



उम्मीदवार इस पुस्तिका के सबसे ऊपरी सील को खोलकर पृष्ठ संख्या 2 और 3 के मध्य स्थापित OMR उत्तर शीट को निकाल लें।
Candidates should open the top side of the seal of this Booklet and take out the OMR Answer Sheet placed at page no. 2 and 3.

पुस्तिका सं. :
Booklet No. :

परीक्षा पुस्तिका शृंखला : **A**
Test Booklet Series :

SA-EL

परीक्षा प्रश्न-पुस्तिका / EXAMINATION QUESTION BOOKLET

निर्धारित समय : 180 मिनट
Time Allowed : 180 Minutes

ELECTRONICS

अधिकतम अंक : 120
Maximum Marks : 120

रोल नं.
Roll No. :

उत्तर शीट सं. :
Answer Sheet No. :

प्रश्नों के उत्तर देने से पहले निम्नलिखित अनुदेशों को ध्यान से पढ़ लें। / Read the following instructions carefully before you begin to answer the questions.

उम्मीदवारों के लिए अनुदेश	Instructions to the Candidates
<p>1. प्रश्नों के उत्तर लिखना आरंभ करने से पहले आप इस पुस्तिका की जाँच करके सुनिश्चित कर लें कि इसमें पूरे पृष्ठ (1-20) हैं तथा कोई पृष्ठ या उसका भाग कम या दुबारा तो नहीं आ गया है। उम्मीदवारों को यह भी जाँच करनी है कि उनको केवल उस स्ट्रीम की सही परीक्षा-पुस्तिका मिली है जिसके लिए उन्होंने आवेदन किया है और जो उनके Admit Card में छपा है अर्थात् कंप्यूटर साइंस या सूचना प्रौद्योगिकी या इलेक्ट्रॉनिक्स। यदि आप इस पुस्तिका में कोई त्रुटि पाएँ, तो तत्काल इसके बदले दूसरी पुस्तिका ले।</p> <p>2. ओएमआर उत्तर-शीट प्रश्न पुस्तिका में ही उपलब्ध रहेगी। कृपया सुनिश्चित करें कि ओएमआर शीट संख्या और परीक्षण पुस्तिका संख्या समान हैं। ओएमआर शीट पर जानकारी भरने से पहले ओएमआर शीट पर छपे निर्देशों को ध्यान से पढ़ें। आपको ओएमआर उत्तर-पत्रक पर सभी विवरणों को सही ढंग से पूरा और कोड करना होगा, ऐसा न करने पर आपकी उत्तर पुस्तिका का मूल्यांकन नहीं किया जा सकता है। प्रश्नों का उत्तर देना शुरू करने से पहले आपको ओएमआर उत्तर-पत्रक पर दिये गए निर्धारित स्थान पर अपने हस्ताक्षर करने होंगे। इन निर्देशों का पूर्ण रूप से पालन किया जाना चाहिए, ऐसा न करने पर आपकी ओएमआर उत्तर-पुस्तिका का मूल्यांकन नहीं किया जा सकता है। (दृष्टिहीन उम्मीदवारों के लिए यह विवरण लेखक द्वारा भरे जायेंगे। फिर भी, सभी दृष्टिहीन उम्मीदवारों को ओएमआर उत्तर-शीट में निर्धारित स्थान पर अपने बाएँ हाथ के अंगूठे का निशान अवश्य लगाना चाहिए। इसके अतिरिक्त, जो दृष्टिहीन उम्मीदवार अपना हस्ताक्षर कर सकते हैं, वे अंगूठे के निशान के अलावा अपने हस्ताक्षर भी करें।)</p> <p>3. ओएमआर उत्तर-शीट तीन प्रतियों में होंगी (मूल तथा कार्बन की दो प्रतिलिपियाँ)। परीक्षा समाप्ति के बाद ओ.एम.आर. की मूल शीट तथा एक कार्बन प्रतिलिपि निरीक्षक को सौंपने के पश्चात् उम्मीदवार अपने साथ एक कार्बन प्रतिलिपि ले जा सकते/सकती हैं। यदि कोई भी उम्मीदवार ऐसा करने में असफल रहता/रहती है तो उसकी उम्मीदवारी रद्द कर दी जायेगी। यदि कोई उम्मीदवार अपनी कार्बन प्रतिलिपि में किसी भी प्रकार का फेर-बदल कर उसका दावा करता/ करती है तो इस स्थिति में भी उसका/उसकी उम्मीदवारी रद्द की जायेगी।</p> <p>4. इस प्रश्न-पुस्तिका में 120 बहुविकल्पीय प्रश्न हैं। प्रत्येक प्रश्न के 4 विकल्प दिए गए हैं, (A), (B), (C) और (D)। किसी भी स्थिति में प्रत्येक प्रश्न का केवल एक विकल्प ही सही उत्तर है। यदि आपको एक से अधिक विकल्प सही लगें तो सबसे अधिक उचित एक विकल्प का चुनाव करें और उत्तर शीट में सम्बंधित प्रश्न के सामने वाले उपयुक्त गोले को काला करें।</p> <p>5. प्रश्न पुस्तिका में दो भाग हैं : भाग A : सामान्य (42 प्रश्न) और भाग B : तकनीकी (78 प्रश्न)। उम्मीदवार को दोनों भागों के उत्तर लिखना अनिवार्य हैं।</p> <p>6. प्रत्येक सही उत्तर के लिए 1 अंक दिया जाएगा और प्रत्येक गलत उत्तर के लिए 0.25 अंक काट लिया जाएगा।</p> <p>7. गोले को काला करने के लिए केवल काले/नीले बॉल प्वाइंट पेन का प्रयोग करें। गोले को एक बार काला करने के बाद इसको मिटाने या बदलने की अनुमति नहीं है। यदि किसी प्रश्न के सामने एक से ज्यादा गोले काले किये गए हों तो मशीन द्वारा उसके लिए शून्य अंक दिया जाएगा।</p> <p>8. किसी भी स्थिति में उत्तर शीट को न मोड़ें।</p> <p>9. उत्तर-पुस्तिका पर कोई भी रफ कार्य नहीं करना है। रफ कार्य के लिए इस पुस्तिका में स्थान दिया गया है।</p> <p>10. परीक्षा हॉल/कमरों में मोबाइल फ़ोन तथा बेतार संचार साधन पूरी तरह निषिद्ध हैं। उम्मीदवारों को उनके अपने हित में सलाह दी जाती है कि मोबाइल फ़ोन/किसी अन्य बेतार संचार साधन को स्विच ऑफ करके भी अपने पास न रखें। इस प्रावधान का अनुपालन न करने को परीक्षा में अनुचित उपायों का प्रयोग माना जायेगा और उनके विरुद्ध कार्यवाही की जाएगी, जिसमें उनकी उम्मीदवारी रद्द करना भी शामिल है।</p> <p>11. अभ्यर्थी अपनी उत्तर पुस्तिका पर्यवेक्षक को सौंपे बिना और अपने रोल नंबर के सामने उचित स्थान पर उपस्थिति पत्रक पर हस्ताक्षर किए बिना परीक्षा हॉल/कक्ष से बाहर नहीं जा सकता। इसके अलावा अभ्यर्थी को उपस्थिति पत्रक पर हस्ताक्षर करने से पहले यह भी सुनिश्चित करना चाहिए कि बुकलेट नंबर, बुकलेट सीरीज और ओएमआर उत्तर पुस्तिका संख्या सही ढंग से लिखी गई हो। ऐसा ना करने पर, ओएमआर उत्तर पुस्तिका को अमान्य माना जाएगा/मूल्यांकन नहीं किया जा सकता है।</p>	<p>1. Before you start to answer the questions you must check this booklet and ensure that it contains all the pages (1-20) and see that no page or portion thereof is missing or repeated. Candidates are also required to check that they have got the right question booklet strictly from the stream candidate has applied for and printed on the Admit Card i.e. Computer Science OR Information Technology OR Electronics. If you find any defect in this Booklet, you must get it replaced immediately.</p> <p>2. OMR Answer-Sheet is within the Question Booklet. Please ensure OMR Answer-Sheet number and Test Booklet No. of Question Paper are same. Read the instructions printed on OMR Answer-Sheet carefully before filling the information on the OMR Answer-Sheet. You must complete and code all the details on the OMR answer sheet correctly failing which your answer sheet may not be evaluated. You must also put your signature on the OMR Answer-Sheet at the prescribed place before you actually start answering the questions. These instructions must be fully complied with, failing which, your OMR Answer-Sheet may not be evaluated. (For V.H. candidates these details will be filled in by the scribe. However, all V.H. candidates must put their left-hand thumb impression at the space provided in the OMR Answer-Sheet. In addition, those V.H. candidates who can sign should also put their signatures in addition to thumb impression.)</p> <p>3. The OMR Answer-Sheet will be in triplicate (Original and two carbon copies). Candidate has to take one carbon copy (marked as 'candidate copy') with him/her after examination and handover the original OMR along with one carbon copy to invigilator. If candidate fails to handover the original OMR along with one carbon copy to invigilator, his /her candidature will be cancelled. Further, if the candidate tampers with candidate OMR carbon copy and claims for same, in that case also his/her candidature will be cancelled.</p> <p>4. This booklet consists of 120 Multiple Choice Questions. Each question has 4 (four) alternatives (A), (B), (C) and (D). In any case only one alternative will be the correct answer. In case if you find more than one correct answer, then choose the most appropriate single option and darken the appropriate circle in the answer sheet in front of the related question.</p> <p>5. Question Booklet consists of two parts : Part A : Generic (having 42 questions) and Part B : Technical (having 78 questions). Candidates has to attempt both parts compulsorily.</p> <p>6. For each correct answer One mark will be given and for each incorrect answer 0.25 marks will be deducted.</p> <p>7. Use Black/Blue ball point Pen to darken the circle. Answer once darkened is not allowed to be erased or altered. Against any question if more than one circle is darkened, machine will allot zero mark for that question.</p> <p>8. Do not fold answer sheet in any case.</p> <p>9. No rough work is to be done on the Answer-Sheet. Space for rough work has been provided in this booklet.</p> <p>10. Mobile phones and wireless communication devices are completely banned in the examination hall/rooms. Candidates are advised not to keep mobile phones/any other wireless communication devices with them even switching it off, in their own interest. Failing to comply with this provision will be considered as using unfair means in the examination and action will be taken against them including cancellation of their candidature.</p> <p>11. Candidate should not leave the examination hall / room without handing over his/her Answer-Sheet to the invigilator and without signing on the attendance sheet at proper place against your roll number, further candidate should also ensure that booklet no., booklet series and OMR Answer-Sheet No. are correctly written on attendance sheet before signing on it, failing in doing so, may lead to disqualification / no evaluation of OMR Answer-Sheet.</p>

जब तक आपसे कहा न जाए तब तक प्रश्न-पुस्तिका न खोलें / DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

उम्मीदवार का नाम/Name of Candidate :

उम्मीदवार के हस्ताक्षर/Signature of Candidate :



PART - A
GENERIC

Direction (1-3) : Read the following information carefully and answer question number 1-3 given below :

In an engineering college, four students Diksha, Shreya, Tanvi and Akriti exhibit a very strange mix of hobbies and subject interests. One of them studies Computer Science and plays Golf and Lawn Tennis. Diksha and Shreya study Mechanical engineering. Diksha plays Billiards. Both the Mechanical Engineering students play chess. Tanvi is a student of Physics. The Physics student plays Chess and Badminton. All the friends play two games each and study one subject each. One of the students also does weight training.

1. How many games are played and subjects studied by all the four students ?
(A) 2, 1 (B) 3, 2
(C) 6, 3 (D) 5, 4

2. Who does not play Chess ?
(A) Diksha (B) Shreya
(C) Tanvi (D) Akriti

3. Who studies Mechanical Engineering and plays Billiards ?
(A) Diksha (B) Shreya
(C) Tanvi (D) Akriti

4. In a certain code language, '493' means 'Friendship Big Challenge', '961' means 'Struggle Big Exam' and '178' means 'Exam Confidential Subject'. What does 'Confidential' stand for ?
(A) 7 or 8 (B) 7 or 9
(C) 8 (D) 8 or 1

5. The day before the day before yesterday is three days after Saturday. What day is it today ?
(A) Tuesday (B) Wednesday
(C) Thursday (D) Friday

6. John's house is 100 m North of his uncle's office. His uncle's house is located 200 m West of his (uncle's) office. Kabir is the friend of John and he stays 100 m East of John's house. The office of Kabir is located 100 m South of his house. Then, how far is his uncle's house from Kabir's office ?
(A) 200 m (B) 300 m
(C) 400 m (D) 500 m

Direction (7-8) : What value should come in place of the question mark (?) in the series given below ?

7. BEAG, DGCI, FIEK, ?
(A) HMIE (B) HKGM
(C) HGKJ (D) HKLJ

8. 128, 61, Y, 64, 63, S, 32, 65, N, 16, 67, J, 8, 69, G, ?, ?, ? :
(A) 2, 70, J (B) 3, 70, E
(C) 4, 70, E (D) 4, 71, E

Direction (9-13) : Read the information given below and on the basis of the information, select the correct alternative for each question (9-13) given after the information.

A training college has to conduct a refresher course for teachers of seven different subjects - Mechanics, Psychology, Philosophy, Sociology, Economics, Science and Engineering from November 22 to November 29.

- (i) Course should start with Psychology.
 - (ii) November 23, being Sunday, should be a holiday.
 - (iii) Science subject should be on the previous day of the Engineering subject.
 - (iv) Course should end with Mechanics subject.
 - (v) Philosophy should be immediately after holiday.
 - (vi) There should be a gap of one day between Economics and Engineering.
 - (vii) There should be a gap of two days between Sociology and Economics.
9. How many days' gap is there between Science and Philosophy ?
- (A) 1 (B) 2
(C) 3 (D) No gap
10. Which subject precedes Mechanics ?
- (A) Psychology (B) Mechanics
(C) Economics (D) Sociology
11. Which subject will be on Tuesday ?
- (A) Psychology (B) Mechanics
(C) Economics (D) Sociology

12. The refresher course will start with which one of the following subjects ?
- (A) Psychology (B) Mechanics
(C) Economics (D) Sociology
13. Which subject succeeds Science ?
- (A) Psychology (B) Mechanics
(C) Engineering (D) Sociology

Direction (14-18) : Read the information given below and on the basis of the information, select the correct alternative for each question (14-18) given after the information.

There are six women, Shalini, Divya, Ritu, Rashmi, Nisha and Renu in a family of 12 members. There are few married couples in the family and none of the grand children are married. Sunil is married into the family. Rohan, Mahesh and Jatin have a nephew Dipesh who is the son of Rashmi. Ravi is the paternal grandfather of Nisha. Ritu is the daughter-in-law of Shalini. Renu is the first cousin of Dipesh. Shalini has only three grand children. Mahesh has two brothers and only one sister Rashmi and a sister-in-law Divya. Dipesh's only unmarried maternal uncle Jatin is the brother-in-law of Sunil. Rohan is the paternal uncle of Nisha. Ritu has two daughters one of whom is Nisha.

14. Rashmi is _____.
- (A) Mahesh's wife
(B) Renu's aunt
(C) Nisha's Mother
(D) None of these
15. How many married couples are there in the second generation ?
- (A) 1 (B) 2
(C) 3 (D) 4

16. Which of the following is true ?
 (A) Dipesh is Mahesh's son.
 (B) Ravi has only two married children.
 (C) Ravi is the paternal grandfather of Renu.
 (D) None of these.
17. Dipesh is _____.
 (A) Mahesh's son
 (B) Ravi's grand son
 (C) Rohan's son
 (D) Sunil's nephew
18. Which one of the following is a married couple ?
 (A) Rohan and Ritu
 (B) Shalini and Mahesh
 (C) Renu and Sunil
 (D) Mahesh and Ritu

Direction (19-21) : Read the information given below and on the basis of the information, select the correct alternative for each question (19-21) given after the information.

- (i) Eleven students A, B, C, D, E, F, G, H, I, J and K are sitting in a row of the class facing the teacher.
- (ii) D, who is to the immediate left to F, is second to the right of C.
- (iii) A, is the second to the right of E, who is at one of the ends.
- (iv) J is the immediate neighbor of A and B and third to the left of G.
- (v) H is to the immediate left of D and third to the right of I.
19. Who is sitting in the middle of the row ?
 (A) C (B) I
 (C) B (D) G

20. Which of the following statements is true in the context of the above sitting arrangement ?
 (A) There are three students sitting between D and G.
 (B) G and C are neighbors sitting to immediate right of H.
 (C) B is sitting between J and I.
 (D) K is sitting between A and G.
21. Which of the following groups of friends is sitting to the right of G ?
 (A) IBJA (B) ICHDF
 (C) CHDF (D) CHDE
22. Out of 13 applicants for a job there are 5 women and 8 men. Two persons are to be selected for the job. Find the probability that at least one of the selected persons will be a women.
 (A) $\frac{25}{39}$ (B) $\frac{10}{21}$
 (C) $\frac{14}{27}$ (D) $\frac{12}{51}$
23. How many eight letter words can be formed from the letters of the word "COURTESY" beginning with C and ending with Y ?
 (A) 120 (B) 256
 (C) 720 (D) 750
24. If the numerator of a fraction is increased by 2 and the denominator is decreased by 1, then it becomes $\frac{2}{3}$. If the numerator is increased by 1 and the denominator is increased by 2, then it becomes $\frac{1}{3}$. Find the fraction.
 (A) $\frac{2}{9}$ (B) $\frac{2}{7}$
 (C) $\frac{1}{6}$ (D) $\frac{1}{5}$

25. The untimely loss of life is a cause of serious global concern as thousands of people get killed _____ accidents every year while many other die _____ diseases like cardio vascular disease, cancer, etc.

- (A) in, of (B) from, of
(C) during, from (D) from, from

26. Find the wrong term in the series 5, 11, 29, 83, 245, 765, 2189, 6563 :

- (A) 245 (B) 765
(C) 2189 (D) 6563

27. The length, breadth and height of a cuboid are in the ratio 3 : 4 : 5 and its volume is 3840 cm^3 , The smallest side has a length of :

- (A) 12 cm (B) 20 cm
(C) 15 cm (D) 18 cm

28. An aeroplane at an altitude of 3000 m observes the angles of depression of opposite points on the two banks of a river to be 45° and 60° respectively. Find the width of the river in metre.

- (A) 4730 (B) 4430
(C) 4150 (D) 4650

29. Choose the most appropriate word from the options given below to complete the following sentence: He is _____ speaker, his discourses are always informative and inspirational.

- (A) an eloquent
(B) an amateur
(C) a novice
(D) an inarticulate

30. Find the missing number :

15		2
	80	
5		6

12		4
	54	
6		5

18		3
	?	
7		2

- (A) 46 (B) 15
(C) 55 (D) 32

31. Given below question has an idiomatic expression followed by four options. Choose the one closest to its meaning :

“To smell a rat”

- (A) science of plague epidemic
(B) bad smell
(C) suspect foul dealings
(D) to be in a bad mood

32. The LCM of two numbers is 45 times their HCF. One number is 125 and the sum of their HCF and LCM is 1150. Find the other number.

- (A) 275 (B) 215
(C) 230 (D) 225

33. In a company ABC Ltd. a certain number of engineers can develop a design in 40 days. If there were 5 more engineers, it could be finished in 10 days less. How many engineers were there in the beginning ?

- (A) 18 (B) 20
(C) 25 (D) 15

34. First bag contains 5 white and 4 black balls. Second bag contains 7 white and 9 black balls. A ball is transferred from the first bag to the second bag and then a ball is drawn from the second bag. Find the probability that the ball drawn is white.
- (A) $7/18$ (B) $5/9$
(C) $4/9$ (D) $11/18$
35. "The judge's standing in the legal community, though shaken by false allegations of wrongdoing, remained _____." The word that best fills the blank in the above sentence is :
- (A) undiminished (B) damaged
(C) illegal (D) uncertain
36. A certain sum of money amounts to ₹ 6600 in 4 years at a certain rate percent simple interest. If the rate of interest be increased by its 25%, the same sum would amount to ₹ 7000 during the same period. Find the sum.
- (A) ₹ 6000 (B) ₹ 5500
(C) ₹ 5000 (D) ₹ 7000
37. $\log(x+3) + \log(x+5) = \log 35$, solve for x :
- (A) 1 (B) 2
(C) 3 (D) 4
38. The length, breadth and height of a room are in the ratio of 3 : 2 : 1. If its volume be 1296 m^3 , find its breadth.
- (A) 12 m (B) 18 m
(C) 16 m (D) 24 m
39. Abha can do some work in 10 days, Billu can do it in 20 days and Chintu can do it in 40 days. They start working in turns with Abha starting to work on the first day followed by Billu on the second day and by Chintu on the third day and again by Abha on the fourth day and so on, till the work is completed fully. Find the time taken (approx.) to complete the work fully.
- (A) 16 days (B) 15 days
(C) 17 days (D) 20 days
40. Which of the following is true ?
- (A) $\log_{17} 275 = \log_{19} 375$
(B) $\log_{17} 275 > \log_{19} 375$
(C) $\log_{17} 275 < \log_{19} 375$
(D) None of these
- Direction (41-42) :** The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair.
41. QUISLING : BETRAY
- (A) appreciate : provoke
(B) inception : termination
(C) juggernaut : crush
(D) obstinate : preserve
42. INTIMATE : CLOSE
- (A) evanescent : permanency
(B) articulate : speech
(C) enclose : parentheses
(D) obsessed : attracted

PART - B
TECHNICAL

43. A lossless transmission line is terminated in a load which reflects a part of the incident power. If VSWR is 2, the reflection coefficient will be :

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

44. During read operation, the CPU fetches _____.

- (A) A program instruction
(B) Address
(C) Data
(D) All of the above

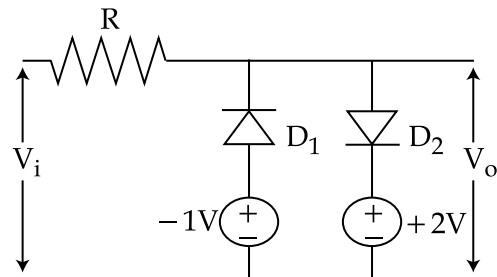
45. The various components in superheterodyne receiver is arranged as :

- (i) AM Detector
(ii) Mixer
(iii) RF Amplifier
(iv) AF Amplifier

The **correct** sequence is :

- (A) (iii), (ii), (i), (iv)
(B) (i), (ii), (iv), (iii)
(C) (iii), (ii), (iv), (i)
(D) (ii), (i), (iii), (iv)

46. Two silicon diodes with a forward voltage drop of 0.7 V, are used in the circuit shown below. The range of input voltage V_i for which the output voltage $V_o = V_i$ is :



- (A) $-0.3 \text{ V} < V_i < 1.3 \text{ V}$
(B) $-0.3 \text{ V} < V_i < 2 \text{ V}$
(C) $-1.0 \text{ V} < V_i < 2 \text{ V}$
(D) $-1.7 \text{ V} < V_i < 2.7 \text{ V}$

47. If the function $X (P, Q, R, S)$ and $Y (P, Q, R, S)$ are

$$X = R + P'Q + R'S \text{ and } Y = P'Q' R' S' + P Q R' S' + PQ'R'S'$$

(where ' represent complement). Which of the following is true ?

- (A) $X = Y$
(B) $X = Y'$
(C) no direct relation between X and Y
(D) insufficient data

48. What is the combined voltage across two series reactive components in a series RLC circuit at resonance ?

- (A) Same as applied voltage
(B) 0
(C) Half of applied voltage
(D) None of above

49. Which one of the following is the correct relation ? ($a > 0$)

- (A) $F(at) = aF(\omega/a)$
- (B) $F(at) = aF(a\omega)$
- (C) $F(t/a) = aF(\omega/a)$
- (D) $F(at) = (1/a)F(\omega/a)$

50. The solution of $U_x = 4U_y : U(0, y) = 8 e^{-3y}$ is :

- (A) $8 e^{-3(3x+4y)}$
- (B) $8 e^{-3(4x+y)}$
- (C) $8 e^{3(4x+y)}$
- (D) $8 e^{3(3x+4y)}$

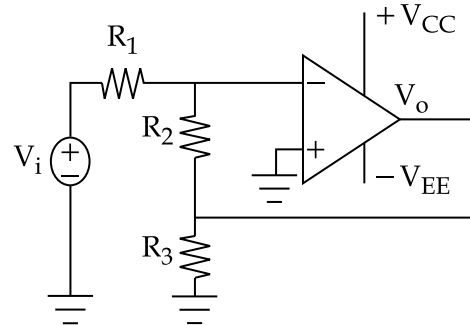
51. The TRAP in 8085 is equivalent to _____ in 8086.

- (A) RST 01 (B) RST 5
- (C) NMI (D) INTR

52. The number of roots in the left half of the s-plane for a system having characteristic equations : $s^3 + 5s^2 + 7s + 3 = 0$ is :

- (A) Zero (B) One
- (C) Two (D) Three

53. The voltage gain of the amplifier shown below is :

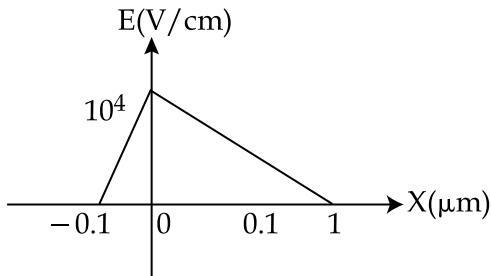


- (A) $-(R_2/R_1)$
- (B) $-(R_3/R_2)$
- (C) $-(R_2 \parallel R_3)/R_1$
- (D) $-(R_2 + R_3)/R_1$

54. Two channels, one with bit rate of 150 Mbps and another with bit rate of 300 Mbps, are to be multiplexed. The bit rate of link is :

- (A) 150 Mbps (B) 450 Mbps
- (C) 300 Mbps (D) 100 Mbps

55. The electric field profile in the depletion region of a PN junction in equilibrium is shown below. Which one of the following statement is TRUE ?



- (A) The left side of junction is P-type and the right side is N-type.
 (B) Both the N-type and P-type depletion regions are non-uniformly doped.
 (C) If the P-type has a doping concentration of 10^{10} cm^{-3} , then doping concentration in N-type region will be 10^{11} cm^{-3} .
 (D) None of the options

56. The Laplace transform of $x(t)$ is $\sqrt{\frac{2}{s-3}}$. Then Laplace transform of $e^{-6t}x(t)$ is :

- (A) $\sqrt{\frac{2}{s+3}}$ (B) $e^{-6s}\sqrt{\frac{2}{s-3}}$
 (C) $\sqrt{\frac{2}{s-3}}$ (D) $\frac{\sqrt{2}}{s+3}$

57. What does 8-bit term in 8-bit microprocessor denotes ?

- (A) Size of control bus
 (B) ALU
 (C) Address bus
 (D) Number of ports

58. Which of the following correctly states Gauss law ?

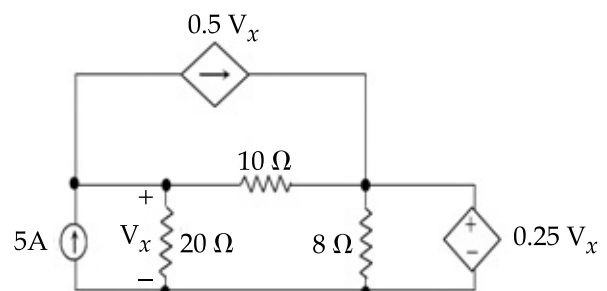
- (A) Electric flux is equal to charge
 (B) Electric flux per unit volume is equal to charge
 (C) Electric field is equal to charge density
 (D) Electric flux per unit volume is equal to volume charge density

59. The number of essential prime implicant for the logic expression :

$$F = ABC + CDA + BD + AC$$

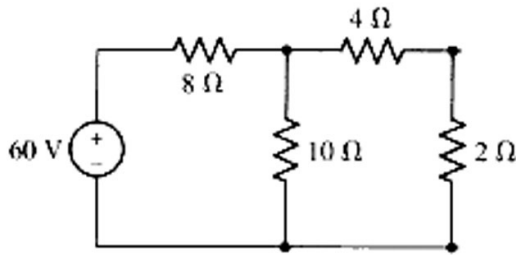
- (A) 2 (B) 4
 (C) 3 (D) 5

60. In the circuit shown below, the voltage V_x (in Volts) is :



- (A) 0 (B) 2
 (C) 8 (D) 1

61. The Thevenin voltage (in V) across 2Ω resistor in the circuit given below :



- (A) $100/3$ (B) $8/3$
 (C) 14 (D) 6

62. If $B \subset A$ then :

- (A) $P(A \cap \bar{B}) \leq P(A) - P(B)$
 (B) $P(A \cap \bar{B}) \geq P(A) - P(B)$
 (C) $P(A \cap \bar{B}) = P(A) - P(B)$
 (D) $P(A \cap \bar{B}) = P(A) - P(\bar{B})$

63. The maximum digital transmission rates for unipolar return-to-zero data transmissions over an optical fiber 10-km long with specified pulse-spreading constant of 10 ns/km is :

- (A) 5 Mbps (B) 10 Mbps
 (C) 20 Mbps (D) 25 Mbps

64. Let $I_1 = \int_0^1 \frac{\operatorname{cosec} x}{x} dx$ and

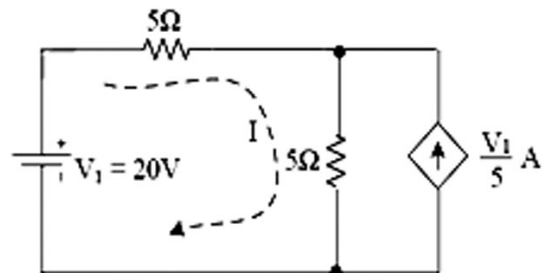
$$I_2 = \int_0^{\frac{\pi}{2}} \frac{\sin^m x}{x^n} dx \text{ then :}$$

- (A) I_1 converges & I_2 converges if $n \geq m + 1$
 (B) I_1 converges & I_2 converges if $n, m \in \mathbb{N}$
 (C) I_1 diverges & I_2 diverges if $n < m + 1$
 (D) I_1 diverges & I_2 converges if $n < m + 1$

65. Which method bypasses the CPU for certain types of data transfer operation ?

- (A) Software Interrupts
 (B) Interrupts driven IO
 (C) Polled IO
 (D) Direct Memory Access (DMA)

66. The dependent current source shown in the figure below :



- (A) Delivers 80 W
 (B) Absorbs 80 W
 (C) Delivers 40 W
 (D) Absorbs 40 W

67. The emitter resistance stabilizes the Q-point as it :
- (A) Makes Base Emitter voltage constant
 (B) Reduces Base Emitter voltage
 (C) Increases Base Emitter voltage
 (D) Increases Collector current

68. The Routh Array is as below :

$$\begin{array}{rcccc} S^6 & 1 & 8 & 20 & 16 \\ S^5 & 2 & 12 & 16 & \\ S^4 & 2 & 12 & 16 & \\ S^3 & 0 & 0 & & \end{array}$$

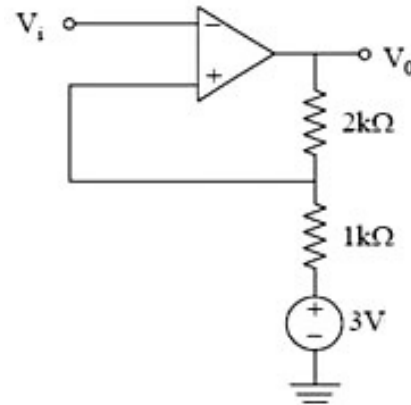
The row of zero of this array will be replaced by coefficients of

- (A) $S^4 + 12S^2 + 16$ (B) $S^3 + 3S$
 (C) $S^4 + 6S^2$ (D) $S^3 + 12S$
69. If $A = \begin{bmatrix} 1 & 3 \\ 0 & -1 \end{bmatrix}$, then trace of $5A^5 + 4A^4 + 3A^3 + 2A^2 + A + I_2$ is :
- (A) -16 (B) 14
 (C) -14 (D) 16

70. If a Two port Network "A" is cascaded with another two port Network B, then which of the following is true.
- (A) $[Z] = [Z_A] + [Z_B]$
 (B) $[Y] = [Y_A] \times [Y_B]$
 (C) $[T] = [T_A] \times [T_B]$
 (D) $[h] = [h_A] + [h_B]$

71. For a control system having fourteen poles and two zeros, the slope in its magnitude plot for high frequency asymptote will be :
- (A) -40 dB/decade
 (B) -240 dB/decade
 (C) -280 dB/decade
 (D) -320 dB/decade

72. Consider Op-Amp biasing voltage as $\pm 15V$. The threshold voltages for Schmitt trigger is :



- (A) -2V, 3V (B) 2V, 6V
 (C) 7V, -3V (D) -7V, -3V

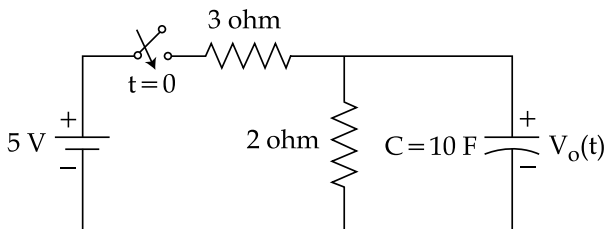
73. If $Z(u_n) = f(z)$, then $Z(a^{-n}u_n)$ (where Z denotes z-transform) equals to :
- (A) $f\left(\frac{z}{2a}\right)$ (B) $f(z)$
 (C) $f\left(\frac{z}{a}\right)$ (D) $f(az)$

74. The loop transfer function of a closed-loop control system is given as :

$$G(s)H(s) = \frac{k(s + 1)}{s(s + 2)(s + 3)}$$

The centroid of the asymptotes in root locus is :

- (A) $(-4, 0)$ (B) $(-1, 0)$
 (C) $(-2, 0)$ (D) $(-3, 0)$
75. In the circuit shown switch is closed at $t=0$. The time constant of the circuit is :



- (A) 12 sec (B) 1.2 sec
 (C) 10 sec (D) 6/7 sec
76. What is the difference between INX H and INR H ?
- (A) Both the instructions, Increment the content of H register
 (B) Increment the content of HL register pair and increment the content of only Register H respectively
 (C) It depends on the previous instruction executed
 (D) None of the above

77. The core refractive index and a relative refractive index difference of a multimode step-index fiber are specified as 1.5 and 2%, respectively. At operating wavelength of 1300 nm, the approximate number of propagating modes is 1000. The diameter of the fiber core is :

- (A) 10 μm (B) 31 μm
 (C) 62 μm (D) 150 μm

78. A continuous-time signal $x(t)$ is defined as :

$$x(t) = \begin{cases} 5 & -2 \leq t \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

The energy of signal $x(t)$ is :

- (A) 0 (B) 50
 (C) 100 (D) 20

79. No. of Flip flop required for designing synchronous counter having 5 states with counting sequence : $0 \Rightarrow 1 \Rightarrow 6 \Rightarrow 10 \Rightarrow 4$ will be :

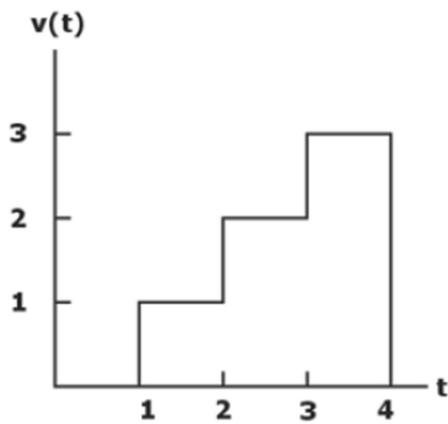
- (A) 9 (B) 5
 (C) 4 (D) 3

80. For input S_1 and output S_2 , the characteristics of μ -law companding is correctly expressed as :

- (A) $|S_2| = l_n (1 + |S_1|) / l_n(1 + \mu)$
 (B) $|S_2| = l_n (\mu |S_1|) / l_n(1 + \mu)$
 (C) $|S_2| = l_n (1 + \mu) / l_n(1 + \mu |S_1|)$
 (D) $|S_2| = l_n (1 + \mu |S_1|) / l_n(1 + \mu)$

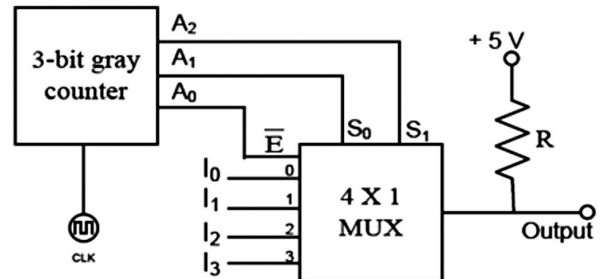
81. Amplitude limiter in FM receivers are used to :
- (A) Remove amplitude variations due to noise
 - (B) Filtration
 - (C) Demodulation
 - (D) Amplification

82. The equation for voltage waveform $v(t)$ shown below is (where $u(t)$ is unit step input) :



- (A) $u(t-1) + u(t-2) + u(t-3)$
 - (B) $u(t-1) + 2u(t-2) + 3u(t-3)$
 - (C) $u(t-1) - u(t-2) - u(t-3) + 3u(t-4)$
 - (D) $u(t-1) + u(t-2) + u(t-3) - 3u(t-4)$
83. If skin depth of a conductor with frequency f Hz is d , what will be the new skin depth if the frequency increased to $4f$:
- (A) $d/4$ (B) $2d$
 - (C) $d/2$ (D) $4d$

84. A 3-bit gray counter is used to control the output of the multiplexer as shown in the figure below. The initial state of the counter is 000. The output is pulled high when multiplexer is not enabled. The output of the circuit follows the sequence :



- (A) $I_0, 1, 1, I_1, I_3, 1, 1, I_2$
 - (B) $I_0, 1, I_1, 1, I_2, 1, I_3, 1$
 - (C) $1, I_0, 1, I_1, I_2, 1, I_3, 1$
 - (D) $I_0, I_1, I_2, I_3, I_0, I_1, I_2, I_3$
85. If A and B are mutually exclusive events and $P(A \cup B) \neq 0$ then $P(A/A \cup B)$ equals to :
- (A) $\frac{P(A)}{P(A) + P(B)}$
 - (B) $\frac{P(B)}{P(A) + P(B)}$
 - (C) $\frac{P(A)}{P(A) - P(B)}$
 - (D) $\frac{P(B)}{P(A) - P(B)}$

86. A load of $3 + j4\Omega$ is connected to a 1Ω lossless line. The magnitude of reflection coefficient at the load will be :
- (A) 0.058 (B) 0.79
(C) 0 (D) 1
87. The only function among the following that satisfies Cauchy's Riemann (C-R) equations is :
- (A) $f(z) = \text{Re}(z)$
(B) $f(z) = \text{Im}(z)$
(C) $f(z) = \bar{z}$
(D) $f(z) = \sin z$
88. _____ is a multilevel modulation in which four phase shift are used for representing four different symbols.
- (A) QPSK (B) BFSK
(C) BPSK (D) 8-PSK
89. The rate of convergence of Newton-Raphson method is :
- (A) 1 (B) 2
(C) 1.1618 (D) 3
90. The number of hardware interrupts present in 8085 microprocessor is :
- (A) 10 (B) 5
(C) 16 (D) 4
91. The following instructions were executed on 8085 microprocessor :
- MVI A, 33H

MVI B, 78H

ADD B

CMA
- The Accumulator value after the execution of the fourth instruction is
- (A) 10 H (B) CCH
(C) 54 H (D) 32H
92. Which instruction is the example of immediate addressing mode ?
- (A) MOV A, #25H
(B) MOV A, R0
(C) MOV R3, A
(D) MOV R0, 40H
93. The value of the integral $\int_{-1}^1 \int_0^{\sqrt{1-x^2}} (x^2 + y^2)^{\frac{3}{2}} dy dx$ is :
- (A) π (B) $\pi/3$
(C) $\pi/5$ (D) $\pi/7$

94. The partial differential equation obtained by eliminating ϕ from :

$$\phi(x + y + z, x^2 + y^2 - z^2) = 0 \text{ is :}$$

- (A) $(y + z)p - (x + z)q = x - y$
- (B) $(y + z)p + (x + z)q = x - y$
- (C) $(y + z)p - (x + z)q = x + y$
- (D) $(y + z)p + (x + z)q = x + y$

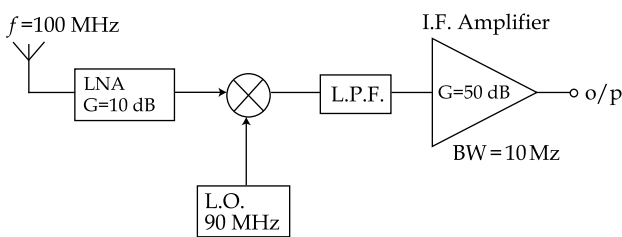
95. In differential encoding the _____ difference between two waveforms is measured.

- (A) Magnitude (B) Frequency
- (C) Phase (D) Time period

96. If the number bits per sample in a PCM system is increased from 16 to 17, the improvement in signal to quantization noise ratio will be :

- (A) 3 dB (B) 6 dB
- (C) 2 dB (D) 1 dB

97. What is the bandwidth of the receiver ?



- (A) 190 MHz (B) 100 MHz
- (C) 90 MHz (D) 10 MHz

98. A superheterodyne receiver is designed to receive signals with carrier frequencies between 4 and 6 MHz with transmitted bandwidths of 100 kHz each. It's IF frequency is 850 kHz. What range of local oscillator frequencies is required using high-side injection ?

- (A) $f_{LO} \geq 10.85 \text{ MHz}$
- (B) $f_{LO} \leq 4.85 \text{ MHz}$
- (C) $4.85 \text{ MHz} \leq f_{LO} \leq 6.85 \text{ MHz}$
- (D) $f_{LO} \geq 6.85 \text{ MHz}$

99. The resolution of a 9 bit-D/A converter which give a maximum output of 5.12 V is :

- (A) 10 mV (B) 20 mV
- (C) 15 mV (D) 25 mV

100. Which one is true for LHLD instruction ?

- (A) Two Byte Instruction
- (B) Three Byte Instruction
- (C) One Byte Instruction
- (D) Four Byte Instruction

101. A unity feedback system is characterized by the open-loop transfer function

$$G(s) = \frac{100}{s(5s + 10)(2s + 10)}$$

The steady-state errors for unit-step and unit-ramp inputs are :

- (A) 1, 1 (B) 0, 0
 (C) 0, 1 (D) 1, ∞

102. The address bus in 8086 microprocessor is _____ bit wide.

- (A) 10 (B) 12
 (C) 16 (D) 20

103. Which of the following statements on DRAM are **correct** ?

- (i) Page mode read operation is faster than RAS read.
 (ii) RAS input remains active during column address strobe.
 (iii) The row and column addresses are strobed into the internal buffers using RAS and CAS inputs respectively.
- (A) (i) & (iii)
 (B) (i) & (ii)
 (C) Only (iii)
 (D) All of the above

104. Which one of the following systems described by the following input-output relations is time invariant ?

- (A) $Y[n] = nx[n]$
 (B) $Y[n] = x[n] - x[n - 1]$
 (C) $Y[n] = x[-n]$
 (D) $Y[n] = x[n]\cos(2\pi f_0 n)$

105. _____ number of 3-dB couplers are needed for a 64×64 bi-directional star coupler.

- (A) 128 (B) 192
 (C) 648 (D) 4096

106. The minimum number of 2-input NAND gate required to implement Boolean function $F(A, B, C) = AB' + BC + AC$ is (assuming only normal inputs are available) :

- (A) 6 (B) 4
 (C) 3 (D) 5

107. Conductivity of an extrinsic semiconductor is considerably influenced by :

- (A) Majority charge carriers originated from doping
 (B) Minority charge carriers originated from thermal agitation
 (C) Majority charge carriers originated from thermal agitation
 (D) Minority charge carriers originated from doping

108. The dopants are introduced in the active areas of silicon by using which process ?

- (A) Metallization
- (B) Ion Implantation
- (C) Chemical Vapour Deposition
- (D) None of the above

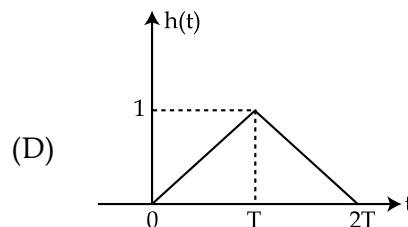
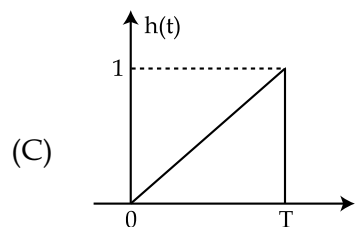
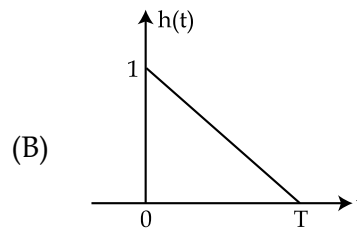
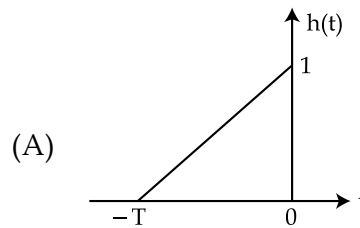
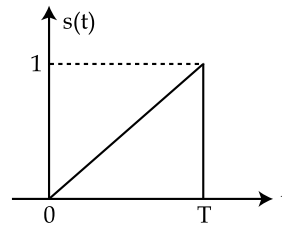
109. Compared to Photo lithography, Electron beam lithography results in :

- (A) Higher resolution
- (B) Lower resolution
- (C) Same resolution
- (D) None of the above

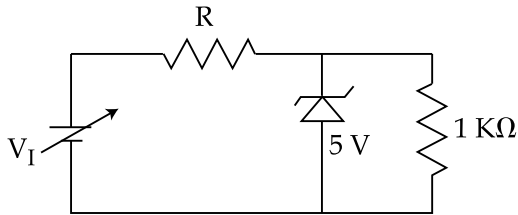
110. What is the XCHG command does in 8085 ?

- (A) Exchange the content of HL register pair with DE register pair
- (B) Exchange the nibbles of the content of HL register pair with DE register pair
- (C) Exchange the content of HL register pair with the content of BC register pair
- (D) None

111. The impulse response $h(t)$ of the filter matched to the input pulse $s(t)$ is :

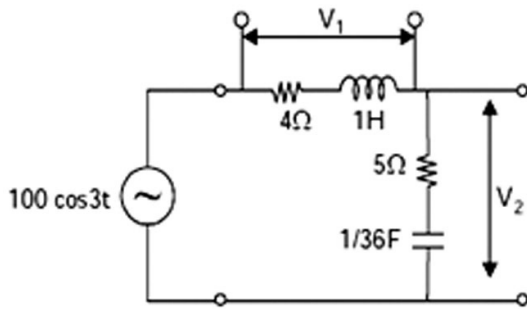


112. Assume that the Zener diode has a constant reverse break down voltage for a current range starting from a minimum required Zener current $I_{Z\min} = 2 \text{ mA}$ to its maximum allowable current. The input voltage V_I varies from 7 V to 30 V. The value of R will be :



- (A) 186Ω (B) 100Ω
 (C) 285Ω (D) 1000Ω

113. The ratio of amplitude of V_2/V_1 for circuit shown below is :

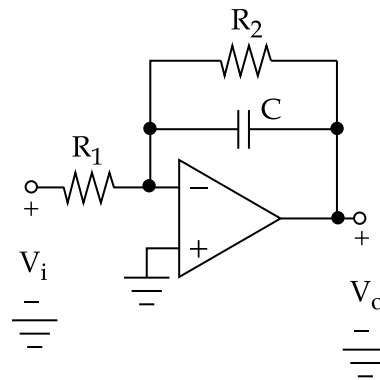


- (A) 10 (B) 1.6
 (C) 2.6 (D) 1.25

114. A rectangular waveguide has dimensions $1 \text{ cm} \times 0.5 \text{ cm}$. Its cut off frequency is :

- (A) 10 GHz (B) 15 GHz
 (C) 5 GHz (D) 2.5 GHz

115. The gain and cut-off frequency (in radian/sec) for the circuit shown below are :



- (A) $-R_2/R_1, 1/CR_2$
 (B) $-R_1/R_2, 1/CR_1$
 (C) $(1 + R_2/R_1), 1/CR_2$
 (D) $(1 + R_2/R_1), 1/CR_1$

116. Consider a cube having the dimension $x, y, z \in [1, 3]$. If a $\vec{B} = 2x^2y\hat{a}_x + 3x^2y^2\hat{a}_y$. Divergence of \vec{B} at the centre of cube is :

- (A) 60 (B) 48
(C) 72 (D) 64

117. The condition that holds good in a distortion-less transmission line is :

- (A) $R/L = G/C$ (B) $RL = GC$
(C) $L/R^2 = C/G^2$ (D) RG/LC

118. In the instruction of 8086, ASSUME CS : CODE, DS : DATA, SS : STACK the ASSUME directive directs to the assembler the _____.

- (A) Name of the stack, code and data segments
(B) Pointer address of the stack segment
(C) Name of the stack segment
(D) Address of the stack segment

119. The remaining address line of _____ bus is decoded to generated chip select signal :

- (A) Data
(B) Address
(C) Control
(D) Both (A) and (B)

120. For Astable-IC555 based multivibrator, $T_{OFF} = 0.69CR_2$. Between which pins of IC 555, R_2 is connected :

- (A) 2,7 (B) 5,1
(C) 4,7 (D) 3,0

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SPACE FOR ROUGH WORK