnath Mountain in Sikar; it is currently housed in the Ajmer Museum.

सीकर के हर्षनाथ पर्वत पर भगवान शिव की सबसे दुर्लभ लिंगाद्भव की मूर्ति प्राप्त हुई है जिसे वर्तमान में अजमेर के संग्रहालय में रखा गया है।

18. Answer C

Solution

Harishchandra – Founder of the Pratihara dynasty; renowned by the title 'Rohiladdhi'.

Capital: Mandore, Jodhpur.

Achievement: Laid the foundation of the Pratihara dynasty.

He is known as the "Progenitor of the Pratiharas of Rajasthan."

हरिश्चन्द्र - प्रतिहार वंश के संस्थापक रोहिलद्धी उपाधि से प्रसिद्ध

राजधानी: मण्डोर, जोधपुर

उपलब्धि: प्रतिहार वंश की नींव रखी।

इन्हें "राजस्थान के प्रतिहारों का आदि पुरुष" कहा जाता है

19. Answer A

Solution

Akbar's Fort / Daulatkhana – Built by Akbar in 1570 AD in the heart of Ajmer city.

Later, the British converted it into a "Magazine" (an ammunition depot), which is why it is also known as the "Magazine Fort."

It is the only fort in Rajasthan constructed entirely based on Mughal/Islamic fort architecture.

Other forts, such as Junagarh and Bala Qila, feature a blend of Rajput and Mughal styles; Akbar's Fort is a quadrilateral structure made of red sandstone.

अकबर का किला / दौलतखाना - 1570 ई. में अकबर ने अजमेर शहर के मध्य बनवाया

बाद में इसे अंग्रेजों ने "मैगजीन" यानी गोला-बारूद का गोदाम बना दिया, इसलिए "मैगजीन किला" भी कहते हैं

यह राजस्थान का एकमात्र दुर्ग है जो पूरी तरह से मुगल/इस्लामिक दुर्ग वास्तुकला पर बना है

बाकी किले जैसे जूनागढ़, बाला किला राजपूत शैली + मुगल मिश्रण हैं (अकबर का किला लाल बलुआ पत्थर का, चारकोणीय से बना है)

20. Answer D

Solution

Rao Mukund Singh – 1648–1658 AD

Maharao Bhim Singh I – 1707–1720 AD

Maharao Umed Singh II – 1770–1819 AD (Founder of modern Kota)

Kishor Singh II – 1819–1828 AD

राव मुकुन्द सिंह - 1648 - 1658 ई.

महाराव भीमसिंह -I - 1707 - 1720 ई.

महाराव उम्मेद सिंह -II – 1770 – 1819 ई. (आधुनिक कोटा के निर्माता)

किशोर सिंह -II - 1819 - 1828 ई.

21. Answer C

Solution

Maharana Kumbha – "Abhinav Bharatacharya"

Kumbha's court scholars:

Natha – Musician, author of "Raga Chandrika"

Tilla Bhatta – Renowned musician

Bhuvanamand Suri – Jain scholar, wrote a commentary on "Sangeet Raj"
Krishna Bhatta – A courtier of Maharana Sangram Singh I
महाराणा कुम्भा - "अभिनव भरताचार्य"
कुम्भा के दरबारी विद्वान:
नाथा - संगीतज्ञ, "राग चन्द्रिका" के रचयिता
टिल्ला भट्ट - प्रसिद्ध संगीतज्ञ
भुवनमंद सूरि - जैन विद्वान, "संगीत राज" पर टीका लिखी
कृष्णभट्ट महाराणा संग्राम सिंह -I के दरबारी थे

22. Answer A

Solution

Event – 1678 AD
Context: After the death of Maharaja Jaswant Singh of Jodhpur, Aurangzeb attempted to imprison his son, Ajit Singh.
Durgadas Rathore fled to Mewar with Ajit Singh.
Ruler of Sirohi – Rao Vairisal
Location: Ajit Singh was given refuge in Kalindri village, Sirohi.
घटना - 1678 ई.
संदर्भ: औरंगजेब ने जोधपुर के महाराजा जसवंत सिंह की मृत्यु के बाद उनके पुत्र अजीत सिंह को कैद करने की कोशिश की
दुर्गादास राठौड़ अजीतसिंह को लेकर मेवाड़ भागे
सिरोही के शासक - राव वैरिसाल
स्थान: कालिन्द्रि गाँव, सिरोही में अजीतसिंह को शरण दी

23. Answer A

Solution

Nrityaratnakosha – Rana Kumbha
Shraddha Prayoga Chintamani – Anup Singh
Nehatarang – Buddha Singh
Veli Krishna Rukmani Ri – Prithviraj Rathore
He was a distinguished poet of the Dingal language, a scholar, and a courtier of Akbar. "Veli" is considered the finest work in Dingal.
नृत्यरत्नकोष - राणा कुम्भा
श्राद्ध प्रयोग चिन्तामणि – अनुपसिंह
नेहतरंग – बुद्धसिंह
वेलि कृष्ण रुक्मणी री - पृथ्वीराज राठौड़
डिंगल भाषा के श्रेष्ठ कवि व अकबर के दरबारी विद्वान थे
"वेलि" को डिंगल की सर्वश्रेष्ठ रचना माना जाता है

24. Answer D

Solution

All three statements are true.
तीनों कथन सत्य हैं

25. Answer A

Solution

Battle of Kayadara (1178 CE) (Sirohi)
Muhammad Ghori vs. Mularaja II (Chalukya) — [with] Nayika Devi, Dharavarsha, Kelhan and Kirtipala.
Nayika Devi defeated Muhammad Ghori.
कायन्द्रा का युद्ध 1178 ई. (सिरोही)
मोहम्मद गौरी बनाम मूलराज -II चालुथ्य (नायिका देवो.) धारावर्ष केल्हण, कीर्तिपाल
नायिका देवी ने मोहम्मद गौरी को पराजित किया।

26. Answer A

Solution

Rajasthan Public Service Guarantee Act, 2011
Came into force on 14 November 2011.
Section 2 – Definitions
Section 5 – Provision of service within the stipulated time limit
Section 9 – Protection of action taken in good faith
Section 10 – Power to make rules
Section 8 – Revision
राजस्थान लोक सेवा गारंटी अधिनियम 2011
14 नवम्बर 2011 को लागू।
धारा 2 – परिभाषाएँ
धारा 5 - नियत समय-सीमा में सेवा प्रदान करना
धारा 9 - सद्भावनापूर्वक की गई कार्रवाई का संरक्षण
धारा 10 – नियम बनाने की शक्ति
धारा 8 - पुनरीक्षण

27. Answer A

Solution

Rajasthan State Election Commission
Established: July 1, 1994 – following the 73rd and 74th Constitutional Amendments
First Commissioner: Amarjeet Singh Rathore
It is a single-member body
Tenure: 5 years or up to the age of 65 (whichever is earlier)
The procedure for removing the State Election Commissioner is the same as that for a High Court judge
The Governor can remove the Commissioner in the same manner as the President removes a High Court judge
Under Article 243K of the Constitution

राजस्थान राज्य निर्वाचन आयोग
स्थापना: 01 July 1994 - 73वें और 74वें संविधान संशोधन के बाद
पहला आयुक्त: अमरजीत सिंह राठौड़
यह एक सदस्यीय निकाय है
कार्यकाल : 5 वर्ष या 65 वर्ष की आयु (जो भी पहले हो)
राज्य निर्वाचन आयुक्त को हटाने की प्रक्रिया उच्च न्यायालय के न्यायाधीश के समान है
इसे राज्यपाल उसी रीति से हटा सकता है जैसे HC जज को राष्ट्रपति हटाता है
संविधान के अनुच्छेद 243K के तहत

28. Answer C

Solution

The Speaker of the Legislative Assembly is not a member of the State Information Commission.
Composition of the Selection Committee – Section 15(3) of the RTI Act
The Chairperson and members of the State Information Commission are appointed by the Governor based on the recommendation of a committee.
The committee consists of three members:
Chief Minister – Chairperson of the committee
Leader of the Opposition in the Legislative Assembly – Member
A Cabinet Minister nominated by the Chief Minister – Member
राज्य सूचना आयोग में विधानसभा अध्यक्ष सदस्य नहीं होता।
चयन समिति की संरचना - धारा 15(3) RTI Act
राज्य सूचना आयोग के अध्यक्ष + सदस्यों की नियुक्ति राज्यपाल द्वारा एक समिति की सिफारिश पर होती है।
समिति में 3 सदस्य होते हैं:
मुख्यमंत्री - समिति के अध्यक्ष
विधानसभा में विपक्ष का नेता – सदस्य
मुख्यमंत्री द्वारा मनोनीत कैबिनेट मंत्री – सदस्य

29. Answer B

Solution

The SHRC was established on January 18, 1999.
The term of office is 5 years or up to the age of 70, whichever is earlier.
SHRC की स्थापना 18 जनवरी 1999 को हुई।
कार्यकाल 5 वर्ष या 70 वर्ष की आयु, जो भी पहले हो।

Chairperson	Tenure
A. Justice Smt. Kanta Bhatnagar	March 2000 to Aug 2000
B. Justice S. K. Jain	2005 - 2010, a full 5 years
C. Justice S. Saghir Ahmad	2001 - 2004
D. Justice Prakash Tatia	2016 - 2019

अध्यक्ष	कार्यकाल
A. न्यायमूर्ति श्रीमती कांता भटनागर	March 2000 to Aug 2000
B. न्यायमूर्ति एस. के. जैन	2005 - 2010, पूरे 5 वर्ष
C. न्यायमूर्ति एस. सगीर अहमद	2001 - 2004
D. न्यायमूर्ति प्रकाश टाटिया	2016 - 2019

Establishment: Under the Protection of Human Rights Act, 1993
Headquarters: Jaipur
Members: 1 Chairperson + 2 Members
स्थापना : मानवाधिकार संरक्षण अधिनियम 1993 के तहत
मुख्यालय : जयपुर
सदस्य: 1 अध्यक्ष + 2 सदस्य

30. Answer C

Solution

It is a non-constitutional body established under the Rajasthan Lokayukta and Up-Lokayukta Act, 1973.
The Lokayukta only conducts investigations and submits reports or recommendations.
The government is required to report the action taken within three months, but it is not mandatory to accept the recommendations.
Therefore, the recommendations are not binding.
First Lokayukta: Justice I.D. Dua – 1973
Tenure: 5 years or 65 years of age (whichever is earlier)
Appointment: By the Governor, in consultation with the Chief Minister, the Chief Justice of the High Court, the Speaker of the Legislative Assembly, and the Leader of the Opposition (LOP).
Up-Lokayukta: There is one post.

यह राजस्थान लोकायुक्त एवं उप-लोकायुक्त अधिनियम 1973 द्वारा बना गैर-संवैधानिक संस्थान है।
लोकायुक्त केवल जांच कर रिपोर्ट/सिफारिश भेजता है।
सरकार को 3 महीने में कार्यवाही बतानी होती है, पर मानना जरूरी नहीं।
इसलिए बाध्यकारी नहीं।
पहले लोकायुक्त: न्यायमूर्ति आई.डी. दुआ – 1973
कार्यकाल: 5 वर्ष या 65 वर्ष (जो भी पहले हो)
नियुक्ति: राज्यपाल द्वारा CM, HC CJ, विधानसभा अध्यक्ष, LOP की सलाह से
उप-लोकायुक्त: 1 होता है

31. Answer B

Solution

A Tehsildar is an officer of the Rajasthan State Service.
The authority to suspend or dismiss a Tehsildar rests solely with the Board of Revenue, Ajmer.
The District Collector can only recommend disciplinary action.
Hierarchy: District Collector > Additional Collector > Sub-Divisional Officer > Tehsildar > Naib Tehsildar > Patwari > Girdawar; Naib Tehsildars work directly under the Tehsildar.
तहसीलदार राजस्थान राज्य सेवा का अधिकारी होता है।
इसका निलंबन तथा निष्कासन का अधिकार सिर्फ राजस्व मण्डल, अजमेर को है।
जिला कलेक्टर केवल अनुशासनात्मक कार्रवाई की सिफारिश कर सकता है।
पदसोपान : जिला कलेक्टर > अतिरिक्त कलेक्टर > उपखण्ड अधिकारी > तहसीलदार > नायब तहसीलदार > पटवारी > गिरदावर, नायब तहसीलदार सीधे तहसीलदार के अधीन काम करते है

32. Answer B

Solution

The District Collector serves as the Chairperson of the District Disaster Management Authority (DDMA).
The District Superintendent of Police (SP) is a member of the authority.
Basis: Disaster Management Act, 2005.
During the decennial census, the District Collector acts as the "Principal Census Officer" for the district.
He coordinates census operations across the entire district.
Rajasthan Civil Services Appellate Tribunal
The headquarters of RCAT is located in Jaipur.
It also has benches in Jodhpur and Ajmer.
जिला आपदा प्रबंधन प्राधिकरण - DDMA का अध्यक्ष = जिला कलेक्टर होता है।
जिला पुलिस अधीक्षक SP इसका सदस्य होता है।
आधार: आपदा प्रबंधन अधिनियम 2005
हर 10 साल में होने वाली जनगणना में जिला कलेक्टर "जिले का प्रमुख जनगणना अधिकारी" होता है।
वह पूरे जिले में जनगणना का समन्वय करता है।
राजस्थान सिविल सेवा अपीलीय अधिकरण
RCAT का मुख्यालय जयपुर में है।
इसकी खंडपीठें जोधपुर और अजमेर में भी हैं।

33. Answer B

Solution

According to Article 164(1A), the size of the Council of Ministers is 15% of the Legislative Assembly members.
It can comprise up to 30 ministers, including the Chief Minister.
There are three categories of ministers: Cabinet Ministers (holding key portfolios), Ministers of State (holding independent charge or assisting Cabinet Ministers), and Deputy Ministers (subordinate to Cabinet Ministers).
Not all ministers are Cabinet Ministers.
The Cabinet is the smallest yet most significant part of the Council of Ministers.
It includes ministers holding crucial portfolios such as Home Affairs, Finance, and Education.
Currently, the post of Deputy Minister does not exist in the Rajasthan government.
There are only Cabinet Ministers and Ministers of State.
अनुच्छेद 164(1A) के अनुसार मंत्रिपरिषद का आकार = विधानसभा सदस्यों का 15%
इसमें CM सहित 30 मंत्री हो सकते हैं।
मंत्री 3 प्रकार के होते हैं:कैबिनेट मंत्री - महत्वपूर्ण विभागराज्य मंत्री - स्वतंत्र प्रभार या कैबिनेट मंत्री के साथ
उपमंत्री - कैबिनेट मंत्री के अधीन
सभी मंत्री कैबिनेट मंत्री नहीं होते।
कैबिनेट मंत्रिपरिषद का सबसे छोटा और महत्वपूर्ण हिस्सा है।
इसमें गृह, वित्त, शिक्षा जैसे महत्वपूर्ण विभागों के मंत्री होते हैं।
वर्तमान में राजस्थान सरकार में उपमंत्री पद नहीं है।
केवल कैबिनेट मंत्री + राज्य मंत्री हैं।

34. Answer D

Solution

Smt. Vasundhara Raje: Served as a Union Minister in the Vajpayee government.

Portfolios: Small-scale Industries; Personnel, Public Grievances and Pensions.

Shri Ashok Gehlot: Served as a Union Minister in the UPA government from 2004 to 2008.

Portfolios: Sports; Youth Affairs; Statistics and Programme Implementation.

श्रीमती वसुंधरा राजे: वाजपेयी सरकार में केंद्रीय मंत्री रहीं।

विभाग: लघु उद्योग एवं कार्मिक, लोक शिकायत और पेंशन

श्री अशोक गहलोत: 2004-2008 तक UPA सरकार में केंद्रीय मंत्री रहे।

विभाग: खेल, युवा मामले, सांख्यिकी एवं कार्यक्रम क्रियान्वयन

35. Answer A

Solution

According to the Legislative Assembly rules, at least three sessions must be convened in a calendar year: the Budget Session, the Monsoon Session, and the Winter Session.

Note: While Article 174 of the Constitution mandates a session at least once every six months, the rules in Rajasthan provide for three sessions.

Bicameral states = States having both a Legislative Assembly and a Legislative Council.

Examples: UP, Bihar, Maharashtra, Karnataka, etc.

Rajasthan does not have a Legislative Council; therefore, it is unicameral.

विधानसभा नियमों के अनुसार एक कैलेंडर वर्ष में कम से कम 3 सत्र बुलाए जाने चाहिए - बजट सत्र, मानसून सत्र, शीतकालीन सत्र।

नोट: संविधान अनु. 174 कहता है 6 माह में 1 बार, पर राजस्थान के नियमों में 3 सत्र का प्रावधान है।

द्विसदनीय राज्य = विधानसभा + विधानपरिषद वाले राज्य।

जैसे: UP, बिहार, महाराष्ट्र, कर्नाटक आदि।

राजस्थान में विधानपरिषद नहीं है, इसलिए यह एकसदनीय है।

36. Answer B

Solution

A. अनुच्छेद 155	राज्यपाल की नियुक्ति
B. अनुच्छेद 156	राज्यपाल का कार्यकाल
C. अनुच्छेद 158	राज्यपाल के पद के लिए शर्तें
D. अनुच्छेद 159	राज्यपाल द्वारा शपथ या प्रतिज्ञान

A. Article 155	Appointment of the Governor
B. Article 156	Term of office of the Governor
C. Article 158	Conditions of the Governor's office
D. Article 159	Oath or affirmation by the Governor

Key points

Important Articles related to the Governor

Article 153: There shall be a Governor for each state

Article 154: Executive power of the state vested in the Governor

Article 155: Appointment of the Governor – by the President

Article 156: Term of office of the Governor – 5 years; holds office during the pleasure of the President

Article 157: Qualifications for appointment as Governor

- Must be a citizen of India
- Must have completed 35 years of age

Article 158: Conditions of office – salary, allowances, and not holding any other office

Article 159: Oath or affirmation

राज्यपाल से संबंधित महत्वपूर्ण अनुच्छेद

अनुच्छेद 153: प्रत्येक राज्य में एक राज्यपाल होगा

अनुच्छेद 154: राज्य की कार्यपालिका शक्ति राज्यपाल में निहित

अनुच्छेद 155: राज्यपाल की नियुक्ति - राष्ट्रपति द्वारा

अनुच्छेद 156: राज्यपाल का कार्यकाल - 5 वर्ष, राष्ट्रपति के प्रसादपर्यंत

अनुच्छेद 157: राज्यपाल नियुक्त होने की अर्हताएँ

- भारत का नागरिक हो
- 35 वर्ष की आयु पूरी कर चुका हो

अनुच्छेद 158: पद के लिए शर्तें - वेतन, भत्ते, अन्य पद धारण न करना

अनुच्छेद 159: शपथ या प्रतिज्ञान

37. Answer C

Solution

Article 164(1)

The Governor appoints ministers on the advice of the Chief Minister.

Article 165

The Governor appoints the Advocate General of the state.

The Parliamentary Secretary is appointed by the Chief Minister.
This is not a constitutional post.
It is created only to assist the minister.
The Governor has no role in this.
Upalokayukta
Rajasthan Lokayukta and Up-Lokayukta Act 1973
The Governor appoints the CM, HC CJ, on the advice of the Assembly Speaker, LOP.
अनुच्छेद 164(1)
मुख्यमंत्री की सलाह पर राज्यपाल मंत्रियों को नियुक्त करता है।
अनुच्छेद 165
राज्यपाल राज्य का महाधिवक्ता नियुक्त करता है।
संसदीय सचिव की नियुक्ति मुख्यमंत्री करता है।
यह संवैधानिक पद नहीं है।
यह केवल मंत्री को सहायता के लिए बनाया जाता है।
राज्यपाल की इसमें कोई भूमिका नहीं।
उपलोकायुक्त
राजस्थान लोकायुक्त एवं उप-लोकायुक्त अधिनियम 1973
राज्यपाल CM, HC CJ, विधानसभा अध्यक्ष, LOP की सलाह से नियुक्त करता है।

38. Answer D

Solution

Following the implementation of the Panchayati Raj Act, 1994 in Rajasthan, the first Gram Sabha was constituted in 1999 at Muhana (Jaipur) by Chief Minister Shri Ashok Gehlot.
राजस्थान में पंचायती राज अधिनियम 1994 लागू होने के बाद प्रथम ग्राम सभा का गठन 1999 में मुख्यमंत्री श्री अशोक गहलोत द्वारा मुहाना (जयपुर) में स्थापित की गई

39. Answer B

Solution

During the era of princely states, several states enacted Panchayat laws.
Examples include Jodhpur (1928), Bharatpur (1930), Jaipur (1935), Sirohi (1933), Udaipur (1946), and Karauli (1947).
The State of Bikaner was the first to enact the "Bikaner Gram Panchayat Act, 1928."
This is considered the oldest Panchayat Act in all of India.
The "Rajasthan Panchayat Act, 1948" was enacted,
but it was not implemented across the entire state—only in certain parts.
A uniform Act for the whole of Rajasthan was introduced in 1953.
रियासत काल में कई रियासतों ने पंचायत कानून बनाए थे।
जोधपुर-1928, भरतपुर-1930, जयपुर-1935, सिरोही-1933, उदयपुर-1946, करौली-1947 आदि।
बीकानेर राज्य ने सबसे पहले "बीकानेर ग्राम पंचायत अधिनियम 1928" बनाया था।
यह पूरे भारत में सबसे पुराना पंचायत अधिनियम माना जाता है।
"राजस्थान पंचायत अधिनियम 1948" बना था,
और यह पूरे राज्य में लागू नहीं हुआ था, केवल कुछ हिस्सों में।
पूरे राजस्थान में एक समान अधिनियम 1953 में आया।

40. Answer D

Solution

Article 243W and the 12th Schedule assign 18 subjects to municipalities.
Vital statistics (birth and death registration)
Roads and bridges
Fire services
Markets and fairs – this is not a subject of the 12th Schedule; "markets and fairs" is a subject of the State List.
अनुच्छेद 243W + 12वीं अनुसूची में नगरपालिकाओं को 18 विषय दिए गए हैं।
जन्म-मरण सांख्यिकी
सड़कें और पुल
अग्निशमन सेवाओं
बाजार और मेले - यह 12वीं अनुसूची का विषय नहीं है"बाजार और मेले" राज्य सूची का विषय है,

41. Answer D

Solution

For calculating wind load on the members of a truss, the sequence is:
Step 1 : Basic Wind Speed (V_b)
The basic wind speed is obtained from the wind speed map.
Step 2: Design Wind Speed (V_z)
The basic wind speed is modified using appropriate factors :
$V_z = V_b k_1 k_2 k_3$
Step 3: Design wind Pressure (p_z)
The design wind pressure is calculated from the design wind speed:
$p_z = 0.6 V_z^2$
Step 4: Wind Load

Finally, the wind load is calculated using the design wind pressure and the effective area of the structure.

Therefore, the correct sequence is:

$2 \rightarrow 4 \rightarrow 3 \rightarrow 1$

42. Answer C

Solution

In order to increase the radius of gyration, we need to increase the moment of inertia of the built-up section and this can be done by placing the elements away from the principal axis.

Lacing shall be placed at 40° to 70° to the axis of built-up members and batten shall be placed in the transverse direction. So this statement is incorrect.

43. Answer C

Solution

Combination	Limit State of Strength					Limit State of Serviceability			
	DL	LL"		WL/EL	AL	DL	LL"		WL/EL
		Leading	Accomp-anying				Leading	Accomp-anying	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
DL+LL+CL	1.5	1.5	1.05	-	-	1.0	1.0	1.0	-
DL+LL+CL+WL/EL	1.2	1.2	1.05	0.6	-	1.0	0.8	0.8	0.8
	1.2	1.2	0.53	1.2					
DL+WL/EL	1.5/0.9*	-	-	1.5	-	1.0	-	-	1.0
DL+ER	1.2	1.2	-	-	-	-	-	-	-
	0.9*								
DL+LL+AL	1.0	0.35	0.35	-	1.0	-			-

(1) When action of different live loads is simultaneously considered, the leading live load shall be considered to be the one causing the higher load effects in the member/section.

* This value is to be considered when the dead load contributes to stability against overturning is critical or the dead load causes reduction in stress due to other loads.

Abbreviations:

DL = Dead load, LL = Imposed load (Live loads), WL = Wind load, CL = Crane load (Vertical/Horizontal), AL= Accidental load, ER = Erection load, EL = Earthquake load.

44. Answer D

Solution

Battening of the composite column should not be done if it is subjected to eccentric loading or a applied moment in the plane of battens. Also Battens shall be designed to carry the bending moments and shear arising from transverse shear force V of 2.5% of total axial force on whole compression member, at any point in the length of member, divided equally between parallel planes of battens.

45. Answer D

Solution

Type of Formwork	Minimum period Formwork
Props to slabs → Spanning up to 4.5 m → Spanning over *4.5* m	7 days 14 days
Props to beams and arches	14 days 21 days
→ Spanning up to 6 m →Spanning over 6 m	
Vertical formwork to columns walls, beams	16-24 hours
Soffit formwork to slabs	3 days

46. Answer D

Solution

For a tension member having staggered or zigzag rivet holes, the net width along a zigzag failure path is calculated as :

$$b_n = b - \sum d_h + \sum \frac{s^2}{4g}$$

Therefore, the net cross-sectional area is:

$$A_n = t \times \left(b - \sum d_h + \sum \frac{s^2}{4g} \right)$$

For each staggered pitch, the correction term added to the net area is:

$$\frac{s^2}{4g} \times t$$

Hence, the net cross-sectional area is increased by an amount equal to

$$\frac{s^2 t}{4g}$$

where:

s = staggered pitch,

g = gauge distance,

t = thickness of plate.

47. Answer C

Solution

Neutral axis coincides with the centroidal axis only in the region of linear stress-strain curve.

In WSM, we use linear stress-strain curve, while in LSM, we use non linear stress strain curve, hence in LSM, centroidal axis and neutral axis do not coincide.

Hence assertion is correct.

In working stress method, there is strain compatibility in bond between steel and concrete and it is assumed that concrete is elastic, steel and concrete act together elastically and the relationship between stress and strain is linear. Hence reason given is wrong.

48. Answer B

Solution

In a bracket connection subjected to an external moment M, the rivets are arranged in m vertical lines at a pitch p.

The moment of resistance of the rivet group is given by :

$$M = \frac{R \times n^2 \times m \times p}{6}$$

where R is the strength (rivet value) of one rivet and n is the number of rivets in one line. Rearranging the above equation to find n :

$$n = \sqrt{\frac{6M}{mpR}}$$

49. Answer D

Solution

A. IS-875 - Loads calculation

B. IS-1343 - Prestress design

C. IS-1893 - Earthquake resistant design

D. IS-3370 - Liquid retaining structure

50. Answer B

Solution

As per IS 800 : 2007 (Clause 10.5.7.3 – Long Joints), When the length of the welded joint of a splice or end connection in a compression or tension element exceeds 150 times the throat size of the weld, the design capacity of the weld shall be reduced by multiplying with a reduction factor.

$$\beta_{lw} = 1.2 - \frac{0.2L_j}{150t_t} \le 1.0$$

where

L_j = length of the joint in the direction of the force,

t_t = throat size of the weld.

51. Answer C

Solution

For flaky aggregate :- Least dimension is 0.6 times of mean dimension.

For elongated aggregate : - Maximum dimension is 1.8 times of mean dimension.

52. Answer C

Solution

Nominal cover protects steel from rust, provides fire insulation, and ensures proper bond stress transfer. Statement **(2)** is incorrect because shear resistance is handled by transverse stirrups or bent-up bars, not the concrete cover.

53. Answer C

Solution

As per IS 800 : 2007, Clause 10.3.4, the nominal bearing strength of a bolt is given by:

$$V_{npb} = 2.5k_b dtf_u$$

where

k_b is the smaller of $\frac{e}{3d_0}, \frac{p}{3d_0} - 0.25, \frac{f_{ub}}{f_u}$ and 1.0

e = end distance,

p = pitch distance,

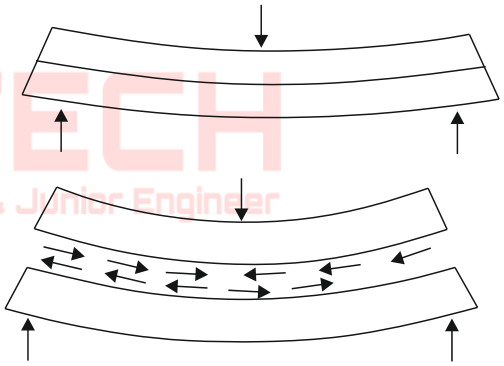
d_0 = diameter of the hole,

f_u = ultimate tensile stress of the plate.

54. Answer B

Solution

Minimum shear reinforcement as stirrups must be provided in beams even if the shear stress (τ_v)< shear strength of concrete (τ_c) because it restrains the growth of inclined cracks, introduces ductility in shear, and improves the dowel action of the longitudinal tension bars.



(Shear in homogeneous rectangular beams)

Bending in beams creates a tendency in the particle to slide upon each other, this is called shear (shown in figure).

55. Answer C

Solution

As per IS 800 : 2007, for high - strength friction grip (HSFG) bolts, the proof stress used to calculate the minimum bolt tension (pretension) is taken as:

$f_0 = 0.7 f_{ub}$

where f_{ub} is the ultimate tensile stress of the bolt.

56. Answer D

Solution

Development length (L_d) = $\frac{\phi\sigma_{st}}{4\tau_{bd}}$

For mild steel

$$L_d = \frac{\phi \times 250 \times 0.87}{4\tau_{bd}}$$

$$= 54.375\frac{\phi}{\tau_{bd}}$$

For HYSD bar

$$L_d = \frac{\phi \times 0.87 \times 415}{4 \times 1.6 \times \tau_{bd}}$$

$$= 56.41\frac{\phi}{\tau_{bd}}$$

L_d required is more for HYSD bar

57. Answer B

Solution

In tension members (as per IS 800 : 2007):

Gross section yielding occurs when the stress on the gross cross-sectional area reaches the yield stress f_y

This leads to extensive plastic deformation (elongation) along the length of the member before actual fracture takes place. It is a ductile mode of failure.

Net section rupture is a brittle failure that occurs suddenly at the weakest net section (usually at bolt holes) with very little prior deformation.

Block shear failure involves a combination of shear and tension failure of a block of material and is relatively less ductile.

Torsional warping is not a governing failure mode for pure tension members.

Hence, considerable longitudinal deformation before fracture occurs only in gross section yielding.

58. Answer C

Solution

Reinforcement type:

(i) Footing slab, tensile reinforcement

(ii) Cantilever beam, tensile reinforcement

(iii) Simply supported beam, tensile reinforcement

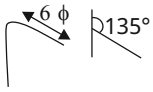
(iv) Beam, shear stirrup

Anchorage requirement:

(a) L_d from the column face

(b) L_d into the support

(c) $L_d/3$ into the support

(d) 

, i.e 6ϕ for 135° bend.

59. Answer B

Solution

As per IS 800 : 2007, Clause 6.3.3 (Single Angles):

For preliminary sizing, the rupture strength of the net section may be approximately taken as

$$T_{dn} = \alpha \times A_n \frac{f_u}{\gamma_{m1}}$$

where

α = 0.6 for one or two bolts,

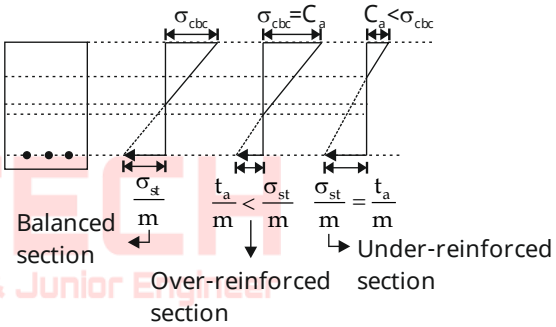
α = 0.7 for three bolts,

α = 0.8 for four or more bolts along the length in the end connection (or equivalent weld length).

A_n is the net area of the total cross-section.

60. Answer D

Solution



For an over-reinforced section, concrete reaches its permissible limit before steel reaches its permissible limit. Hence concrete fails first.

Whereas, in an under-reinforced section, steel reaches its permissible limit before concrete reaches its permissible limit. Hence steel fails first.

As steel is more ductile than concrete, hence the behaviour of an under reinforced beam is more ductile than an over-reinforced beam.

Hence assertion is wrong.

61. Answer D

Solution

As per IS 800 : 2007, Table 7 (Imperfection Factors), the values of the imperfection factor α corresponding to the different buckling classes are:

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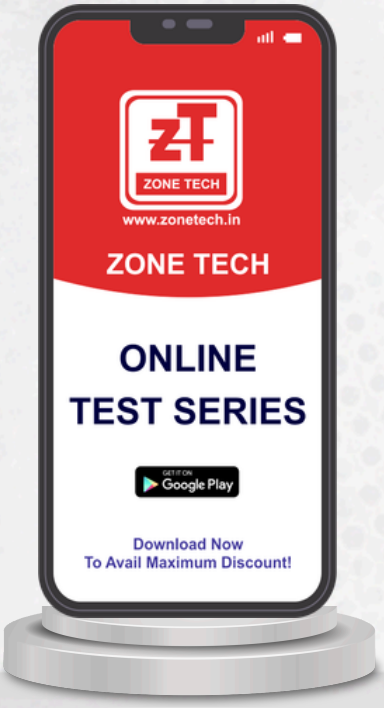

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Buckling Class	Imperfection Factor (α)
A	0.21
B	0.34
C	0.49
D	0.76

These factors are used in the calculation of the design compressive stress f_{cd} for members under axial compression (Clause 7.1.2).

62. Answer B

Solution

(a) Minimum % of tension reinforcement of RC beam : $\frac{85}{f_y}(\text{Cl}\,26.5.1.1)$

(b) Minimum % of shear reinforcement of RC beam : $\frac{40S_v}{f_y d}\,\text{derived from}\,(\text{Cl}\,26.5.1.6)$

(c) Maximum allowable % of tensile reinforcement : 4% (Cl 26.5.1.1)

(d) Maximum allowable % % of compression reinforcement : 4% of RC beam (Cl 26.5.1.2)

63. Answer D

Solution

As per IS 800 : 1984, the Merchant-Rankine formula is used to determine the permissible stress in axial compression for columns/struts.

The formula is expressed as:

$$\frac{1}{(f)^n}=\frac{1}{(f_e)^n}+\frac{1}{(f_y)^n}$$

or equivalently

$$\frac{1}{(f)^n}=\frac{1}{(f_{cc})^n}+\frac{1}{(f_y)^n}$$

where

f (or σ_{ac})= permissible stress in axial compression

f_e or f_{cc} = elastic critical stress in compression = $\frac{\pi^2 E}{\lambda^2}$

f_y = yield stress of steel

n = imperfection factor (taken as 1.4)

λ = slenderness ratio

A factor of safety is then applied to obtain the design/permissible value (limited also to $0.6f_y$).

64. Answer B

Solution

Following precautions are required for concreting in sub zero temperature:

(i) Utilisation of heat developed by the hydration of cement and practical methods of insulation.

(ii) Selection of suitable type of cement.

(iii) Economical heating of material of concrete.

(iv) Admixture of antifreezing material.

(v) Electrical heating of concrete mass.

(vi) Use of air entraining agents.

65. Answer C

Solution

0.04b	Maximum area of tension reinforcement in beams
$\frac{250b^2}{d}$	Slenderness limit for simply supported or continuous beam to ensure lateral stability.
$\frac{100b^2}{d}$	Slenderness limit to ensure lateral stability for cantilever
$\frac{k_x l_x}{D_x}$	Column

66. Answer D

Solution

As per IS 800 (Clause 7.7.2.1 for battened columns) :

Battens shall be designed to carry the bending moments and shear forces arising from a transverse shear force V_t equal to 2.5% of the total axial force on the whole compression member (divided equally between the parallel planes of battens).

At each connection, the batten must resist simultaneously :

A longitudinal shear force along the column axis:

$$V_b=\frac{V_t C}{NS}$$

A moment

$$M=\frac{V_t C}{2N}$$

where the symbols have the meanings given in the question.

67. Answer D

Solution

As per IS 13311,

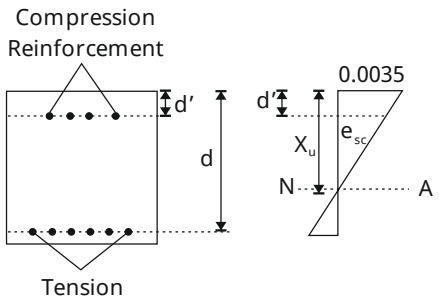
Velocity criterion for concrete quality

Pulse velocity (km/h) Concrete quality

Above 4.5	Excellent
3.5-4.5	Good
3.0-3.5	Medium
Below 3.0	Doubtful

68. Answer B

Solution



$$\frac{0.0035}{x_u} = \frac{e_{sc}}{X_u - d'}$$

e_{sc} = maximum strain in concrete at the level of compression reinforcement.

$$e_{sc}=0.0035\left(1-\frac{d'}{x_u}\right)$$

69. Answer B

Solution

As per IS 800 : 2007, Clause 7.6.5.1 (Spacing of lacing bars):

The maximum spacing of lacing bars (whether connected by bolting, riveting or welding) shall be such that the maximum slenderness ratio of the components of the main member between consecutive lacing connections is not greater than 50 or 0.7 times the most unfavourable slenderness ratio of the member as a whole, whichever is less.

This limit is imposed to prevent local buckling of the individual main components between the lacing points.

70. Answer D

Solution

Clause 3.2.3., BIS-'SP-16'

Design charts for combined axial compression and bending are given in the form of interaction diagrams in which curves for $\frac{P_u}{f_{ck}bD}$ versus $\frac{M_u}{f_{ck}bD^2}$ are plotted for different values of $\frac{p}{f_{ck}}$, where p is the reinforcement percentage.

71. Answer D

Solution

In plate girders, bearing stiffeners (also referred to as bearing plates in some contexts) are provided at supports and under concentrated loads.

Their primary purpose is to:

Prevent local buckling or crippling of the thin web under high concentrated compressive forces (reactions or loads).

Distribute the concentrated force into the web over a sufficient area so that the web does not crush or buckle locally.

They also help in transferring the load into the web, but the main design intent (as per IS 800) is to safeguard the web against buckling/crippling.

72. Answer A

Solution

Both Statement (I) and Statement (II) are true, and Statement (II) gives the correct reason for Statement (I). When a long or slender column takes a load, it bends sideways. This side movement creates extra bending force, so designers must include these extra moments. Therefore, the correct choice is **(a)**

73. Answer D

Solution

As per IS 800 : 2007, Clause 8.4.1:

The nominal plastic shear resistance under pure shear is given by:

$$V_n = V_p = \frac{A_v f_{yw}}{\sqrt{3}}$$

Where

A_v = shear area of the section

f_{yw} = yield strength of the web

The design shear strength is then obtained as $V_d = V_n/\gamma_{m0}$ (with γ_{m0} = 1.10).

74. Answer D

Solution

Stress	Resultant Location
(i) Bending moment	(a) At the face of the column
(ii) one way shear	(b) At d from the face of column
(iii) Two way shear	(c) At d/2 from the face of column.

75. Answer C

Solution

As per IS 800:2007, Table 6 (Deflection Limits):

For gantry girders, the recommended maximum vertical deflection limits under crane loads are:

Manually operated cranes → L/500

Electrically operated (EOT) cranes with capacity up to 50 t (500 kN) → L/750

Electrically operated (EOT) cranes with capacity over 50 t (500 kN) → L/1000

76. Answer C

Solution

During design we check depth of footing by maximum bending moment, maximum shear force and punching shear.

77. Answer B

Solution

As per IS 800 : 2007, Clause 8.7.2.6 (Connection of intermediate stiffeners to web) :

Intermediate transverse stiffeners not subject to external loading should be connected to the web so as to withstand a shear between each component of the stiffener and the web (in kN/mm) of not less than:

$$\frac{t_w^2}{5b_s}$$

where

t_w = web thickness (mm)

b_s = outstand width of the stiffener (mm)

For stiffeners subject to external loading, the shear due to such loading shall be added to the above value.

78. Answer A

Solution

Total Loss in the pretensioned beam is due to elastic deformation of concrete, relaxation of steel, shrinkage of concrete and due to creep of concrete, which adds to around 20% of total prestress.

In post tensioned member the loss is due to elastic shortening does not occur, if the members are loaded simultaneously.

This loss in the pretensioned member is maximum of all, which does not occur in the post tensioned member, that is why overall losses in post tensioned member are limited to 15% of initial prestress.

79. Answer D

Solution

Zone-IV sand is finest will have largest surface area hence require larger w/c ratio.

Note:

Zone-1 sand is coarsest among all four zones of sand.

Fineness modulus for different zones of sand are

Zone 1: (4 - 2.7). (Coarsest)

Zone 2: (3.4-2.1)

Zone 3 (2.8 - 1.7)

Zone 4 (2.2-1.3) (Finest)

Fineness modulus increases with increase in size of particles.

80. Answer D

Solution

When the bending moment is assumed to be resisted entirely by the flanges, the economical (optimum) depth of the web of a plate girder is obtained by minimising the total steel area.

The expression is derived as:

$$d = \left(\frac{M_z k}{f_y}\right)^{1/3} = \left[\frac{M_z \times k}{f_y}\right]^{0.33}$$

where

M_z = design bending moment

$k = d/t_w$ = web slenderness ratio

f_y = design strength of the flanges

This gives the depth corresponding to the minimum cross-sectional area of steel.

81. Answer B

Solution

The approximate value of shrinkage strain for design shall be assumed as follows (IS 1383) for pre- tensioning = 0.0003.

Given, initial pre-stressing force P_0= 300 kN.

Area = 300 mm^2

Assume elasticity of steel = 2 x 10^5 N/mm^2

Initial stress = σ = P_0/A = 300000/300 = 1000 N/mm^2

Loss of pre - stress due to shrinkage = $E_p \times \varepsilon_{sh}$

= $2 \times 10^5 \times 0.0003 = 60$ N/mm^2

Loss of stress (%) = $\frac{60}{1000} \times 100 = 6\%$

6% = 6.3%

82. Answer B

Solution

As per IS 800:2007 (Clause 8.7.1 and related provisions):

Intermediate transverse web stiffeners (also called vertical stiffeners) are provided primarily to improve the buckling strength of a slender web due to shear.

They divide the web into smaller panels, reduce the panel aspect ratio, and thereby increase the shear buckling resistance of the web.

Other stiffeners have different primary purposes:

Bearing / load-carrying stiffeners → prevent local crushing or buckling under concentrated loads.

Tension stiffeners → transmit tensile forces from flange to web.

83. Answer A

Solution

'P' is the pre-stressed force applied to the tendon of rectangular pre-stressed beam whose area of cross-section is 'A' and sectional modulus is 'Z'.

The maximum stress 'f in the beam, subjected to a maximum bending moment 'M' is-

$$f = \frac{P}{A} + \frac{M}{Z}$$

84. Answer C

Solution

In the design of plate girders (especially riveted/bolted construction under working-stress concepts):

A portion of the web area is assumed to act with the flanges.

For the tension flange, after accounting for rivet/bolt holes, one-eighth of the web area ($A_w/8$) is considered effective as flange area.

Thus, the effective flange area in tension is taken as:

$$A_f + \frac{A_w}{8}$$

(Note: For the compression flange, the corresponding value is often taken as $A_f + A_w / 6$ on a gross-area basis.)

85. Answer D

Solution

For isolated L-beam, the effective flange width shall be obtained as below but in no case greater than the actual width:

L-Beam, $b_f = \frac{0.5 l_0}{\left(\frac{l_0}{b} + 4\right)} + b_w$

T-Beam, $b_f = \frac{l_0}{\left(\frac{l_0}{b}\right) + 4} + b_w$

86. Answer B

Solution

Sag rods (also called sag bars) are slender tension members placed between consecutive purlins.

Their purpose is to:

Provide intermediate lateral support to the purlins

Reduce the unsupported length of the purlin about its minor axis

Prevent excessive deflection (sag) of the purlin in the plane parallel to the sloping roof due to the component of gravity loads

They are designed purely as tension members.

87. Answer A

Solution

As per IS: 456-2000, the minimum grade of cement concrete specified for mild exposure condition is M 20.

88. Answer D

Solution

Uniformly distributed across the central bond-

$$\frac{\text{Reinforcement in central band width}}{\text{Total reinforcement in short direction}} = \frac{2}{\beta + 1}$$

β = is the ratio of the long side to the short side of the footing = $\frac{2}{1.5+1} = \frac{2}{2.5} = \frac{2}{5} = \frac{4}{5} = 0.80$

89. Answer B

Solution

Purlins are secondary beams that span between the main rafters/trusses and support the roof sheeting.

They are subjected predominantly to Bending due to dead load, live load and wind load (biaxial bending in sloping roofs)

Although they may carry small axial forces, the governing design criterion is flexure (bending strength and deflection). Hence, as per IS 800 : 2007, steel purlins are primarily designed as flexural members.

90. Answer A

Solution

Creep strain is a time dependent property, it is due to dead load only.

Creep strain is caused due to sustained loads i.e. a load that is stationary for a longer period of time.

For Ex-Dead loads, water tank on the roofs etc.

91. Answer B

Solution

In a combined footing the bottom bars under a column should be extended into the interior of the slab. This distance should be greater of the distance up to the point of contra flexure and 42 times diameter of the main reinforcement from the outer face of the column.

92. Answer D

Solution

As per IS 800 : 2007, Clause 3.7.2, cross-sections are classified into four classes based on local buckling behaviour of plate elements:

Class 1 (Plastic): Can develop plastic hinges and have the required rotation capacity for plastic mechanism formation.

Class 2 (Compact): Can develop the full plastic moment of resistance, but have inadequate rotation capacity.

Class 3 (Semi-compact): Extreme fibre can reach yield stress, but cannot develop the plastic moment of resistance due to local buckling.

Class 4 (Slender): Elements buckle locally even before reaching yield stress.

For slender sections, design is based on the effective cross-section (reduced area accounting for local buckling).

93. Answer D

Solution

1 bag cement of 50 kg is 35 liters in volume.

Hence for 1:3:6 concrete mix by volume

Quantity of cement = 35 litre

Quantity of sand = 3 x 35 = 105 liters

Quantity of coarse aggregates = 6 x 35 = 210 litters.

94. Answer A

Solution

IS 2950 : 1981 - Design of raft foundation.

IS 1904 : 1986- Design and construction of foundation in soil.

IS 1080: 1985- Design and construction of shallow foundation in soil.

IS 456 : 2000 - Plain and reinforced concrete.

95. Answer B

Solution

For compacting plain concret surfaces of thickness less than 20 cm, screed vibrator should be used.

Note:

Screed vibrator is directly placed on the concrete mass for compaction of shallow elements such as road surfaces, concrete floors.

Internal vibrator (needle vibrator) is commonly used vibrator for concrete having depths not more than 600 mm.

96. Answer B

Solution

As per IS 800:2007 (Clause 7.7):

Statement I is correct: Battens are plates (or sections such as angles, channels, etc.) used to connect the main components of built-up compression members at intervals along their length. They help the individual components act together as a single member.

Statement II is also correct: Battens should be placed opposite to each other on the two parallel faces of the main components. This ensures symmetrical restraint, avoids eccentricity, and provides balanced resistance to shear and bending.

Therefore, both statements are correct.

97. Answer C

Solution

Size = 250 × 300 mm

l_{eff} = 5 m = 5000 mm

$$Cr = 1.25 - \frac{l_{ef}}{48b}$$

$$= 1.25 - \frac{5000}{48 \times 250}$$

C_r = 1.25 – 0.4167 = 0.8333

98. Answer A

Solution

As per IS 800 : 2007:

For plates (Clause 6.3.1):

The design strength due to rupture of the critical section is

$$T_{dn} = \frac{0.9A_n f_u}{\gamma_{m1}}$$

where A_n is the net effective area of the plate.

So Statement B is correct; Statement A is incorrect.

For single angles (Clause 6.3.3):

The design strength due to rupture is

$$T_{dn} = \frac{0.9A_{nc} f_u}{\gamma_{m1}} + \beta \frac{A_{go} f_y}{\gamma_{m0}}$$

where A_{go} is the gross area of the outstanding leg.

So Statement C is correct; Statement D is incorrect.

99. Answer A

Solution

ϕ_{max}=25 mm, ϕ_{min}=16 mm,

Transverse steel

Tie diameter $\phi_t \geq \begin{cases} \frac{\phi_{max}}{4} \\ 6mm \end{cases}$

$$\frac{25}{4} = 6.25 \Rightarrow \text{take } 8\,mm$$

Tie spacing $s_t \leq \begin{cases} D - \text{least lateral dimension} \\ 16\phi_{min} \\ 300\,mm \end{cases}$

- D = 350 mm
- 16 ϕ_{min} = 16× 16 = 256
- 300 mm

Provide 8 mm diameter @ 256 mm c/c

100. Answer B

Solution

As per IS 800 : 2007, Clause 7.6:

Statement 1 is incorrect: The minimum width of lacing bars in bolted/riveted construction shall be three times (not four times) the nominal diameter of the end bolt/rivet.

Statement 2 is correct: Thickness of flat lacing bars ≥ l/40 of effective length for single lacings and ≥ l/60 of effective length for double lacings.

Statement 3 is correct: Rolled sections or tubes of equivalent strength may be used instead of flats.

Statement 4 is correct: Lacing bars shall be inclined at an angle between 40° and 70° to the axis of the built-up member.

101. Answer B

Solution

Minimum area of tension reinforcement should be -

$$\frac{A_{st}}{bd} = \frac{0.85}{f_y}$$

$$d = 450 - 25 - \frac{\phi}{2}$$

= 450 – 25 – 6 = 419 mm

$$A_{st} = \frac{0.85 \times 419 \times 230}{500}$$

A_{st} = 163.829 mm^2

102. Answer C

Solution

Statement (i) is correct: Placing the two angles on opposite sides of the gusset plate results in a larger minimum radius of gyration (r_{min}) compared to placing them on the same side. This leads to a lower slenderness ratio and higher load-carrying capacity for the same section, making it more economical.

Statement (ii) is incorrect: For unequal angles, connecting the longer leg to the gusset plate is more economical, as it provides a larger radius of gyration about the critical axis.

Statement (iii) is correct: For equal angles, the star configuration (angles arranged to form a star shape) generally provides a more efficient (higher r_{min}) section compared to other arrangements, making it economical.

103. Answer C

Solution

Marcus's method of designing two-way slabs.

- Marcus has given an approximate method for determining BM in slabs, simply supported on four edge with corner prevented from being lifted and considering torsion in the slab.
- In this method thickness of the slab is generally taken to be 1/30 of a shorter span.
- Used for simply supported slab when corners and edges are not prevented from lifting (free to lift).

104. Answer A

Solution

As per IS 800 : 2007, Clause 8.7.1:

Load-carrying stiffener: To prevent local buckling of the web due to concentrated loading → C

Bearing stiffener: To prevent local crushing of the web due to concentrated loading → A

Diagonal stiffener: To provide local reinforcement to a web under shear and bearing → D

Tension stiffener: To transmit tensile forces applied to a web through a flange → B

Correct matching : 1-C, 2-A, 3-D, 4-B

105. Answer B

Solution

The tension reinforcement provided at mid- span in the middle strip shall extended in the lower part of the slab to within 0.25 L of continuous edge or 0.15 L of a discontinuous edge.

106. Answer B

Solution

P) Compression member in a roof truss → Strut (3)

Q) Beams which carry roof loads in trusses → Purlin (4)

R) Member supporting roof in a building → Joist (1)

S) Tension member in a roof truss → Tie (2)

Correct matching: P-3, Q-4, R-1, S-2

107. Answer A

Solution

Given,

Characteristic strength of steel (f_y) = 250 N/mm^2

Bond stress (τ_{bd})= 1.2 N/mm^2

Diameter of bars (ϕ) = 25 mm

Development length (L_d) = $\frac{0.87 f_y \phi}{4\tau_{bd}}$

$= \frac{0.87 \times 250 \times 25}{4 \times 1.20}$

= 1132.81 mm = 1133 mm

108. Answer A

Solution

For a double-V butt weld, complete penetration is achieved.

Effective throat thickness t_e= thickness of the thinner plate = 16 mm

Effective length of weld L_w= 200 mm

Ultimate strength of weld metal f_u = 410 N/mm² (Fe410)

Partial safety factor for shop welds γ_{mw}= 1.25

Design strength of the butt weld:

$$P_{dw} = \frac{L_w \times t_e \times f_u}{\gamma_{mw} \times \sqrt{3}} = \frac{200 \times 16 \times 410}{1.25 \times \sqrt{3}}$$

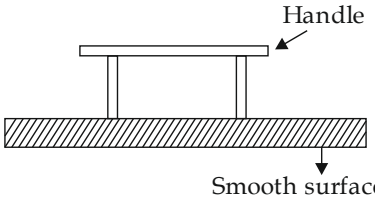
$$= \frac{1312000}{2.165} \approx 605.987\text{N} = 605.987\text{kN}$$

109. Answer B

Solution

Screeding: Striking off the excess concrete to bring the top surface upto proper grade is called screeding. It removes humps & hollow of uniform concrete surface.

Floating: It is removal of all irregularities on the surface of concrete which are left after screeding. It is done by wooden float.



Trowelling: Final operation of finishing be done after all excess water has evaporated by steel float to give a very smooth finish.

Finishing: Process of levelling & smoothing the top surface of freshly placed concrete to achieve the desired appearance.

110. Answer D

Solution

Short term static modulus of concrete.

$$E_c = 5000\sqrt{f_{ck}}$$

f_{ck} = gradual concrete

Long term elastic modulas or effective modules.

$$E_{ce} = \frac{E_c}{1+\theta}$$

111. Answer A

Solution

As per IS 800:2007, Clause 10.3.3, the nominal shear capacity of a bolt is given by:

$$V_{nsb} = \frac{f_u}{\sqrt{3}}\left(n_n A_{nb} + n_s A_{sb}\right)$$

Given data:

Bolt: M20, Grade 4.6 → f_u = 400 N/mm²

Nominal shank diameter, d = 20 mm

Number of shear planes through shank, n_n = 1

Number of shear planes through threads, n_s = 1

Step 1: Shank area (A_{sb})

$$A_{sb} = \frac{\pi}{4}(20)^2 = 314.16\,mm^2$$

Step 2: Net tensile stress area at threads (A_{nb})

For M20 bolts, the standard net (root) area at the threaded portion is:

A_{nb}=245 mm²

Step 3 : Nominal shear capacity

$$V_{nsb} = \frac{400}{\sqrt{3}}\left[(1\times 314.16)+(1\times 245)\right]$$

$$V_{nsb} = 230.94\times 559.16$$

$$V_{nsb} = 129132\,N \approx 129.14\,kN$$

112. Answer C

Solution

Given,

Beam width b= 300 mm

A_{st}= 600 mm²

f_y = 500 N/mm²

Lever arm (z) = 300 mm

ultimate moment of resistance (M) = 0.87 f_y A_{st} Z

= 0.87 × 500 × 600 × 300

= 78.3 kN-m

113. Answer D

Solution

Uses of admixture:

(a) To accelerate the initial set of concrete i.e. to speed up the rate of strength development at early ages

(b) To improve potential durability & reduce permeability

(c) To increase workability without changing water content

(d) To reduce water content without changing workability.

(e) To decrease the density of concrete

(f) To reduce segregation and bleeding

(g) To improve pumpability

114. Answer C

Solution

As per IS 875 (Part 3), the basic wind pressure is related to the design wind speed by the formula:

P_z=0.6 $(V_z)^2$

where:

P_z = wind pressure in N/m² at height z

V_z = design wind speed in m/s

Step 1 : Substitute the given wind speed

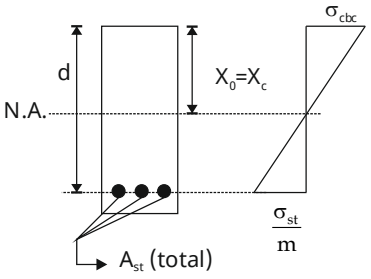
P_z= 0.6 × (60)²

P_z = 2160 N/m²

115. Answer C

Solution

Take Balance Section



From Similar Triangle

$$\frac{\sigma_{cbc}}{X_c} = \frac{\sigma_{st}/m}{(d-x_c)}$$

$$\sigma_{cbc}(d-x_c) = X_c \times \frac{\sigma_{st}}{m}$$

$$(d - x_c) = \frac{x_c}{\sigma_{cbc}} \times \frac{\sigma_{st}}{m}$$

$$d - x_c = \frac{x_c}{\sigma_{cbc}} \times \frac{\sigma_{st}}{m}$$

$$d = \frac{x_c}{\sigma_{cbc}} \times \frac{\sigma_{st}}{m} + x_c$$

$$\frac{X_c}{d} = \frac{m\sigma_{cbc}}{(m\sigma_{cbc} + \sigma_{st})}$$

$$k = \frac{m\sigma_{cbc}}{m\sigma_{cbc} + \sigma_{st}}$$

Where,

X_c = critical depth of neutral axis

X_a = actual depth of neutral axis

116. Answer C

Solution

Flexural strength of concrete = $0.7\sqrt{f_{ck}}$ N/mm^2

For M25, F_{ck} = 25 N/mm^2

Flexural strength = $0.7\sqrt{25}$ = 3.5 N/mm^2

117. Answer C

Solution

Impact factor is considered in the design of a gantry girder to cater for impact due to movement and stoppage of the crane. Loads transferred to the gantry girder are not momentary.

118. Answer A

Solution

Simply supported under reinforced concrete beam the failure of the beam takes place due to the yielding of steel.

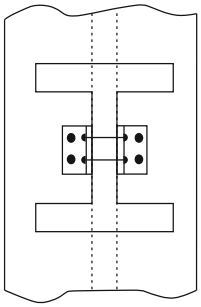
Failure takes place by crushing of concrete after the steel has yield.

The neutral axis moves up as the load is increased.

119. Answer C

Solution

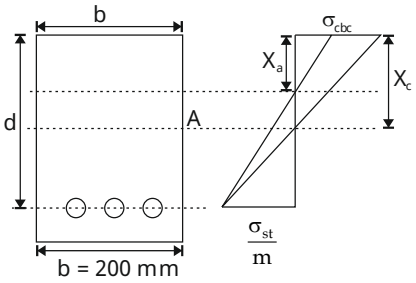
This kind of connection is known as framed connection, not rigid, as it is torsionally restraint but warping restrain is absent.



120. Answer B

Solution

Actual depth of neutral axis is less than the critical depth of neutral axis.



Moment of resistance is less than that of balanced section.

Failure of beam is due to failure of reinforcement therefore failure will be ductile.

Stresses in concrete are always less than the maximum permissible value

$$M_r = \sigma_{st} A_{st} \left(d - \frac{X_a}{3}\right)$$