

**PAPER-III**  
**ELECTRONIC SCIENCE**

**Signature and Name of Invigilator**

1. (Signature) \_\_\_\_\_  
(Name) \_\_\_\_\_
2. (Signature) \_\_\_\_\_  
(Name) \_\_\_\_\_

- OMR Sheet No. : .....  
(To be filled by the Candidate)
- Roll No. 

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(In figures as per admission card)
- Roll No. \_\_\_\_\_  
(In words)

**J 8 8 1 2**

Time : 2 1/2 hours]

[Maximum Marks : 150

Number of Pages in this Booklet : 12

Number of Questions in this Booklet : 75

**Instructions for the Candidates**

- Write your roll number in the space provided on the top of this page.
- This paper consists of seventy five multiple-choice type of questions.
- At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
  - To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
  - Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.**
  - After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
- Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.  
**Example :** (A) (B) (C) (D)  
where (C) is the correct response.
- Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only**. If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
- Read instructions given inside carefully.
- Rough Work is to be done in the end of this booklet.
- If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
- You have to return the test question booklet and Original OMR Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry duplicate copy of OMR Sheet on conclusion of examination.
- Use only **Blue/Black Ball point pen**.
- Use of any calculator or log table etc., is prohibited.
- There is no negative marks for incorrect answers.

**परीक्षार्थियों के लिए निर्देश**

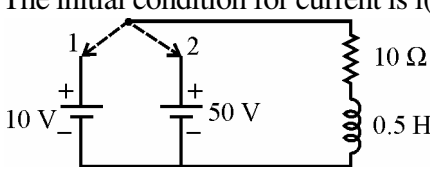
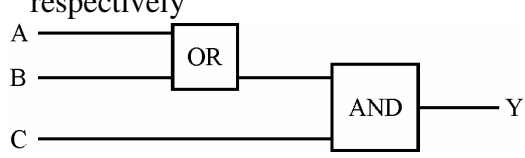
- पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
- इस प्रश्न-पत्र में पचहत्तर बहुविकल्पीय प्रश्न हैं ।
- परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी । पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
  - प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी कागज की सील को फाड़ लें । खुली हुई या बिना स्टीकर-सील की पुस्तिका स्वीकार न करें ।
  - कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चेक कर लें कि ये पूरे हैं । दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें । इसके लिए आपको पाँच मिनट दिये जायेंगे । उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा ।**
  - इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
- प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।  
**उदाहरण :** (A) (B) (C) (D)  
जबकि (C) सही उत्तर है ।
- प्रश्नों के उत्तर केवल प्रश्न पुस्तिका के अन्दर दिये गये OMR पत्रक पर ही अंकित करने हैं । यदि आप OMR पत्रक पर दिये गये वृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नांकित करते हैं, तो उसका मूल्यांकन नहीं होगा ।
- अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
- कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
- यदि आप OMR पत्रक पर नियत स्थान के अलावा अपना नाम, रोल नम्बर, फोन नम्बर या कोई भी ऐसा चिह्न जिससे आपकी पहचान हो सके, अंकित करते हैं अथवा अभद्र भाषा का प्रयोग करते हैं, या कोई अन्य अनुचित साधन का प्रयोग करते हैं, तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
- आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालांकि आप परीक्षा समाप्ति पर OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
- केवल नीले/काले बाल प्वाइंट पेन का ही इस्तेमाल करें ।
- किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।
- गलत उत्तरों के लिए कोई अंक काटे नहीं जाएँगे ।

## ELECTRONIC SCIENCE

### Paper – III

**Note :** This paper contains **seventy five (75)** objective type questions of **two (2)** marks each.

All questions are compulsory.

1. What is the resistivity of intrinsic Germanium at 300 °K, given that its carrier concentration is  $2.5 \times 10^{13} \text{ cm}^{-3}$  and electron and hole mobility is  $3,800 \text{ cm}^2/\text{v-s}$  and  $1,800 \text{ cm}^2/\text{v-s}$  respectively ?  
 (A)  $0.446 \Omega\text{-cm}$  (B)  $44.6 \Omega\text{-cm}$   
 (C)  $0.022 \Omega\text{-cm}$  (D)  $22.2 \Omega\text{-cm}$
2. Volt-ampere equation for a p-n diode is given by  
 (A)  $I = I_o (e^{V_T/\eta V} - 1)$   
 (B)  $I = I_o (e^{\eta V/V_T} - 1)$   
 (C)  $I = I_o (e^{V/\eta V_T} - 1)$   
 (D)  $I = I_o (e^{\eta V_T/V} - 1)$
3. Consider an n-channel depletion mode MOSFET having following parameters :  $V_{TN} = -2.5 \text{ V}$  and  $K_n = 1.1 \text{ mA/V}^2$   
 If  $V_{GS} = 0 \text{ V}$  and  $V_{DS} = 0.5 \text{ V}$ , then current  $I_D$ , is  
 (A)  $9.96 \text{ mA}$  (B)  $6.43 \text{ mA}$   
 (C)  $2.48 \text{ mA}$  (D)  $5.56 \text{ mA}$
4. The tie-set schedule gives relation between  
 (A) branch currents and link currents  
 (B) branch voltages and link currents  
 (C) branch currents and link voltages  
 (D) branch voltages and link voltages
5. The switch is in position 1 for long time. It is changed to position 2 at  $t = 0$ . The initial condition for current is  $i(0^-) =$   

 (A)  $0 \text{ A}$  (B)  $1 \text{ A}$   
 (C)  $5 \text{ A}$  (D)  $25 \text{ A}$
6. The final value of  $2S + 1 / S^4 + 8S^3 + 16S^2 + S$  is  
 (A) 0 (B)  $\infty$   
 (C) 1 (D) 2
7. If differential amplifier has a differential gain of 20,000. CMRR = 80 dB, then common mode gain is  
 (A) 2 (B) 1  
 (C)  $\frac{1}{2}$  (D) 0
8. For proper operation of integrators, its RC time constant and period T of the wave should be such that  
 (A)  $T \gg RC$  (B)  $T \ll RC$   
 (C)  $T = RC$  (D)  $T = 2 \ln RC$
9. The phase shift introduced by feed network or amplifier in Wein bridge oscillator is  
 (A)  $0^\circ$  (B)  $90^\circ$   
 (C)  $180^\circ$  (D)  $270^\circ$
10. For a certain logic family if  $V_{OL} = 0.5 \text{ V}$ ,  $V_{IL} = 1.2 \text{ V}$  and  $V_{OH} = 3.5 \text{ V}$ ,  $V_{IH} = 2.8 \text{ V}$ , then the noise margin is  
 (A) 3 V (B) 1.7 V  
 (C) 1.3 V (D) 0.7 V
11. To get an output  $Y = 1$  from the circuit shown, the input A, B and C must be respectively  

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

12. Number of flip-flops needed to construct a shift register capable of storing decimal numbers upto 32 are  
 (A) 6 (B) 4  
 (C) 5 (D) 2
13. In the mode word format of 8251 during initialization,  $D_6$  and  $D_7$  bits as 0 and 1 signify  
 (A) 16 X Baud Rate  
 (B) Character length as 7 bits  
 (C) Parity enable and even parity  
 (D) No. of stop bits as  $1\frac{1}{2}$
14. The control word of '0B5H' of 8253 indicates that the following counter is selected  
 (A) Counter 0 (B) Counter 1  
 (C) Counter 2 (D) Counter 3
15. In 8051, Pin 30 (ALE /  $\overline{\text{PROG}}$ ), if this bit is set as logic zero ('0'), it signifies  
 (A) Address is latched  
 (B) For enabling internal ROM of programming  
 (C) For disabling internal ROM programming  
 (D) Both (A) and (C)
16. The expression  $a = 7/22 * (3.14 + 2) * 3/5$  evaluates to  
 (A) 8.28 (B) 6.28  
 (C) 3.14 (D) 0
17. Which escape sequence takes the cursor to the beginning of the current line ?  
 (A) \n (B) \r  
 (C) \a (D) \t

18. If  $x = 1234$  is printed with `printf("%d",-6x)`; the output will be  
 (A) 

1	2	3	4		
---	---	---	---	--	--

  
 (B) 

		1	2	3	4
--	--	---	---	---	---

  
 (C) 

1	2	3	4
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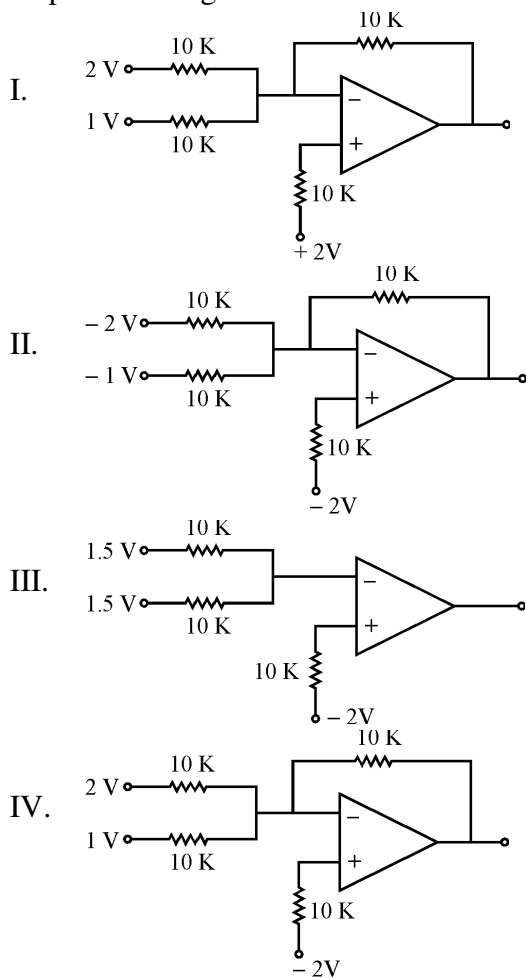
  
 (D) 

1	2			3	4
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19. Given  $\vec{E} = E_m \sin(\omega t - \beta z) \hat{a}_y$  in free space then  $\vec{B}$  will be given in free space as  
 (A)  $-\frac{E_m \beta}{\omega} \sin(\omega t - \beta z) \hat{a}_z$   
 (B)  $+\frac{E_m \beta}{\omega} \cos(\omega t - \beta z) \hat{a}_x$   
 (C)  $\frac{E_m \beta}{\omega} \sin(\omega t - \beta z) \hat{a}_y$   
 (D)  $-\frac{E_m \beta}{\omega} \sin(\omega t - \beta z) \hat{a}_x$
20. The depth of penetration of a wave in a lossy dielectric increases with increasing  
 (A) Conductivity (B) Permeability  
 (C) Wavelength (D) Permittivity
21. A very lossy,  $\frac{\lambda}{4}$  long, 50 ohm transmission line is open circuited at the load end. The input impedance measured at the other end of the line is approximately  
 (A) 0 (B) 50 ohm  
 (C)  $\infty$  (D) 200 ohm

22. In the spectrum of frequency modulated wave
- (A) The carrier frequency disappears when the modulation index is large.
  - (B) The amplitude of any side band depends on the modulation index.
  - (C) The total number of side bands depends on the modulation index.
  - (D) The carrier frequency cannot disappear.
23. Indicate which one of the following is not an advantage of FM over AM :
- (A) Better noise immunity is provided
  - (B) Lower bandwidth is required
  - (C) The transmitted power is more useful
  - (D) Less modulating power is required
24. Indicate the noise source which belongs to category a different from that of the other three.
- (A) Solar noise
  - (B) Cosmic noise
  - (C) Atmospheric noise
  - (D) Galactic noise
25. The intrinsic stand-off ratio for a UJT is 0.6. If the inter-base resistance is  $10\text{ k}\Omega$ , the values of  $R_{B_1}$  and  $R_{B_2}$  are
- (A)  $6\text{ k}\Omega$  and  $4\text{ k}\Omega$
  - (B)  $4\text{ k}\Omega$  and  $6\text{ k}\Omega$
  - (C)  $5\text{ k}\Omega$  and  $5\text{ k}\Omega$
  - (D)  $10\text{ k}\Omega$  and  $10\text{ k}\Omega$
26. An SCR full wave rectifier supplies to a load of  $100\ \Omega$ , the peak a.c. voltage between centre tap and one end of the secondary coil is 200 volts. The d.c. value of output voltage is given by....., when firing angle is  $60^\circ$ .
- (A)  $100\text{ V}$
  - (B)  $95.5\text{ V}$
  - (C)  $\frac{200}{\sqrt{2}}\text{ V}$
  - (D)  $200\sqrt{2}\text{ V}$
27. Dispersion shifted wavelength in optical fiber is
- (A)  $800\text{ nm}$
  - (B)  $1300\text{ nm}$
  - (C)  $1550\text{ nm}$
  - (D)  $400\text{ nm}$
28. The problem, with PI controller is its response to transients, is
- (A) very fast
  - (B) having a dead zone
  - (C) non-linear
  - (D) sluggish
29. Which is the most linear temperature transducer ?
- (A) Thermocouple
  - (B) RTD
  - (C) IC-sensor
  - (D) Thermistor
30. The variations in the ambient temperature effect the following parameters :
- (A) Sensitivity
  - (B) Accuracy
  - (C) Stability
  - (D) Above all
31. Consider the following statements regarding a semiconductor :
- I. Acceptor level lies close to valence band.
  - II. Donor level lies close to valence band.
  - III. n-type semiconductor behaves as a conductor at  $0^\circ\text{K}$ .
  - IV. p-type semiconductor behaves as an insulator at  $0^\circ\text{K}$ .
- (A) I and II are correct.
  - (B) I and III are correct.
  - (C) II and III are correct.
  - (D) I and IV are correct.

32. A network is said to be linear if and only if
- Response is proportional to excitation function
  - Principle of superposition applies
  - Principle of homogeneity applies
  - It is reciprocal
- (A) Options I and II are correct.  
 (B) Options II and III are correct.  
 (C) Options III and IV are correct.  
 (D) Options I and IV are correct.

33. The output voltage  $V_o$ , in which amplifier configurations is  $-5V$



- (A) Options I and II are correct.  
 (B) Options II and III are correct.  
 (C) Options III and IV are correct.  
 (D) Options IV and I are correct.

34. Which of the following statements are correct ?
- A flip – flop is used to store 1-bit of information
  - Race-around condition occurs in a J-K flip – flop when both inputs are I.
  - A transparent latch consists of a D-type flip – flop
- (A) I and II are correct.  
 (B) I and III are correct.  
 (C) I, II and III are correct.  
 (D) I, II and III are not correct.

35. To access data from external memory by 8085
- Data lines are directly connected
  - $\overline{RD}$  is connected  $\overline{OE}$
  - $\overline{CS}$  is grounded
  - MOV A, M instruction should be employed
- (A) I, II and III are necessary.  
 (B) I, III and IV are necessary.  
 (C) II, III and IV are necessary.  
 (D) I, II, III and IV are necessary.

36. Which of the following statements will store value 3 in the variable a ?
- $a = 15 \% 4;$
  - $\text{int } a = (3 * 4) / (1 + 3);$
  - $\text{int } a = 3;$
  - $\text{int } a = 6.0/2;$
- (A) Options I, II and III are correct.  
 (B) Options II, III and IV are correct.  
 (C) Options I and III are correct.  
 (D) Options II and IV are correct.

37. In a rectangular metallic waveguide
- I. Guided wavelength is never less than the free space wavelength
  - II. TEM mode is possible if the dimensions are properly chosen
  - III.  $v_p \times v_g = C^2$
  - IV. waves travel along all the four walls of the waveguide
- (A) Options I and III are correct.  
 (B) Options III and IV are correct.  
 (C) Options II and III are correct.  
 (D) Options I and IV are correct.
38. Indicate the false statement in the case of Armstrong modulation system.
- I. The system is basically phase and frequency modulation.
  - II. The system is also amplitude modulation.
  - III. Frequency multiplication must be used.
  - IV. Equalization is unnecessary.
- (A) I and II are correct.  
 (B) I, II and III are correct.  
 (C) I and III are correct.  
 (D) III and IV are correct.
39. DIAC is a
- I. 2 terminal unidirectional switch
  - II. 2 terminal bi-directional switch
  - III. 3 layers and no gate device
  - IV. 4 layers and no gate device
- (A) Options II and III are correct.  
 (B) Options II and IV are correct.  
 (C) Options I and III are correct.  
 (D) Options I and IV are correct.

40. In a DVM, the accuracy of the measurement depends on
- I. No. of A/D conversions in a second.
  - II. The resolution of A/D converter.
  - III. A statistical processing of samples and a huge memory.
  - IV. Speed of the processor should be high.
- (A) I, II and III are to be fulfilled  
 (B) II, III and IV are to be fulfilled  
 (C) I, III and IV are to be fulfilled  
 (D) I, II and IV are to be fulfilled

Assertion-Reason type questions :

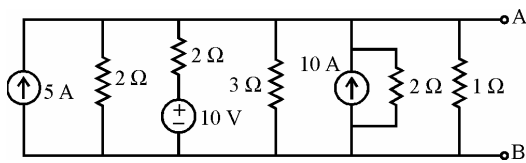
Q. 41 to 50 :

The following items consist of two statements, one labelled the 'Assertion (A)' and the other labelled the 'Reason (R)'. You are to examine these two statements and decide if the Assertion (A) and the Reason (R) are individually true and if so, whether the Reason is a correct explanation of the Assertion. Select your answers to these items using the codes given below and mark your answer sheet accordingly.

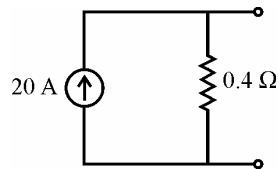
**Codes :**

- (A) Both (A) and (R) are true and (R) is the correct explanation of (A).  
 (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).  
 (C) (A) is true and (R) is false.  
 (D) (A) is false and (R) is true.
41. **Assertion (A) :** A BJT is said to be operating in a saturation region if both the junctions are forward biased.  
**Reason (R) :** In saturation region collector doping concentration is reduced.

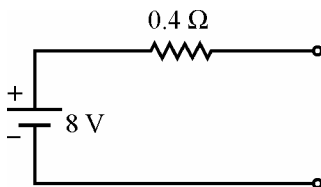
42. **Assertion (A)** : The Norton's equivalent of the circuit is



Norton's equivalent



- Reason (R)** : The Thevenin's equivalent is



43. **Assertion (A)** : Schmitt trigger employs positive feedback and has hysteresis property that helps to compare two voltage levels.

**Reason (R)** : In some logic circuits rise and fall time play important role in switching. Schmitt trigger improves the rise and fall time.

44. **Assertion (A)** : The fan out of a CMOS gate is poor.

**Reason (R)** : The current driving capability of CMOS is poor.

45. **Assertion (A)** : In 8085 processor, lower byte of address bus and data bus are multiplexed. A latch is required to separate address lines and data lines.

**Reason (R)** : Multiplexing makes processor slow speed and compact.

46. **Assertion (A)** : Relational operators cannot be used to evaluate whether a condition evaluates to true (T) or false (F).

**Reason (R)** : Use of '=' as relational operator will form a syntax error.

47. **Assertion (A)** : Radiation resistance of an antenna is equal to the value of hypothetical resistance, that dissipates an equal amount of power, when a current is applied to the antenna.

**Reason (R)** : Radiation resistance of a short Hertzian dipole is given by  $R_r = 40 \pi^2 \left(\frac{d}{\lambda}\right)^2$  ohms.

48. **Assertion (A)** : Radio and Television receivers are generally of superheterodyne type.

**Reason (R)** : Wireless communication is possible by receiving signals through superheterodyne receivers.

49. **Assertion (A)** : The LED is a light emitting diode, that gives out spontaneous emissions, when it is energized.

**Reason (R)** : The recombination of holes and electrons in semiconductor materials gives off energy in terms of light and heat.

50. **Assertion (A)** : Power is integration of energy over a period of time.

**Reason (R)** : The accuracy of power measurement is dependent on integration time constant.

51. Arrange the following in the increasing order of their forbidden energy gap :

- I. Conductors
- II. Insulators
- III. Germanium
- IV. Silicon

- (A) I, II, III, IV    (B) I, II, IV, III  
(C) I, III, IV, II    (D) I, IV, III, II

52. The correct order in which time domain response is obtained for a network
- I. Laplace transform
  - II. Differential equation
  - III. Time domain response
  - IV. Network
- (A) I, II, III, IV  
 (B) II, III, IV, I  
 (C) III, IV, II, I  
 (D) IV, II, I, III
53. The correct start to end sections of a regulator circuit are
- I. Filtering
  - II. Protection
  - III. Rectification
  - IV. Regulation
- (A) II, I, III, IV  
 (B) III, II, IV, I  
 (C) I, III, IV, II  
 (D) IV, II, I, III
54. Arrange the following logic families in the decreasing order of their propagation delay :
- I. CMOS
  - II. TTL
  - III. ECL
  - IV. DTL
- (A) II, III, IV, I  
 (B) IV, II, III, I  
 (C) III, I, II, IV  
 (D) I, IV, II, III
55. The interrupts in 8085 processor are
- I. RST 6.5
  - II. RST 5.5
  - III. TRAP
  - IV. RST 0
- Keep the sequence from least priority to highest priority.
- (A) III, I, II, IV  
 (B) IV, I, II, III  
 (C) IV, II, I, III  
 (D) III, IV, II, I

56. The correct sequence to write a loop statement is formed
- I. body
  - II. main( )
  - III. test condition
  - IV. initialization
- (A) I, IV, II, III  
 (B) IV, III, I, II  
 (C) III, II, IV, I  
 (D) II, IV, III, I
57. The following frequency bands are used in microwaves :
- I. Ku band
  - II. Ka band
  - III. L band
  - IV. C band
- The correct sequence in decreasing frequency is by :
- (A) II, III, IV, I  
 (B) I, II, III, IV  
 (C) II, I, III, IV  
 (D) II, I, IV, III
58. Consider the following communication systems :
- I. Microwave communication system
  - II. Optical communication system
  - III. AM Broadcast system
  - IV. FM Broadcast system
- The correct sequence of these systems from the point of view of increasing order of bandwidth is
- (A) II, I, IV, III  
 (B) I, II, III, IV  
 (C) III, IV, II, I  
 (D) IV, III, I, II



59. The following are the fibers used in optical communication systems :

- I. Plastic fibers
- II. Plastic clad glass fibers
- III. Glass fibers operating at 1330 nm
- IV. Glass fibers operating at 1550 nm

The correct sequence of attenuation of the above fibers in increasing order are :

- (A) I, II, III, IV
- (B) IV, III, II, I
- (C) II, I, IV, III
- (D) IV, II, I, III

60. Arrange the steps given below in correct order :

- I. Network function
- II. Change of sign
- III. Stability
- IV. Routh array

The order in which the stability is evaluated using Routh criterion :

- (A) I, III, II, IV
- (B) I, IV, II, III
- (C) IV, I, III, II
- (D) III, II, I, IV

61. Match the given list of devices with their respective application :

<b>List-I</b>	<b>List-II</b>
(a) Diode	(i) Rectification
(b) Tunnel diode	(ii) Microwave switching
(c) Zener diode	(iii) Oscillator
(d) PIN diode	(iv) Voltage regulator

**Codes :**

- (a) (b) (c) (d)
- (A) (i) (iii) (iv) (ii)
- (B) (i) (iv) (iii) (ii)
- (C) (i) (ii) (iii) (iv)
- (D) (i) (iv) (ii) (iii)

62. Match List – I with List – II and select the correct answer using codes given below :

<b>List-I</b>	<b>List-II</b>
(a) Voltage source in a branch	(i) Polar capacitor
(b) Hysteresis	(ii) Super node
(c) Non-bilateral	(iii) h-parameters
(d) Transistor small signal model	(iv) Avoid false triggering

**Codes :**

- (a) (b) (c) (d)
- (A) (i) (iv) (iii) (ii)
- (B) (iii) (i) (ii) (iv)
- (C) (ii) (iv) (i) (iii)
- (D) (iv) (ii) (iii) (i)

63. Match List – I with List – II and select the correct answer using codes given below :

<b>List-I</b>	<b>List-II</b>
(a) Gating pulse	(i) BJT
(b) Series pass element	(ii) Monostable multivibrator
(c) Lock range	(iii) Voltage regulator
(d) Base width modulation	(iv) PLL

**Codes :**

- (a) (b) (c) (d)
- (A) (i) (ii) (iv) (iii)
- (B) (ii) (iii) (iv) (i)
- (C) (iii) (iv) (i) (ii)
- (D) (iv) (ii) (iii) (i)

64. Match the following list :

<b>List-I</b>	<b>List-II</b>
(a) Positive OR	(i) Negative NAND
(b) Positive AND	(ii) Negative AND
(c) Positive NOR	(iii) Negative OR
(d) Positive NAND	(iv) Negative NOR

**Codes :**

- (a) (b) (c) (d)
- (A) (iii) (ii) (i) (iv)
- (B) (i) (iv) (ii) (iii)
- (C) (ii) (i) (iii) (iv)
- (D) (ii) (iii) (i) (iv)

65. Match the following :

<b>List-I</b>		<b>List-II</b>	
(a) MOV A, B	(i)	Logical instruction	
(b) JNC address	(ii)	Arithmetic instruction	
(c) OR A, B	(iii)	Data transfer	
(d) ADD A, H	(iv)	Branching instruction	

**Codes :**

(a)	(b)	(c)	(d)
(A) (ii)	(iii)	(i)	(iv)
(B) (iii)	(iv)	(i)	(ii)
(C) (iv)	(iii)	(ii)	(i)
(D) (iv)	(i)	(iii)	(ii)

66. Match List – I with List – II and select the correct answer using codes given below :

<b>List-I</b>		<b>List-II</b>	
(a) call by reference	(i)	Incorrect statement	
(b) size of (float);	(ii)	Function	
(c) &	(iii)	4	
(d) return (a, b);	(iv)	bitwise AND	

**Codes :**

(a)	(b)	(c)	(d)
(A) (i)	(ii)	(iii)	(iv)
(B) (iv)	(iii)	(ii)	(i)
(C) (ii)	(iii)	(iv)	(i)
(D) (iii)	(iv)	(i)	(ii)

67. Match List – I with List – II and select the correct answer using the codes given below :

<b>List-I</b>		<b>List-II</b>	
(a) Ferrite devices	(i)	Oscillator	
(b) Magnetron	(ii)	Bunching	
(c) Klystron	(iii)	Cross field devices	
(d) Gun-diode	(iv)	Circulators	

**Codes :**

(a)	(b)	(c)	(d)
(A) (iv)	(ii)	(i)	(iii)
(B) (iv)	(iii)	(ii)	(i)
(C) (iii)	(iv)	(ii)	(i)
(D) (i)	(ii)	(iii)	(iv)

68. Match the following :

<b>List-I</b>		<b>List-II</b>	
(a) Digital Filters	(i)	More channels are accommodated	
(b) Signal Processing	(ii)	Slow speed of data transfer	
(c) Time Division Multiplexing	(iii)	Hardware techniques	
(d) Frequency Division Multiplexing	(iv)	Software techniques	

**Codes :**

(a)	(b)	(c)	(d)
(A) (iv)	(iii)	(ii)	(i)
(B) (i)	(ii)	(iii)	(iv)
(C) (iii)	(iv)	(i)	(ii)
(D) (iv)	(iii)	(i)	(ii)

69. Match List – I with List – II and select the correct answer using the codes given below :

<b>List-I</b>		<b>List-II</b>	
(a) Fan regulator	(i)	Two transistor model	
(b) SCR	(ii)	dc-dc conversion	
(c) Choppers	(iii)	Triac-Diac pair	
(d) Quantum efficiency	(iv)	LED	

**Codes :**

(a)	(b)	(c)	(d)
(A) (ii)	(iii)	(iv)	(i)
(B) (iv)	(iii)	(i)	(ii)
(C) (iii)	(i)	(ii)	(iv)
(D) (iii)	(ii)	(i)	(iv)

70. Match the following :

- | List-I                     | List-II                   |
|----------------------------|---------------------------|
| (a) Small displacement     | (i) DSO                   |
| (b) Phase measurement      | (ii) X-ray diffractometer |
| (c) Slowly varying signals | (iii) CRO                 |
| (d) Crystal structure      | (iv) LVDT                 |

Codes :

- |           |       |       |       |
|-----------|-------|-------|-------|
| (a)       | (b)   | (c)   | (d)   |
| (A) (iv)  | (iii) | (i)   | (ii)  |
| (B) (iii) | (ii)  | (iv)  | (i)   |
| (C) (ii)  | (i)   | (iii) | (iv)  |
| (D) (i)   | (iv)  | (ii)  | (iii) |

Read the following paragraph and answer the questions 71 to 75 :

An operational amplifier is a direct coupled high gain amplifier with feedback. It is employed to perform a wide variety of functions such as summer, integrator, differentiator, logarithmic amplifier, oscillators, filters, comparators voltage to frequency converter, amplitude modulators, sample and hold circuit and so on.

An ideal Op-Amp has infinite input resistance, zero output resistance, infinite voltage gain and bandwidth, zero offset and no drift. An ideal Op-Amp is a perfectly balanced circuit such that output voltage is zero for two equal input signals. However a real Op-Amp exhibits imbalance due to mismatch at the input differential stage. It gives rise to offsets. In practical applications offsets are removed using balancing networks.

In general an Op-Amp consists of the following four stages :

- (1) Differential amplifier first stage
- (2) Differential amplifier second stage
- (3) Emitter follower
- (4) Level translator and output stage

It is most widely used analog device.

71. Which is a non-linear application ?

- (A) I-V converter
- (B) Sample-and-hold
- (C) Voltage follower
- (D) Active filter

72. Analog multiplication is carried out with

- (A) Scalar
- (B) Precision rectifier
- (C) Sample-and-hold circuit
- (D) Logarithmic amplifier

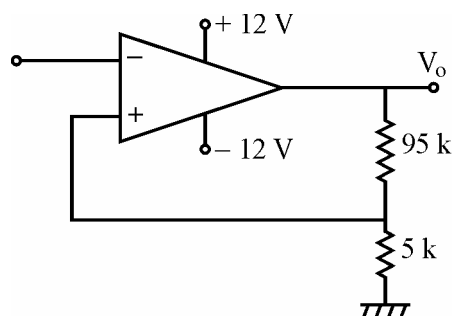
73. Very high input resistance differential stages are used in Op-Amp

- (A) To minimise input offset voltage
- (B) To minimise output offset voltage
- (C) To minimise input offset current
- (D) To minimise output offset current

74. If  $V_{DC} = 5V$  is applied to the input of a differentiator circuit its output will be

- (A) Zero
- (B) Square pulse
- (C) Ramp
- (D) 5 V

75. What will be the feedback voltage ?



- (A) 2.4 V
- (B) 1.2 V
- (C) 0.6 V
- (D) 0.3 V

**Space For Rough Work**