

# Assistant Engineers - Mechanical (Ground Water) <sup>रजभाषा</sup> Exam - 2023

Exam Date - 30/06/2024

पुस्तिका में पृष्ठों की संख्या : 32  
Number of Pages in Booklet : 32  
पुस्तिका में प्रश्नों की संख्या : 150  
No. of Questions in Booklet : 150

**AEG-23**

प्रश्न-पुस्तिका संख्या व बारकोड/  
Question Booklet No. & Barcode



380989

Paper Code : 00



Sub : G.K. & Concerned Subject

समय : 02:30 घण्टे + 10 मिनट अतिरिक्त\*

अधिकतम अंक : 150

Time : 02:30 Hours + 10 Minutes Extra\*

Maximum Marks : 150

प्रश्न-पुस्तिका के पेपर की सील/पोलिथीन बैग को खोलने पर प्रश्न-पत्र हल करने से पूर्व परीक्षार्थी यह सुनिश्चित कर लें कि :

- प्रश्न-पुस्तिका संख्या तथा ओ.एम.आर. उत्तर-पत्रक पर अंकित बारकोड संख्या समान है।
- प्रश्न-पुस्तिका एवं ओ.एम.आर. उत्तर-पत्रक के सभी पृष्ठ व सभी प्रश्न सही मुद्रित हैं। समस्त प्रश्न, जैसा कि ऊपर वर्णित है, उपलब्ध हैं तथा कोई भी पृष्ठ कम नहीं है/ मुद्रण त्रुटि नहीं है। किसी भी प्रकार की विसंगति या दोषपूर्ण होने पर परीक्षार्थी वीक्षक से दूसरा प्रश्न-पत्र प्राप्त कर लें। यह सुनिश्चित करने की जिम्मेदारी अभ्यर्थी की होगी। परीक्षा प्रारम्भ होने के 5 मिनट पश्चात् ऐसे किसी दावे/आपत्ति पर कोई विचार नहीं किया जायेगा।

On opening the paper seal/polythene bag of the Question Booklet before attempting the question paper, the candidate should ensure that :

- Question Booklet Number and Barcode Number of OMR Answer Sheet are same.
- All pages & Questions of Question Booklet and OMR Answer Sheet are properly printed. All questions as mentioned above are available and no page is missing/misprinted.

If there is any discrepancy/defect, candidate must obtain another Question Booklet from Invigilator. Candidate himself shall be responsible for ensuring this. No claim/objection in this regard will be entertained after five minutes of start of examination.

## परीक्षार्थियों के लिए निर्देश

1. प्रत्येक प्रश्न के लिये एक विकल्प भरना अनिवार्य है।
  2. सभी प्रश्नों के अंक समान हैं।
  3. प्रत्येक प्रश्न का मात्र एक ही उत्तर दीजिए। एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
  4. OMR उत्तर-पत्रक इस प्रश्न-पुस्तिका के अन्दर रखा है। जब आपको प्रश्न-पुस्तिका खोलने को कहा जाए, तो उत्तर-पत्रक निकाल कर ध्यान से केवल नीले बॉल पॉइंट पेन से विवरण भरें।
  5. कृपया अपना रोल नम्बर ओ.एम.आर. उत्तर-पत्रक पर सावधानीपूर्वक सही भरें। गलत रोल नम्बर भरने पर परीक्षार्थी स्वयं उत्तरदायी होगा।
  6. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है।
  7. प्रत्येक प्रश्न के पाँच विकल्प दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4, 5 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले (बबल) को उत्तर-पत्रक पर नीले बॉल पॉइंट पेन से गहरा करना है।
  8. यदि आप प्रश्न का उत्तर नहीं देना चाहते हैं तो उत्तर-पत्रक में पाँचवें (5) विकल्प को गहरा करें। यदि पाँच में से कोई भी गोला गहरा नहीं किया जाता है, तो ऐसे प्रश्न के लिये प्रश्न अंक का 1/3 भाग काटा जायेगा।
  - 9.\* प्रश्न-पत्र हल करने के उपरांत अभ्यर्थी अनिवार्य रूप से ओ.एम.आर. उत्तर-पत्रक जाँच लें कि समस्त प्रश्नों के लिये एक विकल्प (गोला) भर दिया गया है। इसके लिये ही निर्धारित समय से 10 मिनट का अतिरिक्त समय दिया गया है।
  10. यदि अभ्यर्थी 10% से अधिक प्रश्नों में पाँच विकल्पों में से कोई भी विकल्प अंकित नहीं करता है, तो उसको अयोग्य माना जायेगा।
  11. यदि किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो तो प्रश्न के हिन्दी तथा अंग्रेजी रूपान्तरों में से अंग्रेजी रूपान्तर मान्य होगा।
  12. मोबाइल फोन अथवा अन्य किसी इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विषय आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
- चेतावनी :** अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराते हुए राजस्थान सार्वजनिक परीक्षा (भर्ती में अनुचित साधनों की रोकथाम अध्यापय) अधिनियम, 2022 तथा अन्य प्रभावी कानून एवं आयोग के नियमों-प्रावधानों के तहत कार्यवाही की जाएगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

## INSTRUCTIONS FOR CANDIDATES

1. It is mandatory to fill one option for each question.
  2. All questions carry equal marks.
  3. Only one answer is to be given for each question. If more than one answers are marked, it would be treated as wrong answer.
  4. The OMR Answer Sheet is inside this Question Booklet. When you are directed to open the Question Booklet, take out the Answer Sheet and fill in the particulars carefully with Blue Ball Point Pen only.
  5. Please correctly fill your Roll Number in OMR Answer Sheet. Candidate will themselves be responsible for filling wrong Roll No.
  6. 1/3 part of the mark(s) of each question will be deducted for each wrong answer. A wrong answer means an incorrect answer or more than one answers for any question.
  7. Each question has five options marked as 1, 2, 3, 4, 5. You have to darken only one circle (bubble) indicating the correct answer on the Answer Sheet using BLUE BALL POINT PEN.
  8. If you are not attempting a question then you have to darken the circle '5'. If none of the five circles is darkened, one third (1/3) part of the marks of question shall be deducted.
  - 9.\* After solving question paper, candidate must ascertain that he/she has darkened one of the circles (bubbles) for each of the questions. Extra time of 10 minutes beyond scheduled time, is provided for this.
  10. A candidate who has not darkened any of the five circles in more than 10% questions, shall be disqualified.
  11. If there is any sort of ambiguity/mistake either of printing or factual nature then out of Hindi and English Versions of the question, the English Version will be treated as standard.
  12. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt as per rules.
- Warning :** If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would liable to be prosecuted under Rajasthan Public Examination (Measures for Prevention of Unfair Means in Recruitment) Act, 2022 & any other laws applicable and Commission's Rules-Regulations. Commission may also debar him/her permanently from all future examinations.

उत्तर-पत्रक में दो प्रतियाँ हैं - मूल प्रति और कार्बन प्रति। परीक्षा समाप्ति पर परीक्षा कक्ष छोड़ने से पूर्व परीक्षार्थी उत्तर-पत्रक की दोनों प्रतियाँ वीक्षक को सौंपेंगे, परीक्षार्थी स्वयं कार्बन प्रति अलग नहीं करें। वीक्षक उत्तर-पत्रक की मूल प्रति को अपने पास जमा कर, कार्बन प्रति को मूल प्रति से कट लाइन से मोड़ कर सावधानीपूर्वक अलग कर परीक्षार्थी को सौंपेंगे, जिसे परीक्षार्थी अपने साथ ले जायेंगे। परीक्षार्थी को उत्तर-पत्रक की कार्बन प्रति चयन प्रक्रिया पूर्ण होने तक सुरक्षित रखनी होगी एवं आयोग द्वारा माँगे जाने पर प्रस्तुत करनी होगी।

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1. ख्याल के निम्न प्रकारों को उसके क्षेत्र से सुमेलित कीजिए :

ख्याल	क्षेत्र
i. कुचामनी	a. शेखावटी
ii. अलीबख्शी	b. नागौर
iii. हीर रांझा	c. जयपुर
iv. कान गूजरी	d. मेवात

	i	ii	iii	iv
(1)	c	b	a	d
(2)	d	b	c	a
(3)	b	d	a	c
(4)	a	c	b	d
(5)	अनुत्तरित प्रश्न			

2. निम्नलिखित में से कौन सा युग्म सुमेलित नहीं है ?

- (1) वालर – गरासिया
- (2) गवरी – भील
- (3) चरी – सांसी
- (4) तेरहताली – कामड़
- (5) अनुत्तरित प्रश्न

3. रामस्नेही सम्प्रदाय की “सिंहथल शाखा” के संस्थापक कौन थे ?

- (1) रामचरण जी
- (2) दरियाव जी
- (3) हरि रामदास जी
- (4) रामदास जी
- (5) अनुत्तरित प्रश्न

4. निम्न में से किस लोक देवता से चांदोजी, डेमाजी, हरमलजी राइका और सलजी सोलंकी सम्बन्धित थे ?

- (1) गोगाजी
- (2) तेजाजी
- (3) पाबूजी
- (4) रामदेवजी
- (5) अनुत्तरित प्रश्न

5. निम्न में से किसने वर्ष 1896 ई. में “मारवाड़ी व्याकरण” का प्रकाशन किया था ?

- (1) शंकरदान सामोर
- (2) सीताराम लालस
- (3) कन्हैयालाल सेठिया
- (4) रामकरण आसोपा
- (5) अनुत्तरित प्रश्न

1. Match the following forms of Khyal with its Region :

Khyal	Region
i. Kuchamani	a. Shekhawati
ii. Alibakhshi	b. Nagore
iii. Heer Ranjha	c. Jaipur
iv. Kaan Gujri	d. Mewat

	i	ii	iii	iv
(1)	c	b	a	d
(2)	d	b	c	a
(3)	b	d	a	c
(4)	a	c	b	d
(5)	Question not attempted			

2. Which of the following pairs is not correctly matched ?

- (1) Walar – Garasiya
- (2) Gavari – Bhil
- (3) Chari – Sansi
- (4) Terah Tali – Kamad
- (5) Question not attempted

3. Who was the founder of “Singhthal Branch” of Ramsnehi Cult ?

- (1) Ramcharan Ji
- (2) Dariyav Ji
- (3) Hari Ramdas Ji
- (4) Ramdas Ji
- (5) Question not attempted

4. Chandoji, Demaji, Harmalji Raika and Salji Solanki are related to which of the following Folk deity ?

- (1) Gogaji
- (2) Tejaji
- (3) Pabuji
- (4) Ramdevji
- (5) Question not attempted

5. Who among the following published “Marwari Vyakaran” in the year 1896 A.D. ?

- (1) Shankardan Samore
- (2) Sitaram Lalas
- (3) Kanhiyalal Sethia
- (4) Ramkaran Aasopa
- (5) Question not attempted



6. मेसा का पठार किस जिले में स्थित है ?  
 (1) उदयपुर जिले में  
 (2) चित्तौड़गढ़ जिले में  
 (3) राजसमन्द जिले में  
 (4) सिरौही जिले में  
 (5) अनुत्तरित प्रश्न
7. निम्नलिखित में से कौन सी भू-आकृति क्रमशः दक्षिण-पश्चिम अरावली और उत्तर-पूर्व अरावली में अवस्थित हैं ?  
 (1) ऋषिकेश तथा भानगढ़  
 (2) मारायजी तथा बैराठ  
 (3) भोराठ पठार तथा रोजा भाखर  
 (4) भानगढ़ तथा ऋषिकेश  
 (5) अनुत्तरित प्रश्न
8. निम्नलिखित में से कौन कालीसिंध नदी की सहायक नदी नहीं है ?  
 (1) परवन (2) उजार  
 (3) निवाज़ (4) पार्वती  
 (5) अनुत्तरित प्रश्न
9. 30 सेमी समवर्षा रेखा (औसत वार्षिक वर्षा) निम्नलिखित किन जिलों से गुजरती है ?  
 (1) जैसलमेर तथा गंगानगर से  
 (2) बाड़मेर तथा सीकर से  
 (3) जोधपुर तथा हनुमानगढ़ से  
 (4) गंगानगर तथा पाली से  
 (5) अनुत्तरित प्रश्न
10. कैम्बोर्थिड्स, केलसीऑर्थिड्स, सेलोर्थिड्स और पैलिऑर्थिड्स निम्न में से राजस्थान की किस मृदा के उप-विभाग हैं ?  
 (1) एल्फीसोल्स (2) एण्टीसोल्स  
 (3) एरिडोसोल्स (4) वर्टीसोल्स  
 (5) अनुत्तरित प्रश्न
11. वन विभाग, राजस्थान के प्रशासनिक प्रतिवेदन 2022-23 के अनुसार निम्नलिखित में से किस जिले में आरक्षित वन का क्षेत्रफल सर्वाधिक है ?  
 (1) चित्तौड़गढ़ (2) अलवर  
 (3) उदयपुर (4) प्रतापगढ़  
 (5) अनुत्तरित प्रश्न

6. Messa Plateau is located in which district ?  
 (1) Udaipur district  
 (2) Chittorgarh district  
 (3) Rajsamand district  
 (4) Sirohi district  
 (5) Question not attempted
7. Which of the following physical features are located in South-West Arawali and North-East Arawali respectively ?  
 (1) Rishikesh and Bhangarh  
 (2) Marayji and Bairath  
 (3) Bhorath Plateau and Roja Bhakhar  
 (4) Bhangarh and Rishikesh  
 (5) Question not attempted
8. Which of the following is not a tributary of river Kalisindh ?  
 (1) Parwan (2) Ujar  
 (3) Niwaj (4) Parwati  
 (5) Question not attempted
9. The isohyet (average annual rainfall) of 30 cm passes through which of the following districts ?  
 (1) Jaisalmer and Ganganagar  
 (2) Barmer and Sikar  
 (3) Jodhpur and Hanumangarh  
 (4) Ganganagar and Pali  
 (5) Question not attempted
10. Camborthids, Calciorthids, Salorthids and paleorthids are the sub-orders of which of the following types of soils in Rajasthan ?  
 (1) Alfisols (2) Entisols  
 (3) Aridosols (4) Vertisols  
 (5) Question not attempted
11. As per Rajasthan Forest Department's Administrative Report 2022-23, which of the following districts has largest area under Reserved forest ?  
 (1) Chittorgarh (2) Alwar  
 (3) Udaipur (4) Pratapgarh  
 (5) Question not attempted



12. जनगणना 2011 के अनुसार, राजस्थान में जनसंख्या घनत्व के आधार पर द्वितीय स्थान (II) वाला जिला कौन सा है ?

- (1) भरतपुर (2) जयपुर  
(3) धौलपुर (4) दौसा  
(5) अनुत्तरित प्रश्न

13. जनगणना 2011 के अनुसार, राजस्थान में कौन से जिलों का युग्म साक्षरता दर में प्रथम व अन्तिम स्थान रखता है ?

- (1) सीकर, बाँसवाड़ा  
(2) जयपुर, बाड़मेर  
(3) कोटा, जालौर  
(4) अलवर, सिरोही  
(5) अनुत्तरित प्रश्न

14. सूची - I को सूची - II से सुमेलित करते हुए नीचे दर्शाए गये विकल्पों में से सही कूट का चयन कीजिए :

सूची - I	सूची - II
ऊर्जा के स्रोत	क्षेत्र
A. तापीय ऊर्जा	i. अमर सागर
B. सौर ऊर्जा	ii. बायतू
C. प्राकृतिक गैस	iii. सूरतगढ़
D. पवन ऊर्जा	iv. भड़ला

कूट :

- |     | A                | B  | C   | D   |
|-----|------------------|----|-----|-----|
| (1) | iii              | iv | i   | ii  |
| (2) | i                | ii | iii | iv  |
| (3) | ii               | iv | i   | iii |
| (4) | iii              | iv | ii  | i   |
| (5) | अनुत्तरित प्रश्न |    |     |     |

15. निम्नलिखित में से किस कृषि वर्ष में राजस्थान में अकाल/अभाव से प्रभावित जिलों की संख्या अधिकतम थी (2010-11 से 2022-23 के मध्य) ?

- (1) 2019-20 (2) 2010-11  
(3) 2015-16 (4) 2022-23  
(5) अनुत्तरित प्रश्न

12. According to census 2011, which district ranks second (II), in order of density of population in Rajasthan ?

- (1) Bharatpur (2) Jaipur  
(3) Dholpur (4) Dausa  
(5) Question not attempted

13. Which pair of districts represent the highest and lowest rate of literacy, as per census 2011 in Rajasthan ?

- (1) Sikar, Banswara  
(2) Jaipur, Barmer  
(3) Kota, Jalore  
(4) Alwar, Sirohi  
(5) Question not attempted

14. Match List - I with List - II and choose the correct code from the options given below :

List - I	List - II
Sources of Power	Region
A. Thermal Power	i. Amar Sagar
B. Solar Power	ii. Baytu
C. Natural Gas	iii. Suratgarh
D. Wind Energy	iv. Bhadla

Code :

- |     | A                      | B  | C   | D   |
|-----|------------------------|----|-----|-----|
| (1) | iii                    | iv | i   | ii  |
| (2) | i                      | ii | iii | iv  |
| (3) | ii                     | iv | i   | iii |
| (4) | iii                    | iv | ii  | i   |
| (5) | Question not attempted |    |     |     |

15. In which of the following agriculture year the Famine/Drought affected districts were maximum in Rajasthan between 2010-11 to 2022-23 ?

- (1) 2019-20 (2) 2010-11  
(3) 2015-16 (4) 2022-23  
(5) Question not attempted



16. निम्नलिखित में से कौन सा सुमेलित नहीं है ?

खनिज	उत्पादन क्षेत्र
(1) अभ्रक	- नट-की-बेरी, टून्का
(2) पन्ना	- गुम-गुरहा, बूबानी-मुहामी
(3) गारनेट	- राजमहल, कुशालपुरा
(4) लीथियम	- जनकपुरा, गुजरवाड़ा
(5) अनुत्तरित प्रश्न	

17. निम्नलिखित में से किस जिले में राजस्थान के प्रमुख जिप्सम भंडार हैं ?

- |                      |              |
|----------------------|--------------|
| (1) नागौर            | (2) झालावाड़ |
| (3) सीकर             | (4) भरतपुर   |
| (5) अनुत्तरित प्रश्न |              |

18. राजस्थान सरकार ने 'राजस्थान विण्ड एण्ड हाइब्रिड एनर्जी पॉलिसी' कब लागू की ?

- (1) 1 दिसम्बर, 2019
- (2) 4 अक्टूबर, 2020
- (3) 18 दिसम्बर, 2019
- (4) 1 सितम्बर, 2022
- (5) अनुत्तरित प्रश्न

19. राजस्थान स्पिनिंग एण्ड वीविंग मिल्स लि. का संयंत्र स्थित है

- (1) केवल गुलाबपुरा में
- (2) भीलवाड़ा, ब्यावर, किशनगढ़ में
- (3) भवानी मंडी, भीलवाड़ा, श्रीगंगानगर में
- (4) बाँसवाड़ा, मोरदी में
- (5) अनुत्तरित प्रश्न

20. निम्नलिखित में से कौन सा रीको द्वारा विकसित एक एग्रो फूड पार्क नहीं है ?

- |                      |               |
|----------------------|---------------|
| (1) रनपुर            | (2) बोरानाड़ा |
| (3) उद्योग विहार     | (4) कमानीपुरा |
| (5) अनुत्तरित प्रश्न |               |

16. Which of the following is not correctly matched ?

Mineral	Area of Production
(1) Mica	- Nat-ki-Beri, Tunka
(2) Emerald	- Gum-Gurha, Bubani-Muhami
(3) Garnet	- Rajmahal, Kushalpura
(4) Lithium	- Janakpura, Gujjarwada
(5) Question not attempted	

17. Which of the following district has major reserves of Gypsum in Rajasthan ?

- |                            |               |
|----------------------------|---------------|
| (1) Nagaur                 | (2) Jhalawar  |
| (3) Sikar                  | (4) Bharatpur |
| (5) Question not attempted |               |

18. When did Government of Rajasthan issue the 'Rajasthan Wind and Hybrid Energy Policy' ?

- (1) 1<sup>st</sup> December, 2019
- (2) 4<sup>th</sup> October, 2020
- (3) 18<sup>th</sup> December, 2019
- (4) 1<sup>st</sup> September, 2022
- (5) Question not attempted

19. Rajasthan Spinning and Weaving Mills Ltd. has its plants at

- (1) Gulabpura only
- (2) Bhilwara, Beawar, Kishangarh
- (3) Bhawani Mandi, Bhilwara, Sriganganagar
- (4) Banswara, Mordī
- (5) Question not attempted

20. Which of the following is not an Agro Food Park developed by RIICO ?

- |                            |                |
|----------------------------|----------------|
| (1) Ranpur                 | (2) Boranada   |
| (3) Udyog Vihar            | (4) Kamanipura |
| (5) Question not attempted |                |



21. निम्न राजस्थान साहित्य अकादमी पुरस्कार विजेता लेखकों (2023-24) व उनकी पुस्तकों को सुमेलित कीजिए :

- |                       |                                     |
|-----------------------|-------------------------------------|
| a. राघवेन्द्र रावत    | i. सांप                             |
| b. पुरुषोत्तम पोमल    | ii. अब पेड़ फल बेचेंगे              |
| c. रतन कुमार सांभरिया | iii. पाषाण पुत्री क्षत्राणी हीरा-दे |
| d. बिलाल पठान         | iv. मारक लहरों के बीच               |

- |     | a                | b   | c   | d  |
|-----|------------------|-----|-----|----|
| (1) | ii               | iii | iv  | i  |
| (2) | iv               | iii | i   | ii |
| (3) | iv               | i   | iii | ii |
| (4) | iii              | ii  | i   | iv |
| (5) | अनुत्तरित प्रश्न |     |     |    |

22. अंतर्राष्ट्रीय ऊँट महोत्सव-2024 के संदर्भ में निम्नलिखित कथनों पर विचार करें :

- (a) यह कार्यक्रम जैसलमेर में आयोजित किया गया ।
- (b) यह 14 से 16 फरवरी 2024 तक आयोजित किया गया ।
- (c) संयुक्त राष्ट्र ने वर्ष 2024 को 'अंतर्राष्ट्रीय कैमलिड्स वर्ष' घोषित किया है ।

ऊपर दिए गए कथनों में से कौन सा/से सही है/हैं ?

- (1) केवल (a) एवं (b)
- (2) केवल (b) एवं (c)
- (3) केवल (c)
- (4) केवल (b)
- (5) अनुत्तरित प्रश्न

21. Match the following Rajasthan Sahitya Academy Award winner authors (2023-24) and their books :

- |                          |                                     |
|--------------------------|-------------------------------------|
| a. Raghvendra Rawat      | i. Saanp                            |
| b. Purushottam Pomal     | ii. Ab Ped Fal Bechenge             |
| c. Ratan Kumar Sambharia | iii. Pashan Putri Kshtrani Heera-De |
| d. Bilal Pathan          | iv. Marak Laharon ke Beech          |

- |     | a                      | b   | c   | d  |
|-----|------------------------|-----|-----|----|
| (1) | ii                     | iii | iv  | i  |
| (2) | iv                     | iii | i   | ii |
| (3) | iv                     | i   | iii | ii |
| (4) | iii                    | ii  | i   | iv |
| (5) | Question not attempted |     |     |    |

22. With reference to the International Camel Festival 2024, consider the following statements :

- (a) The event was organized at Jaisalmer.
- (b) It was held from 14<sup>th</sup> to 16<sup>th</sup> February, 2024.
- (c) The United Nations declared the year 2024 as the International year of camelids.

Which of the statement/s given above is/are correct ?

- (1) only (a) and (b)
- (2) only (b) and (c)
- (3) only (c)
- (4) only (b)
- (5) Question not attempted



23. संशोधित पार्वती-कालीसिंध-चंबल (पीकेसी) लिंक परियोजना के संबंध में निम्नलिखित कथनों पर विचार करें :

- (i) इस परियोजना से राजस्थान के 20 जिलों को अगले तीन-चार दशक तक पेयजल सुविधा मिलेगी ।
- (ii) इस परियोजना के तहत राजस्थान में पाँच बैराज - रामगढ़, महलपुर, मेज, राठौड़ और डूंगरी तथा एक बांध - नवनेरा बनाया जाना प्रस्तावित है ।

ऊपर दिए गए कथन/कथनों में से कौन सा/से सही है/हैं ?

- (1) केवल (i)
- (2) केवल (ii)
- (3) दोनों (i) और (ii)
- (4) न तो (i) और न ही (ii)
- (5) अनुत्तरित प्रश्न

24. राजस्थान में पूर्व गठित मुख्यमंत्री राजस्थान आर्थिक सुधार सलाहकार परिषद के स्थान पर किस इंस्टीट्यूट/कौंसिल का गठन किया गया है ?

- (1) राजस्थान कौंसिल ऑफ़ इकोनॉमिक एडवाइजर्स
- (2) राजस्थान इंस्टीट्यूट फॉर ट्रांसफॉर्मेशन एंड इनोवेशन
- (3) राजस्थान इकोनॉमिक एंड फाइनेंशियल अफेयर्स कौंसिल
- (4) राजस्थान इंस्टीट्यूट ऑफ़ इकोनॉमिक एंड फाइनेंशियल अफेयर्स
- (5) अनुत्तरित प्रश्न

23. Consider the following statements regarding Modified Parvati-Kalisindh-Chambal (PKC) Link Project :

- (i) This Project will provide drinking water facility to 20 districts of Rajasthan for the next three-four decades.
- (ii) Under this project, five barrages - Ramgarh, Mahalpur, Mej, Rathod and Dungri and one dam - Navnera are proposed to be built in Rajasthan.

Which of the statement(s) given above is/are correct ?

- (1) (i) only
- (2) (ii) only
- (3) Both (i) and (ii)
- (4) Neither (i) nor (ii)
- (5) Question not attempted

24. Which institute/council has been formed in Rajasthan in place of the previously formed Chief Minister Rajasthan Economic Transformation Advisory Council ?

- (1) Rajasthan Council of Economic Advisors
- (2) Rajasthan Institute for Transformation and Innovation
- (3) Rajasthan Economic and Financial Affairs Council
- (4) Rajasthan Institute of Economic and Financial Affairs
- (5) Question not attempted



25. अभ्यास 'टाइगर ट्राइफ-24' के संदर्भ में, निम्नलिखित कथनों पर विचार करें :

- (i) यह भारत और फ्रांस के मध्य द्विपक्षीय त्रि-सेवा मानवीय सहायता और आपदा राहत (एचएडीआर) जल-स्थल अभ्यास था।
- (ii) यह अभ्यास 18-29 फरवरी, 2024 तक भारत के पूर्वी समुद्री तट पर आयोजित किया गया था।

ऊपर दिए गए कथनों में से कौन सा/से सही है/हैं ?

- (1) केवल (i)
- (2) केवल (ii)
- (3) दोनों (i) और (ii)
- (4) न तो (i) और न ही (ii)
- (5) अनुत्तरित प्रश्न

26. भारतीय नौसेना के प्रथम स्वतंत्र मुख्यालय "नौसेना भवन" का उद्घाटन कब, कहाँ तथा किसके द्वारा किया गया ?

- (1) 28 फरवरी, 2024, विशाखापट्टनम, राष्ट्रपति द्रोपदी मुर्मू
- (2) 15 मार्च, 2024, दिल्ली, रक्षामंत्री राजनाथ सिंह
- (3) 22 मार्च, 2024, कोलकाता, गृहमंत्री अमित शाह
- (4) 30 मार्च, 2024, मुंबई, प्रधानमंत्री नरेन्द्र मोदी
- (5) अनुत्तरित प्रश्न

27. विश्व आर्द्रभूमि दिवस 2024 की थीम क्या थी ?

- (1) "आर्द्रभूमि और मानव कल्याण"
- (2) "एक संधारणीय शहरी भविष्य के लिए आर्द्रभूमि"
- (3) "आर्द्रभूमि और जलवायु परिवर्तन"
- (4) "आर्द्रभूमि और जल"
- (5) अनुत्तरित प्रश्न

25. With reference to the 'EX TIGER TRIUMPH - 24', consider the following statements :

- (i) It was a bilateral tri-service Humanitarian Assistance and Disaster Relief (HADR) amphibious exercise between India and the France.
- (ii) This exercise was conducted on the Eastern Seaboard of India from February 18-29, 2024.

Which of the statements given above is/are correct ?

- (1) (i) only
- (2) (ii) only
- (3) Both (i) and (ii)
- (4) Neither (i) nor (ii)
- (5) Question not attempted

26. When, where and by whom the first independent headquarters of Indian Navy "Nausena Bhavan" was inaugurated ?

- (1) 28<sup>th</sup> February, 2024, Vishakhapatnam, President Droupadi Murmu
- (2) 15<sup>th</sup> March, 2024, Delhi, Defence Minister Rajnath Singh
- (3) 22<sup>nd</sup> March, 2024, Kolkata, Home Minister Amit Shah
- (4) 30<sup>th</sup> March, 2024, Mumbai, Prime Minister Narendra Modi
- (5) Question not attempted

27. What was the Theme of World Wetlands Day 2024 ?

- (1) "Wetlands and Human Wellbeing"
- (2) "Wetland for a Sustainable Urban Future"
- (3) "Wetland and Climate Change"
- (4) "Wetlands and Water"
- (5) Question not attempted



28. भारत में नागरिकता (संशोधन) नियम, 2024 किस तिथि से प्रवृत्त हुए ?

- (1) 23 मार्च, 2024
- (2) 16 जनवरी, 2024
- (3) 14 फरवरी, 2024
- (4) 11 मार्च, 2024
- (5) अनुत्तरित प्रश्न

29. राजस्थान रिन्यूएबल एनर्जी पॉलिसी, 2023 के अनुसार 2029-30 तक सौर, पवन व हाइब्रिड विद्युत परियोजनाओं के लक्ष्य हैं

- |     | सौर              | पवन व हाइब्रिड |
|-----|------------------|----------------|
| (1) | 75,000 MW        | – 15,000 MW    |
| (2) | 70,000 MW        | – 10,000 MW    |
| (3) | 65,000 MW        | – 15,000 MW    |
| (4) | 60,000 MW        | – 10,000 MW    |
| (5) | अनुत्तरित प्रश्न |                |

30. 'बाउंस ऑफ़ जॉय' के संबंध में निम्नलिखित कथनों पर विचार करें :

- (i) यह नई शिक्षा नीति 2020 के अनुरूप राजस्थान के स्कूलों में नवीन शिक्षण-शास्त्रीय दृष्टिकोण और मूल्यांकन सुधारों के लिए स्कूल शिक्षा विभाग की एक पहल है।
- (ii) आवश्यकता-अंतराल विश्लेषण के आधार पर पूरे राजस्थान से 100 विद्यालयों को इस कार्यक्रम में भाग लेने के लिए चुना गया है।

ऊपर दिए गए कथनों में से कौन सा/से सही है/हैं ?

- (1) केवल (i)
- (2) केवल (ii)
- (3) दोनों (i) और (ii)
- (4) न तो (i) और न ही (ii)
- (5) अनुत्तरित प्रश्न

28. On which date the Citizenship (Amendment) Rules, 2024 were came into force in India ?

- (1) 23<sup>rd</sup> March, 2024
- (2) 16<sup>th</sup> January, 2024
- (3) 14<sup>th</sup> February, 2024
- (4) 11<sup>th</sup> March, 2024
- (5) Question not attempted

29. According to Rajasthan Renewable Energy Policy, 2023, the target of solar, wind and hybrid power projects upto 2029-30 are

- |     | Solar                  | Wind and Hybrid |
|-----|------------------------|-----------------|
| (1) | 75,000 MW              | – 15,000 MW     |
| (2) | 70,000 MW              | – 10,000 MW     |
| (3) | 65,000 MW              | – 15,000 MW     |
| (4) | 60,000 MW              | – 10,000 MW     |
| (5) | Question not attempted |                 |

30. Consider the following statements regarding 'Bounce of Joy' :

- (i) It is an initiative of the School Education Department for innovative pedagogical approaches and assessment reforms in the schools of Rajasthan in line with the New Education Policy 2020.
- (ii) On the basis of need-gap analysis, 100 schools from across Rajasthan are selected to participate in this program.

Which of the statements given above is/are correct ?

- (1) (i) only
- (2) (ii) only
- (3) Both (i) and (ii)
- (4) Neither (i) nor (ii)
- (5) Question not attempted



31. पुरातत्त्वविद् कार्लाइल ने निम्नलिखित में से किस स्थल से महापाषाण कर्त्रों को खोजा था ?

- (1) दौसा
- (2) गणेश्वर
- (3) बूढ़ा पुष्कर
- (4) बागोर
- (5) अनुत्तरित प्रश्न

32. राजस्थान में प्रागैतिहासिक शैल चित्र प्राप्त हुए हैं :

- (1) जोधपुरा
- (2) बालाथल
- (3) विराटनगर (बैराठ)
- (4) भानगढ़
- (5) अनुत्तरित प्रश्न

33. मंडोर के किस प्रतिहार शासक ने मेड़ता को अपनी राजधानी बनाया ?

- (1) रज्जिल
- (2) नरभट्ट
- (3) भोगभट्ट
- (4) नागभट्ट प्रथम
- (5) अनुत्तरित प्रश्न

34. निम्नलिखित में से बीकानेर के किस शासक ने 'ज्योतिष रत्नाकर' की रचना की ?

- (1) राय सिंह
- (2) राज सिंह
- (3) अनूप सिंह
- (4) गज सिंह
- (5) अनुत्तरित प्रश्न

35. 1919 ई. में राजपूताना मध्य भारत सभा का द्वितीय अधिवेशन कहाँ आयोजित किया गया था ?

- (1) वर्धा
- (2) दिल्ली
- (3) अजमेर
- (4) अमृतसर
- (5) अनुत्तरित प्रश्न

36. विजय सिंह पथिक द्वारा बैरीसाल में गठित किसानों के संगठन का नाम था

- (1) ऊपरमाल किसान बोर्ड
- (2) किसान पंचायत बोर्ड
- (3) बिजोलिया किसान एसोसिएशन
- (4) मेवाड़ ठिकाना किसान एसोसिएशन
- (5) अनुत्तरित प्रश्न

31. Archaeologist Carlyle discovered the megalithic burials from which of the following sites ?

- (1) Dausa
- (2) Ganeshwar
- (3) Budha Pushkar
- (4) Bagore
- (5) Question not attempted

32. The pre-historic rock paintings in Rajasthan are found at

- (1) Jodhpura
- (2) Balathal
- (3) Viratnagar (Bairath)
- (4) Bhangarh
- (5) Question not attempted

33. Which Pratihara ruler of Mandore made Merta his capital ?

- (1) Rajjil
- (2) Narbhatt
- (3) Bhogbhatt
- (4) Nagbhatt I
- (5) Question not attempted

34. Which of the following rulers of Bikaner wrote 'Jyotish Ratnakar' ?

- (1) Rai Singh
- (2) Raj Singh
- (3) Anoop Singh
- (4) Gaj Singh
- (5) Question not attempted

35. Where was the second session of Rajputana Madhya Bharat Sabha held in 1919 A.D. ?

- (1) Vardha
- (2) Delhi
- (3) Ajmer
- (4) Amritsar
- (5) Question not attempted

36. Vijay Singh Pathik formed the farmers' organization in Bairisal which was known as \_\_\_\_\_

- (1) Upparmal Board of Farmers
- (2) Kisan Panchayat Board
- (3) Bijolia Kisan Association
- (4) Mewar Thikana Peasants Association
- (5) Question not attempted



37. किस सम्मेलन की रिपोर्ट ने देशी राज्यों में प्रतिनिधि सरकार के गठन पर जोर दिया ?

- (1) लाहौर सम्मेलन
- (2) कलकत्ता सम्मेलन
- (3) नागपुर सम्मेलन
- (4) बरार सम्मेलन
- (5) अनुत्तरित प्रश्न

38. 'मत्स्य संघ' का विलय राजस्थान में किस तिथि को हुआ ?

- (1) 18 मार्च, 1949
- (2) 18 मार्च, 1948
- (3) 15 मई, 1948
- (4) 15 मई, 1949
- (5) अनुत्तरित प्रश्न

39. 10 अप्रैल, 1940 को जब्त की गयी पुस्तक 'उस पार रोशनी' की प्रतियाँ रखने के आरोप पर अजमेर के किस प्रेस कार्यालय की भारतीय सुरक्षा अधिनियम, 1932 के अंतर्गत तलाशी ली गयी ?

- (1) नवज्योति प्रिंटिंग प्रेस
- (2) राजस्थान सेवा संघ प्रेस
- (3) अमर प्रिंटिंग प्रेस
- (4) भारत प्रिंटिंग प्रेस
- (5) अनुत्तरित प्रश्न

40. कीर्ति स्तंभ की मूर्तिकला के संबंध में इनमें से कौन सा कथन सही नहीं है ?

- (1) स्तंभ के प्रवेश द्वार पर जनार्दन की मूर्ति उत्कीर्ण है।
- (2) पाँचवीं मंजिल पर युग्म मूर्तियाँ हैं।
- (3) सातवीं मंजिल पर बुद्ध की प्रतिमा है।
- (4) आठवीं मंजिल पर महासरस्वती, महालक्ष्मी और महाकाली की मूर्तियाँ हैं।
- (5) अनुत्तरित प्रश्न

37. Report of which conference laid stress on the formation of representative govt. in the princely states ?

- (1) Lahore Conference
- (2) Calcutta Conference
- (3) Nagpur Conference
- (4) Berar Conference
- (5) Question not attempted

38. On which date the 'Matsaya Sangh' was merged in Rajasthan ?

- (1) 18<sup>th</sup> March, 1949
- (2) 18<sup>th</sup> March, 1948
- (3) 15<sup>th</sup> May, 1948
- (4) 15<sup>th</sup> May, 1949
- (5) Question not attempted

39. Which press office of Ajmer was searched under Indian Security Act, 1932 on the charge of keeping copies of the seized book 'Us Paar Roshni' on 10<sup>th</sup> April 1940 ?

- (1) Navajyoti Printing Press
- (2) Rajasthan Sewa Sangh Press
- (3) Amar Printing Press
- (4) Bharat Printing Press
- (5) Question not attempted

40. Which of the statements is not correct regarding the sculpture of Kirti Stambh ?

- (1) The entrance of the stambh is engraved with the idol of Janardan.
- (2) There are couple images at the fifth storey.
- (3) The statue of Buddha is there on seventh storey.
- (4) The eighth storey has idols of Maha Saraswati, Maha Laxmi and Maha Kali.
- (5) Question not attempted



41. Consider the following :

- A. Temperature
- B. Viscosity
- C. Thermal conductivity
- D. Enthalpy

Which of these properties of a system are the intensive properties ?

- (1) A and B
- (2) A, B and C
- (3) A, C and D
- (4) A, B, C and D
- (5) Question not attempted

42. If  $G$  is irradiation and  $E_b$  is the emissive power, the radiosity ( $J$ ) of a surface is expressed by

- (1)  $J = G + \epsilon E_b$
- (2)  $J = G + E_b$
- (3)  $J = \rho G + \epsilon E_b$
- (4)  $J = \rho G + E_b$
- (5) Question not attempted

Where  $\rho$  is reflectivity and  $\epsilon$  is emissivity of a surface.

43. A heat pump operates between two temperatures  $T_1$  and  $T_2$ , where  $T_1$  is greater than  $T_2$ . For the operation of heat pump, which of the following option is correct ?

- (1)  $T_1 = T_{atm}$  and  $T_2 < T_{atm}$
- (2)  $T_1 < T_{atm}$  and  $T_2 > T_{atm}$
- (3)  $T_1 > T_{atm}$  and  $T_2 = T_{atm}$
- (4)  $T_1 > T_{atm}$  and  $T_2 < T_{atm}$
- (5) Question not attempted

Where  $T_{atm}$  is the atmospheric temperature.

44. For estimating the shape factor in Radiative heat transfer, the Reciprocity theorem states -

- (1)  $F_{1-2} = F_{2-1}$
- (2)  $A_1 F_{1-2} = A_2 F_{2-1}$
- (3)  $A_2 F_{1-2} = A_1 F_{2-1}$
- (4)  $\epsilon_1 F_{1-2} = \epsilon_2 F_{2-1}$
- (5) Question not attempted

45. The dimensionless number which is the ratio of kinematic viscosity and thermal diffusivity is known as \_\_\_\_\_.

- (1) Grashoff Number
- (2) Prandtl Number
- (3) Mach Number
- (4) Nusselt Number
- (5) Question not attempted



46. During a phase-change process in a condenser, its effectiveness is given by which of the following? Assume the heat capacity ratio to

$$be C = \frac{C_{min}}{C_{max}}$$

(1)  $\frac{1 - \exp(-NTU(1+C))}{(1+C)}$

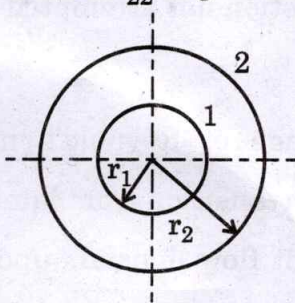
(2)  $\frac{1 - \exp(-NTU(1-C))}{(1+C)}$

(3)  $1 - \exp(-NTU)$

(4)  $\frac{NTU}{1+NTU}$

(5) Question not attempted

47. Consider two concentric spheres, as shown in figure. If  $r_1$  and  $r_2$  are the radii of the inner and outer spheres respectively, then the view factor  $F_{22}$  is given by



(1)  $\frac{r_1}{r_2}$

(2)  $\left(\frac{r_1}{r_2}\right)^2$

(3)  $\left(\frac{r_1}{r_2}\right)^2 - 1$

(4)  $1 - \left(\frac{r_1}{r_2}\right)^2$

(5) Question not attempted

48. In a Rankine cycle, water is pumped from 10 kPa to 2 MPa. Assuming water to be incompressible, the specific work (in kJ/kg) supplied to the pump is given by (Assume water density = 1000 kg/m<sup>3</sup>)

(1) 1.99

(2) 2.10

(3) 1.25

(4) 2.25

(5) Question not attempted

49. The CORRECT statement about the characteristics of critical point of a pure substance is that

(1) the ice directly converts from solid phase to vapour phase.

(2) it has no point of inflection with zero slope.

(3) there is no constant temperature vapourization process.

(4) ice, liquid water and water vapour co-exist at this point.

(5) Question not attempted



50. A system, containing air, undergoes separately isothermal expansion, adiabatic expansion, isobaric expansion and polytropic expansion ( $n = 1.35$ ). To attain the same final volume, the correct order of work output in these four processes is :

(1)  $W_{\text{isothermal}} > W_{\text{adiabatic}} >$

$W_{\text{polytropic}} > W_{\text{isobaric}}$

(2)  $W_{\text{polytropic}} > W_{\text{adiabatic}} >$

$W_{\text{isothermal}} > W_{\text{isobaric}}$

(3)  $W_{\text{adiabatic}} > W_{\text{isothermal}} >$

$W_{\text{polytropic}} > W_{\text{isobaric}}$

(4)  $W_{\text{isobaric}} > W_{\text{isothermal}} >$

$W_{\text{polytropic}} > W_{\text{adiabatic}}$

(5) Question not attempted

51. The power developed by a turbine in a certain steam power plant is 1206 kW. The heat supplied to boiler is 3500 kJ/kg. The heat rejected by steam to cooling water is 2900 kJ/kg. The feed pump work required to condensate back into the boiler is 6 kW. What will be mass flow rate of cycle ?

(1) 2 kg/s

(2) 0.002 kg/s

(3) 6.22 kg/s

(4) 0.00622 kg/s

(5) Question not attempted

52. Radiation shields are used to reduce the heat transfer between two heat exchanging surfaces. If  $n$  is the number of radiation shields, the following expression is correct :

(1)  $\left(\frac{q}{A}\right)_{\text{with shields}} = \frac{1}{(n+1)} \left(\frac{q}{A}\right)_{\text{without shields}}$

(2)  $\left(\frac{q}{A}\right)_{\text{without shields}} = \frac{1}{(n+1)} \left(\frac{q}{A}\right)_{\text{with shields}}$

(3)  $\left(\frac{q}{A}\right)_{\text{with shields}} = n \times \left(\frac{q}{A}\right)_{\text{without shields}}$

(4)  $\left(\frac{q}{A}\right)_{\text{without shields}} = n \times \left(\frac{q}{A}\right)_{\text{with shields}}$

(5) Question not attempted

53. The range of Reynold's number (Re) for transition from laminar to turbulent flow depends upon pipe roughness and smoothness of the flow. The generally accepted range for transition is :

(1)  $Re > 4000$

(2)  $Re < 2000$

(3)  $3 \times 10^5 < Re < 5 \times 10^5$

(4)  $2000 < Re < 4000$

(5) Question not attempted



54. If the Otto, Diesel and Dual cycles are compared for the same maximum pressure and temperature, the following option will be true :

- (1)  $\eta_{\text{Diesel}} > \eta_{\text{Otto}}$
- (2)  $\eta_{\text{Otto}} > \eta_{\text{Diesel}}$
- (3)  $\eta_{\text{Dual}} > \eta_{\text{Diesel}}$
- (4)  $\eta_{\text{Otto}} > \eta_{\text{Dual}}$
- (5) Question not attempted

55. The following property of a gas remains constant in throttling process :

- (1) Entropy
- (2) Temperature
- (3) Internal Energy
- (4) Enthalpy
- (5) Question not attempted

56. The thermal efficiency of an air standard Brayton cycle in terms of the pressure ratio ( $r_p$ ) and

$\gamma \left( = \frac{C_p}{C_v} \right)$  is given by :

(1)  $1 - \frac{1}{(r_p)^{\gamma-1}}$

(2)  $1 - \frac{1}{(r_p)^\gamma}$

(3)  $1 - \frac{1}{(r_p)^{1/\gamma}}$

(4)  $1 - \frac{1}{(r_p)^{\left(\frac{\gamma-1}{\gamma}\right)}}$

- (5) Question not attempted

57. Match List - I (Refrigerant) with List - II (Chemical formulae) and select the appropriate option :

List - I

List - II

A. R-32      i.  $C_2Cl_3F_3$

B. R-113      ii.  $CH_2F_2$

C. R-717      iii.  $NH_3$

D. R-12      iv.  $CCl_2F_2$

A      B      C      D

(1) ii      i      iii      iv

(2) ii      iii      i      iv

(3) iv      i      iii      ii

(4) ii      iv      iii      i

- (5) Question not attempted

58. In a vapour compression refrigeration system, the flash chamber is mounted between -

- (1) compressor and condenser
- (2) condenser and expansion device

- (3) expansion device and evaporator

- (4) evaporator and compressor

- (5) Question not attempted





59. If a liquid-vapour regenerative heat exchanger is installed between suction line and liquid line in simple vapour compression system, then the coefficient of performance of the cycle

- (1) always increases
- (2) always decreases
- (3) increases in case of R12 refrigerant and decreases for R22 and  $\text{NH}_3$  refrigerants
- (4) remains unchanged
- (5) Question not attempted

60. The index that correlates the combined effects of air temperature, relative humidity and air velocity on the human body is known as

- (1) Mean radiant temperature
- (2) Effective temperature
- (3) Dew point temperature
- (4) Solar temperature
- (5) Question not attempted

61. In a Brayton cycle, the value of optimum pressure ratio ( $r_p$ ) for maximum net work done between temperature  $T_1$  and  $T_3$  is, (where  $T_3$  is maximum temperature and  $T_1$  is minimum temperature)

$$(1) r_p = \left(\frac{T_3}{T_1}\right)^{\frac{\gamma}{\gamma-1}}$$

$$(2) r_p = \left(\frac{T_3}{T_1}\right)^{\frac{\gamma-1}{2\gamma}}$$

$$(3) r_p = \left(\frac{T_3}{T_1}\right)^{\frac{\gamma}{2(\gamma-1)}}$$

$$(4) r_p = \left(\frac{T_3}{T_1}\right)^{2\left(\frac{\gamma-1}{\gamma}\right)}$$

- (5) Question not attempted

62. The Morse test in context of IC engines is applicable only to :

- (1) Single cylinder SI engine
- (2) Single cylinder CI engine
- (3) Multi cylinder SI and CI engine
- (4) Multi cylinder CI engine
- (5) Question not attempted

63. Which of the following cannot be used as a moderator in a nuclear power plant ?

- (1) Graphite
- (2) Beryllium
- (3) Heavy water
- (4) Lead
- (5) Question not attempted



64. Which of the following components in a vapour absorption system is a substitute for the compressor of the vapour compression system ?
- (1) Absorber and Generator
  - (2) Heat Exchanger and Generator
  - (3) Pump and Absorber
  - (4) Absorber, Pump, Generator and Pressure reducing valve
  - (5) Question not attempted
65. If a mass of moist air in an airtight container is cooled down to a lower temperature then
- (1) dew point temperature decreases
  - (2) dew point temperature increases
  - (3) relative humidity increases
  - (4) relative humidity decreases
  - (5) Question not attempted
66. A gas having a positive Joule-Thompson coefficient ( $\mu_J > 0$ ) when throttled will
- (1) become warmer
  - (2) become cooler
  - (3) remain at the same temperature
  - (4) undergo heating and cooling both
  - (5) Question not attempted
67. In compression ignition engines the auto ignition of the charge causing knocking occurs at which stage of combustion ?
- (1) Start
  - (2) Mid
  - (3) End
  - (4) Any stage
  - (5) Question not attempted
68. The velocity compounded impulse steam turbine used in a steam power plant is called -
- (1) Rateau turbine
  - (2) Curtis turbine
  - (3) Curtis-Rateau turbine
  - (4) Parson's turbine
  - (5) Question not attempted
69. In a cooling and dehumidification process, the temperature at which the Room Sensible Heat Factor (RSHF) line intersects the saturation curve on the psychrometric chart, is called
- (1) Dew point
  - (2) Triple point
  - (3) Room Apparatus Dew Point (Room ADP)
  - (4) Coil Apparatus Dew Point (coil ADP)
  - (5) Question not attempted



70. In an absorption refrigeration system, the refrigeration temperature is  $-15^{\circ}\text{C}$ . The generator is operated by solar heat, where the temperature reaches to  $110^{\circ}\text{C}$ . The temperature of the heat sink is  $55^{\circ}\text{C}$ . What is the maximum possible COP of the system ?

- (1) 3.4                      (2) 2.4
- (3) 0.24                    (4) 0.52
- (5) Question not attempted

71. A kinematic pair is a joint of :

- (1) Two links which are fixed
- (2) Two links that are not mechanically held
- (3) Two links having relative motion between them
- (4) Welded Lap Joint
- (5) Question not attempted

72. Coriolis component of acceleration depends on

- a. Acceleration of the slider
  - b. Angular velocity of the link
  - c. Change of linear displacement
- Which of the above is/are correct ?

- (1) a only                    (2) b only
- (3) a and c                 (4) b and c
- (5) Question not attempted

73. The number of teeth of a spur gear is 30 and it rotates at 200 rpm. What will be its circular pitch if it has a module of 2 mm ?

- (1) 5.28 mm                (2) 6.28 mm
- (3) 7.28 mm                (4) 8.28 mm
- (5) Question not attempted

74. A pair of spur gears with module 5 mm and a center distance of 450 mm is used for a speed reduction of 5:1. The number of teeth on pinion is

- (1) 20                        (2) 30
- (3) 40                        (4) 50
- (5) Question not attempted

75. In a Hartnell governor, the mass of each ball is 2.5 kg. Maximum and minimum centrifugal forces on the balls are 2000 N and 200 N corresponding to radii 20 cm and 15 cm respectively. The length of vertical and horizontal arms of the bell crank lever are same. Then, what will be the spring stiffness in N/cm ?

- (1) 190                        (2) 380
- (3) 570                        (4) 720
- (5) Question not attempted



76. Find the coefficient of speed fluctuation of a flywheel if the ratio of  $\omega_{\max}/\omega_{\min}$  is 2.

- (1) 4/3                      (2) 5/3
- (3) 2/3                      (4) 7/3
- (5) Question not attempted

77. In a flat belt drive, the slip between the driver and belt is 1% and slip between the belt and follower is 3%. If the pulley diameters for the driver and follower are equal, the velocity ratio of the drive is :

- (1) 0.99                      (2) 0.96
- (3) 0.98                      (4) 0.97
- (5) Question not attempted

78. Mechanical Governor contain leaf springs is known as

- (1) Porter Governor
- (2) Hartnell Governor
- (3) Pickering Governor
- (4) Hartung Governor
- (5) Question not attempted

79. The ratio of maximum displacement of the forced vibration to the deflection due to the static force is known as

- (1) Damping coefficient
- (2) Damping factor
- (3) Magnification factor
- (4) Logarithmic decrement
- (5) Question not attempted

80. A vibrating system consists of a mass of 50 kg, a spring with a stiffness of 30 kN/m and a damper. The damping that is provided is only 20% of the critical value. Calculate critical damping coefficient.

- (1) 489.896 N/(m/s)
- (2) 2449.48 N/(m/s)
- (3) 2249.48 N/(m/s)
- (4) 1489.896 N/(m/s)
- (5) Question not attempted

81. With usual notations, for a single degree of freedom spring mass mechanical system, the equation,

$$F_0 \sin \omega t = m\ddot{x} + c\dot{x} + sx$$

represents :

- (1) Free vibration with damping
- (2) Free vibration without damping
- (3) Forced vibration with damping
- (4) Forced vibration without damping
- (5) Question not attempted



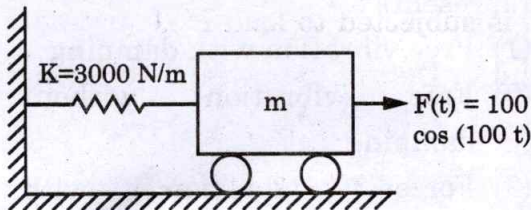
82. A vibratory system consists of a mass 12.5 kg, a spring of stiffness 1000 N/m, and a dashpot with damping coefficient of 15 Ns/m. The value of critical damping of the system is

- (1) 0.223 Ns/m    (2) 17.88 Ns/m  
 (3) 71.4 Ns/m    (4) 223.6 Ns/m  
 (5) Question not attempted

83. The natural frequency of a spring-mass system on earth is  $\omega_n$ . The natural frequency of this system on the moon ( $g_{\text{moon}} = g_{\text{earth}}/6$ ) is

- (1)  $0.204 \omega_n$     (2)  $0.408 \omega_n$   
 (3)  $\omega_n$     (4)  $0.167 \omega_n$   
 (5) Question not attempted

84. A mass,  $m$ , attached to spring is subjected to a harmonic force as shown in figure. The amplitude of the forced motion is observed to be 50 mm. The value of  $m$  (in kg) is



- (1) 1.0    (2) 0.5  
 (3) 0.3    (4) 0.1  
 (5) Question not attempted

85. In Rayleigh's method, the \_\_\_\_\_ at the mean position (where potential energy is zero) is equal to the maximum potential energy (or strain energy) at the extreme position (where the kinetic energy is zero).

- (1) minimum kinetic energy  
 (2) minimum potential energy  
 (3) maximum kinetic energy  
 (4) maximum potential energy  
 (5) Question not attempted

86. If the principal stresses in a plane stress problem, are  $\sigma_1 = 100 \text{ MPa}$ ,  $\sigma_2 = 40 \text{ MPa}$ , the magnitude of the maximum shear stress in MPa will be

- (1) 60 MPa    (2) 30 MPa  
 (3) 50 MPa    (4) 70 MPa  
 (5) Question not attempted

87. The Young's modulus of elasticity of steel is 210 GPa, and the Poisson's ratio is 0.29. The shear modulus will be :

- (1) 110.45 GPa    (2) 105.33 GPa  
 (3) 81.39 GPa    (4) 71.77 GPa  
 (5) Question not attempted



88. Maximum shear stress developed on the surface of a solid circular shaft under pure torsion is 240 MPa. If the shaft diameter is doubled, the maximum shear stress developed corresponding to the same torque will be :

- (1) 240 MPa
- (2) 60 MPa
- (3) 30 MPa
- (4) 90 MPa
- (5) Question not attempted

89. A cylindrical rod of length,  $l$  and diameter,  $d$ , is rigidly fixed at its upper end and hangs vertically. The elongation produced in the rod due to its total self weight,  $W$  is :

- (1)  $\frac{Wl}{2AE}$
- (2)  $\frac{Wl}{AE}$
- (3)  $\frac{2Wl}{AE}$
- (4)  $\frac{3Wl}{2AE}$

(5) Question not attempted

Where  $A$  is area of cross-section of cylindrical rod and  $E$  is modulus of elasticity.

90. A gradually varying cross-section tapering bar with diameter of the end sections being  $d_1$  and  $d_2$  and a bar having uniform cross section with diameter  $d$  have the same length  $L$  and subjected to the same axial pull  $P$  and are made of same material, then, both the bars will have the same extension if  $d$  is equal to :

- (1)  $\frac{d_1 + d_2}{2}$
- (2)  $\sqrt{d_1 \cdot d_2}$
- (3)  $\frac{\sqrt{d_1 \cdot d_2}}{2}$
- (4)  $\frac{\sqrt{d_1 + d_2}}{2}$

(5) Question not attempted

91. A simply supported beam of constant flexural rigidity and length  $2L$  carries a concentrated load  $P$  at its mid span and the maximum deflection under the load is  $\delta$ . A cantilever beam of the same flexural rigidity and length  $L$  is subjected to load  $P$  at its free end. Determine the relation between the deflection at free end of the cantilever with  $\delta$ .

- (1)  $\delta$
- (2)  $2\delta$
- (3)  $1.5\delta$
- (4)  $3\delta$
- (5) Question not attempted



92. A steel member of area of cross section  $1000 \text{ mm}^2$ , having a length of  $1 \text{ m}$  is subjected to an axial compressive load of  $10 \text{ kN}$ . Assuming the case of pure compression in the member, the axial deflection is given by :

(Take  $E = 200 \text{ GPa}$ )

- (1)  $0.05 \text{ mm}$       (2)  $0.5 \text{ mm}$   
 (3)  $5 \text{ mm}$       (4)  $1/5 \text{ mm}$   
 (5) Question not attempted

93. The S-N curve for steel becomes asymptotic nearly at

- (1)  $10^3$  cycles      (2)  $10^4$  cycles  
 (3)  $10^6$  cycles      (4)  $10^9$  cycles  
 (5) Question not attempted

94. The life of a ball bearing at a load of  $10 \text{ kN}$  is  $8000$  hours. Its life in hours, if the load is increased to  $20 \text{ kN}$ , keeping all other conditions same, is :

- (1)  $4000$       (2)  $2000$   
 (3)  $1000$       (4)  $500$   
 (5) Question not attempted

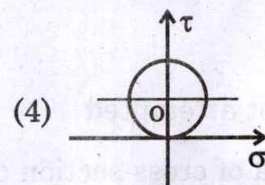
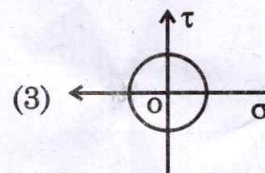
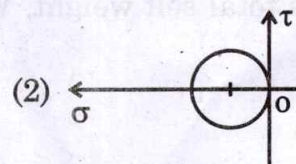
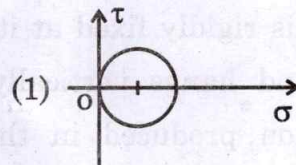
95. A bolted joint is so designed that the stiffness of a threaded portion ( $K_1$ ) is equal to the stiffness of unthreaded portion ( $K_2$ ) of the bolt in a clamped region, then combined stiffness (effective) ( $K_e$ ) of the bolt is given by

- (1)  $0.5 K_1$       (2)  $1.0 K_1$   
 (3)  $2.0 K_1$       (4)  $4.0 K_1$   
 (5) Question not attempted

96. A thin cylinder of inner radius  $500 \text{ mm}$  and thickness  $10 \text{ mm}$  is subjected to an internal pressure of  $5 \text{ MPa}$ . The average circumferential (hoop) stress in MPa is

- (1)  $100$       (2)  $250$   
 (3)  $500$       (4)  $1000$   
 (5) Question not attempted

97. Which of the following Mohr's circle represents the condition of pure shear ?



- (5) Question not attempted

100009

100009

100009



98. A plate with a circular hole in the centre is subjected to a tensile load. The maximum stress induced at the edge of hole will be \_\_\_\_\_ of the normal stress.

- (1) double            (2) 2.5 times
- (3) four times      (4) 3 times
- (5) Question not attempted

99. In the calculation of induced shear stress in helical spring, the Wahl's correction factor is used to take care of combined effect of

- (1) Transverse shear stress and bending stress in wire.
- (2) Transverse shear stress and curvature of wire.
- (3) Torsional shear stress and transverse shear stress of wire.
- (4) Bending stress and curvature of wire.
- (5) Question not attempted

100. The atomic packing factor for an FCC unit cell is

- (1) 0.68            (2) 0.69
- (3) 0.72            (4) 0.74
- (5) Question not attempted

101. The iron-carbon diagram and TTT curve are determined under :

- (1) Equilibrium and non-equilibrium conditions respectively
- (2) Non-equilibrium and equilibrium conditions respectively
- (3) Equilibrium conditions for both
- (4) Non-equilibrium conditions for both
- (5) Question not attempted

102. What is the primary purpose of annealing in the heat treatment of steel ?

- (1) Increasing hardness
- (2) Improving corrosion resistance
- (3) Relieving stress
- (4) Enhancing wear resistance
- (5) Question not attempted

103. For a ductile material, toughness is the measure of

- (1) resistance to scratching
- (2) ability to absorb energy up to fracture
- (3) ability to absorb energy till elastic limit
- (4) resistance to indentation
- (5) Question not attempted



104. In case of a 0.8% carbon steel, during eutectoid reaction at 727 °C with lever arm extending upto ferrite (0.0% Carbon) at one end and up to cementite (6.67 % C) at other end, the fraction of ferrite is given by

- (1) 0.88                      (2) 0.12  
(3) 0.75                      (4) 0.25  
(5) Question not attempted

105. In Iron-Carbon phase diagram, eutectoid reaction to transform austenite to ferrite and cementite takes place at a temperature

- (1) 540 °C                      (2) 727 °C  
(3) 1147 °C                      (4) 1493 °C  
(5) Question not attempted

106. The property of moulding sand that affects its ability to stick together and maintain its shape is :

- (1) Permeability (2) Collapsibility  
(3) Cohesiveness (4) Flowability  
(5) Question not attempted

107. The velocity of the molten metal at the gate, passing through a sprue of height 'h' is given by

- (1) gh                      (2) 2gh  
(3)  $\sqrt{2gh}$                       (4)  $\sqrt{2} \cdot gh$   
(5) Question not attempted

108. Which of the following welding process is a solid state welding ?

- (1) Gas Metal Arc welding  
(2) Submerged Arc welding  
(3) Friction welding  
(4) Electro-slag welding  
(5) Question not attempted

109. In a thermit welding, the ratio of aluminium and iron oxides is used as

- (1) 1:1                      (2) 1:2  
(3) 1:3                      (4) 3:1  
(5) Question not attempted

110. The operation of removing the burr from the forged parts in drop forging is known as

- (1) Lancing                      (2) Coining  
(3) Shot peening (4) Trimming  
(5) Question not attempted

111. Which of the following processes is primarily used for producing long continuous shapes, such as rods, tubes, and bars, by forcing metal through a shaped die ?

- (1) Extrusion                      (2) Forging  
(3) Casting                      (4) Welding  
(5) Question not attempted



112. In an orthogonal cutting, the cutting speed is 2 m/s, depth of cut is 0.5 mm and the chip thickness is 0.6 mm. Then the chip velocity is :

- (1) 2 m/s                      (2) 2.4 m/s
- (3) 1 m/s                      (4) 1.66 m/s
- (5) Question not attempted

113. In four high rolls mill, the bigger roll is known as

- (1) Guide roll
- (2) Backup roll
- (3) Main roll
- (4) Planetary roll
- (5) Question not attempted

114. A Flexible Manufacturing System (FMS) is characterized by

- (1) Low automation and high manual intervention
- (2) Fixed sequence of operations and low variety
- (3) High setup time and high production volume
- (4) High flexibility and high automation
- (5) Question not attempted

115. Which of the following organizational structures is characterized by cross-functional teams that report to both functional managers and project managers ?

- (1) Functional organization
- (2) Divisional organization
- (3) Matrix organization
- (4) Flat organization
- (5) Question not attempted

116. In micro-motion study, each fundamental element of work is referred as a :

- (1) Micromotion unit
- (2) Time unit
- (3) Therblig
- (4) Motion cycle
- (5) Question not attempted

117. In which of the following types of plant layout are machines arranged according to the sequence of operations required to manufacture a specific product ?

- (1) Process layout
- (2) Product layout
- (3) Fixed-position layout
- (4) Combination layout
- (5) Question not attempted





118. The standard time to accomplish a work is composed of
- (1) Normal time + Allowance
  - (2) Observed time + Allowance
  - (3) Observed time  $\times$  Rating factor
  - (4) Normal time + Observed time
  - (5) Question not attempted

119. Which of the following method is not used for the decision related to facility location ?
- (1) Factor rating method
  - (2) Transportation method
  - (3) Correlation and regression analysis
  - (4) Cost-volume-profit ratio
  - (5) Question not attempted

120. The observed time for an element is 2.4 minutes. The pace rating is 90 percent and the sum of all secondary adjustment amounts to 40 percent. The normal time is
- (1) 3.02 minutes
  - (2) 3.73 minutes
  - (3) 4.01 minutes
  - (4) 2.16 minutes
  - (5) Question not attempted

121. If there are 'm' rows and 'n' columns in a tabular form of a transportation problem, then the number of occupied cells for optimal solution should be equal to
- (1)  $m - n + 1$
  - (2)  $m + n - 1$
  - (3)  $m - n - 1$
  - (4)  $m + n + 1$
  - (5) Question not attempted

122. The size of payoff matrix of a game can be reduced by using \_\_\_\_\_ .
- (1) Determinant method
  - (2) Game Transpose
  - (3) Principle of dominance
  - (4) Game inversion
  - (5) Question not attempted

123. Which of the following is the measure of forecast error ?
- (1) Mean Absolute Deviation (MAD)
  - (2) Trend value
  - (3) Moving average
  - (4) Price fluctuation
  - (5) Question not attempted

124. MRP-II stands for
- (1) Material Resource Planning
  - (2) Manufacturing Resource Planning
  - (3) Master Resource Planning
  - (4) Manufacturing Review Process
  - (5) Question not attempted

125. Chase strategy in aggregate production planning is used when
- (1) Hiring and layoff cost is high.
  - (2) Hiring and layoff cost is low.
  - (3) Inventory carrying cost is low.
  - (4) Overtime production cost is high.
  - (5) Question not attempted



126. The breakeven point of a manufacturing company is 50,000 units. The fixed cost is ₹ 2,00,000 and the variable cost per unit is ₹ 40. The selling price per unit (in ₹) of the product at this breakeven point is :

- (1) 44                      (2) 46  
(3) 42                      (4) 48  
(5) Question not attempted

127. For a project using PERT, an activity has the following time estimates :

Optimistic Time = 12 days  
Most Likely Time = 15 days  
Pessimistic Time = 18 days  
What is the standard deviation for the activity ?

- (1) 1 day                      (2) 2 days  
(3) 3 days                      (4) 4 days  
(5) Question not attempted

128. Which of the following is considered to find the standard deviation of project completion time ?

- (1) Variance of all activities' times.  
(2) Variance of those activities' times which do not lie on critical path.  
(3) Variance of those activities' times which lie on critical path.  
(4) Variance of those activities' times which lie on longest path of the network.  
(5) Question not attempted

129. A linear programming problem is as follows :

Maximize  $3x + 7y$

Subject to  $3x + 7y \leq 10$

$4x + 6y \leq 8$

$x, y \geq 0$

It has :

- (1) An unbounded objective function  
(2) Unique optimum solution  
(3) Alternate optimum solutions  
(4) Infinitely many optimum solutions  
(5) Question not attempted

130. If the annual demand of an item is 100 units and ordering cost is ₹ 40 per order. The inventory holding cost is ₹ 20 per unit per year. What will be the economic order quantity ?

- (1) 20  
(2) 4  
(3) 8.94  
(4) 16  
(5) Question not attempted



131. For general relationship between the shear stress  $\tau$  and the rate of shear strain  $\frac{du}{dy}$  for a fluid can be written as

$$\tau = A + B \left( \frac{du}{dy} \right)^n$$

where A, B and n are constant. Which of the following is a false statement?

- (1) For ideal fluids :  $A = B = 0$
- (2) For Newtonian fluids :  $n = 1$  and  $A = 0$
- (3) For dilatant fluids :  $n < 1$  and  $A = 0$
- (4) For Bingham plastics :  $n = 1$  and  $A \neq 0$
- (5) Question not attempted

132. What is the vertical distance of the centre of pressure below the centroid of a plane surface, which is inclined at an angle  $\theta$  with the free surface (horizontal) of the liquid?

- (1)  $\frac{I_G}{Ah}$
- (2)  $\frac{I_G \sin \theta}{Ah}$
- (3)  $\frac{I_G \sin^2 \theta}{Ah}$
- (4)  $\frac{I_G \sin^2 \theta}{Ah^2}$
- (5) Question not attempted

133. Water is pumped through a pipeline to a height of 10 m at the rate of  $0.1 \text{ m}^3/\text{s}$ . If the frictional and other losses amount to 5 m, the pumping power required in kW would be

- (1) 9.80
- (2) 13.3
- (3) 14.7
- (4) 20.0
- (5) Question not attempted

134. A floating body has centre of buoyancy at B, centre of gravity at G and metacentre at M. Then, for stable equilibrium of the body

- (1)  $MG = 0$
- (2) M is below G
- (3)  $BG = 0$
- (4) M is above G
- (5) Question not attempted

135. At the vena contracta, the velocity of flow is given by

- (1)  $\sqrt{2gh}$
- (2)  $\sqrt{\frac{2g}{h}}$
- (3)  $\sqrt{2g} \times h$
- (4)  $C_v \times \sqrt{2gh}$
- (5) Question not attempted



136. For laminar flow through a circular duct, the maximum laminar entrance length at a critical Reynolds number of  $Re_{cr} = 2300$  is given by :

- (1)  $116 \times$  Diameter of duct
- (2)  $127 \times$  Diameter of duct
- (3)  $138 \times$  Diameter of duct
- (4)  $148 \times$  Diameter of duct
- (5) Question not attempted

137. Head loss due to friction in a pipe of diameter 300 mm and length 50 m, through which water is flowing at a velocity of 3 m/s using Chezy's formula for which Chezy's constant = 60 and Kinematic viscosity of water = 0.01 stokes is

- (1) 0.66
- (2) 1.66
- (3) 2.66
- (4) 3.66
- (5) Question not attempted

138. The Moody chart used for design consideration of pipes for fluid flow shows the relation between

- (1) Reynolds number and friction factor
- (2) Prandtl number and friction factor
- (3) Reynolds number and viscosity
- (4) Prandtl number and viscosity
- (5) Question not attempted

139. Identify incorrect assumption made in Bernoulli's equation.

- (1) The fluid is non-viscous.
- (2) The fluid flow is continuous, steady and laminar.
- (3) The fluid is compressible.
- (4) No external force except force of gravity and pressure acts on the fluid.
- (5) Question not attempted





140. It is usual to designate the frictional resistance to flow in a pipe by Darcy-Weisbach equation :

$$h_f = \frac{4fLV^2}{2gd}$$

For laminar viscous flow ( $Re < 2000$ ) through a circular pipe, the friction factor 'f' varies inversely with Reynolds number (Re) as :

- (1)  $8/Re$
- (2)  $16/Re$
- (3)  $32/Re$
- (4)  $64/Re$
- (5) Question not attempted

141. For a venturimeter, if  $a_1$  is cross sectional area of the pipe and  $a_2$  is cross section area of the throat, actual discharge through venturimeter is proportional to -

- (1)  $\sqrt{a_1^2 - a_2^2}$
- (2)  $\frac{\sqrt{a_1^2 - a_2^2}}{2 a_1 a_2}$
- (3)  $a_1 a_2$
- (4)  $\frac{a_1 a_2}{\sqrt{a_1^2 - a_2^2}}$
- (5) Question not attempted

142. The dimension of dynamic viscosity is given by -

- (1)  $MLT^{-1}$
- (2)  $ML^{-1}T$
- (3)  $ML^{-1}T^{-1}$
- (4)  $ML^{-2}T$
- (5) Question not attempted

143. Identify the incorrect statement about impulse turbines.

- (1) All the available pressure head is converted into kinetic energy before striking the buckets.
- (2) Flow of water cannot be regulated without loss of efficiency.
- (3) Components of turbine are easily accessible hence repairs are easy.
- (4) Draft tube not required.
- (5) Question not attempted

144. Identify incorrect statement pertaining to prevention of cavitation in centrifugal pumps.

- (1) Velocity of fluid in suction pipe should be kept low.
- (2) Sharp bends should be avoided as far as possible.
- (3) Suction head should be kept high.
- (4) Specific speed of pump should be kept low.
- (5) Question not attempted



145. If  $Q$  is actual discharge and  $H$  is actual head then the unit discharge  $Q_u$  of a water turbine will be given by

(1)  $Q_u = \frac{Q}{H^{3/4}}$

(2)  $Q_u = \frac{Q}{H^2}$

(3)  $Q_u = \frac{Q}{H^{1/2}}$

(4)  $Q_u = \frac{Q}{H^{5/4}}$

(5) Question not attempted

146. If a multi-jet Pelton wheel has  $n$  number of jets, then its specific speed is \_\_\_\_\_ times the specific speed for a single jet Pelton wheel.

(1)  $n$

(2)  $n^{3/4}$

(3)  $n^{1/2}$

(4)  $n^{5/4}$

(5) Question not attempted

147. Boundary layer separation is caused by

(1) Release of bubbles from the fluid when the pressure goes below the vapour pressure

(2) An adverse pressure gradient

(3) Reduction of pressure gradient to zero

(4) Boundary layer thickness reducing to zero value

(5) Question not attempted

148. According to Chezy's formula, velocity of flow through a pipeline is given by -

(1)  $v = m\sqrt{Ci}$

(2)  $v = i\sqrt{mC}$

(3)  $v = C^2\sqrt{mi}$

(4)  $v = C\sqrt{mi}$

(5) Question not attempted

Where  $m$  is hydraulic mean depth and  $i$  is head lost in friction per unit length and 'C' is the Chezy's constant.

149. Mechanical efficiency of a centrifugal pump is

(1) Shaft power / Power at impeller

(2) Power at impeller / Shaft Power

(3) Power with water / Power at impeller

(4) Power at impeller / Power with water

(5) Question not attempted

150. Centrifugal pumps dealing with mud, slurry and sewage have \_\_\_\_\_.

(1) isolated impeller

(2) open impeller

(3) semi-closed impeller

(4) closed impeller

(5) Question not attempted



रफ कार्य के लिए स्थान / SPACE FOR ROUGH WORK

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