

PAPER-III
ELECTRONIC SCIENCE

Signature and Name of Invigilator

1. (Signature) _____

(Name) _____

2. (Signature) _____

(Name) _____

J A 0 8 8 1 7

Time : 2 ½ hours]

[Maximum Marks : 150

Number of Pages in this Booklet : 24

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 Test Booklet Number should be entered on the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
 - The test booklet no. and OMR sheet no. should be same. In case of discrepancy in the number, the candidate should immediately report the matter to the invigilator for replacement of the test booklet / OMR Sheet.
- Each item has four alternative responses marked (1), (2), (3) and (4). You have to darken the circle as indicated below on the correct response against each item.
Example : ① ② ● ④
where (3) 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 your response 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, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
- You have to return the 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 original question booklet on conclusion of examination.
- Use only **Black Ball point pen**.
- Use of any calculator or log table etc., is prohibited.
- There is no negative marks for incorrect answers.
- In case of any discrepancy in the English and Hindi versions, English version will be taken as final.

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)

परीक्षार्थियों के लिए निर्देश

- इस 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 पुस्तिका 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 चैक कर लें कि ये पूरे हैं । दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आये 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 प्रश्न-पुस्तिका का नंबर OMR पत्रक पर अंकित करें और OMR पत्रक का नंबर इस प्रश्न-पुस्तिका पर अंकित कर दें ।
 - प्रश्न पुस्तिका नं. और OMR पत्रक नं. समान होने चाहिए । यदि नंबर भिन्न हों, तो परीक्षार्थी प्रश्न-पुस्तिका / OMR पत्रक बदलने के लिए निरीक्षक को तुरंत सूचित करें ।
- प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (1), (2), (3) तथा (4) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है :
उदाहरण : ① ② ● ④
जबकि (3) 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 चिह्नित 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, जैसे कि अंकित किये गये उत्तर को मिटाना या सफेद स्याही से बदलना तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
- आपको परीक्षा समाप्त होने पर मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालाँकि आप परीक्षा समाप्ति पर मूल प्रश्न-पुस्तिका अपने साथ ले जा सकते हैं ।
- 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 नकारात्मक अंक नहीं हैं ।
- यदि अंग्रेजी या हिंदी विवरण में कोई विसंगति हो, तो अंग्रेजी विवरण अंतिम माना जाएगा ।



ELECTRONIC SCIENCE

PAPER – III

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

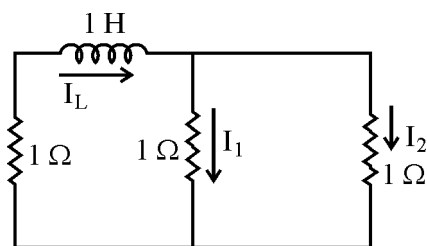
1. A conducting line on an IC chip is 2.8 mm long and has a rectangular cross-section of $1 \mu\text{m} \times 4 \mu\text{m}$. A current of 5 mA produces a voltage drop of 100 mV across the line. If the electron mobility is $500 \text{ cm}^2/\text{V-s}$, the electron concentration is

- (1) $4.38 \times 10^{21} \text{ cm}^{-3}$ (2) $3.5 \times 10^{17} \text{ cm}^{-3}$
 (3) $5.48 \times 10^{21} \text{ cm}^{-3}$ (4) $4.6 \times 10^{20} \text{ cm}^{-3}$

2. In a MOSFET the drain saturation current is

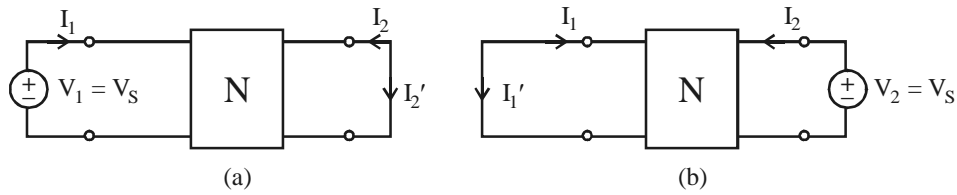
- (1) $\frac{\mu_n \text{ Cox } W}{L} (V_{\text{gs}} - V_{\text{th}})$
 (2) $\frac{\mu_n \text{ Cox } W}{2L} (V_{\text{gs}} - V_{\text{th}})^2$
 (3) $\frac{\mu_n \text{ Cox } W}{2L} (V_{\text{gs}} - V_{\text{th}}) \text{ vds}$
 (4) $\frac{\mu_n \text{ Cox } L}{W} (V_{\text{gs}} - V_{\text{th}})^2$

3. The time constant for the network shown below will be :



- (1) $\frac{1}{3} \text{ sec}$ (2) $\frac{2}{3} \text{ sec}$
 (3) 1 sec (4) 3 sec

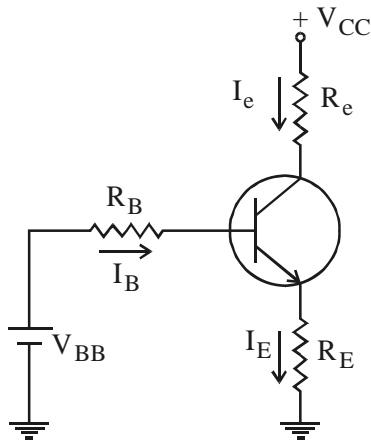
4. Consider the networks shown in the following figures (a) and (b) :



The above networks are :

- (1) Thevenin's equivalent of each other
- (2) Dual network of each other
- (3) Reciprocal network of each other
- (4) They are symmetrical to each other

5. In a circuit given below the base current I_B is



- | | |
|---|--|
| (1) $\frac{V_{BB}}{R_B}$ | (2) $\frac{V_{BB} - V_{BE}}{R_B + R_E}$ |
| (3) $\frac{V_{BB} - V_{BE}}{R_B + (\beta + 1) R_E}$ | (4) $\frac{V_{BB}}{R_B + (\beta + 1) R_E}$ |

6. In a class A large signal amplifier with R_L as a load resistance, I_m and V_m represents the peak sinusoidal current and voltage, the output power is

- | | |
|--|--|
| (1) $\frac{(V_{max} - V_{min})(I_{max} - I_{min})}{2\sqrt{2}}$ | (2) $\frac{(V_{max} - V_{min})(I_{max} - I_{min})}{8}$ |
| (3) $\frac{V_m \cdot I_m}{\sqrt{2}}$ | (4) $\frac{(V_{max} - V_{min})(I_{max} - I_{min})}{2}$ |

7. In a 4 bit ripple counter and a 4 bit synchronous counter are made using flip-flops having a propagation delay of 10 ns each. If the worst case delay in the ripple counter and the synchronous counter be 'R' & 'S' respectively, then the value of 'R' & 'S' is given by :

- (1) R = 10 ns, S = 40 ns (2) R = 40 ns, S = 10 ns
 (3) R = 10 ns, S = 30 ns (4) R = 30 ns, S = 10 ns

8. The Boolean expression $AC + B\bar{C}$ is equivalent to :

- (1) $\bar{A}C + B\bar{C} + AC$ (2) $\bar{B}C + AC + B\bar{C} + \bar{A}C\bar{B}$
 (3) $AC + B\bar{C} + \bar{B}C + ABC$ (4) $ABC + \bar{A}B\bar{C} + AB\bar{C} + A\bar{B}C$

9. For pushing of flags and popping of flags in 8086, the instructions are :

- (1) Push and Pop (2) Push F and Pop F
 (3) Push and Pop F (4) None of the above

10. Consider the following set of 8085 instructions :

```
MVI A, 8EH
ADI 73H
JC DSPLY
OUT PORT1
HLT
DSPLY : XR A
        OUT PORT1
        HLT
```

The output at PORT1 is :

- (1) FEH (2) 01H
 (3) 00 (4) 11H

11. Which of the following cannot be a member of a structure in 'C' ?

- (1) Enumeration (2) Another structure
 (3) Function (4) Array

12. For which of the following declarations in 'C', "NEXT ++;" code will fail ?
- (1) # define NEXT 85.5 (2) char *NEXT = "A";
 (3) float NEXT = 85.5 (4) None of the above
13. In a loss less transmission line of length 50 cm with $L = 10 \mu\text{H/m}$, $C = 40 \text{ pF/m}$ is operated at 25 MHz. Its electrical path length is
- (1) 0.5 metres (2) λ metres
 (3) $\pi/2$ radian (4) 180 degrees
14. A TRAPATT diode has the doping concentration $N_A = 2 \times 10^{15}/\text{cm}^3$ and a current density of 20 kA/cm^2 . The value of avalanche zone velocity is given by :
- (1) $6.25 \times 10^9 \text{ cm/s}$ (2) $6.25 \times 10^7 \text{ cm/s}$
 (3) $6.25 \times 10^8 \text{ m/s}$ (4) $6.25 \times 10^3 \text{ cm/s}$
15. The Hilbert transform of $\cos \omega_1 t + \sin \omega_2 t$ is
- (1) $\sin \omega_1 t + \sin \omega_2 t$ (2) $\cos \omega_1 t + \sin \omega_2 t$
 (3) $\sin \omega_1 t + \cos \omega_2 t$ (4) $\cos \omega_1 t + \cos \omega_2 t$
16. When optimum filter becomes a matched filter and noise is white, the probability of error is given by
- (1) $P_e = \frac{1}{2} \operatorname{erfc} \left[\frac{E_S}{4\eta} \right]^{\frac{1}{2}}$ (2) $P_e = \frac{1}{2} \operatorname{erfc} \left[\frac{E_S}{\eta} \right]^{\frac{1}{2}}$
 (3) $P_e = \frac{1}{2} \operatorname{erfc} \left[0.6 \frac{E_S}{\eta} \right]^{\frac{1}{2}}$ (4) $P_e = \frac{1}{2} \operatorname{erfc} \left[\frac{E_S}{2\eta} \right]^{\frac{1}{2}}$
17. Which of the following conditions is applicable in semiconductor LASERS ?
- (1) $E_{FC} - E_{FV} = E_g$ (2) $E_{FC} - E_{FV} > E_g$
 (3) $E_{FC} - E_{FV} < E_g$ (4) $E_{FC} - E_{FV} = 2E_g$

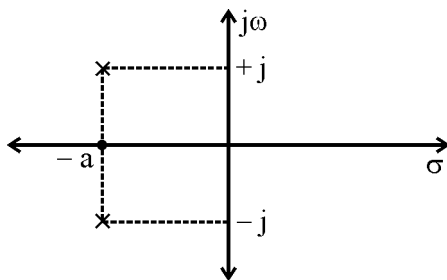
18. A channel with bit rate $R_b = 36$ Kbps is available for PCM voice transmission. Find the sampling rate f_s , assuming $f_m = 3.2$ kHz.

- (1) 7.2 MHz (2) 3.6 MHz
(3) 3.6 kHz (4) 7.2 kHz

19. The fundamental law that is used in temperature measurement is known as

- (1) First law of thermodynamics (2) Second law of thermodynamics
(3) Third law of thermodynamics (4) Zeroth law of thermodynamics

20. The location of closed loop poles of a LTI system is given as shown in the figure :



The system will be

- (1) Unstable (2) Marginally stable
(3) Absolutely stable (4) Relatively stable

21. For non-degenerate semiconductors the product of the majority and minority carrier concentration is fixed as

- (a) ni^2 (b) $N_c N_v \exp\left(\frac{E_g}{kT}\right)$
(c) $N_c N_v \exp\left(-\frac{E_g}{kT}\right)$ (d) $N_v \exp\left(-\frac{E_g}{kT}\right)$

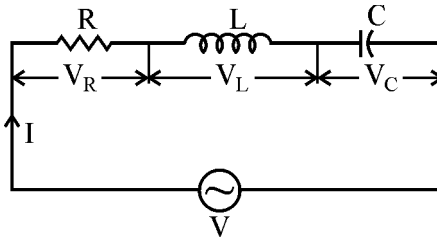
Which of the above are correct ?

- (1) (a) and (c) are correct. (2) (b) and (a) are correct.
(3) (b) is correct, but (a) is wrong. (4) (a) and (d) are correct.

22. In a BJT the collector current in common emitter configuration is

- (1) $\alpha I_E + I_{CBO}$ (2) $\alpha I_E + I_{CEO}$
(3) $\beta I_B + I_{CBO}$ (4) $\beta I_B + I_{CEO}$

23. Consider the following RLC circuit and read the statements given below :



- (a) The current I is in phase with V_R .
 (b) The current I leads V_C by $\pi/2$.
 (c) The current I lags behind V_L by $\pi/2$.
 (d) The current I leads V_L by $\pi/2$.

Which of the above statements are correct ?

- (1) Only (a) and (b) are correct. (2) Only (b) and (c) are correct.
 (3) Only (a), (b) and (d) are correct. (4) Only (a), (b) and (c) are correct.

24. In a common emitter transistor amplifier the current gain can be expressed as

- (a) $\frac{-h_{fe}}{h_{oe}}$ (b) $\frac{-h_{fe}}{1 + h_{oe} R_L}$
 (c) $\frac{h_{fe}}{1 - h_{oe} R_L}$ (d) $\frac{-h_{fe}}{1 - h_{oe} R_L}$

Options :

- (1) (a) is correct, but (b) is wrong. (2) (b) and (d) are correct.
 (3) (b) is correct, but (d) is wrong. (4) (c) and (d) are correct.

25. Read the following statements regarding complexity of a network :

- (a) The order of complexity of a network is defined as the number of independent initial conditions that can be specified in a network.
 (b) The number of state equations that can be written for a network is equal to the order of the complexity of the network.
 (c) The order of complexity is always more than the number of energy storing elements.
 (d) The number of state equations that can be written for a network is always higher than the number of energy storing elements.

Which of the above statements are correct ?

- (1) (a) and (b) are correct. (2) (b) and (c) are correct.
 (3) (c) and (d) are correct. (4) (a) and (c) are correct.

26. In a rectifier the ripple factor can be expressed as

(a) $\frac{I_{rms}}{I_{dc}}$

(b) $\sqrt{\frac{I_{dc}}{I_{rms}}}$

(c) $\sqrt{\left(\frac{I_{rms}}{I_{dc}}\right)^2 - 1}$

(d) $\sqrt{1 - \left(\frac{I_{rms}}{I_{dc}}\right)^2}$

Which one of the above is correct ?

- (1) (a) and (b) are correct. (2) (a) is wrong, but (c) is correct.
 (3) (d) is correct, but (c) is wrong. (4) (c) and (d) are correct.

27. For a three state TTL following statements are given :

- (a) It allows to connect outputs directly.
 (b) It allows to connect the inputs directly.
 (c) It is used to decrease the switching time.
 (d) It is used to increase the switching time in order to interface the peripherals for matching the speed with computer.

Which of the above are correct ?

- (1) (a) & (d) (2) (a) and (c)
 (3) (b) & (c) (4) (b) & (d)

28. For A to D converters, following statements are given :

- (a) It is the process of converting time varying input to discrete output levels.
 (b) Flash type A/D conversion are slow in nature.
 (c) The quantisation error depends upon the step size of quantisation.
 (d) Flash type A/D conversion is a simultaneous conversion.

Which of the above are correct ?

- (1) (a), (b) & (c) (2) (a), (c) & (d)
 (3) (a) and (b) only (4) (b), (d) & (c) only

29. Consider the following registers :

- | | |
|-----------------------|-----------------------|
| (a) A and B registers | (b) B and C registers |
| (c) D and E registers | (d) H and L registers |

Which of these 8-bit registers of 8085 microprocessor can be paired together to make a 16 bit register ?

- | | |
|----------------------|----------------------|
| (1) (a), (c) and (d) | (2) (a), (b) and (c) |
| (3) (b), (c) and (d) | (4) (b), (d) and (a) |

30. Consider the following instructions of 8085 microprocessor :

- | | |
|---------------|-----------|
| (a) MOV M, A | (b) ADD C |
| (c) MVI A, FF | (d) CMP M |

Which of these cause change in the status of flag(s) ?

- | | |
|-----------------|-----------------|
| (1) (a) and (b) | (2) (b) and (d) |
| (3) (a) and (c) | (4) (b) and (c) |

31. Which of the following functions manipulate the value of file position indicator ?

- | | |
|---------------|----------------|
| (a) ftell() | (b) fgetpos() |
| (c) rewind() | (d) fgetc() |

Codes :

- | | |
|-----------------------------------|--|
| (1) (a) and (b) are correct. | (2) (c) and (d) are correct. |
| (3) (a), (b) and (c) are correct. | (4) (a), (b), (c) and (d) are correct. |

32. Which of the following statements are correct about the C declarations given below ?

```
char *p = "Honesty";
char a[ ] = "Honesty";
```

- | |
|---|
| (a) There is no difference in the declarations and both serve the same purpose. |
| (b) In both cases the '\0' will be added at the end of the string "Honesty". |
| (c) The first statement is incorrect since '\0' is not given in the string. |
| (d) 'p' is a non-const pointer pointing to a non-const string, whereas 'a' is a const pointer pointing to a non-const string. |

Codes :

- | | |
|------------------------------|------------------------------|
| (1) (a) and (b) are correct. | (2) (c) and (d) are correct. |
| (3) (a) and (c) are correct. | (4) (b) and (d) are correct. |

36. Which of the following statements are correct ?

- (a) In CDMA, the entire bandwidth can be used all the time.
- (b) TDMA is a technique which does not allow for spectrum re-un i.e. utilizing same spectrum in different time slots.
- (c) TDMA has primary disadvantage of susceptibility for station cross-linking.
- (d) FDMA is the simplest & most basic format Multiple Access Communications.

Options :

- (1) (b) & (c) are correct.
- (2) (a), (c) & (d) are correct.
- (3) (a) & (d) are correct.
- (4) (c) & (d) are correct.

37. Which of the following statements are correct in case of Light Emitting Diodes ?

- (a) Homojunctions LEDs are often surface emitters.
- (b) Heterojunctions LEDs are Edge emitters.
- (c) Heterojunction LEDs are often surface emitters.
- (d) LEDs provide monochromatic & coherent radiations.

Options :

- (1) (a) & (b) are correct.
- (2) (a) & (c) are correct.
- (3) (a), (b) & (d) are correct.
- (4) (a), (c) & (d) are correct.

38. Which of the following statements are incorrect in case of semiconductor LASERS ?

- (a) Stimulated emission rate dominates the spontaneous emission with increase in the value of energy of radiation per unit volume per unit frequency.
- (b) Stimulated emission rate dominates the absorption rate of the charge carriers in the ground state are higher than the excited state.
- (c) LASERS have a longer life-line than LEDs.
- (d) LASER diodes are more temperature sensitive than LEDs.

Options :

- (1) (c) & (d) are incorrect.
- (2) (a), (c) and (d) are incorrect.
- (3) (a) & (d) are incorrect.
- (4) (b) & (c) are incorrect.

39. Read the following statements regarding biomedical instrumentations :

- (a) Sphygmomanometer is used for blood pressure measurement.
- (b) EMG represents a record of the electrical activity of the brain.
- (c) ERG represents the record of potential from the retina.
- (d) ECG represents the record of electrical activity of brain.

Which of the above statements are correct ?

- (1) (a) and (b) are correct.
- (2) (b) and (c) are correct.
- (3) (a) and (c) are correct.
- (4) (b) and (d) are correct.

40. Read the following statements regarding PID controller :

- (a) The system complexity of a PID controller is less than that of a PI controller.
- (b) A PID controller produces no action for any constant error signal.
- (c) A PID controller is used to increase the damping factor of the dominant poles of a PI controlled system.
- (d) A PID controller is used to decrease the damping factor of the dominant poles of a PI controlled system.

Which of the above statements are correct ?

- (1) (a) and (b)
- (2) (b) and (c)
- (3) (a) and (d)
- (4) (b) and (d)

41. Match the following lists :

List – I

- a. Abrupt p-n junction
- b. Linearly graded p-n junction
- c. Tunnel diode
- d. p-i-n diode

List – II

- i.

p ⁺	n ⁺
----------------	----------------
- ii.

p ⁺	n	n ⁺
----------------	---	----------------
- iii.

p	$\pi(\nu)$	n
---	------------	---
- iv.

p ⁺	p	n	n ⁺
----------------	---	---	----------------

Correct codes are :

Codes :

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

42. Match the following lists :

List – I

- a. Negative real and simple roots
- b. Negative real and equal roots
- c. Complex conjugate roots
- d. Imaginary conjugate roots

List – II

- i. Sustained oscillatory
- ii. Overdamped
- iii. Critically damped
- iv. Underdamped

Correct codes are :

Codes :

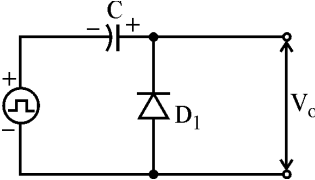
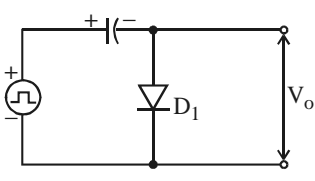
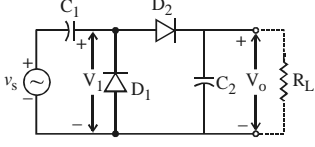
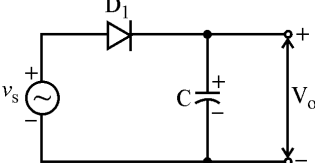
- | | | | | |
|-----|-----|-----|----|----|
| | a | b | c | d |
| (1) | iii | ii | iv | i |
| (2) | iii | ii | i | iv |
| (3) | ii | iii | i | iv |
| (4) | ii | iii | iv | i |

43. Match the following lists :

List – I

- a. Voltage doubler
- b. Halfwave rectifier
- c. Positive clamping circuit
- d. Negative clamping circuit

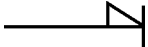

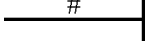
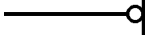
List – II

- i. 
- ii. 
- iii. 
- iv. 

Codes :

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

44. Match the following lists in terms of qualifying symbols for inputs and outputs :

List – I	List – II
a. 	i. Non-logic connection
b. 	ii. Input for digital signals
c. 	iii. Logic negation at the input
d. 	iv. Active low input

Correct codes are :

Codes :

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

45. Match the following lists in 8085 :

List – I	List – II
Interrupt	Vector Address
a. RST 7.5	i. 0034H
b. RST 6.5	ii. 0024H
c. RST 5.5	iii. 003CH
d. TRAP	iv. 002CH

Codes :

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

46. Match the items of List-I in C++ with the items of List-II in FORTRAN :

List – I	List – II
a. Global variables	i. Computed GOTO
b. Static	ii. EQUIVALENCE
c. Reference	iii. COMMON
d. Switch	iv. SAVE

Codes :

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

47. Match the following lists :

List – I	List – II
a. Beam efficiency	i. $4\pi/\Omega_A$
b. Directivity	ii. kD
c. Gain	iii. $\frac{\Omega_M}{\Omega_A}$
d. Aperture Efficiency	iv. A_e/A_p

Correct Codes are :

Codes :

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

48. Match the following lists :

List – I	List – II
a. Power efficient transmission of signals	i. AM
b. Bandwidth efficient transmission of signals with significant dc signals	ii. VSB
c. Most bandwidth efficient transmission of voice signals	iii. SSB-SC
d. Simplest Receiver Circuit	iv. FM

Correct Codes are :

Codes :

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

49. Match the following lists :

List – I	List – II
a. SCR can be turned off by	i. it turns off when anode current falls below this value.
b. Turn on time of SCR can be reduced by	ii. the rectangular pulse of high amplitude and narrow width
c. Holding current for an SCR means	iii. its anode current interruption
d. A forward current can be applied to an SCR after	iv. its gate recovery time

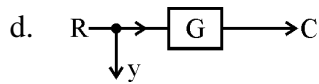
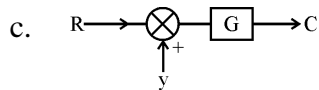
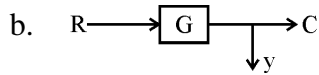
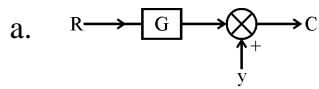
Correct Codes are :

Codes :

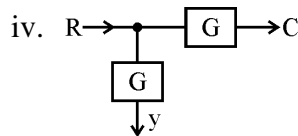
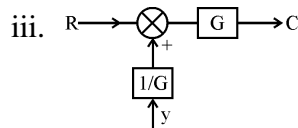
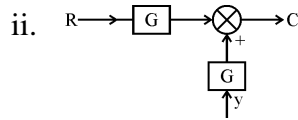
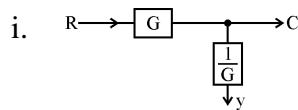
	a	b	c	d
(1)	i	iii	ii	iv
(2)	iii	ii	i	iv
(3)	iii	ii	iv	i
(4)	i	iii	iv	ii

50. Match the following lists :

List – I



List – II



Codes :

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

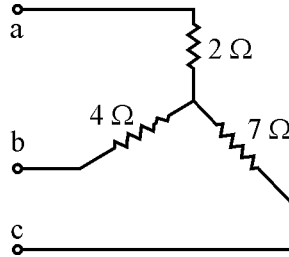
51. Arrange the following materials in ascending order based on their mobility of electrons at 300 K :

- | | |
|----------------------|---------------------|
| (a) Germanium | (b) Silicon |
| (c) Gallium Arsenide | (d) Gallium Nitride |

Codes :

- | | | | | |
|-----|-----|-----|-----|-----|
| (1) | (a) | (b) | (c) | (d) |
| (2) | (b) | (c) | (d) | (a) |
| (3) | (d) | (b) | (a) | (c) |
| (4) | (c) | (d) | (b) | (a) |

52. Consider a star network as shown in the following figure :



If the resistance between terminals b and c with a open is represent by R_A , the resistance between c and a with b open is R_B and the resistance between a and b with c open is R_C , then arrange R_A , R_B and R_C in descending order.

- | | |
|---------------------|---------------------|
| (1) R_C, R_B, R_A | (2) R_B, R_C, R_A |
| (3) R_A, R_B, R_C | (4) R_B, R_A, R_C |

53. Arrange the following fabrication steps in order needed to fabricate the IC :

- | | |
|-------------------|----------------------|
| (a) Oxidation | (b) Etching |
| (c) Metallization | (d) Epitaxial growth |

Codes :

- (1) (a) (b) (c) (d)
- (2) (d) (a) (b) (c)
- (3) (b) (c) (d) (a)
- (4) (c) (d) (a) (b)

54. For TTL operation in low and high states at the output different voltages are required :

- | | |
|-------------------|-------------------|
| (a) $V_{IL, max}$ | (b) $V_{IH, min}$ |
| (c) $V_{OL, max}$ | (d) $V_{OH, min}$ |

Arrange the above in ascending order of voltages, the correct code is given by :

Codes :

- (1) (c) (a) (b) (d)
- (2) (b) (a) (c) (d)
- (3) (a) (b) (c) (d)
- (4) (d) (b) (a) (c)

55. Arrange the following in descending order w.r.t. their pin numbers of 8251 USART :

- (a) CLK (b) $\overline{\text{DTR}}$
 (c) $\overline{\text{CTS}}$ (d) $\overline{\text{CS}}$

Codes :

- (1) (d) (c) (a) (b)
 (2) (c) (b) (d) (a)
 (3) (a) (d) (b) (c)
 (4) (b) (a) (c) (d)

56. Arrange the following in 'C' in the order they can appear logically in a graphics related program :

- (a) restorecrtmode()
 (b) initgraph()
 (c) DETECT
 (d) closegraph()

The correct order of sequence is :

Codes :

- (1) (a) (d) (b) (c)
 (2) (c) (b) (d) (a)
 (3) (b) (a) (c) (d)
 (4) (d) (c) (a) (b)

57. Following are microwave bands :

- (a) Ka
 (b) L
 (c) C
 (d) X

Arrange them in descending order of frequencies :

Codes :

- (1) (a) (b) (c) (d)
 (2) (b) (d) (c) (a)
 (3) (a) (d) (c) (b)
 (4) (a) (c) (d) (b)

58. Arrange in order of the increasing Bandwidth value for the below mentioned systems :

- (a) DSB-SC (b) VSB
(c) FM (d) SSB

Codes :

- (1) (d) (a) (b) (c)
(2) (b) (d) (a) (c)
(3) (c) (a) (b) (d)
(4) (d) (b) (a) (c)

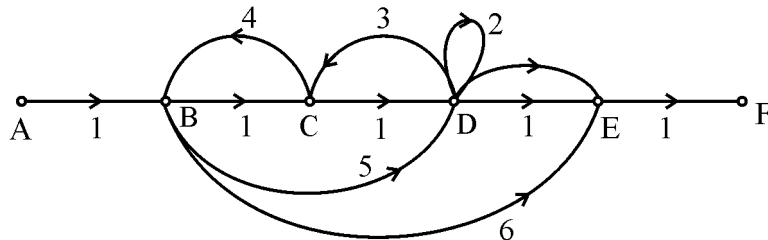
59. Arrange the below mentioned III-V materials to produce LEDs in order of their increasing emission wavelengths :

- (a) In AS (b) Si C
(c) Ga P (d) Ga AS

Codes :

- (1) (c) (d) (b) (a)
(2) (b) (c) (d) (a)
(3) (a) (b) (c) (d)
(4) (b) (a) (c) (d)

60. Consider the following signal flow graph given in the figure :



Let

- A. is no. of forward paths
B. is no. of total loops
C. is no. of non-touching loop

Arrange above in increasing orders of their values :

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

Directions : Question Nos. **61 – 70 :**

The following items consist of two statements, one labelled as “Assertion (A)” and the other labelled as the “Reason (R)”. You are to examine the two statements carefully 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 answer to these items using the codes given below and mark your answer accordingly.

Codes :

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (2) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (3) (A) is true, but (R) is false.
- (4) (A) is false, but (R) is true.

61. Assertion (A) : In a bipolar IC fabrication, the diode isolation is used to isolate one device from the other.

Reason (R) : P⁺n diode used as isolation diode in IC fabrication.

62. Assertion (A) : It is convenient to write loop equations for a network containing voltage source but no current source.

Reason (R) : If the current sources are present, then these must be first converted into their equivalent voltage sources.

63. Assertion (A) : The Gunn diode characteristics shows the region of negative resistance.

Reason (R) : The Gunn diode is made of n-type and p-type degenerate semiconductor.

64. Assertion (A) : Asynchronous sequential circuit is also called event driven circuit.

Reason (R) : Event driven circuit does not have clock to trigger change of state. The states are changed by the change in input signal of the previous stage.

65. Assertion (A) : A low \overline{WR} means a write operation and a low \overline{RD} means a read operation.

Reason (R) : \overline{WR} and \overline{RD} both cannot be low at the same time.

66. Assertion (A) : In 'C', structures cannot be compared using relational operators == and !=.

Reason (R) : A field by field comparison might require unacceptable amounts of repetitive code for large structures. Pointer fields may also cause problems.

67. Assertion (A) : Curl of any vector is a vector. It gives normal vector which is perpendicular to both the plane and the parent vector.

Reason (R) : The value of $\text{curl } \vec{H}$ can be found by the following expression :

$$(\text{Curl } \vec{H})_{\text{Normal}} = \lim_{\Delta S \rightarrow 0} \frac{\oint \vec{H} \times d\vec{l}}{\Delta S}$$

Where, ΔS is the planar area, $d\vec{l}$ is line element.

68. Assertion (A) : The kind of radio receiver best suited to have the sensitivity and selectivity to fully reproduce the modulating signal at its output is known as superheterodyne receivers.

Reason (R) : The transmitted signal at the receiver end becomes very weak due to noise and further it had to share the free space with thousands of other signal and may have to travel a distance.

69. Assertion (A) : Those semiconductor materials that practically no thermally generated current carriers at room temperature are used as photoconductors.

Reason (R) : These materials are essentially insulators in the dark and carriers generated by the absorption of light cause maximum possible change in the resistivity of the cell.

70. Assertion (A) : According to Routh-Hurwitz criterion, the system represented by characteristic equation $F(S)$ will be unstable, if the first column of the array contains no sign change.

Reason (R) : If any row of the Routh's table is multiplied or divided by a positive integer, then the system stability will not be affected.

Now-a-days, electronic measuring instruments are required for all the applications like industrial, medical, biomedical, Aerospace, etc. They are based upon basic principles of measuring resistance, temperature, pH, viscosity, pressure, humidity, etc. They are based on transducers, which convert physical quantity into electrical quantity, which are later on measured and calibrated.

71. The pH value of a solution having a hydrogen ion concentration of 2.3×10^{-11} g/litre is :
- (1) Strong acidic in nature (2) Alkaline in nature
(3) Neutral (4) Slightly acidic
72. The reference electrode in pH measurement is
- (1) Glass electrode (2) Hydrogen electrode
(3) Antimony electrode (4) Hg-Calomel electrode
73. ECG represents :
- (1) the rhythmic curve of depolarisation and repolarisation of the myocardium, the heart muscle.
(2) the wave form of the voltage produced in the heart muscle due to an externally applied electrical stimulus.
(3) the record of electrical currents flowing in the cardiac muscle.
(4) the record of intensity of heart sounds at different intervals sensed by an electro-acoustic sensor.
74. Optical pyrometers are used to measure :
- (1) High intensity (2) Low temperatures
(3) High temperatures (4) Light intensity & high temperatures
75. Which of the following is a positive displacement device ?
- (1) Rotameter (2) Sliding vane flow meter
(3) Turbine flow meter (4) Volumetric tank

Space For Rough Work