MPPSC
DSP
Previous Year Paper
(Radio) 2021

DSP/2021

SET **A** **ELECTRONICS AND TELECOMMUNICATION**

प्रश्न-पुस्तिका क्र.
Question Booklet No.
1205305

अनुक्रमांक
Roll No. | | | | | | |

← 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 प्रारम्भ होने के तुरन्त बाद, आप इस प्रश्न-पुस्तिका की पड़ताल अवश्य कर लें, कि इसमें कोई बिना छपा, फटा या छूटा 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 है । खंड – 'अ' तथा खंड – 'ब' ।
3. खंड – 'अ' सामान्य अध्ययन से संबंधित है, जिसमें कुल **50** प्रश्न हैं । सभी प्रश्न हिन्दी तथा अंग्रेज़ी भाषा में हैं । **सभी** प्रश्न अनिवार्य हैं ।
4. खंड – 'ब' संबंधित इलेक्ट्रॉनिक्स एण्ड टेलिकम्यूनिकेशन विषय से है, जिसमें कुल **100** प्रश्न हैं । सभी प्रश्न केवल अंग्रेज़ी भाषा में हैं । **सभी** प्रश्न अनिवार्य हैं ।
5. **सभी** प्रश्नों के अंक समान हैं । प्रत्येक सही उत्तर के लिए **03** अंक प्रदान किए जाएँगे । **ऋणात्मक मूल्यांकन** का प्रावधान है । प्रत्येक गलत उत्तर के लिए **01** अंक काटा जाएगा ।
6. प्रदत्त उत्तर-पत्र (ओ.एम.आर. शीट) 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 रफ़ कार्य प्रश्न-पुस्तिका के अंतिम पृष्ठों पर निर्धारित स्थान पर ही करें, अन्यत्र कहीं नहीं तथा उत्तर-पत्र (ओ.एम.आर. शीट) पर भी नहीं ।
9. यदि खंड – 'अ' के किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो, तो प्रश्न के हिन्दी तथा अंग्रेज़ी रूपांतरों में से हिन्दी रूपांतर को मानक माना जाएगा ।

A

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 another 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 Electronics and Telecommunication subject. All questions are in English language only. **All** questions are compulsory.
5. **All** questions carry equal marks. **Three** marks will be given for each correct answer. There is a provision of **Negative Marking**. 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 in 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. 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.

खंड अ
सामान्य अध्ययन

1. "फिशिंग" का प्रयास निम्नलिखित में से किसके द्वारा किया जाता है ?
   (A) ई-मेल
   (B) एस.एम.एस.
   (C) फ़ोन कॉल
   (D) उपर्युक्त सभी

2. इलेक्ट्रॉनिक माध्यम से की जाने वाली निम्नलिखित में से कौन-सी परस्परक्रिया (इन्टरेक्शन) ई-गवर्नेन्स *नहीं* है ?
   (A) शासन एवं नागरिकों के मध्य
   (B) शासन एवं व्यापार के मध्य
   (C) शासन के आंतरिक कार्य के मध्य
   (D) नागरिकों एवं व्यापार के आंतरिक कार्यों के मध्य

3. भारतीय राष्ट्रीय भुगतान निगम (NPCI) द्वारा जारी किए गए कार्ड का नाम है
   (A) VISA
   (B) PAISA
   (C) RuPay
   (D) RUPA

4. निम्नलिखित में से कौन-सी मेमोरी अस्थिर है ?
   (A) RAM
   (B) ROM
   (C) PROM
   (D) EPROM

5. विस्फोटकों की पहचान के लिए डी.आर.डी.ओ. (DRDO) द्वारा विकसित रोबोटिक यंत्र का नाम है
   (A) रुस्तम
   (B) नेत्र
   (C) निशांत
   (D) दक्ष

6. ई-कॉमर्स में किस डिजिटल भुगतान पद्धति का प्रयोग किया जाता है ?
   (A) इंटरनेट बैंकिंग
   (B) बैंकिंग कार्ड
   (C) मोबाइल वॉलेट्स
   (D) उपर्युक्त सभी

7. यू.पी.आई. (UPI) निम्नलिखित में से किसका संक्षिप्त रूप है, जिसका आमतौर पर भुगतान हेतु उपयोग किया जाता है ?
   (A) युनिफाइड पेमेन्ट्स इन्टरफेस
   (B) युनिवर्सल पेमेन्ट्स इन्टरफेस
   (C) युनाइटेड पेमेन्ट्स इन्टरफेस
   (D) युनिफाइड पेमेन्ट्स इन्टरचेंज

8. निम्नलिखित में से कौन-सा सर्च इंजन *नहीं* है ?
   (A) अल्टा विस्टा
   (B) माइक्रोसॉफ्ट एज
   (C) याहू!
   (D) लायकॉस

9. भारतीय मूल की सोशल नेटवर्किंग साइट का नाम है
   (A) ट्वीटर
   (B) टिक-टॉक
   (C) इंस्टाग्राम
   (D) कू

SECTION A

General Studies

1. "Phishing" is attempted through which of the following ?
   (A) E-mails
   (B) SMS
   (C) Phone calls
   (D) All of the above

2. Which of the following interactions carried out through electronic means is ***not*** e-governance ?
   (A) Between Government and Citizens
   (B) Between Government and Business
   (C) Between Internal Government Operations
   (D) Between Citizens and Internal Operations of Business

3. The name of the card launched by National Payments Corporation of India (NPCI) is
   (A) VISA
   (B) PAISA
   (C) RuPay
   (D) RUPA

4. Which of the following is a volatile memory ?
   (A) RAM
   (B) ROM
   (C) PROM
   (D) EPROM

5. Name of the robotic equipment developed by DRDO to identify explosives is
   (A) Rustom
   (B) Netra
   (C) Nishant
   (D) Daksh

6. Which digital payment method is used in e-Commerce ?
   (A) Internet banking
   (B) Banking cards
   (C) Mobile wallets
   (D) All of the above

7. UPI is a short form of which of the following, often used for making payments ?
   (A) Unified Payments Interface
   (B) Universal Payments Interface
   (C) United Payments Interface
   (D) Unified Payments Interchange

8. Which of the following is ***not*** a search engine ?
   (A) Alta Vista
   (B) Microsoft Edge
   (C) Yahoo!
   (D) Lycos

9. The social networking site of Indian origin is
   (A) Twitter
   (B) Tik-Tok
   (C) Instagram
   (D) Koo

10. इन्दिरा सागर बाँध मध्य प्रदेश की कौन-सी नदी पर निर्मित है ?

(A) नर्मदा

(B) चम्बल

(C) बेतवा

(D) सोन

11. मध्य प्रदेश की पहली विधान सभा कब गठित हुई ?

(A) 1952

(B) 1962

(C) 1967

(D) 1956

12. मध्य प्रदेश वित्तीय निगम का मुख्यालय किस जिले में स्थित है ?

(A) भोपाल

(B) इन्दौर

(C) जबलपुर

(D) सागर

13. फर्टिलाइजर कारखाना विजयपुर जिला गुना किन देशों के सहयोग से स्थापित किया गया ?

(A) सं.रा. अमेरिका – इटली

(B) सं.रा. अमेरिका – जापान

(C) सं.रा. अमेरिका – जर्मनी

(D) सं.रा. अमेरिका – सोवियत संघ

14. भारतीय संविधान का अनुच्छेद 370 (जम्मू-कश्मीर से संबंधित) कब निरस्त किया गया था ?

(A) 12 अगस्त, 2019

(B) 5 अगस्त, 2019

(C) 5 अगस्त, 2018

(D) 12 अगस्त, 2018

15. भारत की प्रथम महिला मनोचिकित्सक, जिनकी मृत्यु 5 दिसम्बर, 2021 को हुई, का नाम क्या था ?

(A) शारदा मेनन

(B) शारदा रेड्डी

(C) इन्दिरा मेनन

(D) इन्दिरा रेड्डी

16. भारत का प्रथम स्वदेशी एयरक्राफ्ट केरियर आई.एन.एस. (इंडियन नेवल शिप) 'विक्रांत' 2 सितम्बर 2022 को किस शिपयार्ड में भारतीय नौसेना को सौंपा गया ?

(A) मुंबई शिपयार्ड

(B) कोलकाता शिपयार्ड

(C) गोवा शिपयार्ड

(D) कोचीन शिपयार्ड

17. मध्य प्रदेश को कितने "औद्योगिक केन्द्र विकास निगम" में बाँटा गया है ?

(A) 8

(B) 6

(C) 7

(D) 5

10. Indira Sagar Dam has been constructed on which river of Madhya Pradesh ?

(A) Narmada

(B) Chambal

(C) Betwa

(D) Sone

11. When was Madhya Pradesh's first Legislative Assembly constituted ?

(A) 1952

(B) 1962

(C) 1967

(D) 1956

12. In which district is the headquarters of Madhya Pradesh Financial Corporation located ?

(A) Bhopal

(B) Indore

(C) Jabalpur

(D) Sagar

13. Fertilizer factory in Vijaipur of Guna district was established with the help of which countries ?

(A) U.S.A. – Italy

(B) U.S.A. – Japan

(C) U.S.A. – Germany

(D) U.S.A. – Soviet Union

14. When was Article 370 of the Indian Constitution (relating to Jammu and Kashmir) abrogated ?

(A) 12th August, 2019

(B) 5th August, 2019

(C) 5th August, 2018

(D) 12th August, 2018

15. What was the name of India's first female psychiatrist, who died on 5th December, 2021 ?

(A) Sarada Menon

(B) Sarada Reddy

(C) Indira Menon

(D) Indira Reddy

16. On 2nd September 2022, from which shipyard was India's first indigenous aircraft carrier INS (Indian Naval Ship) 'Vikrant' commissioned to the Indian Navy ?

(A) Mumbai Shipyard

(B) Kolkata Shipyard

(C) Goa Shipyard

(D) Cochin Shipyard

17. Madhya Pradesh has been divided into how many "Audyogik Kendra Vikas Nigams" ?

(A) 8

(B) 6

(C) 7

(D) 5

18. रानी लक्ष्मी बाई को अंग्रेज़ों से बचाने हेतु उनकी वेशभूषा धारण करने वाली वीरांगना का नाम क्या था ?

(A) मोती बाई

(B) काशी बाई

(C) अवंती बाई

(D) झलकारी बाई

19. निम्नलिखित में से कहाँ के किले में आहूखाना/मृगवन स्थित है ?

(A) बुरहानपुर

(B) धार

(C) मांडू

(D) नरवर

20. भगौरिया पर्व किस त्योहार से संबंधित है ?

(A) नव वर्ष

(B) होली

(C) दीपावली

(D) दशहरा

21. *होशंगाबाद हुंकार* किसकी कृति है ?

(A) रघुबीर सिंह

(B) प्रयाग दत्त शुक्ल

(C) भूपति सिंह

(D) हीरालाल

22. काकनाद का आधुनिक नाम क्या है ?

(A) अमरकंटक

(B) खजुराहो

(C) सांची

(D) मांडू

23. रानी दुर्गावती के पिता का नाम क्या था ?

(A) दधिवाहन

(B) शालिवाहन

(C) दंतिवाहन

(D) बलवाहन

24. किस वर्ष में "झंडा सत्याग्रह" हुआ था ?

(A) 1923

(B) 1933

(C) 1928

(D) 1925

25. "राई परम्परा" क्या है ?

(A) परिधान सज्जा

(B) फ़सल पद्धति

(C) लोक नृत्य

(D) जादू-टोना

18. What was the name of the warrior who dressed like Rani Laxmi Bai in order to save her from the British ?

(A) Moti Bai

(B) Kashi Bai

(C) Avanti Bai

(D) Jhalkari Bai

19. Ahukhana/Mrigvan is located in which of the following fort ?

(A) Burhanpur

(B) Dhar

(C) Mandu

(D) Narwar

20. Bhagoria is related to which festival ?

(A) New Year

(B) Holi

(C) Deepawali

(D) Dussehra

21. *Hoshangabad Hunkar* is written by

(A) Raghubir Singh

(B) Prayag Dutt Shukla

(C) Bhupati Singh

(D) Hiralal

22. What is the modern name of Kaknaad ?

(A) Amarkantak

(B) Khajuraho

(C) Sanchi

(D) Mandu

23. What was the name of the father of Rani Durgavati ?

(A) Dadhivahan

(B) Shalivahan

(C) Dantivahan

(D) Balvahan

24. In which year did the "Jhanda Satyagrah" take place ?

(A) 1923

(B) 1933

(C) 1928

(D) 1925

25. What is "Rai Parampara" ?

(A) Dress Adoration

(B) Cultivation Technique

(C) Folk Dance

(D) Magic and Charm

26. निम्नलिखित में से कौन-सी नदी नर्मदा नदी की सहायक नदी *नहीं* है ?

(A) हिरन

(B) देनवा

(C) गोई

(D) हथिनी

27. मध्य प्रदेश में सबसे अधिक तापमान पाया जाता है

(A) बड़वानी में

(B) ग्वालियर में

(C) इन्दौर में

(D) शहडोल में

28. सियारी क्या है ?

(A) हथियार

(B) आभूषण

(C) फ़सल

(D) स्थानीय बोली

29. किस ऐतिहासिक स्मारक को खामबाबा के नाम से जाना जाता है ?

(A) विदिशा का गरुड़ स्तंभ

(B) सांची का तोरण

(C) भरहुत का तोरण

(D) भीमबेटका

30. बुन्देलखण्ड प्रदेश की सबसे ऊँची चोटी है

(A) धूपगढ़

(B) जानापाव

(C) मैकल

(D) सिद्ध बाबा

31. कठोरता की दृष्टि से हीरे के बाद दूसरा अधात्विक खनिज है

(A) फायर क्ले

(B) कोरण्डम

(C) फेल्डस्पार

(D) गेरु

32. मध्य प्रदेश में पाए जाने वाले मैंगनीज़ अयस्क में मैंगनीज़ की मात्रा पाई जाती है

(A) 40·42%

(B) 40·45%

(C) 45·50%

(D) 40·50%

33. नेपा के कागज कारखाने को शक्ति प्रदान करने के लिए एक तापीय शक्ति केन्द्र स्थापित किया गया है

(A) वैधान में

(B) सतपूड़ा में

(C) चाँदनी में

(D) उपर्युक्त में से कोई नहीं

34. मध्य प्रदेश में सबसे अधिक वर्षा कहाँ होती है ?

(A) मण्डला

(B) अमरकंटक

(C) पंचमढ़ी

(D) बालाघाट

26. Which of the following rivers is ***not*** a tributary of Narmada river ?

(A) Hiran

(B) Denwa

(C) Goi

(D) Hathini

27. The highest temperature in Madhya Pradesh is found in

(A) Barwani

(B) Gwalior

(C) Indore

(D) Shahdol

28. What is Siari ?

(A) Weapon

(B) Ornament

(C) Harvest

(D) Local Dialect

29. Which historical monument is known as Khambaba ?

(A) Garud Pillar of Vidisha

(B) Toran of Sanchi

(C) Toran of Bharhut

(D) Bhimbetka

30. The highest peak of Bundelkhand region is

(A) Dhupgarh

(B) Janapav

(C) Maikal

(D) Sidha Baba

31. The second non-metallic hard mineral after diamond in terms of hardness is

(A) Fire clay

(B) Corundum

(C) Feldspar

(D) Ochre

32. The amount of manganese found in the manganese ore in Madhya Pradesh is

(A) 40·42%

(B) 40·45%

(C) 45·50%

(D) 40·50%

33. To provide power to the paper factory in Nepa, a Thermal Power Station is established in

(A) Waidhan

(B) Satpura

(C) Chandni

(D) None of the above

34. Where does maximum rainfall occur in Madhya Pradesh ?

(A) Mandla

(B) Amarkantak

(C) Panchmarhi

(D) Balaghat

35. मध्य प्रदेश में किस वर्ष "पोषण महोत्सव" योजना लागू की गई ?

(A) 2018

(B) 2019

(C) 2020

(D) 2021

36. 2011 की जनगणना के अनुसार मध्य प्रदेश के किस जिले में लिंग अनुपात सबसे अधिक है ?

(A) शिवपुरी

(B) देवास

(C) बेतुल

(D) बालाघाट

37. वर्ष 2011 की जनगणना के अनुसार मध्य प्रदेश की न्यूनतम बाल जनसंख्या वाला जिला कौन-सा है ?

(A) इन्दौर

(B) दतिया

(C) हरदा

(D) ग्वालियर

38. मध्य प्रदेश में पंचायती राज अधिनियम कब बनाया गया ?

(A) 1994

(B) 1993

(C) 1995

(D) 1996

39. मध्य प्रदेश में लाख बनाने (माइनर फॉरेस्ट प्रोड्यूस) का एक शासकीय कारखाना स्थित है

(A) सिंगरौली में

(B) रीवा में

(C) उमरिया में

(D) सतना में

40. निम्नलिखित में से किसे मध्य प्रदेश विधान सभा भंग करने का अधिकार है ?

(A) राज्यपाल

(B) मुख्यमंत्री

(C) उच्च न्यायालय का मुख्य न्यायाधीश

(D) मध्य प्रदेश विधान सभा अध्यक्ष

41. मध्य प्रदेश के नीमच जिले के कौन-से गाँव में 130 मेगावॉट क्षमता का सौर ऊर्जा संयंत्र स्थापित किया गया है ?

(A) बमोरी

(B) भगवानपुरा

(C) बरुखेड़ा

(D) भाटखेड़ा

42. निम्नलिखित में से कौन-सी मध्य प्रदेश और उत्तर प्रदेश की संयुक्त सिंचाई परियोजना ***नहीं*** है ?

(A) सिन्ध परियोजना

(B) बाण सागर परियोजना

(C) भाण्डेर नहर परियोजना

(D) उर्मिल परियोजना

35. In which year was "Poshan Mahotsav" scheme launched in Madhya Pradesh ?

(A) 2018

(B) 2019

(C) 2020

(D) 2021

36. Which district of Madhya Pradesh has the highest sex-ratio according to Census 2011 ?

(A) Shivpuri

(B) Devas

(C) Betul

(D) Balaghat

37. According to Census 2011, which district has the lowest child population in Madhya Pradesh ?

(A) Indore

(B) Datia

(C) Harda

(D) Gwalior

38. When was Madhya Pradesh Panchayati Raj Act enacted ?

(A) 1994

(B) 1993

(C) 1995

(D) 1996

39. Government factory for making lac (minor forest produce) in Madhya Pradesh is situated in

(A) Singrauli

(B) Rewa

(C) Umaria

(D) Satna

40. Who among the following is empowered to dissolve the Legislative Assembly of Madhya Pradesh ?

(A) Governor

(B) Chief Minister

(C) Chief Justice of High Court

(D) Speaker of Madhya Pradesh Legislative Assembly

41. In which village of Neemuch district of Madhya Pradesh is 130 MW capacity Solar Plant established ?

(A) Bamori

(B) Bhagwanpura

(C) Barukheda

(D) Bhatkheda

42. Which of the following is ***not*** a joint irrigation project of Madhya Pradesh and Uttar Pradesh ?

(A) Sindh Project

(B) Ban Sagar Project

(C) Bhander Canal Project

(D) Urmil Project

43. मध्य प्रदेश में प्रभाष जोशी पुरस्कार किस खेल से सम्बन्धित है ?

(A) कबड्डी

(B) आट्या-पाट्या

(C) खो-खो

(D) मलखम्ब

44. मध्य प्रदेश सरकार की संत रविदास स्वरोजगार योजना का संचालन निम्नलिखित में से किसके द्वारा किया जाता है ?

(A) अनुसूचित जनजाति कल्याण निगम

(B) अनुसूचित जाति वित्त विकास निगम

(C) पिछड़ा वर्ग विकास निगम

(D) जन कल्याण वित्त निगम

45. 2020 टोक्यो पैरालिम्पिंक में भारत के किस खिलाड़ी ने भाला फेंक में स्वर्ण पदक जीता ?

(A) देवेन्द्र झाझरिया

(B) सुंदर गुर्जर

(C) सुमित अन्तिल

(D) नीरज चोपड़ा

46. 2020 में मुक्केबाज़ी के लिए मध्य प्रदेश का विक्रम पुरस्कार किस खिलाड़ी को प्रदान किया गया था ?

(A) मेघा परमार

(B) मंजू बम्बोरिया

(C) परिधि जोशी

(D) एकता यादव

47. प्रसिद्ध पत्रकार माधव राव सप्रे का जन्म मध्य प्रदेश के किस गाँव में हुआ था ?

(A) दमोह के पथरिया गाँव में

(B) पन्ना के पडरिया गाँव में

(C) मण्डला के बकौरा गाँव में

(D) नरसिंहपुर के बधुवार गाँव में

48. इनमें से कौन-सा भारतीय वैज्ञानिक मध्य प्रदेश से सम्बन्धित है ?

(A) कैलाश नाथ कौल

(B) बीरबल साहनी

(C) राजा रमन्ना

(D) अनिल काकोडकर

49. निम्नलिखित में से कौन-सा एक अर्धचालक है ?

(A) ऐलुमिनियम

(B) ताँबा

(C) जर्मेनियम (शुद्ध)

(D) सोना

50. मध्य प्रदेश सरकार ने भगवान बिरसा मुंडा स्वरोजगार योजना की अनुशंसा 2022 में किस तिथि पर की ?

(A) 6 अगस्त

(B) 9 सितम्बर

(C) 6 सितम्बर

(D) 9 अगस्त

43. Prabhash Joshi Award of Madhya Pradesh is related to which sport ?

(A) Kabaddi

(B) Atya-Patya

(C) Kho-Kho

(D) Malkhamb

44. Which of the following operates the Sant Ravidas Swarozgar Yojana of Madhya Pradesh Government ?

(A) Scheduled Tribes Welfare Corporation

(B) Scheduled Castes Finance Development Corporation

(C) Backward Classes Development Corporation

(D) Public Welfare Finance Corporation

45. Which Indian player won the gold medal in Javelin throw in 2020 Tokyo Paralympics ?

(A) Devendra Jhajharia

(B) Sunder Gurjar

(C) Sumit Antil

(D) Neeraj Chopra

46. Which player was given the Vikram Award of Madhya Pradesh for Boxing in 2020 ?

(A) Megha Parmar

(B) Manju Bamboria

(C) Paridhi Joshi

(D) Ekta Yadav

47. In which village of Madhya Pradesh was the famous journalist Madhav Rao Sapre born ?

(A) Patharia village of Damoh

(B) Padaria village of Panna

(C) Bakora village of Mandla

(D) Badhuwar village of Narsinghpur

48. Which of these Indian scientists belongs to Madhya Pradesh ?

(A) Kailash Nath Kaul

(B) Birbal Sahni

(C) Raja Ramanna

(D) Anil Kakodkar

49. Which of the following is a semiconductor ?

(A) Aluminium

(B) Copper

(C) Germanium (Pure)

(D) Gold

50. On which date did Madhya Pradesh Government recommend Bhagwan Birsa Munda Swarozgar Yojana in 2022 ?

(A) 6th August

(B) 9th September

(C) 6th September

(D) 9th August

खंड ब / SECTION B

इलेक्ट्रॉनिक्स एण्ड टेलिकम्यूनिकेशन

Electronics and Telecommunication

51. The constant M-circle corresponding to the magnitude (M) of the closed loop transfer function of a linear system for value of M greater than one will be in the G-plane and to the

(A) Left of M = 1 line

(B) Right of M = 1 line

(C) Upper side of M = + j1 line

(D) Lower side of M = – j1 line

52. A linear time-invariant system is described by the state variable model

$$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

$$y = [1 \quad 2] \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}.$$

Which statement is correct for the given system ?

(A) The system is completely controllable but not observable.

(B) The system is observable but not controllable.

(C) The system is both controllable and observable.

(D) The system is neither controllable nor observable.

53. In the root locus of a system with open loop transfer function

$$G(s)\,H(s) = \frac{K(s+6)}{(s+3)(s+5)}.$$

The break-away and break-in points are located respectively at

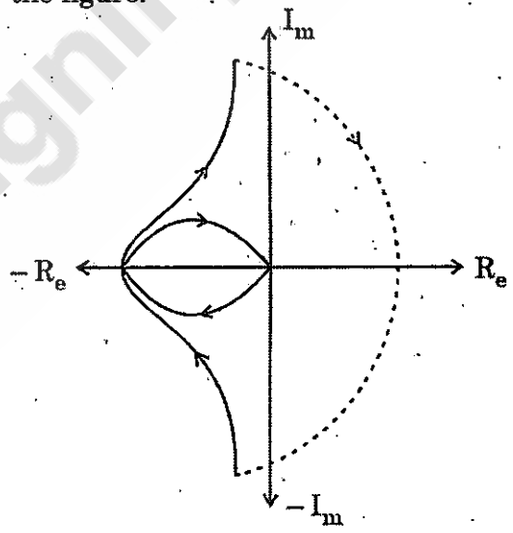
(A) – 2 and – 1

(B) – 4·27 and – 7·73

(C) – 7·73 and – 4·27

(D) – 1 and – 2

54. The Nyquist plot of a system is shown in the figure.



Identify the type of the system.

(A) Type-0 system

(B) Type-1 system

(C) Type-2 system

(D) Type-3 system

55. The characteristic equation of a closed loop system is given by

$$s^4 + 6s^3 + 11s^2 + 6s + K = 0.$$

Stable closed loop behaviour can be ensured when gain K is

(A) $0 < K < 10$

(B) $K > 10$

(C) $0 < K < -20$

(D) $-\infty < K < \infty$

56. The boolean function $F = xy + x'z$ can be expressed in a product of maxterm form with

(A) $F(x, y, z) = \Pi (1, 2, 4, 5)$

(B) $F(x, y, z) = \Pi (0, 2, 4, 5)$

(C) $F(x, y, z) = \Pi (1, 3, 4, 5)$

(D) $F(x, y, z) = \Pi (2, 4, 6, 7)$

57. The five and six variables of Karnaugh maps require

(A) 25 and 30 squares respectively

(B) 20 and 24 squares respectively

(C) 64 and 32 squares respectively

(D) 32 and 64 squares respectively

58. In IC logic families, DC noise is caused by a drift in the

(A) Current levels of a signal

(B) Voltage levels of a signal

(C) Power levels of a signal

(D) All of the above

59. Which is the most stable primary standard for frequency ?

(A) Rubidium vapour standard

(B) Quartz standard

(C) Caesium beam standard

(D) Hydrogen maser standard

60. The successive approximation method of analog to digital (A/D) converter has

(A) High resolution, low speed

(B) Low resolution, low speed

(C) High resolution, high speed

(D) Low resolution, high speed

61. Choose the correct statement regarding electronic weighing and mechanical weighing.

(A) Accuracy of electronic weighing system is high while accuracy of mechanical weighing system is low.

(B) Resolution of electronic weighing system is low while resolution of mechanical weighing system is high.

(C) Reliability of electronic weighing system is medium while reliability of mechanical weighing system is high.

(D) Life of electronic weighing system is less while life of mechanical weighing system is high.

62. While calibrating thermometers in the range of – 100°C to 0°C using "Electrically Heated Liquid Bath" mechanism, the material used for bath liquid will be

(A) Water

(B) Methanol

(C) Wax

(D) Silicon oil

63. Which of the following statements is ***not*** true ?

(A) The probability of any event is always less than or equal to 1 and non-negative.

(B) If A and B are two mutually exclusive events, then
$P(A + B) = P(A) + P(B)$.

(C) If A and B are two events (not mutually exclusive events), then
$P(A + B) = P(A) + P(B) - P(AB)$.

(D) None of the above

64. Electric field intensity in the region about a uniform line charge of 8 ηC/m lying along the z-axis in free space at $\rho = 3$ cm is

(A) $47{\cdot}9\ \bar{a}_\rho$ V/m

(B) $95{\cdot}8\ \bar{a}_\rho$ V/m

(C) $100\ \bar{a}_\rho$ V/m

(D) $150\ \bar{a}_\rho$ V/m

65. A random process is said to be a wide sense stationary process if the following conditions are satisfied :

(A) $E[X(t)] = \bar{X}$ = Constant

(B) $E[X(t) \cdot X(t + \tau)] = R_{XX}(\tau)$

(C) $E[X(t) \cdot X(t - \tau)] = R_{XX}(\tau)$

(D) Both (A) and (B)

66. Wiener-Kinchin theorem says that

(A) Spectral density and autocovariance makes a Fourier transform pair.

(B) Power spectral density and autocorrelation makes a Fourier transform pair.

(C) Power spectral density and variance makes a Fourier transform pair.

(D) None of the above

67. The power spectral density of non-periodic signals can be calculated by

(A) Converting to periodic signals

(B) Integrating

(C) Truncating

(D) None of the above

68. Dirichlet's conditions for Fourier series representation is/are

(A) The function gp(t) is single-valued within the interval T_o.

(B) The function of gp(t) has at most a finite number of discontinuities and a finite number of maxima and minima in the interval T_o.

(C) The function gp(t) is absolutely integrable.

(D) All of the above

69. The particular solution for a simple RC network is

(A) $i = \begin{cases} -\frac{V}{R} e^{-t/RC}, & t \geq 0 \\ 0, & t < 0 \end{cases}$

(B) $i = \begin{cases} -\frac{R}{C} e^{-tR/C}, & t \geq 0 \\ 0, & t < 0 \end{cases}$

(C) $i = \begin{cases} \frac{V}{R} e^{-tC/R}, & t \geq 0 \\ 0, & t < 0 \end{cases}$

(D) $i = \begin{cases} \frac{V}{R} e^{tC/R}, & t \geq 0 \\ 0, & t < 0 \end{cases}$

70. If a connected graph has 'b' branches and 'n' nodes, the number of links corresponding to any tree of the graphs is

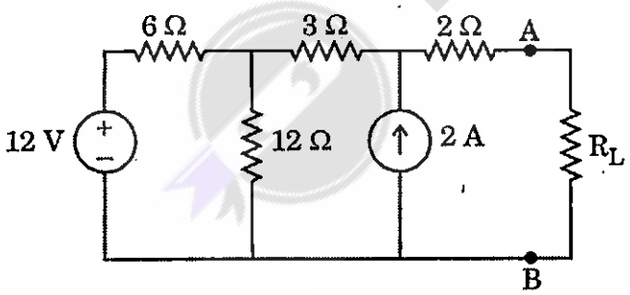
(A) $b + n - 1$

(B) $b - 2n + 1$

(C) $b - n - 1$

(D) $b - n + 1$

71. The value of load resistor 'R_L' for maximum power transfer in the circuit shown in the figure is



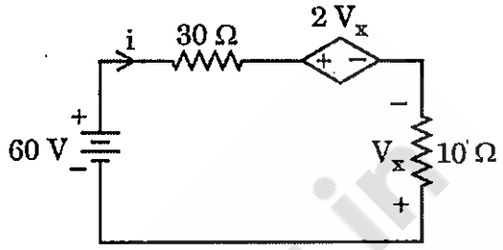
(A) 2 Ω

(B) 13 Ω

(C) 1·5 Ω

(D) 9 Ω

72. The figure given below shows a voltage controlled voltage source with two resistors and a battery source of 60 V. What will be the power supplied by the controlled source ?



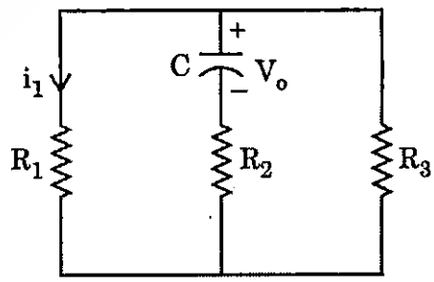
(A) 180 W

(B) 360 W

(C) 120 W

(D) 90 W

73. The following figure shows a network which consists of a single capacitor and several resistors. Which one among the following would be the current through resistor R_1 ?



(A) $\frac{R_3}{R_1 + R_2} \cdot \frac{V_o}{R_{eq}} \cdot e^{-t/R_{eq} \cdot C}$ for $t \geq 0$

(B) $\frac{R_3}{R_1 + R_3} \cdot \frac{V_o}{R_{eq}} \cdot e^{-tC}$ for $t \geq 0$

(C) $\frac{R_3}{R_1 + R_3} \cdot R_{eq} \cdot V_o \, e^{-tC}$ for $t \geq 0$

(D) $\frac{R_3}{R_1 + R_3} \cdot \frac{V_o}{R_{eq}} \cdot e^{-t/R_{eq} \cdot C}$ for $t \geq 0$

74. As compared to class A, class B power amplifiers offer

(A) Higher efficiency and lower distortion

(B) Lower efficiency and lower distortion

(C) Higher efficiency and higher distortion

(D) Lower efficiency and higher distortion

75. In resistance wire strain gauge, the normal range of gauge factor lies between

(A) – 12 to 5

(B) – 5 to 50

(C) 20 to 100

(D) 100 to 5000

76. Potentiometer-type displacement transducer has

(A) good dynamic response and poor resolution.

(B) poor dynamic response and poor resolution.

(C) good dynamic response and good resolution.

(D) poor dynamic response and good resolution.

77. A low pass filter has an input signal-to-noise ratio of 25. What will be the noise voltage if the input voltage is 5 mV ?

(A) 5·0 mV

(B) 20·0 mV

(C) 1·0 mV

(D) 12·5 mV

78. Base currents of 16 μA and 20 μA are supplied to the emitter coupled transistor of a differential amplifier. The input bias current will be

(A) – 4 μA

(B) 4 μA

(C) 36 μA

(D) 18 μA

79. The gain of a buffer amplifier is

(A) Zero

(B) Unity

(C) Infinity

(D) Parameter dependent

80. If a rectangular waveguide is 5·1 cm by 2·4 cm (inside measurements), then cut-off frequency of the dominant mode is

(A) 2·94 GHz

(B) 5·88 GHz

(C) 1·47 GHz

(D) 8·82 GHz

81. An MTI radar operates at 5 GHz, with a pulse repetition frequency of 800 PPS. Calculate the lowest three blind speeds of this radar.

(A) 300, 400, 500 km/H

(B) 172·8, 345·6, 518·4 km/h

(C) 192, 370, 422·5 km/h

(D) 182·8, 348·8, 520·5 km/H

82. For a N-channel Junction Field Effect Transistor (JFET), the saturation drain current (I_{DSS}) is 20 mA, pinch-off voltage (V_P) is – 8 V and transconductance (gm) is 5 mA/V. The value of drain current (I_D) at gate to source voltage (V_{GS}) of – 4 V is

(A) 10 mA

(B) 40 mA

(C) 5 mA

(D) 0·5 mA

83. The transconductance (g_m) of a Junction Field Effect Transistor (JFET) is related to the drain current (I_{DS}) by

(A) $g_m = \frac{2\,I_D}{(V_{GS} - V_T)}$

(B) $g_m = \frac{2}{|V_P|} \cdot \sqrt{I_{DSS} \cdot I_{DS}}$

(C) $g_m = \frac{|V_P|}{2} \cdot \sqrt{I_{DSS} \cdot I_{DS}}$

(D) $g_m = \frac{2 \cdot I_{DS}}{V_P} \sqrt{I_{DSS}}$

84. In comparison to P-N junction diode, the Schottky barrier diode has a _____ threshold voltage and _____ reverse saturation current.

(A) large, large

(B) large, lower

(C) lower, large

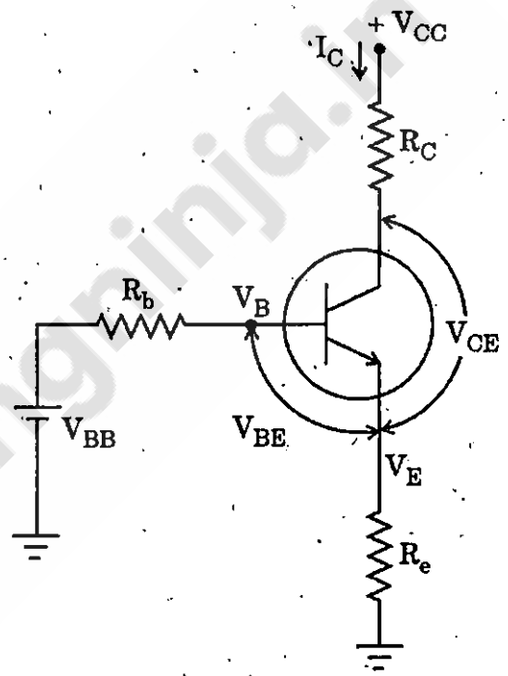
(D) lower, lower

85. For a Bipolar Junction Transistor (BJT), the value of base current (I_B) for the circuit given in the figure below for the given parameters is

V_{CC} = 10 V, V_{BB} = 5 V, V_{BE} = 0·7 V

R_b = 10 K, R_C = 500 Ω, R_e = 100 Ω

h_{FE} = 100



(A) 2·139 mA

(B) 21·39 mA

(C) 21·39 μA

(D) 213·93 μA

86. Two identical Field Effect Transistors (FETs), each characterized by the parameters transconductance (g_m) and drain resistance r_d, are connected in parallel. The composite FET is then characterized by the parameters

(A) $2g_m$ and r_d

(B) $g_m/2$ and $2r_d$

(C) g_m and $r_d/2$

(D) $2g_m$ and $r_d/2$

87. The relationship between the signum function to unit step function is given by

(A) $sgn(t) = 2\mu(t) - 1$

(B) $sgn(t) = \mu(t) - 1$

(C) $sgn(t) = \mu(t) - 2$

(D) None of the above

88. The Laplace transform of the function f(t) is

$$f(s) = \frac{5s + 4}{s(s + 1)(s^2 + 4s + 5)}.$$

Its final value is

(A) $\frac{5}{4}$

(B) 4

(C) $\frac{4}{5}$

(D) 5

89. The Laplace transform of the delta function $\delta(t)$ is

(A) 0

(B) 1

(C) $\frac{1}{s}$

(D) $\frac{1}{s^2}$

90. The total area under the curve of $\sin c^2 t$ is equal to

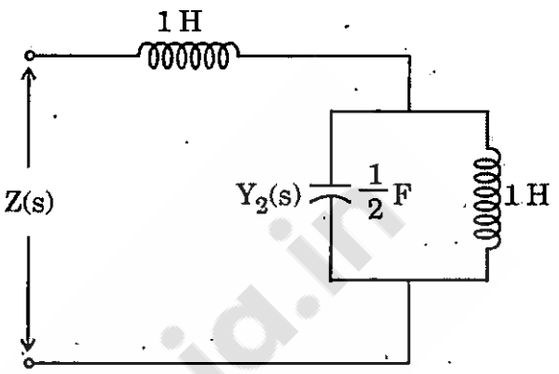
(A) 0

(B) 1

(C) Infinite

(D) None of the above

91. The driving point impedance of the network shown in the figure is



(A) $\frac{s^3 + 2s}{s^2 + 2}$

(B) $\frac{s^3 + 4s}{s^2 + 2}$

(C) $\frac{s^3 + 2s}{s^2 + 2s}$

(D) $\frac{s^2 + 2}{s^3 + 2s}$

92. Which theorem states that the average power of a periodic signal gp(t) is equal to the sum of the squared amplitudes of all the harmonic components of the signal gp(t) ?

(A) Sampling Theorem

(B) Modulation Theorem

(C) Parseval's Power Theorem

(D) Rayleigh's Energy Theorem

93. Which protocol provides a remote login capability ?

(A) USENET

(B) TELNET

(C) ICMP

(D) IMAP

94. 8086 microprocessors have _____ address lines.

(A) 8 bit

(B) 16 bit

(C) 20 bit

(D) 30 bit

95. Which of the following is a type of queue ?

(A) Single ended queue

(B) Priority queue

(C) B-queue

(D) None of the above

96. Which of the following belongs to the Data Link Protocol ?

(A) Error control

(B) Flow control

(C) HDLC

(D) All of the above

97. In OSI model, at which layer is header ***not*** added to the data packet ?

(A) Layer 6

(B) Layer 2

(C) Layer 1

(D) None of the above

98. Which of the following statement is ***not*** correct ?

(A) Hexadecimal numbers use sixteen distinct counting digits '0' through '9' and 'A' through 'F'.

(B) The 1's complement of a binary number is obtained by changing its each 0/1 into 1/0.

(C) Octal number has a base of 7.

(D) Excess-3 code is an unweighted code.

99. What is the correct conversion of the following ?

$(7E)_{r16} = (?)_{r10} = (?)_{r8} = (?)_{r2}$

(A) 126, 156, 1111110

(B) 126, 176, 1111110

(C) 124, 156, 1111100

(D) 124, 176, 1111100

100. Flash memory is also known as

(A) EEPROM

(B) RMM

(C) EAROM

(D) All of the above

101. Which of the following data structure defines the recursion ?

(A) Linked list

(B) Stack

(C) Queue

(D) Array

102. Measurement of low microwave power in the range of 1 to 10 mW is done by

(A) Baretter type Bolometer technique

(B) Calorimetric technique

(C) Both of the above

(D) None of the above

103. In a reflex klystron, the best time for electrons to return to the gap is at the _____ point of the sine wave gap voltage.

Fill the blank in the above statement by any one of the following :

(A) 45°

(B) 135°

(C) 90°

(D) 0°

104. The operating frequency of the IMPATT diode is in the range of

(A) 1 – 100 MHz

(B) 0·5 – 100 MHz

(C) 100 – 500 MHz

(D) None of the above

105. Modes on microstrip line are only

(A) TE mode

(B) TM mode

(C) Quasi-Transverse Electric and Magnetic (TEM) modes

(D) None of the above

106. In optical fibre communication, Snell's law may be defined as

(A) $\sin \phi_c = \frac{n_1}{n_2}$

(B) $\cos \phi_c = \frac{n_1}{n_2}$

(C) $\sin \phi_c = \frac{n_2}{n_1}$

(D) $\cos \phi_c = \frac{n_2}{n_1}$

107. The most popular frequency band for satellite communication is

(A) 6 GHz (uplink) and 4 GHz (downlink)

(B) 4 GHz (uplink) and 6 GHz (downlink)

(C) 10 GHz (uplink) and 8 GHz (downlink)

(D) 8 GHz (uplink) and 10 GHz (downlink)

108. At higher code rates or low SNR value conditions, which channel code exhibits better performance ?

(A) Turbo code

(B) Parity code

(C) Convolution code

(D) Block code

109. The greatest single advantage of FM is

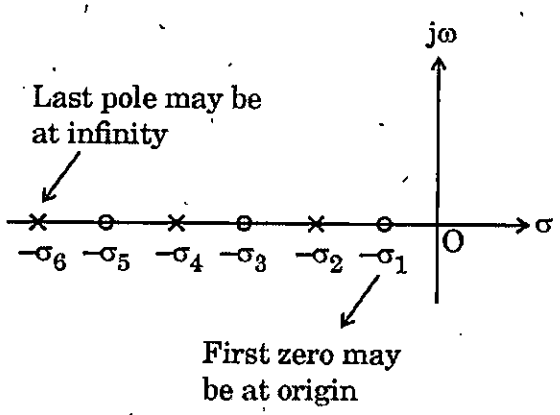
(A) The amplitude of the frequency modulated wave remains constant at all times.

(B) The amplitude of the frequency modulated wave increases with time.

(C) The amplitude of the frequency modulated wave decreases with time

(D) All of the above are wrong.

110. The pole zero diagram as shown in the figure represents which functions ?



(A) RL admittance

(B) RC admittance

(C) LC impedance

(D) LC admittance

111. For the given polynomial

$P(s) = s^4 + Ks^3 + s^2 + 2s + 1$

to be a Hurwitz polynomial, range of constant K is

(A) $K > 2$

(B) $K > 0$

(C) No value of K

(D) $\frac{2 - K^2}{K - 2} > 0$

112. For a series connection of two, two-port networks, which of the following relations holds true ?

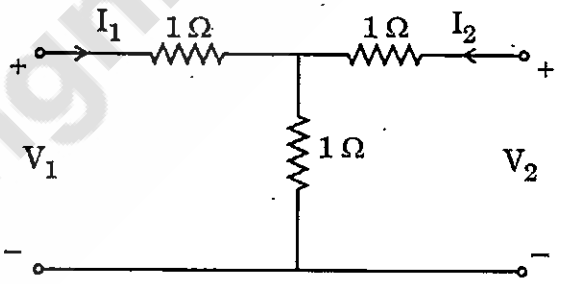
(A) $[h] = [h_a] + [h_b]$

(B) $[Z] = [Z_a] + [Z_b]$

(C) $[Y] = [Y_a] + [Y_b]$

(D) $[h] = [h_a] \cdot [h_b]$

113. Two identical sections of the network shown in the figure are cascaded. The overall transmission parameters are



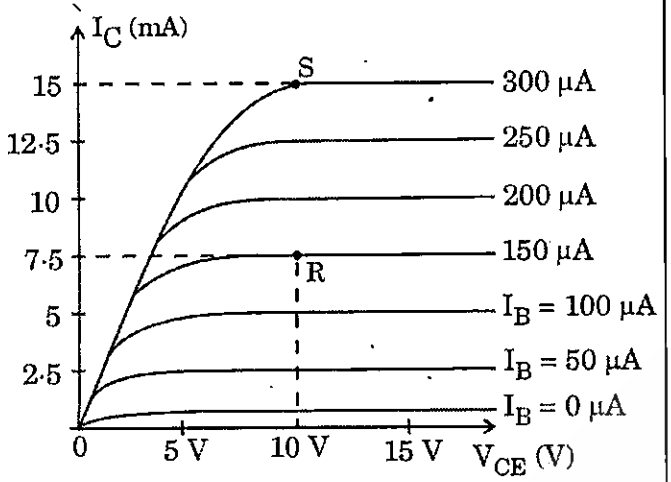
(A) $\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$

(B) $\begin{bmatrix} 9 & 4 \\ 4 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 7 & 12 \\ 4 & 7 \end{bmatrix}$

(D) $\begin{bmatrix} 4 & 12 \\ 7 & 4 \end{bmatrix}$

114. The characteristic curve for Common-Emitter (CE) configuration of a Bipolar Junction Transistor (BJT) is shown in the figure below. Then the value of large signal current gain (β) at point S and small signal current gain (h_{fe}) between points S and R are



(A) 100, 100

(B) 50, 100

(C) 100, 50

(D) 50, 50

115. In the cut-off region the Base to Emitter (B – E) and Collector to Base (C – B) junctions of a Bipolar Junction Transistor are

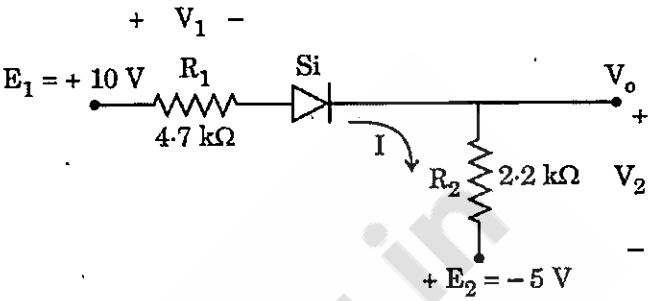
(A) Both the junctions are forward biased.

(B) B – E junction is forward biased and C – B junction is reverse biased.

(C) Both the junctions are reverse biased.

(D) B – E junction is reverse biased and C – B junction is forward biased.

116. The value of current (I) for the DC configuration for the circuit given in the figure below is



(A) 2·07 mA

(B) 2·18 mA

(C) 2·007 mA

(D) 2·0 mA

117. Which phenomenon is used to determine whether a semiconductor is n-type or p-type ?

(A) Raman effect

(B) Doppler effect

(C) Hall effect

(D) Photoelectric effect

118. The concentration of free electrons (n) for a good conductor is

(A) ~ 10^3 electrons/m^3

(B) ~ 10^{12} electrons/m^3

(C) ~ 10^7 electrons/m^3

(D) ~ 10^{28} electrons/m^3

119. Given $H = H_m e^{i(\omega t + \beta z)} a_x$ in free space, find E.

(A) $\frac{\varepsilon_o}{D}$

(B) $\frac{D}{\varepsilon_o}$

(C) $\frac{\mu_o}{D}$

(D) $\frac{D}{\mu_o}$

120. As a result of reflections from a plane conducting wall, electromagnetic waves acquire an apparent velocity greater than the velocity of light in space. This is known as

(A) Normal velocity

(B) Velocity of propagation

(C) Group velocity

(D) Phase velocity

121. It is required to match a 200 Ω load to a 300 Ω transmission line to reduce the SWR along the line to 1. Z_0 : characteristic impedance of $\frac{\lambda}{4}$ transformer is _____, if it is connected directly to the load.

(A) 245 Ω

(B) 254 Ω

(C) 542 Ω

(D) 425 Ω

122. For a perfect conductor, which of the following equations is considered as correct ?

(A) $\alpha > \beta$

(B) $\alpha = \beta$

(C) $\alpha < \beta$

(D) $\alpha = \beta^2$

123. Radiation resistance is defined as the ratio of power radiated by the antenna to the _____ of the feed point.

(A) voltage

(B) current

(C) square of the current

(D) square of the voltage

124. If a transmission line is terminated in a purely reactive load then SWR is

(A) 0

(B) 1

(C) $\frac{1}{\sqrt{2}}$

(D) α

125. Before using Laplace's equation or Poisson's equation in several examples, we must pause to show that if our answer satisfies Laplace's equation and also satisfies the _____ , then it is the only possible answer.

(A) Gaussian surface

(B) Perfect conductor characteristics

(C) Boundary conditions

(D) Maxwell's equation

126. When electromagnetic waves are propagated in a waveguide

(A) propagation is by reflection from the walls.

(B) propagation is by conduction along the walls.

(C) propagation is by both reflection and conduction.

(D) None of the above

127. In the absence of an attenuator in a travelling wave tube, which one of the following is most likely to occur ?

(A) Bunching process will be enhanced

(B) Oscillations are possible

(C) Decrement in gain

(D) Backward wave is attenuated

128. To represent data in memory, the collection of 4-bits is called

(A) Byte

(B) Nibble

(C) Word

(D) Record

129. For self-consistent oscillation in a cavity magnetron, the phase difference between adjoining anode poles must be

(where n is an integer)

(A) $\frac{n\pi}{4}$

(B) $\frac{n\pi}{2}$

(C) $\frac{n\pi}{8}$

(D) $\frac{n\pi}{16}$

130. The total efficiency of an injection laser with a GaAs active region is 18%. The voltage applied to the device is 2·5 V and the band-gap energy for GaAs is 2·5 eV, then the external power efficiency of the device is

(A) 10%

(B) 25%

(C) 50%

(D) 18%

131. The drift velocity of electron is 10^7 cm/sec through the active region having length 10^{-3} cm, then the natural frequency of the Gunn diode is

(A) 20 GHz

(B) 100 GHz

(C) 5 GHz

(D) 10 GHz

132. A waveguide tee in which the axis of its side arm is "shunting" only the E-field of the main guide is termed as

(A) E-plane Tee

(B) H-plane Tee

(C) Magic Tee

(D) None of the above

133. Shift registers are used for

(A) Time delays

(B) Serial/Parallel data conversion

(C) Ring counter

(D) All of the above

134. In which type of RAM will the stored data gradually disappear because of capacitor discharge ?

(A) Static RAM

(B) ECL RAM

(C) Dynamic RAM

(D) None of the above

135. Which type of flip-flop has the following excitation table ?

Q(t)	Q(t + 1)	Input
0	0	0
0	1	1
1	0	0
1	1	1

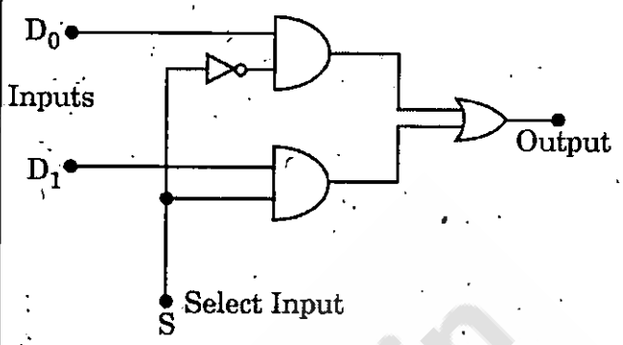
(A) T flip-flop

(B) D flip-flop

(C) JK flip-flop

(D) None of the above

136. The following combinational circuit can be used as



(A) Decoder

(B) Encoder

(C) De-multiplexer

(D) Multiplexer

137. A 2048 bit Read Only Memory (ROM) may be organised as 512 words of 4 bits each. In this unit, the number of input lines and output lines are

(A) 9 and 4 respectively

(B) 4 and 9 respectively

(C) 4 and 16 respectively

(D) 16 and 4 respectively

138. In a 4-bit parallel adder, the principle of look-ahead carry is employed to

(A) increase carry propagation time

(B) reduce carry propagation time

(C) improve noise-margin

(D) increase fan-out

139. The process of reconstructing a continuous time signal from its samples is known as

(A) Regeneration

(B) Reformation

(C) Interpolation

(D) Modulation

140. The sampled signal with B bandwidth can be reconstructed without any loss or distortion by which condition of sampling interval ?

(A) $T_s > 2\,B$

(B) $T_s < 2\,B$

(C) $T_s > \frac{1}{2}\,B$

(D) $T_s < \frac{1}{2}\,B$

141. An analog signal is band-limited to BHz, sampled at Nyquist rate, and the samples are quantized into 4 levels. The quantization levels Q_1 Q_2 Q_3 Q_4 (messages) are assumed independent and occur with probabilities $P_1 = P_3 = \frac{1}{8}$ and $P_2 = P_4 = \frac{3}{8}$. Find the information rate of the source.

(A) 7·2 B bits/sec

(B) 5·4 B bits/sec

(C) 3·6 B bits/sec

(D) 1·8 B bits/sec

142. Two-way communication where both parties turn transmitting and receiving using the same radio channel is referred to as

(A) Simplex

(B) Half-duplex

(C) Full-duplex

(D) None of the above

143. A cellular system is allocated a total spectrum of 10 MHz for deployment of an analog cellular system based on FDMA technique with each simplex channel occupying 2·5 KHz bandwidth. Calculate the number of simultaneous calls allowed in the system.

(A) 100

(B) 400

(C) 200

(D) 1000

144. To overcome the problem of inter-symbol interference for Narrow Band FDMA and TDMA, which technique is suitable ?

(A) Channel Coding

(B) Channel Equalisation

(C) Source Coding

(D) Encoder Coding

145. For a gain constant K, the phase-lead compensator

(A) reduces the slope of the magnitude curve in the entire range of frequency domain.

(B) decreases the gain crossover frequency.

(C) reduces phase-margins.

(D) reduces the resonant peak.

146. The error response of a second order system to a step input is obtained as

$$e(t) = 1{\cdot}66\, e^{-8t} \sin(6t + 37°).$$

The damping ratio is

(A) 0·4

(B) 0·5

(C) 1·0

(D) 0·8

147. The value of system matrix A in $\dot{X} = AX$ for a system described by the differential equation

$$\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 3y = 0$$

is

(A) $\begin{bmatrix} 1 & 0 \\ -2 & -1 \end{bmatrix}$

(B) $\begin{bmatrix} 1 & 0 \\ -1 & -2 \end{bmatrix}$

(C) $\begin{bmatrix} 0 & 1 \\ -3 & -2 \end{bmatrix}$

(D) $\begin{bmatrix} 0 & 1 \\ -2 & -1 \end{bmatrix}$

148. A plant has the following transfer function :

$$G(s) = \frac{1}{s^2 + 0{\cdot}2s + 1}$$

For step input it is required that the response settles to within 2% of its final value. The plant settling time is

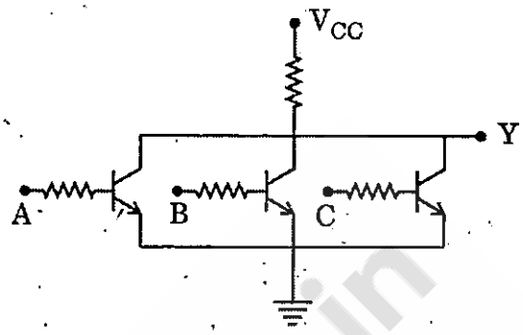
(A) 20 seconds

(B) 35 seconds

(C) 40 seconds

(D) 45 seconds

149. What function is being performed by the following Register Transistor Logic (RTL) circuit ?



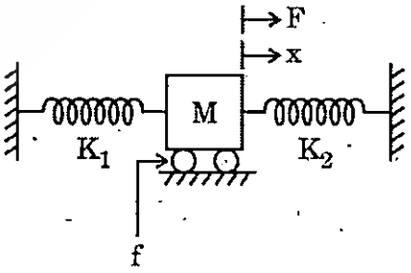
(A) $Y = A \cdot B \cdot C$

(B) $Y = (A + B + C)'$

(C) $Y = (ABC)'$

(D) $Y = A + B + C$

150. The transfer function for a spring-mass-damper system shown in the figure, with applied force F, mass M, spring constants K_1 and K_2 and friction coefficient f is



(A) $\frac{1}{Ms^2 + fs + K_1K_2}$

(B) $\frac{1}{Ms^2 + fs + K_1 + K_2}$

(C) $\frac{1}{Ms^2 + fs + \frac{K_1K_2}{K_1 + K_2}}$

(D) $\frac{K_2}{Ms^2 + fs + K_1}$

कच्चे काम के लिए जगह
SPACE FOR ROUGH WORK

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