

Test Paper : II
Test Subject : ELECTRONIC SCIENCE
Test Subject Code : K-3117

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 : II

Subject : ELECTRONIC SCIENCE

Time : 1 Hour 15 Minutes

Maximum Marks : 100

Number of Pages in this Booklet : 8

Number of Questions in this Booklet : 50

ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಸೂಚನೆಗಳು

- ಈ ಪುಟದ ಮೇಲ್ಭಾಗದಲ್ಲಿ ಒದಗಿಸಿದ ಸ್ಥಳದಲ್ಲಿ ನಿಮ್ಮ ರೋಲ್ ನಂಬರನ್ನು ಬರೆಯಿರಿ.
- ಈ ಪತ್ರಿಕೆಯು ಒಂದು ಆಯ್ಕೆ ವಿಧದ ಐವತ್ತು ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡಿದೆ.
- ಪರೀಕ್ಷೆಯ ಪ್ರಾರಂಭದಲ್ಲಿ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ನಿಮಗನಿರೀಕ್ಷಿಸಲಾಗುವುದು. ಮೊದಲ 5 ನಿಮಿಷಗಳಲ್ಲಿ ನಿಮ್ಮ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ತೆರೆಯಲು ಮತ್ತು ಕೆಳಗಿನಂತೆ ಕಡ್ಡಾಯವಾಗಿ ಪರೀಕ್ಷಿಸಲು ಕೋರಲಾಗಿದೆ.
(i) ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಗೆ ಪ್ರವೇಶವನ್ನು ಪಡೆಯಲು, ಈ ಹೊದಿಕೆ ಪುಟದ ಅಂಚಿನ ಮೇಲಿರುವ ಪೇಪರ್ ಸೀಲನ್ನು ಹರಿಯಿರಿ. ಸ್ವಿಚ್ಚರ್ ಸೀಲ್ ಇಲ್ಲದ ಅಥವಾ ತೆರೆದ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ಸ್ವೀಕರಿಸಬೇಡಿ.
(ii) ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯಲ್ಲಿನ ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ ಮತ್ತು ಪುಟಗಳ ಸಂಖ್ಯೆಯನ್ನು ಮುಖಪುಟದ ಮೇಲೆ ಮುದ್ರಿಸಿದ ಮಾಹಿತಿಯೊಂದಿಗೆ ತಾಳಿ ನೋಡಿ. ಪುಟಗಳು/ಪ್ರಶ್ನೆಗಳು ಕಾಣೆಯಾದ, ಅಥವಾ ದ್ವಿಪ್ರತಿ ಅಥವಾ ಅನುಕ್ರಮವಾಗಿಲ್ಲದ ಅಥವಾ ಇತರ ಯಾವುದೇ ವ್ಯತ್ಯಾಸದ ದೋಷಪೂರಿತ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೊಡಲೆ 5 ನಿಮಿಷದ ಅವಧಿ ಒಳಗೆ, ಸಂವೀಕ್ಷಕರಿಂದ ಸರಿ ಇರುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ಬದಲಾಯಿಸಿಕೊಳ್ಳಬೇಕು. ಆ ಬಳಿಕ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಬದಲಾಯಿಸಲಾಗುವುದಿಲ್ಲ. ಯಾವುದೇ ಹೆಚ್ಚು ಸಮಯವನ್ನೂ ಕೊಡಲಾಗುವುದಿಲ್ಲ.
- ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೂ (A), (B), (C) ಮತ್ತು (D) ಎಂದು ಗುರುತಿಸಿದ ನಾಲ್ಕು ಪರ್ಯಾಯ ಉತ್ತರಗಳಿವೆ. ನಿಮ್ಮ ಪ್ರಶ್ನೆಯ ಎದುರು ಸರಿಯಾದ ಉತ್ತರದ ಮೇಲೆ, ಕೆಳಗೆ ಕಾಣಿಸಿದಂತೆ ಅಂದಾಕೃತಿಯನ್ನು ಕಟ್ಟಿಸಬೇಕು.
ಉದಾಹರಣೆ :

A	B	C	D
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(C) ಸರಿಯಾದ ಉತ್ತರವಾಗಿದ್ದಾಗ.
- ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ I ರಲ್ಲಿ ಕೊಟ್ಟಿರುವ OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ I ಮತ್ತು ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ II ರಲ್ಲಿ ಇರುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ನಿಮ್ಮ ಉತ್ತರಗಳನ್ನು ಸೂಚಿಸತಕ್ಕದ್ದು OMR ಹಾಳೆಯಲ್ಲಿ ಅಂದಾಕೃತಿಯಲ್ಲದ ಬೇರೆ ಯಾವುದೇ ಸ್ಥಳದಲ್ಲಿ ಉತ್ತರವನ್ನು ಗುರುತಿಸಿದರೆ, ಅದರ ಮಾಲ್ಯಮಾಪನ 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 ಬರೆದರೆ, ನಿಮ್ಮ ಅನರ್ಹತೆಗೆ ಬಾಧ್ಯರಾಗಿರುತ್ತೀರಿ.
- ಪರೀಕ್ಷೆಯು ಮುಗಿದನಂತರ, ಕಡ್ಡಾಯವಾಗಿ OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ಸಂವೀಕ್ಷಕರಿಗೆ ನಿಮ್ಮ ಹಿಂತಿರುಗಿಸಬೇಕು ಮತ್ತು ಪರೀಕ್ಷಾ ಕೊಠಡಿಯ ಹೊರಗೆ OMR ನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ಕೊಂಡೊಯ್ಯಕೊಡದು.
- ಪರೀಕ್ಷೆಯ ನಂತರ, ಪರೀಕ್ಷಾ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಮತ್ತು ನಕಲು OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
- ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್ ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರವೇ ಉಪಯೋಗಿಸಿರಿ.
- ಕ್ಯಾಲ್ಕುಲೇಟರ್, ವಿದ್ಯುನ್ಮಾನ ಉಪಕರಣ 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 fifty 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 circle 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 questions are to be indicated in the **OMR Sheet kept inside the Paper I Booklet only**. If you mark at any place other than in the circles in the OMR 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 after the examination.
- Use only Blue/Black Ball point pen.**
- Use of any calculator, Electronic gadgets 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 – II

Note : This paper contains **fifty (50)** objective type questions. **Each** question carries **two (2)** marks. **All** questions are **compulsory**.

1. In intrinsic semiconductor at absolute zero temperature the probability of finding an electron in the conduction band is
(A) 0% (B) 40%
(C) 80% (D) 100%
2. The diffusion capacitance of a P-N junction
(A) Decreases with increasing current and increasing temperature
(B) Decreases with decreasing current and increasing temperature
(C) Increases with increasing current and increasing temperature
(D) Increases with increasing current and decreasing temperature
3. In a balanced Wheatstone bridge, if position of defector and source are interchanged then bridge will still remain balanced
(A) Duality principle
(B) Compensation theorem
(C) Reciprocity principle
(D) Equivalence theorem
4. Laplace transform of $x(at)$
(A) $|a| \times (as)$ (B) $\frac{1}{|a|} \times (as)$
(C) $\frac{1}{|a|} \times \left(\frac{s}{a}\right)$ (D) $\frac{1}{|a|} \times (s)$
5. Which of the following offers poor stability against variations in the leakage current ?
(A) Fixed-bias configuration
(B) Emitter-bias configuration
(C) Voltage-divider bias configuration
(D) Collector to base bias configuration
6. A triangular wave oscillator can consist of an op-amp comparator, followed by a(n)
(A) Differentiator (B) Amplifier
(C) Multivibrator (D) Integrator
7. One of the following is not a synchronous input with reference to the output of flip-flops
(A) J-input in J-K flip-flop
(B) R-input in an R-S flip-flop
(C) PRESET input in a J-K flip-flop
(D) D-input in a D-flip-flop
8. Determine the output frequency for a frequency division circuit that contains 12 flip-flops with an input clock frequency of 20.48 MHz
(A) 1.7067 MHz (B) 5 kHz
(C) 30.24 kHz (D) 15 kHz
9. If the following instruction is executed by 8085 microprocessor then the sequence of values written at the address pin A15-A8 is
8FFE LDA 4567H
(A) 8F, 90, 45, 67 (B) 8F, 8F, 90, 67
(C) 8F, 8F, 90, 45 (D) FF, FF, 00, 67
10. A 8085 based microprocessor kit is supposed to do the following :
i) Acquire two inputs from ADC,
ii) Add them and display the result on a serial display
Identify which of the following IC is not required ?
(A) 8255 (B) 8253
(C) 8251 (D) 8279



11. Format of double floating point data type is
(A) Sign bit, 11 bit exponent and 52 bit mantissa
(B) Sign bit, 8 bit exponent and 23 bit mantissa
(C) Sign bit, 15 bit exponent and 64 bit mantissa
(D) 8 bit exponent and 64 bit mantissa
12. Which of the following is type declaration statement in C ?
(A) $s = s + 1;$
(B) $king = horse + 1;$
(C) $int bar;$
(D) $prin = prin * prin;$
13. The wave in wave guide has
(A) group velocity inversally proportional to wavelength
(B) larger frequency than in free space
(C) diminishing wavelength than in the free space
(D) larger wavelength than in the free space
14. In an impedance Smith chart, a clockwise movement along a constant resistance circle gives rise to
(A) decrease in the value of reactance
(B) an increase in the value of reactance
(C) no change in reactance value
(D) no change in the impedance value
15. An audio signal (say from 50 Hz to 10000 Hz) is frequency translated by a carrier having a frequency of 106 Hz. The values of initial (without frequency translation) and final (after frequency translation) fractional change in frequency from one band edge to the other are
(A) 200 and 1.01 (B) 200 and 10.01
(C) 200 and 100.1 (D) 200 and 200
16. In standard pulse code modulation system
(A) Suffers from the disadvantages of its incompatibly with TDM
(B) Quantising noise can be reduced by decreasing the number
(C) Quantising noise can be overcome by companding
(D) Large bandwidth is required
17. An SCR is triggered at 40° in the positive half cycle only. The average anode current is 50 A. If the firing angle is changed to 80° , the average anode current is likely to be
(A) 50 A
(B) 25 A
(C) Less than 50 A but more than 25 A
(D) Less than 25 A
18. A technique that is used to minimize the intermodal dispersion effect is to
(A) Minimise the core diameter
(B) Use a higher frequency light source
(C) Use plastic cladding
(D) Use of glass cladding
19. Fourier transform of a signal can be visually displayed on following instrument
(A) CRO
(B) Digital storage oscilloscope
(C) Spectrum analyser
(D) Logic analyser
20. A lead compensator may be represented by one of the following transfer functions
(A) $\frac{s+2}{s+4}$ (B) $\frac{s+4}{s+2}$
(C) $\frac{s(s+2)}{s+4}$ (D) $\frac{s+2}{s(s+4)}$



Q. No. (s) 21 to 30 : The following items consist of two statements, one labeled the "Assertion (A)" and other "Reason (R)". You are to examine these two statements carefully and decide if the Assertion (A) and the Reason (R) an 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 :

- A) Both (A) and (R) are true and (R) is correct explanation of (A)
- B) Both (A) and (R) are true, but (R) is not correct explanation of (A)
- C) (A) is true but (R) is false
- D) (A) is false but (R) is true

21. Assertion (A) : After ion implantation, annealing is necessary.

Reason (R) : This repairs the crystal damage and activates the dopants.

22. Assertion (A) : The piecewise linear equivalent circuit model is the most accurate equivalent model of a diode.

Reason (R) : The model is not valid for both AC and DC applications.

23. Assertion (A) : An Op-Amp can amplify DC signal

Reason (R) : Op-Amp consists of differential input stage.

24. Assertion (A) : In a serial in serial out shift register, access is available only to the left most or right most flip-flops.

Reason (R) : If the output of a shift register is feedback to serial input it can be used as a ring counter.

25. Assertion (A) : Stack memory is LIFO

Reason (R) : Stack pointer can be initialised to lowest address of stack memory.

26. Assertion (A) : `int a;` is a non-executable statements.

Reason (R) : Processor is used to allocate memory for declared variables.

27. Assertion (A) : Electromagnetic waves acquire an apparent velocity greater than velocity of light in space.

Reason (R) : Electromagnetic waves exhibit TEM characteristics.

28. Assertion (A) : Modulation facilitates use of practicable antenna.

Reason (R) : Modulation reduces the bandwidth

29. Assertion (A) : Inverters and choppers use fast switching thyristors.

Reason (R) : Fast switching SCR has low turn of time.

30. Assertion (A) : Thermocouple instruments can be used for ac only.

Reason (R) : Thermocouple instrument has a non linear scale.

31. Following are the regions :

1. SiO_2
2. Reverse P-N junction
3. n^- region
4. p^+ region

Arrange these in the increasing order of conductivity.

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

32. Following are the transistors :

1. BC 107
2. 2N 3055
3. SL 100

Arrange these transistors in the decreasing order of power handling capacity.

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

33. Consider the following for 8085 :

1. LXI
2. STA
3. DAA
4. ADD M

Arrange these in terms of increasing order of number of machine cycles.

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



34. Consider the following blocks in PCM receiver :

1. Reconstruction filter
2. Regenerative circuit
3. Decoder

Arrange these in the order from input to output.

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

35. Consider the following fibers :

1. Plastic clad fiber
2. Plastic fiber
3. Silica fiber

Arrange them in the increasing order of loss.

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

Directions : Q. No. 36 to 45 :

In the following questions, match List – I and List – II select the correct answer using the codes given below the lists :

36. **List – I**

- a. BJT
- b. FET
- c. PN diode
- d. Tunnel diode

List – II

- i. Narrow depletion region
- ii. Used for both AC as well as DC applications
- iii. High gain
- iv. Low gain

Codes :

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

37. **List – I**

- a. Z_{11}
- b. Z_{12}
- c. Z_{21}
- d. Z_{22}

List – II

- i. Z_r
- ii. Z_o
- iii. Z_i
- iv. Z_f

Codes :

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

38. **List – I**

- a. Operational amplifier
- b. Astable Multivibrator
- c. Basic integrator
- d. PLL

List – II

- i. Low pass filter
- ii. One capacitor
- iii. Two capacitances
- iv. Class B stage

Codes :

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

39. **List – I**

- a. SRAM
- b. DRAM
- c. Parallel Access
- d. ROM

List – II

- i. Bios memory
- ii. Cache memory
- iii. Main memory
- iv. Register

Codes :

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

40. **List – I**

- a. Direct Addressing
- b. Register Addressing
- c. Register Indirect
- d. Immediate Addressing

List – II

- i. MOV A, M
- ii. LXI FOOOH
- iii. STA FFCOH
- iv. MOV C, A

Codes :

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



- 41. List – I**
- a. Assembler
 - b. Compiler
 - c. Linker
 - d. debugger
- List – II**
- i. Finds faults driving execution
 - ii. Creates machine code
 - iii. Creates object file
 - iv. Creates executive file

Codes :

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

- 42. List – I**
- a. Characteristic Impedance
- List – II**
- i. $\nabla \cdot D = \rho_v$

b. Poynting vector ii. $\sqrt{\frac{j\omega\mu}{(\sigma + j\omega\epsilon)}}$

c. Displacement Current iii. $E \times H$

d. Point form of Gauss law iv. $\frac{\delta D}{\delta t}$

Codes :

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

- 43. List – I**
- a. FM
 - b. DM
 - c. PSK
 - d. PCM
- List – II**
- i. μ -law
 - ii. capture effect
 - iii. slope overload
 - iv. matched filter

Codes :

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

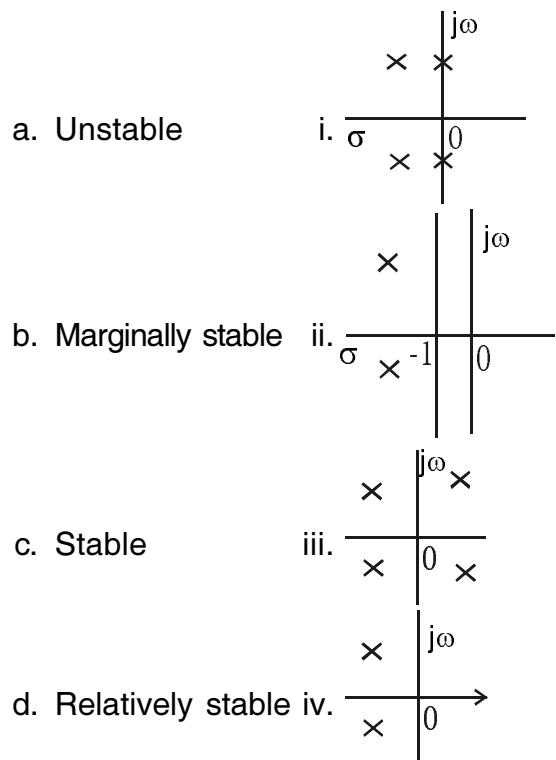
- 44. List – I**
- a. LASER
 - b. Solar cell
 - c. Photo diode
 - d. LED
- List – II**
- i. Emit monochromatic light of low intensity
 - ii. Conduction due to incident light
 - iii. Power to load
 - iv. Emit monochromatic light of high intensity

Codes :

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

- 45. List – I**
- a. Unstable
 - b. Marginally stable
 - c. Stable
 - d. Relatively stable

List – II



Codes :

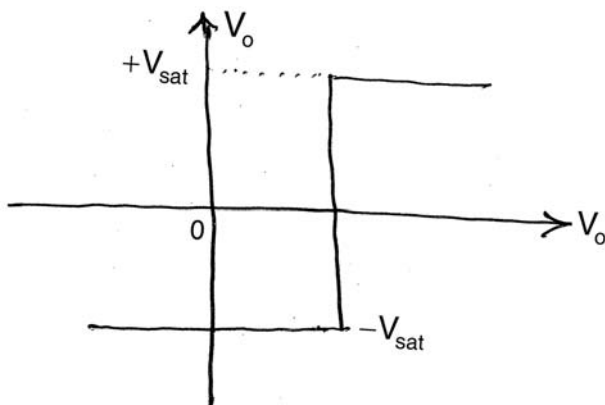
- | | a | b | c | d |
|-----|-----|-----|----|-----|
| (A) | iii | i | iv | ii |
| (B) | iv | iii | ii | i |
| (C) | iii | ii | i | iv |
| (D) | iv | i | ii | iii |



Q. No. 46 to 50 :

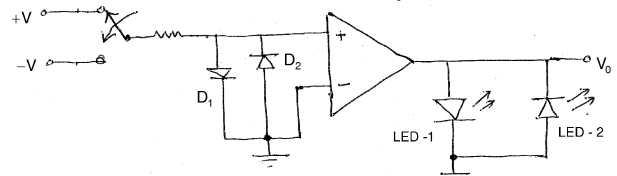
A comparator circuit is a two-input, one-output building block that produces a high or low output depending upon the relative magnitudes of the two inputs. An op-amp can be very conveniently used as a comparator when used without negative feedback. Because of very large value of open-loop voltage gain, it produces either positively saturated or negatively saturated output voltage depending upon whether the amplitude of the voltage applied at the non-inverting input terminal is more or less positive than the voltage applied at the inverting input terminal. One of the inputs of the comparator is generally applied a reference voltage and the other input is fed with the input voltage that needs to be compared with the reference voltage. In a special case where the reference voltage is zero, the circuit is referred to as zero-crossing detector.

46. The following figure shows transfer characteristics of an Op-Amp based circuit. It could possibly be



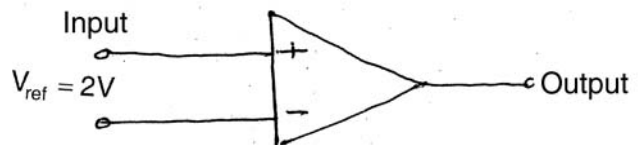
- (A) An inverting comparator
- (B) A non-inverting comparator
- (C) An inverting amplifier with hysteresis
- (D) A non-inverting amplifier with hysteresis

47. For the comparator circuit shown in following figure, diodes D_1 and D_2 have forward biased with voltage drop equal to 0.7 V each. What is the state of LED - 1 and LED - 2 (whether ON or OFF) when the switch SW - 1 is in position A ?



- (A) LED - 1 ON, LED - 2 OFF
- (B) LED - 1 ON, LED - 2 ON
- (C) LED - 1 OFF, LED - 2 ON
- (D) LED - 1 OFF, LED - 2 OFF

48. If the input to the ideal comparator shown in the following figure is a sinusoidal signal of 8V (peak-to-peak) without any dc component, then the output of the comparator has a duty cycle of



- (A) $\frac{1}{2}$
- (B) $\frac{1}{6}$
- (C) $\frac{1}{3}$
- (D) $\frac{1}{12}$

49. Which of the following are the non-linear applications of Op-Amp ?

1. Current to voltage converter
2. Comparator
3. Peak detector
4. Limiter

Select the correct answer from the codes given below

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

50. Why clamp diodes are used in comparator ?

- (A) To reduce output offset voltage
- (B) To increase gain of Op-Amp
- (C) To reduce input offset voltage
- (D) To protect Op-Amp from damage



Total Number of Pages : 8

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Space for Rough Work