

**SEE/ME/2020****SET****A****(Mechanical Engineering)****30000189****प्रश्न-पुस्तिका क्र.
Question Booklet No.****A****अनुक्रमांक
Roll No.**

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परीक्षार्थी अपना अनुक्रमांक दिए गए खानों में लिखें
Candidate should write his/her
Roll No. in the given boxes

मुद्रित पृष्ठों की संख्या/No. of Printed Pages : 32**कुल प्रश्नों की संख्या/Total No. of Questions : 150****समय/Time : 3 घण्टे/Hours****पूर्णांक/Total Marks : 450****परीक्षार्थियों के लिए निर्देश**

1. परीक्षा प्रारंभ होने के तुरन्त बाद, आप इस प्रश्न-पुस्तिका की पड़ताल अवश्य कर ले, कि इसमें कोई बिना छपा, फटा या छुटा हुआ पृष्ठ अथवा प्रश्नांश आदि न हो। यदि ऐसा है, तो वीक्षक से तत्काल संपर्क कर प्रश्न-पुस्तिका बदल लेवें।
2. यह प्रश्न-पुस्तिका सम्मिलित रूप से दो खंडों में विभाजित हैं। खंड - 'अ' तथा खंड - 'ब'।
3. खंड - 'अ' के प्रश्न सामान्य अध्ययन से संबंधित है, जिसमें कुल 50 प्रश्न हैं, सभी प्रश्न हिन्दी तथा अंग्रेजी भाषा में हैं। सभी प्रश्न अनिवार्य हैं।
4. खंड - 'ब' संबंधित इंजीनियरिंग विषय से है। जिसमें कुल 100 प्रश्न हैं। सभी प्रश्न केवल अंग्रेजी भाषा में हैं। सभी प्रश्न अनिवार्य हैं। अभ्यर्थी स्वयं यह सुनिश्चित कर लें कि जिस पद हेतु आवेदन किया है वही विषय का प्रश्न-पत्र प्राप्त हुआ है।
5. सभी प्रश्नों के अंक समान हैं। प्रत्येक सही उत्तर के लिए 03 अंक प्रदान किए जायेंगे। ऋणात्मक मूल्यांकन का प्रावधान है। प्रत्येक गलत उत्तर के लिए 01 अंक काटा जायेगा।
6. प्रदत्त उत्तर-पत्र पर दिए गए निर्देशों को ध्यानपूर्वक पढ़ें तथा अपने उत्तर तदनुसार अंकित करें।
7. कृपया उत्तर-पत्र (ओ.एम.आर. शीट) पर निर्धारित स्थानों पर आवश्यक प्रविष्टियाँ करें, अन्यत्र स्थानों पर नहीं।
8. परीक्षार्थी सभी रफ कार्य प्रश्न-पुस्तिका के अंतिम पृष्ठ पर निर्धारित स्थान पर ही करें, अन्यत्र कहीं नहीं तथा उत्तर-पत्र (ओ.एम.आर. शीट) पर भी नहीं।
9. प्रश्न-पत्र हल करने हेतु सामान्य केलक्यूलेटर ही मान्य किया जावेगा। साइंटिफिक/इंजीनियरिंग केलक्यूलेटर परीक्षा में मान्य नहीं है।
10. यदि खंड- 'अ' के किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो, तो प्रश्न के हिन्दी तथा अंग्रेजी रूपांतरों में से हिन्दी रूपांतर को मानक माना जाएगा।

INSTRUCTIONS TO THE CANDIDATES

1. Immediately after the commencement of the examination, you should check that this Question Booklet does not have any unprinted or torn or missing pages or items etc. If so, immediately contact the invigilator and get it replaced with Question Booklet.
2. This combined Question Booklet is divided in two Sections. Section - 'A' and Section - 'B'.
3. Section - 'A' contains 50 Questions of General Studies. All Questions are in Hindi and English Language. All questions are compulsory.
4. Section - 'B' contains 100 Questions of Concerned Engineering Subject. Question are only in English Language. All questions are compulsory. Candidates should ensure that he/she got the question paper of the same post for which he/she had applied.
5. All questions carry equal marks. Three marks for each correct answer. There is provision of **Negative Markings**. For each wrong answer, one mark will be deducted.
6. Read carefully the instructions given on the Answer Sheet (OMR) supplied and indicate your answers accordingly.
7. Kindly make necessary entries on the Answer Sheet (OMR) at the places indicated and nowhere else.
8. Examinee should do all rough work on the space meant for rough work on pages given at the end of the Question Booklet and nowhere else, not even on the Answer Sheet (OMR).
9. Only simple calculator is allowed to solve the Question Paper. Scientific/Engineering calculator will not be allowed.
10. If there is any sort of mistake either of printing or of factual nature in any question of Section - A, then out of the Hindi and English versions of the question, the Hindi version will be treated as standard.

SEAL



खंड - अ

1. भूलांजखंड निम्नलिखित में से किस खनिज के लिए प्रसिद्ध है ?
 - (A) बॉक्साइट
 - (B) ताँबा
 - (C) डोलोमाइट
 - (D) चूना पत्थर
2. बाणसागर परियोजना किस नदी पर स्थित है ?
 - (A) केन
 - (B) बेतवा
 - (C) सोन
 - (D) धसान
3. मध्यप्रदेश में गैर-परम्परागत ऊर्जा स्रोतों के अन्तर्गत सर्वाधिक स्थापित क्षमता निम्न में से किस संसाधन की है ?
 - (A) पवन ऊर्जा
 - (B) सौर ऊर्जा
 - (C) बायोमास ऊर्जा
 - (D) कचरा से ऊर्जा
4. मध्यप्रदेश में निम्नलिखित में से किस साधन द्वारा सर्वाधिक सिंचाई होती है ?
 - (A) नहरें
 - (B) तालाब
 - (C) कुएँ - ट्यूबवेल
 - (D) अन्य साधन
5. विन्ध्याचल सुपर थर्मल पावर स्टेशन निम्नलिखित में से किस जिले में स्थापित है ?
 - (A) शहडोल
 - (B) बैतूल
 - (C) उमरिया
 - (D) सिंगरौली
6. रोबोट के चल जोड़ों की संख्या को कहते हैं
 - (A) डिग्री ऑफ इन्डिपेंडेंस
 - (B) डिग्री ऑफ जाइन्ट्स
 - (C) डिग्री ऑफ फ्रीडम
 - (D) डिग्री ऑफ मूवमेन्ट
7. किसी भी संदेश की अखण्डता को सत्यापित करने की तकनीक को _____ कहते हैं ।
 - (A) मेसेज इन्क्रीप्ट
 - (B) मेसेज चेकसम
 - (C) मेसेज डायजेस्ट
 - (D) उपरोक्त में से कोई नहीं
8. _____ एक ऐसा साफ्टवेयर प्रोग्राम है जो कि इन्टरनेट से आने वाले डाटा को फिल्टर करता है ।
 - (A) एन्टीवायरस
 - (B) कूकीज
 - (C) मालवेयर
 - (D) फायरवाल



SECTION – A

1. Malanjkhand is famous for which of the following mineral ?
 - (A) Bauxite
 - (B) Copper
 - (C) Dolomite
 - (D) Limestone
2. Bansagar Project is situated on which of the following river ?
 - (A) Ken
 - (B) Betwa
 - (C) Son
 - (D) Dhasan
3. In Madhya Pradesh, which of the following resources has the highest established capacity among the non-conventional sources of energy ?
 - (A) Wind energy
 - (B) Solar energy
 - (C) Biomass energy
 - (D) Energy from garbage
4. Which of the following sources has highest proportion of irrigation in Madhya Pradesh ?
 - (A) Canals
 - (B) Tanks
 - (C) Wells-tubewells
 - (D) Other sources
5. Vindhya Super Thermal Power Station is established in which of the following district ?
 - (A) Shahdol
 - (B) Betul
 - (C) Umaria
 - (D) Singrauli
6. Number of moveable joints in robot is called
 - (A) Degree of independence
 - (B) Degree of joints
 - (C) Degree of freedom
 - (D) Degree of movement
7. Technique to verify message integrity is known as
 - (A) Message encrypt
 - (B) Message checksum
 - (C) Message digest
 - (D) None of the above
8. _____ is a software program that filters all the data coming through the internet.
 - (A) Antivirus
 - (B) Cookies
 - (C) Malware
 - (D) Firewall



9. एप्लीकेशन एवं डाटा होस्टिंग एवं कनेक्टिविटी एवं क्षमता निर्माण हेतु राष्ट्रीय इ-गवर्नेंस योजना के गठन में सरकार द्वारा प्रदान किये गये बुनियादी ढाँचे के पहलू

- (A) एस.डी.सी., एस.डब्ल्यू.ए.एन. एवं ई.एस.डी.जी.
- (B) एस.डब्ल्यू.ए.एन., एस.डी.सी. एवं एन.आई.सी.
- (C) एस.डब्ल्यू.ए.एन., एस.डी.एल.सी. एवं एन.आई.एस.जी.
- (D) इनमें से कोई नहीं

10. सायबर सिक्यूरिटी का दायरा है

- (A) वलनरेबिलिटी रिडक्शन
- (B) इन्सीडेंट रिस्पांस
- (C) रिकवरी पॉलिसी
- (D) उपरोक्त सभी

11. निम्नलिखित में से कौन-सा लोकनृत्य निमाड़ी लोकनृत्य से संबंधित नहीं है ?

- (A) गणगौर
- (B) राई
- (C) काठी
- (D) फेफारिया

12. निम्नलिखित में से कौन-सा मालवा का प्रसिद्ध लोकनाट्य है ?

- (A) हिंगोला
- (B) छाहुर
- (C) मनसुखा
- (D) माच

13. बघेलखण्ड का प्राचीन नाम क्या था ?

- (A) करुष
- (B) माहिषमती
- (C) तीरभुक्ति
- (D) शुक्तिमती

14. प्रसिद्ध चन्देल सेनायक आल्हा एवं उदल ने किस शासक के विरुद्ध लड़ते हुवे अपने प्राणों की आहुति दी थी ?

- (A) अजयराज
- (B) अर्णोराज
- (C) सिन्धुराज
- (D) पृथ्वीराज चौहान

15. निम्नलिखित में से कौन-सी रचना पं. माखनलाल चतुर्वेदी की नहीं है ?

- (A) हिमकिरीटनी
- (B) बिजुरी
- (C) हिमतरंगिनी
- (D) रसिकप्रिया



9. Infrastructure aspects provided by Government in formation of National e-Governance Plan for application and data hosting and connectivity are

- (A) SDC, SWAN and ESDG
- (B) SWAN, SDC and NIC
- (C) SWAN, SDLC and NISG
- (D) None of these

10. The scope of cyber security is

- (A) Vulnerability reduction
- (B) Incident response
- (C) Recovery policy
- (D) All of the above

11. Which of the following folk-dance is **not** associated to Nimari folk-dance ?

- (A) Gangour
- (B) Rai
- (C) Kathi
- (D) Fefariya

12. Which of the following is a famous folk-drama of Malwa ?

- (A) Hingola
- (B) Chhahur
- (C) Mansukha
- (D) Maach

13. What was the ancient name of Baghelkhand ?

- (A) Karush
- (B) Mahishmati
- (C) Teerbhukti
- (D) Shuktimati

14. The famous Chandela Generals Alha and Udal lost their lives while fighting against which ruler ?

- (A) Ajayraj
- (B) Arnoraj
- (C) Sindhuraj
- (D) Prithviraj Chauhan

15. Which of the following is **not** a composition of Pandit Makhanlal Chaturvedi ?

- (A) Himkiritani
- (B) Bijuri
- (C) Himtarangini
- (D) Rasikpriya



16. ओलम्पिक खेलों का आयोजन टोक्यो में किन तिथियों में किया गया ?
- (A) 21 जुलाई से 5 अगस्त 2021
(B) 22 जुलाई से 10 अगस्त 2021
(C) 22 जुलाई से 11 अगस्त 2021
(D) 23 जुलाई से 8 अगस्त 2021
17. 2024 के ओलम्पिक खेल किस स्थान पर आयोजित किया जाना तय किया गया है ?
- (A) पेरिस
(B) लंदन
(C) जोहान्सबर्ग
(D) बुडापेस्ट
18. आरोग्य सेतु एप भारत सरकार द्वारा किस तिथि पर जारी किया गया ?
- (A) 17 जून 2021
(B) 17 जनवरी 2021
(C) 2 अप्रैल 2020
(D) 14 मार्च 2020
19. मध्यप्रदेश सरकार द्वारा राष्ट्रीय शिक्षा नीति 2020 का शुभारम्भ किस तिथि पर किया गया ?
- (A) 16 अगस्त 2021
(B) 26 अगस्त 2021
(C) 28 अगस्त 2021
(D) 30 अगस्त 2021
20. 2021 में आयोजित पैरा-ओलम्पिक में भारतीय दल ने कितने स्वर्ण पदक जीते ?
- (A) 5
(B) 6
(C) 7
(D) 19
21. मध्यप्रदेश में अगस्त माह में होने वाली वर्षा निम्नलिखित में से मुख्यतः किसके द्वारा होती है ?
- (A) उत्तर-पूर्वी मानसून
(B) दक्षिण-पश्चिमी मानसून
(C) शीतकालीन मानसून
(D) चक्रवातीय वर्षा



16. On what dates were the Olympic Games held in Tokyo ?
- (A) 21 July to 5 August 2021
(B) 22 July to 10 August 2021
(C) 22 July to 11 August 2021
(D) 23 July to 8 August 2021
17. Where is the 2024 Olympic Games Scheduled to be held ?
- (A) Paris
(B) London
(C) Johannesburg
(D) Budapest
18. On which date the Arogya Setu App was launched by the Government of India ?
- (A) 17 June 2021
(B) 17 January 2021
(C) 2 April 2020
(D) 14 March 2020
19. On which date the National Education Policy 2020 was launched by the Government of Madhya Pradesh ?
- (A) 16 August 2021
(B) 26 August 2021
(C) 28 August 2021
(D) 30 August 2021
20. How many gold medals did the Indian team win in the Paralympics held in 2021 ?
- (A) 5
(B) 6
(C) 7
(D) 19
21. Rain occurs in the month of August in Madhya Pradesh is mainly receives from which of the following ?
- (A) North-Eastern Monsoon
(B) South-Western Monsoon
(C) Winter Monsoon
(D) Cyclonic Rain



22. मध्यप्रदेश शासन के अनुसार, कुल वन क्षेत्रों का निम्नलिखित में से कितना प्रतिशत संरक्षित वन क्षेत्र के अंतर्गत है ?
- (A) 45.6%
(B) 44.6%
(C) 32.8%
(D) 70.2%
23. सोन नदी के दक्षिण तथा नर्मदा-ताप्ती नदी के मध्य निम्नलिखित में से कौन-सी पर्वत श्रेणी है ?
- (A) कैमूर श्रेणी
(B) भाण्डेर श्रेणी
(C) विन्ध्याचल श्रेणी
(D) सतपुड़ा-मैकल श्रेणी
24. पश्चिम दिशा में बहने वाली ताप्ती (तापी) नदी का उद्गम स्थल है
- (A) शाहपुर
(B) चिचोली
(C) भैंसदेही
(D) मुलतार्ई
25. देश के कुल मैंगनीज उत्पादन में मध्यप्रदेश का योगदान कितना है ?
- (A) 18.84%
(B) 15.02%
(C) 12.50%
(D) 4.56%
26. निम्नलिखित में से कौन बुन्देली लेखक नहीं है ?
- (A) जगनिक
(B) महाराज विश्वनाथ सिंह
(C) ईसुरी
(D) गंगाधर व्यास
27. मध्यप्रदेश के किस जिले में जागेश्वरी मेला आयोजित किया जाता है ?
- (A) सतना
(B) अशोकनगर
(C) बालाघाट
(D) बड़वानी
28. बुन्देला विद्रोह के दौरान किस क्रान्तिकारी को ब्रिटिश सरकार द्वारा फाँसी दी गई थी ?
- (A) नरहुत के मधुकरशाह
(B) भानपुर के बन्देशाह
(C) हीरापुर के जूझार सिंह
(D) इनमें से कोई नहीं
29. बैगा परम्परा के अनुसार सृष्टि के निर्माता कौन हैं ?
- (A) ठाकुरदेव
(B) इन्द्रदेव
(C) अग्निदेव
(D) सोमदेव



22. According to the Government of Madhya Pradesh, what percentage of the following area is under protected forests out of the total forest area ?
- (A) 45.6%
(B) 44.6%
(C) 32.8%
(D) 70.2%
23. Which of the following mountain range is situated between Narmada-Tapti rivers and South of the Son river ?
- (A) Kaimur range
(B) Bhandar range
(C) Vindhyaachal range
(D) Satpura-Maikal range
24. Which is the origin of the West direction flowing river Tapti (Tapi) ?
- (A) Shahpur
(B) Chicholi
(C) Bhainsdehi
(D) Multai
25. Which of the following is the share of Madhya Pradesh in the total manganese production of the country ?
- (A) 18.84%
(B) 15.02%
(C) 12.50%
(D) 4.56%
26. Who among the following is **not** a Bundeli writer ?
- (A) Jagnik
(B) Maharaj Vishwanath Singh
(C) Isuri
(D) Gangadhar Vyas
27. In which district of Madhya Pradesh, Jageshwari fair is organized ?
- (A) Satna
(B) Ashok-nagar
(C) Balaghat
(D) Badwani
28. Which revolutionary was hanged by the British Government during the Bundela rebellion ?
- (A) Madhukar Shah of Narhot
(B) Bandeshah of Bhanpur
(C) Jujhar Singh of Herapur
(D) None of these
29. According to the Baiga tradition, who was the creator of the Universe ?
- (A) Thakurdev
(B) Indradev
(C) Agnidev
(D) Somdev



30. प्रसिद्ध कलाकार अन्नासाहब रघुनाथ के. फड़के निम्न में से किस कला से सम्बन्धित है ?
- (A) मूर्तिकला
(B) नृत्यकला
(C) संगीतकला
(D) चित्रकला
31. इनमें से कौन-सा एक ओपन सोर्स आपरेटिंग सिस्टम नहीं है ?
- (A) युनिक्स
(B) एन्ड्राइड
(C) विन्डोज
(D) इनमें से कोई नहीं
32. $(1101\ 0001)_2$ बायनरी नम्बर $(\quad)_8$ ऑक्टल नम्बर के बराबर है
- (A) $(321)_8$
(B) $(123)_8$
(C) $(641)_8$
(D) $(146)_8$
33. इनमें से कौन-सा कम्प्यूटर के सी.पी.यु. के लिये उपयोग आता है ?
- (A) माइक्रोप्रोसेसर
(B) माइक्रोकंट्रोलर
(C) माइक्रोकम्प्यूटर
(D) माइक्रोप्रोग्रामर
34. एक गीगाबाइट में कितने मेगाबाइट होते हैं (बायनरी में) ?
- (A) 2048
(B) 1024
(C) 1024×1024
(D) 1048
35. रोबोट संचालन के लिये स्थापित क्षेत्र (स्पेस) का नाम
- (A) एन्वायरनमेंट
(B) स्पेशियल स्पेस
(C) वर्क स्पेस
(D) वर्क एन्वेलप
36. संविधान के किस अनुच्छेद में मंत्रिपरिषद का कार्य राज्यपाल को "सहायता और परामर्श" देना कहा गया है ?
- (A) अनुच्छेद - 162
(B) अनुच्छेद - 163
(C) अनुच्छेद - 164
(D) अनुच्छेद - 165



30. The famous artist Annasaheb Raghunath K. Phadke is associated with which of the following art ?

- (A) Sculpture
- (B) Dance
- (C) Music
- (D) Painting

31. Which of these is **not** an open source Operating System ?

- (A) UNIX
- (B) ANDROID
- (C) WINDOWS
- (D) None of these

32. $(1101\ 0001)_2$ binary number is same as $(\quad)_8$ octal number.

- (A) $(321)_8$
- (B) $(123)_8$
- (C) $(641)_8$
- (D) $(146)_8$

33. Which of these is used as CPU in computer ?

- (A) Microprocessor
- (B) Microcontroller
- (C) Microcomputer
- (D) Microprogrammer

34. How many megabytes represent one gigabyte (in binary) ?

- (A) 2048
- (B) 1024
- (C) 1024×1024
- (D) 1048

35. The space in which a robot operates is called

- (A) Environment
- (B) Spatial space
- (C) Work space
- (D) Work envelope

36. In which Article of the Constitution, the function of the Council of Ministers is said to "Assistance and Advise" the Governor ?

- (A) Article – 162
- (B) Article – 163
- (C) Article – 164
- (D) Article – 165



37. मध्यप्रदेश में पंचायती राज व्यवस्था कितने स्तर की है ?

- (A) दो स्तरीय
- (B) त्रिस्तरीय
- (C) चार स्तरीय
- (D) इनमें से कोई नहीं

38. वन स्टॉप सेंटर (सखी) योजना संबंधित है

- (A) हिंसा पीड़ित महिलाओं को सुविधा उपलब्ध कराना
- (B) राशन उपलब्ध कराना
- (C) स्व-रोजगार
- (D) कौशल एवं प्रशिक्षण

39. मध्यप्रदेश का सबसे कम जनसंख्या घनत्व वाला जिला है

- (A) झाबुआ
- (B) मण्डला
- (C) डिंडोरी
- (D) सीधी

40. मध्यप्रदेश के निम्नलिखित जिलों को लिंगानुपात के अनुसार घटते क्रम में व्यवस्थित कीजिए तथा नीचे दिए गए कूट से सही उत्तर चुनिए ।

1. मण्डला
2. डिंडोरी
3. अलिराजपुर
4. बालाघाट

कूट :

- (A) 1, 2, 3, 4
- (B) 4, 3, 1, 2
- (C) 2, 1, 4, 3
- (D) 3, 4, 2, 1

41. भारतीय खेल प्राधिकरण की स्थापना किस वर्ष में की गई ?

- (A) 1976
- (B) 1981
- (C) 1984
- (D) 1991

42. मध्यप्रदेश सरकार द्वारा 'लाइली लक्ष्मी योजना' कब प्रारम्भ की गई ?

- (A) 1 अप्रैल 2006
- (B) 1 अप्रैल 2007
- (C) 1 अप्रैल 2008
- (D) 1 जुलाई 2006

43. मध्यप्रदेश में मुख्यमंत्री महिला सशक्तिकरण योजना कब आरम्भ हुई ?

- (A) अप्रैल 2012
- (B) जुलाई 2012
- (C) सितम्बर 2013
- (D) नवम्बर 2013



37. What is the level of Panchayati Raj System in Madhya Pradesh ?
- (A) Two tier
(B) Three tier
(C) Four tier
(D) None of these
38. The scheme One Stop Center (Sakhi) is related with
- (A) Providing facilities to women victims of violence
(B) Providing ration
(C) Self employment
(D) Skill and training
39. The lowest population density district of Madhya Pradesh is
- (A) Jhabua
(B) Mandla
(C) Dindori
(D) Sidhi
40. Arrange the following district of Madhya Pradesh in descending order of sex ratio and select the correct answer from below codes.
1. Mandla
2. Dindori
3. Alirajpur
4. Balaghat
- Codes :**
- (A) 1, 2, 3, 4
(B) 4, 3, 1, 2
(C) 2, 1, 4, 3
(D) 3, 4, 2, 1
41. In which year the Sports Authority of India was established ?
- (A) 1976
(B) 1981
(C) 1984
(D) 1991
42. When was the 'Ladli Lakshmi Yojna' started by the Government of Madhya Pradesh ?
- (A) 1 April 2006
(B) 1 April 2007
(C) 1 April 2008
(D) 1 July 2006
43. When was the Chief Minister's Women Empowerment Scheme started in Madhya Pradesh ?
- (A) April 2012
(B) July 2012
(C) September 2013
(D) November 2013



44. मध्यप्रदेश के वर्तमान राज्यपाल श्री मंगुभाई छ. पटेल ने किस तिथि से पदभार संभाला है ?

- (A) 03 जुलाई 2021
- (B) 13 जुलाई 2021
- (C) 08 जुलाई 2021
- (D) 28 जुलाई 2021

45. ज्योतिर्लिंग ममलेश्वर किस प्रसिद्ध स्थान में स्थित है ?

- (A) मन्दसौर
- (B) ओंकारेश्वर
- (C) कपिल धारा
- (D) उज्जैन

46. मुख्यमंत्री कृषक उद्यमी योजना कब प्रारंभ की गई ?

- (A) वर्ष 2016 – 2017
- (B) वर्ष 2017 – 2018
- (C) वर्ष 2018 – 2019
- (D) वर्ष 2019 – 2020

47. मध्यप्रदेश में वर्ष 2005 – 06 में कृषि जोत को औसत आकार है

- (A) 1.28 हेक्टेयर
- (B) 2.22 हेक्टेयर
- (C) 1.8 हेक्टेयर
- (D) 2.25 हेक्टेयर

48. “बैनगंगा” नहर से मध्यप्रदेश के किस जिले में सिंचाई की जाती है ?

- (A) जबलपुर
- (B) मण्डला
- (C) सीधी
- (D) बालाघाट

49. सॉइल हेल्थकार्ड संबंधित है

- (A) संतुलित उर्वरक के उपयोग
- (B) अधिक पैदावार
- (C) मिट्टी का परीक्षण
- (D) उपरोक्त सभी

50. मध्यप्रदेश का सबसे कम महिला साक्षरता दर वाला जिला है

- (A) झाबुआ
- (B) अलिराजपुर
- (C) श्योपुर
- (D) बड़वानी



44. From which date the present Governor of Madhya Pradesh Shri Mangu Bhai Ch. Patel has taken over ?
- (A) 03 July 2021
(B) 13 July 2021
(C) 08 July 2021
(D) 28 July 2021
45. In which famous place Jyotirling Mamleshvar is situated ?
- (A) Mandsour
(B) Omkareshvar
(C) Kapil Dhara
(D) Ujjain
46. When was Chief Minister Krishak Udhayami Yojana launched ?
- (A) Year 2016 – 2017
(B) Year 2017 – 2018
(C) Year 2018 – 2019
(D) Year 2019 – 2020
47. In a year 2005 – 06, average size of agricultural holding in Madhya Pradesh is
- (A) 1.28 Hectare
(B) 2.22 Hectare
(C) 1.8 Hectare
(D) 2.25 Hectare
48. Which district irrigated by “BenGanga” Canal in Madhya Pradesh ?
- (A) Jabalpur
(B) Mandla
(C) Sidhi
(D) Balaghat
49. Soil Health Card is related with
- (A) Use of balanced fertilizer
(B) High yields
(C) Soil test
(D) All of the above
50. Lowest female literacy rate district in Madhya Pradesh is
- (A) Jhabua
(B) Alirajpur
(C) Sheopur
(D) Barwani



खंड - ब/SECTION - B

51. An oil of specific gravity 0.9 is flowing inside a pipe at a velocity of 3 m/s at pipe diameter of 25 mm. The mass flow rate at another location where diameter is reduced to 20 mm will be

- (A) 125.25 Kg/s
- (B) 132.23 Kg/s
- (C) 118.20 Kg/s
- (D) 112.18 Kg/s

52. The three-dimensions continuity equation in Cartesian co-ordinate system for incompressible fluid is

- (A) $\frac{\partial}{\partial x}(\rho u) + \frac{\partial}{\partial y}(\rho v) + \frac{\partial}{\partial z}(\rho w) = 0$
- (B) $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} = 0$
- (C) $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial x} + \frac{\partial w}{\partial x} = 0$
- (D) $\frac{\partial}{\partial x}(\rho u) + \frac{\partial}{\partial x}(\rho v) + \frac{\partial}{\partial x}(\rho w) = 0$

53. A water is flowing at a velocity of 3 m/s through a pipe of diameter 30 cm and length 50 m. If kinematic viscosity is $0.01 \times 10^{-4} \text{ m}^2/\text{s}$, the head lost due to friction using Darcy formula is

- (A) 78.28 cm
- (B) 80.25 cm
- (C) 69.25 cm
- (D) 75.28 cm

54. In case of turbulent flow through pipe, the loss of pressure head is approximately proportional to (velocity)ⁿ, where n is

- (A) 1
- (B) 2
- (C) 3
- (D) 4

55. The square root of ratio of inertia force of a flowing fluid to the surface tension force is

- (A) Froude's number
- (B) Euler's number
- (C) Weber's number
- (D) Mach's number

56. Which of the following is **not** a programming language ?

- (A) ADAPT
- (B) EXAPT
- (C) INAPT
- (D) MINIAPT

57. In which of the following sector, Automated Guided Vehicles (AGVs) are used extensively to move parts and to orient them as required ?

- (A) Flexible manufacturing system
- (B) Group technology
- (C) Cellular manufacturing
- (D) Agile manufacturing



58. Which is a concept that seeks to take advantage of the design and processing similarities among the parts to be produced ?
- (A) Flexible manufacturing system
 - (B) Group technology
 - (C) Cellular manufacturing
 - (D) Agile manufacturing
59. What is the basis of modern Computer-Aided Design System ?
- (A) ICG
 - (B) GCI
 - (C) GIF
 - (D) IGC
60. Which of the following is **not** a part of Computer-Aided Design (CAD) hardware ?
- (A) A graphics terminal
 - (B) Secondary storage
 - (C) Computer programmes
 - (D) Plotters
61. In linear programming problem, the term which is **not** involved is
- (A) Objective function
 - (B) Linear scale
 - (C) Linear constraints
 - (D) Decision variables
62. In transportation model, if the number of row + the number of columns - 1 is not equal to the number of occupied squares, then it is the case of
- (A) Dummy sources
 - (B) Dummy destinations
 - (C) Dummy activity
 - (D) Degeneracy
63. In forecasting, the mean absolute deviation expresses
- (A) Gross error
 - (B) Direction and magnitude of the error
 - (C) Direction of the error
 - (D) Magnitude of the error
64. System efficiency is expressed as ratio of
- (A) Actual measured output to the designed capacity
 - (B) Actual measured output to the installed capacity
 - (C) Actual measured output to the system capacity
 - (D) Actual measured output to the rated capacity
65. One of the characteristics of the queuing system is
- (A) Customers feedback
 - (B) Hungarian mechanism
 - (C) Customer experience
 - (D) Service mechanism



66. A steel bar is subjected to an axial pull of 84 kN. Stress induced into the bar is 140 N/mm^2 . If Young's modulus is $2 \times 10^5 \text{ N/mm}^2$, then the longitudinal strain produced will be
- (A) 0.0002
(B) 0.0003
(C) 0.0006
(D) 0.0007
67. Maximum flexural stress for a cast iron pipe having maximum bending moment 125000 N-mm and section modulus 17017 mm^3 will be
- (A) 17.23 N/mm^2
(B) 7.34 N/mm^2
(C) 9.21 N/mm^2
(D) 14.32 N/mm^2
68. Steel column pinned at both ends has modulus of elasticity $E = 2 \times 10^5 \text{ N/mm}^2$, moment of inertia $I = 90000 \text{ mm}^4$, $l = 1.75 \text{ m}$, value of Euler's critical load will be
- (A) 75000 N
(B) 72000 N
(C) 68000 N
(D) 58009 N
69. An air vessel has circumferential stress of 267.75 N/mm^2 ; longitudinal stress of 133.875 N/mm^2 ; value of Young's modulus $E = 2.1 \times 10^5 \text{ N/mm}^2$, Poisson's ratio $m = 0.3$; value of the circumferential strain will be
- (A) 0.0005090
(B) 0.001084
(C) 0.0002050
(D) 0.002040
70. Metal bar AB is subjected to a tensile load of 50 kN. It's length is 600 mm and cross-sectional area is 1000 mm^2 . If value of Young's modulus $E = 1.05 \times 10^5 \text{ N/mm}^2$; then extension of that metal bar due to the tensile load is
- (A) 0.4916 mm
(B) 3.2916 mm
(C) 0.2857 mm
(D) 4.3164 mm
71. Unit of thermal diffusivity in SI units system
- (A) m^3/s
(B) m^2/s
(C) m/s
(D) W/mK



72. Effectiveness of infinitely long fin is given by

(where, P = Fin parameter, K = Fin thermal conductivity, h = Convective heat transfer coefficient, A_c = Fin cross-section area)

(A) $\sqrt{\frac{Ph}{KA_c}}$

(B) $\sqrt{\frac{PK}{h.A_c}}$

(C) $\sqrt{\frac{P.A_c}{h.K}}$

(D) $\sqrt{\frac{P}{h.K.A_c}}$

73. _____ number is a connecting link between velocity and temperature field and its value strongly influences relative growth of velocity and thermal boundary layers.

- (A) Reynolds
- (B) Grashoff
- (C) Prandtl
- (D) Biot

74. In transient heat conduction, two significant dimensionless parameters are _____ number and _____ number.

- (A) Biot; Reynolds
- (B) Biot; Prandtl
- (C) Reynolds; Grashoff
- (D) Biot; Fourier

75. The role of _____ number is the same in free convection as that of Reynolds number in forced convection.

- (A) Prandtl
- (B) Grashoff
- (C) Fourier
- (D) Biot

76. For a cantilever beam of length l carrying a concentrated load W at free end, the shear force and bending moment diagram will be

- (A) Triangular and Rectangular respectively
- (B) Rectangular and Triangular respectively
- (C) Triangular and Triangular respectively
- (D) Rectangular and Rectangular respectively

77. Torque transmitted by a solid circular shaft of diameter d , subjected to shear stress f_s is given by

(A) $\frac{\pi}{32} f_s \cdot d^2$

(B) $\frac{\pi}{32} f_s \cdot d^3$

(C) $\frac{\pi}{16} f_s \cdot d^2$

(D) $\frac{\pi}{16} f_s \cdot d^3$



78. When both ends of column are pinned or hinged, buckling load equation is given by
- (A) $\frac{\pi^2 EI}{l^2}$
 - (B) $\frac{\pi^3 EI}{l^3}$
 - (C) $\frac{\pi^2 EI}{l^3}$
 - (D) $\frac{\pi^2 EI}{l^4}$
79. Maximum principal stress theory is proper choice for
- (A) Brittle Materials
 - (B) Ductile Materials
 - (C) Fragile Materials
 - (D) Composite Materials
80. For 100 kN tensile test of mild steel bar of 30 mm diameter, stress induced in the bar is
- (A) 103.81 N/mm²
 - (B) 252.61 N/mm²
 - (C) 141.47 N/mm²
 - (D) 365.37 N/mm²
81. In throttling device,
- (A) Enthalpy of fluid before and after throttling are not equal
 - (B) Enthalpy of fluid before and after throttling are equal
 - (C) Work is converted into heat
 - (D) Heat is converted into work
82. In a cyclic heat engine, source temperature is 800°C and sink temperature is 30°C; its maximum efficiency will be
- (A) 65.4%
 - (B) 68.5%
 - (C) 71.8%
 - (D) 54.5%
83. In a compression process, initial temperature is 308 K; if compression ratio is 8; temperature at the end of compression will be
- (A) 823.5 K
 - (B) 691.3 K
 - (C) 910.3 K
 - (D) 708.4 K
84. Machine containing fluid system has a stirring device in the cylinder. Stirring device is turned 10,000 revolutions with an average torque against fluid of 1.275 N-m, then work done by stirring device on system will be
- (A) 173 KJ
 - (B) 110 KJ
 - (C) 90 KJ
 - (D) 80 KJ
85. Certain gas has mass of 2 kg; $C_p = 1.968$ KJ/KgK. Initial temp. $t_1 = 5^\circ\text{C}$; final temp. $t_2 = 100^\circ\text{C}$; change in enthalpy of the gas will be
- (A) 373.92 KJ
 - (B) 437.32 KJ
 - (C) 568.44 KJ
 - (D) 418.21 KJ



86. The natural frequency of free torsional vibrations of a shaft is equal to _____. (where q = Torsional stiffness of the shaft and I = Mass moment of inertia of the disc attached at the end of a shaft.)
- (A) $2\pi\sqrt{\frac{q}{I}}$
(B) $2\pi qI$
(C) $\frac{1}{2\pi}\sqrt{\frac{q}{I}}$
(D) $\frac{1}{2\pi}$
87. Ackerman steering gear consists of
- (A) Sliding pairs
(B) Turning pairs
(C) Rolling pairs
(D) All of the above
88. When the perfectly elastic belt is stationary, it is subjected to some tension known as initial tension. The value of this tension is equal to _____. (Neglecting centrifugal tension.)
- (A) Tension in the tight side of the belt
(B) Tension in the slack side of the belt
(C) Sum of the tensions on the tight side and slack side of the belt
(D) Average of the tensions in the tight side and slack side of the belt
89. When the axes of the first and last wheels of compound gear coincide, then the train is known as
- (A) Reverted gear train
(B) Simple train of wheels
(C) Planetary gear train
(D) Epicyclic gear train
90. What is Hammer blow ?
- (A) It is the maximum horizontal unbalanced force caused by the mass provided to balance the reciprocating masses
(B) It is the maximum vertical unbalanced force caused by the mass added to balance the reciprocating masses
(C) It is the minimum horizontal unbalanced force caused by the mass provided to balance the reciprocating masses
(D) None of the above
91. Which of the following combustion chamber requires multiple hole injection nozzles for proper mixing of fuel ?
- (A) Divided combustion chamber
(B) Open combustion chamber
(C) Precombustion chamber
(D) M-combustion chamber
92. In order to overcome problem of exhaust gas dilution and low charge density, spark advance must be increased at
- (A) Full load operation
(B) No load operation
(C) Part load operation
(D) None of the above
93. Solar radiations received from sun without change of direction are called
- (A) Diffused radiation
(B) Beam radiation
(C) Global radiation
(D) None of the above



94. Gas produced by organic waste digester is known as
- (A) Producer gas
 - (B) Biogas
 - (C) Hydrogen gas only
 - (D) Natural gas
95. In a reaction turbine, drum diameter is 1 m and blades are at 10 cm high. If speed of turbine is 250 rpm, then blade speed will be
- (A) 21.3 m/s
 - (B) 14.4 m/s
 - (C) 38.4 m/s
 - (D) 72.2 m/s
96. Metals and gases respond rapidly to temperature changes as compared to non-metals and liquids due to
- (A) High thermal conductivity
 - (B) Low thermal diffusivity
 - (C) High thermal diffusivity
 - (D) High heat capacity
97. The flow rates of hot and cold water streams running through a parallel flow heat exchanger are 0.2 Kg/sec and 0.5 Kg/sec respectively. The inlet temperatures on hot and cold sides are 75°C and 20°C respectively. The exit temperature of hot water is 45°C. Calculate LMTD of heat exchanger.
- (A) 32°C
 - (B) 40.5°C
 - (C) 29.12°C
 - (D) 45.24°C
98. Saturated steam at 100°C is condensing on shell side of a shell and tube heat exchanger. The cooling water enters the tube at 30°C and leaves at 70°C. Calculate arithmetic mean temperature difference in counter flow arrangement.
- (A) 47.21°C
 - (B) 50°C
 - (C) 45.20°C
 - (D) 50.5°C
99. For a hemispherical furnace, the flat floor is at 700 K and has an emissivity of 0.5. The hemispherical roof is at 1000 K and has an emissivity of 0.25. Find the magnitude of net radiative heat transfer between the roof and floor.
- (A) -12310.4 W/m²
 - (B) 12340.5 W/m²
 - (C) 12345.6 W/m²
 - (D) 12346.5 W/m²
100. Assuming the sun to be a black body emitting radiations with maximum intensity at $\lambda = 0.49 \mu\text{m}$. Calculate the heat flux at the surface of the sun.
- (A) $5.9 \times 10^7 \text{ W/m}^2$
 - (B) $6.93 \times 10^7 \text{ W/m}^2$
 - (C) $4.93 \times 10^7 \text{ W/m}^2$
 - (D) $7.93 \times 10^3 \text{ W/m}^2$



101. What is the relationship between CAD and CAM ?
- (A) Science and Technology
 - (B) Manufacturing and Marketing
 - (C) Design and Marketing
 - (D) Design and Manufacturing
102. Which are the three basic types of motion control systems in numerical control ?
- (A) Point to point, straight cut and contouring
 - (B) Point to point, edge to edge and straight cut
 - (C) Point to point, edge to edge and contouring
 - (D) Straight cut, edge to edge and contouring
103. What is the M-code for tool change in CNC ?
- (A) M05
 - (B) M06
 - (C) M10
 - (D) M12
104. Which type of welding use industrial robots extensively to perform operations ?
- (A) Spot welding
 - (B) MIG welding
 - (C) TIG welding
 - (D) Thermit welding
105. What type of solution is obtained by finite element analysis ?
- (A) Absolute
 - (B) Approximate
 - (C) Average
 - (D) Discrete
106. If the cutting conditions in a turning operation are
Cutting speed = 300 ft/min.
Feed = 0.010 in/rev. and
Depth of cut = 0.100 in,
which one of the following is the material removal rate ?
- (A) 0.025 in³/min.
 - (B) 0.3 in³/min.
 - (C) 3.0 in³/min.
 - (D) 3.6 in³/min.
107. A roughing operation generally involves which one of the following combinations of cutting conditions ?
(where v = cutting speed, f = feed and d = depth.)
- (A) high v , f and d
 - (B) high v , low f and d
 - (C) low v , high f and d
 - (D) low v , f and d
108. In a turning operation, the change in diameter of the work part is equal to which one of the following ?
- (A) 1 × depth of cut
 - (B) 2 × depth of cut
 - (C) 1 × feed
 - (D) 2 × feed



109. Which one of the following cutting tools **cannot** be used on a turret lathe ?
- (A) Broach
 - (B) Reaming tool
 - (C) Drill bit
 - (D) Single-point turning tool
110. In ECM, metal removal rate
- (A) depends on the hardness of the tool
 - (B) depends on the hardness of the job metal
 - (C) is independent of the hardness of the tool and work piece
 - (D) All of the above
111. For simple harmonic motion of the follower, a cosine curve represents
- (A) Displacement Diagram
 - (B) Velocity Diagram
 - (C) Acceleration Diagram
 - (D) All of the above
112. Whirling speed of the shaft is the speed at which
- (A) Shaft tends to vibrate in longitudinal direction
 - (B) Torsional vibrations occur
 - (C) Shaft tends to vibrate vigorously in transverse direction
 - (D) Combination of transverse and longitudinal vibration occurs
113. The maximum retardation of a flat faced follower, when it has contact at the apex of the nose of a circular arc cam, is given by _____.
- (where OQ = Distance between the centre of circular flank and centre of nose.)
- (A) $\omega^2 \times OQ$
 - (B) $\omega^2 \times OQ \sin\theta$
 - (C) $\omega^2 \times OQ \cos\theta$
 - (D) $\omega^2 \times OQ \tan\theta$
114. The natural frequency of free transverse vibrations due to a point load acting over a simply supported shaft is _____. (where δ_s is static deflection of simply supported shaft due to load.)
- (A) $0.4985/\sqrt{\delta_s}$
 - (B) $0.5615/\sqrt{\delta_s}$
 - (C) $0.571/\sqrt{\delta_s}$
 - (D) $0.6253/\sqrt{\delta_s}$
115. In a band and block brake, the ratio of tensions on tight side and slack side of the band is _____. (where μ = coefficient of friction between the block and drum, θ = Semi-angle of each block subtending at the centre of drum and n = Number of blocks.)
- (A) $\frac{T_n}{T_o} = \left[\frac{(1 + \mu \tan\theta)}{(1 - \mu \tan\theta)} \right]^n$
 - (B) $\frac{T_n}{T_o} = \mu \cdot \theta \cdot n$
 - (C) $\frac{T_n}{T_o} = \left[\frac{(1 - \mu \tan\theta)}{(1 + \mu \tan\theta)} \right]^n$
 - (D) $\frac{T_n}{T_o} = \left[\frac{(1 + \mu \tan\theta)}{(1 - \mu \tan\theta)} \right]^{1/n}$



116. Gantt chart is used for
- (A) Resource management
 - (B) Production scheduling
 - (C) Large number of tasks
 - (D) One time update

117. Dispatching is a part of
- (A) Planning phase
 - (B) Action phase
 - (C) Control phase
 - (D) Development phase

118. The 4M's basically involved in production planning are
- (A) Material, Methods, Maintenance, Manpower
 - (B) Material, Measurement, Machines, Manpower
 - (C) Material, Methods, Machines, Manuals
 - (D) Material, Methods, Machines, Manpower

119. The goods that do **not** vanish after a single act of consumption is
- (A) Non-durable consumer goods
 - (B) Single use consumer goods
 - (C) Perishable consumer goods
 - (D) Fast moving consumer goods

120. Production Control involves
- (A) Inventory Management
 - (B) Time Management
 - (C) Vendor Management
 - (D) Inspection

121. In EDM process, work piece is generally connected to

- (A) Positive terminal
- (B) Negative terminal
- (C) Earth terminal
- (D) Neutral terminal

122. Which one of the following is the chip thickness ratio ?

(where, t_c = chip thickness after the cut, t_o = chip thickness before the cut, f = feed, d = depth and w = width of cut)

(A) $r = \frac{t_c}{t_o}$

(B) $r = \frac{t_o}{t_c}$

(C) $r = \frac{f}{d}$

(D) $r = \frac{t_o}{w}$

123. Of the following process, which one is noted for the excellent material removal rates ?

- (A) Electric discharge machining
- (B) Laser beam machining
- (C) Plasma arc cutting
- (D) Ultrasonic machining



124. _____ process is used for making a complicated contour in carbide piece.
- (A) Laser machining
 - (B) Electro-chemical milling
 - (C) Plasma arc machining
 - (D) Electro-discharge machining
125. Which one of the following is closest to the temperatures used in plasma arc cutting ?
- (A) 2750°C (5000°F)
 - (B) 5500°C (10000°F)
 - (C) 8300°C (15000°F)
 - (D) 11000°C (20000°F)
126. The displacement thickness (δ^*) for the velocity distribution in boundary layer is by $(u/U) = (y/\delta)$, where u = velocity at distance y from the plate and $u = U$ at $y = \delta$. If δ is boundary layer thickness, then δ^* is
- (A) $\delta/2$
 - (B) $\delta/3$
 - (C) $\delta/4$
 - (D) $\delta/6$
127. The Bernoulli's equation for adiabatic process and compressible flow is
- (A) $\left(\frac{K}{K-1}\right) \frac{p}{\rho g} + \frac{v^2}{2g} + z = \text{constant}$
 - (B) $\left(\frac{K-1}{K}\right) \frac{p}{\rho g} + \frac{v^2}{2g} + z = \text{constant}$
 - (C) $(K-1) \frac{p}{\rho g} + \frac{v^2}{2g} + z = \text{constant}$
 - (D) $(K) \frac{p}{\rho g} + \frac{v^2}{2g} + z = \text{constant}$
128. A gas is flowing through a horizontal pipe with mass flow rate of 0.5 Kg/s and Gas constant 292 N-m/Kg°K. The parameters at two different section of the pipe (1 and 2) are; At section 1, the cross section is $40 \times 10^{-4} \text{ m}^2$, pressure is $50 \times 10^4 \text{ N/m}^2$ and temperature is 15°C, At section 2, the cross section is $20 \times 10^{-4} \text{ m}^2$ and pressure is $40 \times 10^4 \text{ N/m}^2$. The velocity of gas at section 1 is
- (A) 21.02 m/s
 - (B) 20.01 m/s
 - (C) 21.09 m/s
 - (D) 22.05 m/s
129. One of the observation made by O. Reynold in 1883 is
- (A) When the velocity of flow was low, the dye-filament in the glass tube was randomly distributed
 - (B) With the increase of velocity of flow, the dye-filament was in the form of straight line
 - (C) The straight line of dye filament parallel to the glass tube was the case of laminar flow
 - (D) With further increase of velocity of flow, the dye-filament fails to produce shear stresses
130. The maximum hydraulic efficiency of a Pelton wheel for hydraulic efficiency = $2(V_{w_1} + V_{w_2}) \times u/V_1^2$ with conventional notations is
- (A) $(1 - \text{Cos } \phi)$
 - (B) $(1 + \text{Cos } \phi)$
 - (C) $(1 - \text{Cos } \phi)/2$
 - (D) $(1 + \text{Cos } \phi)/2$



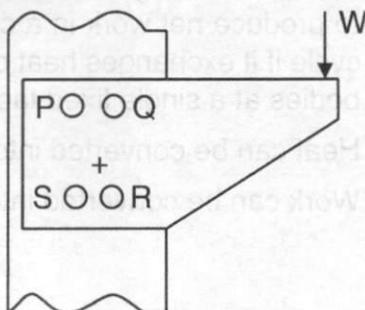
131. The stresses at a point on the circumference of a circular rod in tension and shear are 120 MPa and 60 MPa respectively. If the yield strength of the rod material is 340 MPa, the factor of safety in the rod material using maximum shear stress theory is nearly equal to

- (A) Factor of safety = 2.0
- (B) Factor of safety = 4.0
- (C) Factor of safety = 2.5
- (D) Factor of safety = 3.0

132. The shock absorbing capacity of a bolt is increased by

- (A) Preventing stress concentration anywhere in the bolt
- (B) Making shank diameter equal to the core diameter
- (C) Use a spring washer
- (D) Proper tightening

133. For the bracket bolted as shown with 4 bolts P, Q, R and S. Which of the bolts are heavily loaded ?



- (A) P and Q
- (B) P and S
- (C) S and Q
- (D) Q and R

134. The Bolts in a flange coupling are designed

- (A) Under tensile stresses
- (B) Under shearing stresses caused by torque transmitted
- (C) Under shearing stress which will develop force to cause torque to be transmitted
- (D) By empirical formula

135. Which of the following statements are correct ?

Consider the following statements :
A splined shaft is used for

1. transmitting power
2. holding a fly wheel rigidly in position
3. moving axially the gears mounted on it
4. mounting V-belt pulley on it

- (A) 2 and 4
- (B) 1 and 3
- (C) 1 and 4
- (D) 3 and 4

136. Chemically correct air fuel ratio for SI Engine is

- (A) 6 : 1
- (B) 15 : 1
- (C) 5 : 1
- (D) 4 : 1

137. Time lag between first ignition of fuel and the commencement of main phase of combustion is called as

- (A) After burning
- (B) Flame propagation
- (C) Pre-ignition
- (D) Ignition lag



138. In SI engine, increase in intake temperature and pressure causes flame speed to
- (A) Increases
 - (B) Decreases
 - (C) Both increases and decreases
 - (D) Can not be predicted
139. In SI engine, compression ratio increases causes to
- (A) Decreases knocking tendency
 - (B) Increases knocking tendency
 - (C) May increase or decrease knocking
 - (D) None of the above
140. In CI engine, delay period increases
- (A) With decrease in injection advance angle
 - (B) With increase in injection advance angle
 - (C) Maintaining zero injection advance angle
 - (D) None of the above
141. The properties which are independent of mass in the system are called
- (A) Extensive properties
 - (B) Intensive properties
 - (C) Homogeneous properties
 - (D) None of these
142. The system in which both mass of matter and energy transfer takes place is called as
- (A) Isolated system
 - (B) Closed system
 - (C) Open system
 - (D) All of these
143. Which of the following is an intensive property ?
- (A) Volume
 - (B) Mass
 - (C) Energy
 - (D) Temperature
144. According to Kelvin – Plank statement
- (A) It is impossible to construct a device which operates in a cycle and produces no effect other than transfer of heat from a cooler body to hotter body
 - (B) It is impossible for a heat engine to produce net work in a complete cycle if it exchanges heat only with bodies at a single fixed tap
 - (C) Heat can be converted into work
 - (D) Work can be converted into heat
145. Brayton cycle is an air standard cycle for
- (A) Thermal power plant
 - (B) Diesel engines
 - (C) Otto (S.I.) engines
 - (D) Gas turbine power plant



146. A shaft is subjected to the combined bending load 'M' and torsional load 'T'. If the permissible shear stress is ' ζ ', the diameter 'd' of the shaft will be calculated by the relation
- (A) $d = 16T/\pi\zeta$
(B) $d = 32M/\pi d^3$
(C) $d = [16(M^2 + T^2)^{1/2}/\pi\zeta]^{1/3}$
(D) $d = [32(M^2 + T^2)^{1/2}/\pi\zeta]^{1/3}$
147. A shaft is subjected to combined bending and torsional moments of 6 kN-m and 10 kN-m respectively. The equivalent torque will be equal to
- (A) $\sqrt{136}$ kN-m
(B) 16 kN-m
(C) $\sqrt{16}$ kN-m
(D) 8 kN-m
148. The ratio of inner and outer radii of the friction lining of a plate clutch for maximum power transmission condition is
- (A) 0.58
(B) 0.50
(C) 0.75
(D) 0.65
149. A single plate clutch has outer and inner radii 50 mm and 20 mm respectively. An axial clamping force required to engage the clutch is 2 kN and coefficient of friction between liner material is 0.4, the torque carrying capacity of the clutch using uniform wear theory is
- (A) 56 Nm
(B) 28 Nm
(C) 0.056 Nm
(D) 0.028 Nm
150. Match List-I with List – II and select the correct answer using the codes given below the lists.
- | List – I | List – II |
|------------------------|------------------|
| J. Single-plate clutch | 1. Scooters |
| K. Multi-plate clutch | 2. Rolling mills |
| L. Centrifugal clutch | 3. Trucks |
| M. Jaw clutch | 4. Mopeds |
- Codes :**
- | | J | K | L | M |
|-----|---|---|---|---|
| (A) | 1 | 3 | 4 | 2 |
| (B) | 1 | 3 | 2 | 4 |
| (C) | 3 | 1 | 4 | 2 |
| (D) | 3 | 1 | 2 | 4 |



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A single-plate clutch has outer and inner radii 50 mm and 20 mm respectively. An axial clamping force (sufficient to engage the clutch) is 2 kN and coefficient of friction between inner material is 0.4. The torque carrying capacity of the clutch using uniform wear theory is

- (A) 55 Nm
- (B) 28 Nm
- (C) 0.55 Nm
- (D) 0.028 Nm

150. Match List-I with List-II and select the correct answer using the codes given below the lists.

List-I

- J. Single-plate clutch - 1. Scooters
- K. Multi-plate clutch - 2. Rolling mills
- L. Centrifugal clutch - 3. Trucks
- M. Jaw clutch - 4. Motors

Codes:

- | | | | | |
|-----|---|---|---|---|
| (A) | 1 | 3 | 4 | 2 |
| (B) | 1 | 3 | 2 | 4 |
| (C) | 3 | 1 | 4 | 2 |
| (D) | 3 | 1 | 2 | 4 |

146. A shaft is subjected to bending load M and torsional load T . If the permissible shear stress is τ , the diameter of the shaft will be calculated by the relation

- (A) $d = \sqrt[3]{16T/\tau}$
- (B) $d = \sqrt[3]{32M/\tau}$
- (C) $d = \sqrt[3]{16(M^2 + T^2)/\tau}$
- (D) $d = \sqrt[3]{32(M^2 + T^2)/\tau}$

147. A shaft is subjected to combined bending and torsional moments of 6 kN-m and 10 kN-m respectively. The equivalent torque will be equal to

- (A) 7.136 kN-m
- (B) 18 kN-m
- (C) 118 kN-m
- (D) 8 kN-m

148. The ratio of inner and outer radii of the friction lining of a plate clutch for maximum power transmission condition is

- (A) 0.38
- (B) 0.50
- (C) 0.75
- (D) 0.65



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