

Test Paper : III  
Test Subject : ELECTRONIC SCIENCE  
Test Subject Code : K-3115

Test Booklet Serial No. : \_\_\_\_\_

OMR Sheet No. : \_\_\_\_\_

Roll No. 

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(Figures as per admission card)

**Name & Signature of Invigilator/s**

Signature : \_\_\_\_\_

Name : \_\_\_\_\_

Paper : III  
Subject : ELECTRONIC SCIENCE

Time : 2 Hours 30 Minutes

Maximum Marks : 150

Number of Pages in this Booklet : 16

Number of Questions in this Booklet : 75

**ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಸೂಚನೆಗಳು**

- ಈ ಪುಟದ ಮೇಲ್ಭಾಗದಲ್ಲಿ ಒದಗಿಸಿದ ಸ್ಥಳದಲ್ಲಿ ನಿಮ್ಮ ರೋಲ್ ನಂಬರನ್ನು ಬರೆಯಿರಿ.
- ಈ ಪತ್ರಿಕೆಯು ಬಹು ಆಯ್ಕೆ ವಿಧದ ಎಪ್ಪತ್ತೈದು ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡಿದೆ.
- ಪರಿಷ್ಕರಿಸಿದ ಪ್ರಾರಂಭದಲ್ಲಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ನಿಮಗೆ ನೀಡಲಾಗುವುದು. ಮೊದಲ 5 ನಿಮಿಷಗಳಲ್ಲಿ ನೀವು ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ತೆರೆಯಲು ಮತ್ತು ಕೆಳಗಿನಂತೆ ಕಡ್ಡಾಯವಾಗಿ ಪರಿಷ್ಕರಿಸಲು ಕೋರಲಾಗಿದೆ.  
(i) ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಗೆ ಪ್ರವೇಶವನ್ನು ಪಡೆಯಲು, ಈ ಹೊದಿಕೆ ಪುಟದ ಅಂಚಿನ ಮೇಲಿರುವ ಪೇಪರ್ ಸೀಲನ್ನು ಹರಿಯಿರಿ. ಸ್ವಿಚ್ ಸೀಲ್ ಇಲ್ಲದ ಅಥವಾ ತೆರೆದ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ಸ್ವೀಕರಿಸಬೇಡಿ.  
(ii) ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯಲ್ಲಿನ ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ ಮತ್ತು ಪುಟಗಳ ಸಂಖ್ಯೆಯನ್ನು ಮುಖಪುಟದ ಮೇಲೆ ಮುದ್ರಿಸಿದ ಮಾಹಿತಿಯೊಂದಿಗೆ ತಾಳೆ ನೋಡಿರಿ. ಪುಟಗಳು/ಪ್ರಶ್ನೆಗಳು ಕಾಣೆಯಾದ, ಅಥವಾ ದ್ವಿಪ್ರತಿ ಅಥವಾ ಅನುಕ್ರಮವಾಗಿಲ್ಲದ ಅಥವಾ ಇತರ ಯಾವುದೇ ವ್ಯತ್ಯಾಸದ ದೋಷಪೂರಿತ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ಕೂಡಲೇ 5 ನಿಮಿಷದ ಅವಧಿ ಒಳಗೆ, ಸಂವಿಧಾನದಿಂದ ಸರಿ ಇರುವ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಗೆ ಬದಲಾಯಿಸಿಕೊಳ್ಳಬೇಕು. ಆ ಬಳಿಕ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಬದಲಾಯಿಸಲಾಗುವುದಿಲ್ಲ, ಯಾವುದೇ ಹೆಚ್ಚು ಸಮಯವನ್ನೂ ಕೊಡಲಾಗುವುದಿಲ್ಲ.
- ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೂ (A), (B), (C) ಮತ್ತು (D) ಎಂದು ಗುರುತಿಸಿದ ನಾಲ್ಕು ಪರ್ಯಾಯ ಉತ್ತರಗಳಿವೆ. ನೀವು ಪ್ರಶ್ನೆಯ ಎದುರು ಸರಿಯಾದ ಉತ್ತರದ ಮೇಲೆ, ಕೆಳಗೆ ಕಾಣಿಸಿದಂತೆ ಅಂಡಾಕೃತಿಯನ್ನು ಕಪ್ಪಾಗಿಸಬೇಕು.  
ಉದಾಹರಣೆ : 

A	B	C	D
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(C) ಸರಿಯಾದ ಉತ್ತರವಾಗಿದ್ದಾಗ.
- ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಗಳನ್ನು ಪತ್ರಿಕೆ III ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯೊಳಗೆ ಕೊಟ್ಟಿರುವ OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಮಾತ್ರವೇ ಸೂಚಿಸತಕ್ಕದ್ದು. OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿನ ಅಂಡಾಕೃತಿ ಹೊರತುಪಡಿಸಿ ಬೇರೆ ಯಾವುದೇ ಸ್ಥಳದಲ್ಲಿ ಗುರುತಿಸಿದರೆ, ಅದರ ಮೌಲ್ಯಮಾಪನ ಮಾಡಲಾಗುವುದಿಲ್ಲ.
- OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಕೊಟ್ಟ ಸೂಚನೆಗಳನ್ನು ಜಾಗರೂಕತೆಯಿಂದ ಓದಿರಿ.
- ಎಲ್ಲಾ ಕರಡು ಕೆಲಸವನ್ನು ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯ ಕೊನೆಯಲ್ಲಿ ಮಾಡತಕ್ಕದ್ದು.
- ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಬಹುದಾದ ನಿಮ್ಮ ಹೆಸರು ಅಥವಾ ಯಾವುದೇ ಚಿಹ್ನೆಯನ್ನು, ಸಂಗತವಾದ ಸ್ಥಳ ಹೊರತು ಪಡಿಸಿ, OMR ಉತ್ತರ ಹಾಳೆಯ ಯಾವುದೇ ಭಾಗದಲ್ಲಿ ಬರೆಯಬಾರದು, ನೀವು ಅನರ್ಹತೆಗೆ ಬಾಧ್ಯರಾಗುತ್ತೀರಿ.
- ಪರಿಷ್ಕರಿಸಿದ ಮುಗಿದನಂತರ, ಕಡ್ಡಾಯವಾಗಿ OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ಸಂವಿಧಾನದಂತೆ ನೀವು ಹಿಂತಿರುಗಿಸಬೇಕು ಮತ್ತು ಪರಿಷ್ಕರಿಸಿದ ಕೊಡಲಿಯ ಹೊರಗೆ OMR ನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ಕೊಂಡೊಯ್ಯಬಾರದು.
- ಪರಿಷ್ಕರಿಸಿದ ನಂತರ, ಪರಿಷ್ಕರಿಸಿದ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಮತ್ತು ನಕಲು OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
- ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್ ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರವೇ ಉಪಯೋಗಿಸಿರಿ.
- ಕ್ಯಾಲ್ಕುಲೇಟರ್ ಅಥವಾ ಲಾಗ್ ಟೇಬಲ್ ಇತ್ಯಾದಿಯ ಉಪಯೋಗವನ್ನು ನಿಷೇಧಿಸಲಾಗಿದೆ.
- ಸರಿ ಅಲ್ಲದ ಉತ್ತರಗಳಿಗೆ ಋಣ ಅಂಕ ಇರುವುದಿಲ್ಲ.
- ಕನ್ನಡ ಮತ್ತು ಇಂಗ್ಲಿಷ್ ಆವೃತ್ತಿಗಳ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಗಳಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ವ್ಯತ್ಯಾಸಗಳು ಕಂಡುಬಂದಲ್ಲಿ, ಇಂಗ್ಲಿಷ್ ಆವೃತ್ತಿಗಳಲ್ಲಿರುವುದೇ ಅಂತಿಮವೆಂದು ಪರಿಗಣಿಸಬೇಕು.

**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 :  
(i) To have access to the Question Booklet, tear off the paper seal on the edge of the cover page. Do not accept a booklet without sticker seal or open booklet.  
(ii) 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.
- Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item.  
Example : 

A	B	C	D
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where (C) is the correct response.
- Your responses to the question of Paper III are to be indicated in the OMR Sheet kept inside the Booklet. If you mark at any place other than in the ovals in OMR Answer Sheet, it will not be evaluated.
- Read the instructions given in OMR carefully.
- Rough Work is to be done in the end of this booklet.
- If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
- You have to return the test OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must NOT carry it with you outside the Examination Hall.
- You can take away question booklet and carbon copy of OMR Answer Sheet soon after the 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.
- In case of any discrepancy found in the Kannada translation of a question booklet the question in English version shall be taken as final.



## ELECTRONIC SCIENCE

## PAPER – III

**Note :** This paper contains **seventy-five (75)** objective type questions. **Each** question carries **two (2)** marks. **All** questions are **compulsory**.

1. What is the approximate mobility of holes in Germanium at room temperature ?

- (A)  $4500 \text{ cm}^2/\text{V.S}$
- (B)  $2400 \text{ cm}^2/\text{V.S}$
- (C)  $1800 \text{ cm}^2/\text{V.S}$
- (D)  $900 \text{ cm}^2/\text{V.S}$

2. Almost all the resistors are made in a monolithic integrated circuit

- (A) During the emitter diffusion
- (B) While growing the epitaxial layer
- (C) During the base diffusion
- (D) During the collector diffusion

3. The internal resistance of a current source used in the model of a BJT while analyzing a circuit using BJT is

- (A) Very low
- (B) Zero
- (C) Infinite
- (D) Very high

4. The impedance matrices of two, two port networks are given by

$$\begin{bmatrix} 3 & 2 \\ 2 & 3 \end{bmatrix} \text{ and } \begin{bmatrix} 15 & 5 \\ 5 & 25 \end{bmatrix}$$

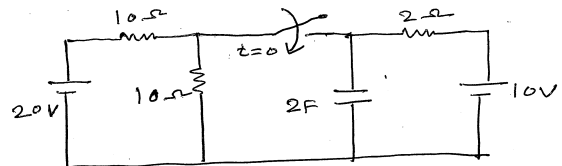
If these two networks are connected in series, the impedance matrix of the resulting two port network will be

- (A)  $\begin{bmatrix} 3 & 5 \\ 2 & 25 \end{bmatrix}$
- (B)  $\begin{bmatrix} 18 & 7 \\ 7 & 28 \end{bmatrix}$
- (C)  $\begin{bmatrix} 15 & 2 \\ 5 & 3 \end{bmatrix}$
- (D) indeterminate

5. In a linear circuit, the superposition principle can be applied to calculate the

- (A) Voltage and power
- (B) Voltage and current
- (C) Current and power
- (D) Voltage, current and power

6. In the circuit shown below, the switch is open for a long time and closed at time  $t = 0$ . What is the current through the switch after the switch is closed at  $t = 0$  ?



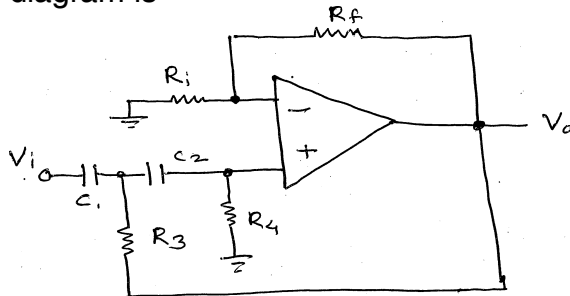
- (A) 0 A
- (B) 1 A
- (C) 2 A
- (D) 5 A

7. A half wave rectifier is equivalent to

- (A) Clamper circuit
- (B) Clipper circuit
- (C) A clamper circuit with negative bias
- (D) A clamper circuit with positive bias

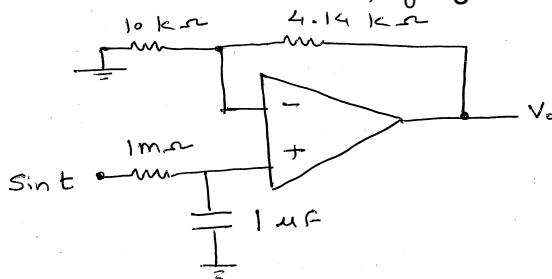


8. Configuration of the Operational Amplifier shown in the following circuit diagram is



- (A) Differentiator
- (B) Schmitt trigger
- (C) Second order high pass filter
- (D) Wien bridge oscillator

9. In the circuit shown below,  $V_o$  is given by



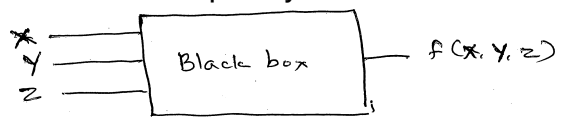
- (A)  $\sin\left(t - \frac{\pi}{4}\right)$
- (B)  $\sin\left(t + \frac{\pi}{4}\right)$
- (C)  $\sin t$
- (D)  $\cos t$

10. What is the minimized logic expression corresponding to given k-map ?

	YZ 00	01	11	10
WX 00			1	
01	1	1	1	
11		1	1	1
10		1		

- (A) XZ
- (B)  $X\bar{W}\bar{Y} + \bar{W}YZ + WXY$
- (C)  $\bar{W}X\bar{Y} + \bar{W}YZ + W\bar{Y}\bar{Z}$
- (D)  $XZ + \bar{W}YZ + \bar{W}X\bar{Y} + WXY + W\bar{Y}\bar{Z}$

11. The black box in the following figure consists of a minimum complexity circuit that uses only AND, OR and NOT gates. The function  $f(X, Y, Z) = 1$  whenever x, y are different and 0 otherwise. In addition the 3 inputs X, Y, Z are never all the same value. Which of the following equation lead to the correct design for the minimum complexity circuit ?



- (A)  $\bar{X}Y + X\bar{Y}$
- (B)  $X + \bar{Y}Z$
- (C)  $\bar{X}\bar{Y}\bar{Z} + X\bar{Y}Z$
- (D)  $XY + \bar{Y}Z + \bar{Z}$

12. The full adder adds the  $k^{\text{th}}$  bits of two numbers to the

- (A) Difference of the previous bits
- (B) Sum of all previous bits
- (C) Carry from  $(k - 1)^{\text{th}}$  bit
- (D) Sum and carry of all the previous bits

13. What will be the contents of register AL and status of CY flag after the following has been executed ?

```
MOV BL, 8C
MOV AL, 7E
ADD AL, BL
```

- (A) 0A and CY flag is set
- (B) 0A and CY flag is reset
- (C) 6A and CY flag is set
- (D) 6A and CY flag is reset



14. When the 8255 is reset, its I/O ports are all initialized as

- (A) Output port using mode 0
- (B) Input port using mode 1
- (C) Output port using mode 1
- (D) Input port using mode 0

15. Consider the following program intended to transfer a block of 5 bytes from A000H to 9000H.

```
START : LXI   B,   9000 H
        LXI   H,   A000 H
        MVI   C,   05 H
LOOP   : MOV   A,   M
        STAX  B
        INX   B
        INX   H
        DCR   C
        JNZ   LOOP
        HLT
```

The above program will not work because

- (A) C register is used as a counter
- (B) DCRC instruction will not affect zero flag
- (C) JNZ instruction is used instead of JZ
- (D) The first two instructions in the loop should have been LDAX D and MOV M, A

16. What is the output of following 'C' Code ?

```
#include <stdio.h>
void main()
{
    int a[2][3] = {1, 2, 3, 4, 5};
    int i = 0, j = 0;
    for (i = 0; i < 2; i++)
    for (j = 0; j < 3; j++)
    printf("%d", a[i][j]);
}
```

- (A) 1 2 3 junk 4 5
- (B) Compile time error
- (C) 1 2 3 0 4 5
- (D) 1 2 3 3 4 5

17. What is the output of the following program ?

```
main()
{
    char thought[2][30]={"Don't walk in front of me..", "I am not follow"};
    printf("%c%c", *(thought[0]+9),
    * (*(thought+0)+5));
}
```

- (A) KK
- (B) Don't walk in front of me
- (C) I am not follow
- (D) K

18. What is the output of the following 'C' Code ?

```
#include <stdio.h>
void main ()
{
    char letter = 'Z';
    printf("\n%c", letter);
}
```

- (A) Z
- (B) 90
- (C) Error
- (D) Garbage value



19. The phenomenon of microwave signals following the curvature of earth is known as
- (A) Faraday effect
  - (B) Ducting
  - (C) Wave tilt
  - (D) Troposcatter
20. A rectangular waveguide measures  $3 \times 4.5$  cm internally and has a 9 GHz signal propagated in it. The cut-off wavelength for  $TE_{10}$  mode is
- (A) 5 cm
  - (B) 10 cm
  - (C) 15 cm
  - (D) 9 cm
21. By measuring the VSWR values in the main and ancillary waveguide of a directional coupler, we can determine its
- (A) Phase co-relation and efficiency
  - (B) Frequency shift and phase variations
  - (C) Attenuation and radiation efficiency
  - (D) Directivity and coupling factor
22. Generally speaking, frequency modulation can be achieved by
- (A) A linear multiplier
  - (B) Use of IF amplifiers
  - (C) Use of a discriminator
  - (D) A voltage controlled oscillator
23. The key difference between IF amplifier and audio amplifier is
- (A) The use of filtration component
  - (B) Voltage requirements
  - (C) Frequency of operation
  - (D) That audio amplifiers are usually in IC form
24. The main purpose of inserting a microwave isolator in a microwave circuit is for
- (A) Offering minimum forward impedance, with maximum reverse impedance
  - (B) Offering maximum power output from the source
  - (C) Maintaining frequency stability of the source
  - (D) Maintaining amplitude stability of output power
25. Heating of the resistive elements of a thyristor such as metallic joints, leads and interfaces depends on
- (A) Holding current ( $I_H$ )
  - (B) Latching current ( $I_L$ )
  - (C) Maximum Surge Current ( $I_{SM}$ )
  - (D) Maximum RMS current ( $I_{rms}$ )
26. A salient pole synchronous motor is running at no load. Its field current is switched off. The motor will
- (A) Come to stop
  - (B) Continue to run at synchronous speed
  - (C) Continue to run at a speed slightly more than the synchronous speed
  - (D) Continue to run at a speed slightly less than the synchronous speed
27. Minimum value of the gate current (which is usually specified at a given forward break over voltage) below which reliable turn 'ON' of the thyristor cannot be guaranteed is referred to as
- (A) Gate current to trigger
  - (B) Peak forward gate current
  - (C) Latching current
  - (D) Holding current



28. Strain gauge, LVDT and thermocouple are examples of
- (A) Active transducers
  - (B) Passive transducers
  - (C) Analog transducers
  - (D) Pressure transducers
29. The transient response, with feedback system
- (A) Rises slowly
  - (B) Rises quickly
  - (C) Decays slowly
  - (D) Decays quickly
30. Voltages  $V_Y = 100 \sin(1000t)$  and  $V_X = 50 \sin(1000t)$  are connected to Y and X terminals of a CRO respectively. What is the shape of the figure seen on the CRO ?
- (A) A circle
  - (B) A straight line
  - (C) An ellipse
  - (D) A parabola
31. Which of the following is/are valid statements ?
- If an electric field is applied to an N-type semiconductor bar, the electrons and holes move in opposite directions due to their opposite charges. The net current is
- I. Due to both electrons and holes with electrons as majority carriers.
  - II. The sum of electron and hole currents.
  - III. The difference between electron and hole current.
- (A) I
  - (B) I and II
  - (C) II
  - (D) III
32. Consider the following statements regarding the driving point admittance function :
- $$Y(s) = \frac{s^2 + 2.5s + 1}{s^2 + 4s + 3}$$
- I. It is an admittance of RL network.
  - II. Poles and zeros alternate on the negative real axis of the s-plane.
  - III. The lowest critical frequency is a pole.
  - IV.  $Y(0) = \frac{1}{3}$ .
- Which of the statements are correct ?
- (A) I, II and III
  - (B) II and IV
  - (C) I and III
  - (D) I, II, III and IV
33. Consider the following statements :  
The lower cutoff frequencies for an RC coupled CE amplifier depends on
- I. Input and output coupling capacitors.
  - II. Emitter bypass capacitor.
  - III. Junction capacitors.
- Which of the statements is/are correct ?
- (A) I alone
  - (B) II alone
  - (C) I and II
  - (D) II and III
34. Consider the following statements regarding the logic families :
- I. ECL has the least propagation delay.
  - II. TTL has the largest fanout.
  - III. CMOS has the highest noise margin.
  - IV. TTL has the lowest power consumption.
- Which of the following statements are correct ?
- (A) I and III
  - (B) II and IV
  - (C) III and IV
  - (D) I and II



- 35.** Consider the following statements :  
In 8085 microprocessor, the SIM instruction outputs the contents of the accumulator to define
- I. Interrupt mask bit.
  - II. Interrupt pending bit.
  - III. Serial input data line.
  - IV. Serial output data line.
- Which of the statements are correct ?
- (A) I and II                      (B) II and III  
(C) III and IV                    (D) I and IV
- 36.** Consider the following C statements :
- I. `X == 1 ; X ++ ;`
  - II. `# define max = 40 ;`
  - III. `X = 1 ; X -- ;`
  - IV. `For ( i = 0 ; i <= 1 ; i ++ )  
{ printf ("i=%d\n");  
}`
- Which of the C statements given above are correct ?
- (A) I and II only  
(B) I, II and III only  
(C) II and III only  
(D) III and IV only
- 37.** Consider the following statements :  
If the narrow dimension of a standard rectangular waveguide carrying the dominant mode is reduced, then the
- I. Wave impedance will increase.
  - II. Attenuation will increase.
  - III. Guide wavelength will decrease.
  - IV. Power handling capability will decrease.
- Which of the following statements are correct ?
- (A) I and II  
(B) II and IV  
(C) III and IV  
(D) I and III
- 38.** Consider the following :
- I. Pulse – position modulation
  - II. Pulse – code modulation
  - III. Pulse – width modulation
- Which of these communication methods are not digital ?
- (A) I, II  
(B) II, III  
(C) I, III  
(D) I, II, III
- 39.** Which of the following is a bidirectional device ?
- I. SCR
  - II. BJT
  - III. Triac
  - IV. UJT
- (A) I, II  
(B) I, III, IV  
(C) I, IV  
(D) III
- 40.** Consider the following statements regarding a PI compensator for a control system :
- I. It is equivalent to adding a zero at origin.
  - II. It reduces overshoot.
  - III. It improves order of the system by 1.
  - IV. It improves steady state error of the system.
- Which of the statements given above are correct ?
- (A) I, II, III and IV  
(B) I, II and III  
(C) II, III and IV  
(D) I and IV



Q. No(s). **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 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 answers to these items using the codes given below and mark your answer 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) :** FETs are more suitable at the input stages of millivoltmeter and CROs than BJTs.

**Reason (R) :** A FET has lower output impedance than BJT.

**42. Assertion (A) :** Maximum power transfer from a source with complex internal impedance to a complex load will occur if the source impedance is same as the load impedance.

**Reason (R) :** The efficiency of maximum power transfer cannot exceed 50%.

**43. Assertion (A) :** A monostable multivibrator can be used to alter the pulse width of a train of pulses.

**Reason (R) :** Monostable multivibrator has a single stable state.

**44. Assertion (A) :** Master slave JK flip-flop is free from race around condition.

**Reason (R) :** Master slave JK flip-flop uses two JK flip-flops.

**45. Assertion (A) :** In programming languages like ‘C’, some redundancy is useful in the programming language syntax.

**Reason (R) :** Redundancy makes a program easier to read and allows more error checking to be done during compilation.

**46. Assertion (A) :** GaAs is preferred to silicon for fabrication of Gunn diode.

**Reason (R) :** GaAs has better frequency stability than Silicon.

**47. Assertion (A) :** Square law detectors are not satisfactory for the detection of modulated signal.

**Reason (R) :** With square law detectors, harmonic distortion of the order of 25% occurs during demodulation process.

**48. Assertion (A) :** Thyristors are preferred over power diodes in variable power rectifiers.

**Reason (R) :** Thyristors provide controlled rectification.

**49. Assertion (A) :** 8085 microprocessor can reference a memory stack without specifying an address.

**Reason (R) :** The address is always available and automatically updated in the stack pointer.

**50. Assertion (A) :** The capacitive transducer is best suited for measurement of very small pressure differentials under dynamic conditions.

**Reason (R) :** The capacitive transducer can be excited by both d.c. and A.C. voltages.





51. Consider the following devices :

- I. BJT in CB mode
- II. BJT in CE mode
- III. JFET
- IV. MOSFET

The correct sequence of these devices in increasing order of their input impedance is

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

52. In the fabrication of N–P–N transistor, the processes involved are

- I. Diffusion
- II. Oxidation
- III. Epitaxy
- IV. Lithography

The correct sequence in which these processes are to be carried out is

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

53. Mesh analysis of a circuit involves following steps. Identify the correct sequence of steps.

- I. Write mesh equations using KVL and simplify them.
- II. Number of equations should be equal to the number of meshes in the network.
- III. Solve the simultaneous system of equations.
- IV. Transform all current sources to voltage sources.
- V. Identify and assign a current to each mesh of the network preferably in the same direction.

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

54. Consider the following logic families :

- I. MOS
- II. DTL
- III. RTL
- IV. ECL

The sequence of these logic families in the order of their increasing noise margin is

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

55. In a 8085 microprocessor data is to be fetched from a memory location.

Following are the steps involved.

I. Microprocessor asserts  $\overline{IO/\overline{m}}$  low and  $\overline{RD}$  low.

II. Address of the memory location is sent on  $AD_0 - AD_7$  and  $A_8$  to  $A_{15}$ .

III. Data is placed by memory on the data bus  $D_0 - D_7$ .

IV. ALE is made low to high to low.

Place the steps in sequence of execution.

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

56. The following fragment of 'C' program is expected to output ASCII values and their corresponding characters. Arrange the statements in the order of increasing sequence :

I. char ch ;

II. main ( ) {

III. printf ("n%d %c," ch, ch);}

IV. for (ch = 0 ; ch <= 255 ; ch ++)

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



57. Identify the correct sequence in case of Reflex Klystron :

- I. Electrons are collected by the walls of the cavity.
- II. Cavity gap enables velocity modulation of electrons.
- III. Repeller region repels the electrons.
- IV. Cavity gap where the electrons release energy during retarding field, there by generation microwaves.

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

58. Identify the correct sequence of subsystems in a FM receiver. The subsystems are

- I. Limiter
- II. IF amplifier
- III. Mixer
- IV. RF amplifier
- V. Discriminator
- VI. Audio amplifier

- (A) I II III IV V VI
- (B) IV I II V III VI
- (C) IV III II I V VI
- (D) IV III I II VI V

59. For a fiber with a core of refractive index 1.47, claddings with different index of refraction viz. 1.45, 1.40, 1.35 and 1.30 were tried. The resulting numerical apertures, are given below :

- I. 0.5817
- II. 0.448
- III. 0.242
- IV. 0.686

The correct sequence matching the index of refraction of cladding is

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

60. Some of the functional building blocks of a measurement system are

- I. Primary Sensing Element (PSE)
- II. Variable Conversion Element (VCE) or Transducer
- III. Variable Manipulation Element (VME)
- IV. Data Presentation Element (DPE)
- V. Data Transmission Element (DTE)

The correct sequential connection of the functional building blocks for an electronic pressure gauge will be

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



61. Match List – I (type of conductor) with List – II (position of Fermi level) :

- | List – I                           | List – II                         |
|------------------------------------|-----------------------------------|
| a. N-type semiconductor            | 1. Middle of band gap             |
| b. P-type semiconductor            | 2. Above conduction band          |
| c. Intrinsic semiconductor         | 3. Near but below conduction band |
| d. Degenerate n-type semiconductor | 4. Near but above valence band    |

Codes :

- |     | a | b | c | d |
|-----|---|---|---|---|
| (A) | 1 | 2 | 3 | 4 |
| (B) | 3 | 4 | 1 | 2 |
| (C) | 1 | 4 | 3 | 2 |
| (D) | 3 | 2 | 1 | 4 |

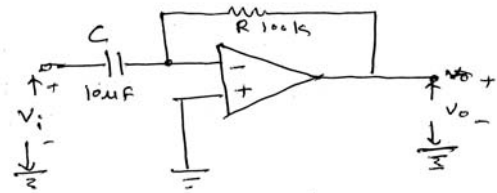
62. Match List – I (Theorem/Law) with List – II (Property) :

- | List – I                  | List – II   |
|---------------------------|---|
| a. Norton's Theorem       | 1. Effects of independent source in a linear circuit are additive |
| b. Superposition Theorem  | 2. Law of non-accumulation of charge holds good at nodes          |
| c. Thevenin's Theorem     | 3. Current sources with shunt resistor                            |
| d. Kirchoff's current law | 4. Voltage source with resistor                                   |

Codes :

- |     | a | b | c | d |
|-----|---|---|---|---|
| (A) | 2 | 4 | 1 | 3 |
| (B) | 3 | 1 | 4 | 2 |
| (C) | 2 | 1 | 4 | 3 |
| (D) | 3 | 4 | 1 | 2 |

63. An operational amplifier circuit is shown in the figure below. Different inputs and outputs are given under List – I and List – II.



List – I

List – II

- |    |    |
|----|----|
| a. | 1. |
| b. | 2. |
| c. | 3. |
| d. | 4. |

Codes :

- |     | a | b | c | d |
|-----|---|---|---|---|
| (A) | 2 | 4 | 1 | 3 |
| (B) | 1 | 3 | 2 | 4 |
| (C) | 2 | 3 | 1 | 4 |
| (D) | 1 | 4 | 2 | 3 |



64. Match List – I (logic type) with List – II (power dissipation per gate in mW) :

List – I	List – II
a. DTL	1. 10
b. TTL	2. 8
c. ECL	3. 1
d. MOS	4. 40

Codes :

	a	b	c	d
(A)	1	2	3	4
(B)	4	3	2	1
(C)	2	1	4	3
(D)	1	3	2	4

65. Match List – I with List – II.

List – I	List – II
a. Immediate addressing	1. LDA 305C
b. Implied addressing	2. MOV A, B
c. Register addressing	3. LXI H, 2050
d. Direct addressing	4. RRC

Codes :

	a	b	c	d
(A)	3	4	2	1
(B)	2	1	3	4
(C)	3	1	2	4
(D)	2	4	3	1

66. Match List – I (operator of C language) with List – II (characteristics of the operator) :

List – I	List – II
a. ^	1. Unary operator
b. &	2. Binary operator
c. mod	3. Ternary operator
d. ?	4. Invalid operator

Codes :

	a	b	c	d
(A)	4	3	2	1
(B)	2	1	4	3
(C)	1	4	2	3
(D)	1	2	3	4

67. Match List – I with List – II.

List – I	List – II
a. Reflex klystron	1. TE <sub>10</sub> mode
b. Rectangular waveguide	2. Mode jumping klystron
c. Gunn diode	3. Electron bunching
d. Magnetron	4. Negative resistance

Codes :

	a	b	c	d
(A)	3	1	4	2
(B)	1	2	3	4
(C)	4	3	2	1
(D)	3	4	1	2

68. Match List – I (modulation) with List – II (power input to antenna in watts).

List – I	List – II
a. 100% AM	1. 1.5
b. 50% AM	2. 1.125
c. 10% AM	3. 1.005
d. FM	4. 1.00

Codes :

	a	b	c	d
(A)	4	3	2	1
(B)	1	2	3	4
(C)	3	2	1	4
(D)	1	4	3	2



69. Match List – I (power device) with its associated feature in List – II :

List – I	List – II
a. Highest voltage/ current ratings	1. MOSFET
b. Possibility of effective	2. Diac
c. Two terminal triggering device	3. Power Diode
d. Uncontrolled rectification	4. SCR

**Codes :**

	a	b	c	d
(A)	3	1	2	4
(B)	4	2	1	3
(C)	4	1	2	3
(D)	3	2	1	4

70. Match List – I (Transducers) with List – II (Measured Physical Parameters) :

List – I	List – II
a. Capacitive transducer	1. Pressure
b. Thermocouple	2. Radiation
c. P-i-N diode	3. Displacement
d. Diaphragm	4. Temperature

**Codes :**

	a	b	c	d
(A)	2	4	3	1
(B)	3	1	2	4
(C)	1	2	3	4
(D)	3	4	2	1

Read the 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 regenerative comparator. 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.

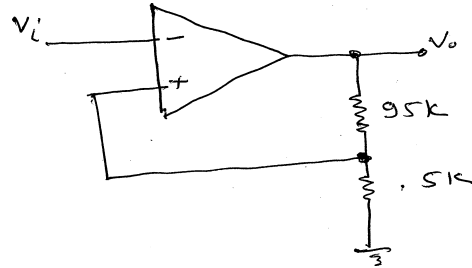
71. The first stage of operational amplifier is

- (A) Differential amplifier
- (B) Constant current source
- (C) Emitter follower
- (D) Level translator



72. Analog multiplication is possible with one of the following configuration of operational amplifier
- (A) Differentiator
  - (B) Precision rectifier
  - (C) Sample and hold circuit
  - (D) Logarithmic amplifier
73. In an Op-Amp based differentiator circuit, if the input voltage  $V_{dc} = +5V$ , the output will be
- (A) zero
  - (B) square pulse
  - (C) ramp
  - (D) +5V

74. Identify the functionality of following Op-Amp configuration.



- (A) Non-inverting amplifier with gain 20
  - (B) Inverting amplifier with gain 19
  - (C) Comparator
  - (D) Schmitt trigger
75. Very high input resistance differential stages are used in operational amplifier
- (A) To minimize input offset voltage
  - (B) To minimize output offset voltage
  - (C) To minimize input bias current
  - (D) To minimize output offset current



Total Number of Pages : 16

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