(6 pages) Reg. No. : .....

Code No. : 20034 E **Sub. Code : SMPH 51**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2022.

Fifth Semester

Physics — Main

BASIC ELECTRONICS

(For those who joined in July 2017–2019)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. In Nortan's current source
   (a) Short the load resistor
   (b) Disconnect the load resistor
   (c) Short the voltage source
   (d) Open the voltage source

2. In ideal current source the output current is
   (a) zero
   (b) constant
   (c) dependent on load
   (d) dependent on internal resistance

3. For break down in zener diode the requirement is
   (a) forward bias
   (b) reverse bias
   (c) both forward and reverse bias
   (d) none

4. The ac beta given by β_{ac} = _____
   (a) $\Delta I_C / \Delta I_B$ (b) $\Delta I_C \times \Delta I_B$
   (c) $\Delta I_E / \Delta I_B$ (d) $\Delta I_E \times \Delta I_B$

5. A MOSFET has _____ terminals.
   (a) two (b) five
   (c) four (d) three

6. In a P - channel JFET, the charge carriers are
   (a) electrons
   (b) holes
   (c) both electrons and holes
   (d) none of these

7. The common mode gain is
   (a) very high (b) very low
   (c) always unity (d) unpredictable

8. In a Colpitt's oscillator, the feedback is obtained
   (a) by magnetic induction
   (b) by a tickler coil
   (c) from the center of split capacitors
   (d) none of these

9. In ideal op - amp the I/P impedance is _____
   (a) infinite (b) zero
   (c) 1 (d) constant

10. The gain of an actual op - amp is around
    (a) 10,00,000 (b) 1,000
    (c) 100 (d) 15 V

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) State and Explain Norton's theorem.

Or

(b) How will you determine the h-parameters of a linear circuit?

12. (a) Describe the working of P – N junction diode discuss its uses.

Or

(b) Define stability factor. Derive an expression for it.

13. (a) Write a note on JFET connections.

Or

(b) Explain the operation of JFET as an amplifier.

14. (a) Using a circuit diagram explain the working of Hartley oscillator.

Or

(b) With a neat circuit diagram, describe the working of a transistor crystal oscillator.

15. (a) Explain band width and slew rate of an op - amp.

Or

(b) Discuss the action of inverting amplifier.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) State and explain Thevenin's theorem.

Or

(b) State and explain maximum power transfer theorem.

17. (a) Describe the V – I characteristics of P – N junction diode.

Or

(b) Discuss the characteristics of a transistor in CE mode.

18. (a) Describe the working characteristics of UJT.

Or

(b) Explain the operation of push - pull amplifier with circuit.

19. (a) Outline the general theory of feedback.

Or

(b) What is monostable multivibrator? Explain its working with a neat circuit diagram.

20. (a) Discuss A.C analysis of OP-AMP.

Or

(b) Describe the operation of a differential amplifier. Derive an expression for the CMRR.

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