D 93916

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Electronics

ELE 1C 01—ELECTRONIC DEVICES

Time : Two Hours

Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. Give the drain current equation of a JFET.

2. What are the three region of a transistor ?

3. Explain forbidden energy gap.

4. Explain about Shockley's equation.

5. What is a Capacitor ?

6. Explain about extrinsic semiconductors.

7. Explain the structure of JFET.

8. Explain pinch off voltage of JFET.

9. What is meant by the leakage current of a transistor ?

10. Mention the applications of MOSFET.

11. Explain α and β of transistor.

12. Give the structure of NPN transistor. Explain.

(8 × 3 = 24 marks)

Turn over

Section B (Short Essay Questions)

Answer at least **five** *questions.*
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. Explain the current gain of a transistor in CB configuration.

14. Briefly explain about different types of capacitors.

15. Compare between MOSFET and FET.

16. Explain why FET is called as voltage controlled devices.

17. Explain the operation of LCD.

18. Explain about Zener diode.

19. Explain the drain and transfer characteristics of a JFET.

(5 × 5 = 25 marks)

Section C (Essay Questions)

Answer any **one** *question.*
The question carries 11 marks.

20. Explain briefly about three configurations of a bipolar transistor.

21. Differentiate between LED and LCD.

(1 × 11 = 11 marks)

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Electronics

ELE 1B 01—BASIC ELECTRONICS AND NETWORK THEOREMS

Time : Two Hours

Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*

Each question carries 3 *marks.*

All questions can be attended.

Overall Ceiling 24.

1. Define Electric charge and current. What is the relation between charge and current ?

2. Determine the Electric Field at point P $(2, -1, 3)$ when a point charge of 6 nC is placed at the origin.

3. A current of 5A flows through the resistor R when it is connected across a 15 V battery. Determine the value of R and power dissipated.

4. What is meant by a short circuit ? What is the current through the short ?

5. State and explain Superposition Theorem.

6. Define h-parameters of a two-port network.

7. State and explain Kirchhoff's Laws.

8. Differentiate intrinsic and extrinsic semiconductors.

9. What is diffusion current ? Explain.

10. Draw the symbols of PN-junction diode, Zener diode, and LED.

11. Write the colour codes for the resistors

    (a)   150 $\Omega \pm$ 10 %.
    (b)   1 M$\Omega \pm$ 5%.

12. Derive the expression for the equivalent capacitor 'C' when two capacitors of C_1 and C_2 are connected in series.

(8 × 3 = 24 marks)

Section B (Short Essay Questions)

Answer at least **five** *questions.*

Each question carries 5 marks.

All questions can be attended.

Overall Ceiling 25.

13. A coil consists of 2000 turns of copper wire having a cross-sectional area of 0.8 mm². The mean length per turn is 80 cm. Find the resistance of the coil and power absorbed by the coil when connected across the 110 V DC supply. The resistivity of the copper is 0.02 μΩ.

14. State Norton's Theorem. Determine the current flowing through the 20Ω resistor using Norton's Theorem.
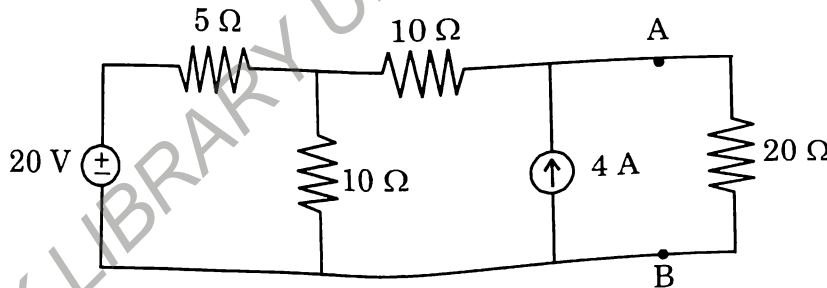
15. Explain the breakdown mechanisms that occurred in PN junction.

16. Explain the energy band diagram for metal, semiconductor and insulator.

17. Explain the input-output characteristics of the Common Emitter configuration of a BJT.

18. Explain the amplifying action of a transistor.
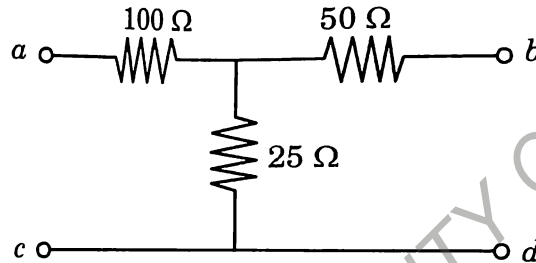
19. Explain the VI- characteristics of SCR.

(5 × 5 = 25 marks)

Section C (Essay Questions)

Answer any **one** *question.*

The question carries 11 *marks.*

20. Find the Z and h parameters of the given two-port network with input port 'ac' and output port 'bd'.

21. Discuss the drain and transfer characteristics of JFET, and give the importance of Shockley's equation.

(1 × 11 = 11 marks)

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FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020

Electronics

ELE 1B 01—BASIC ELECTRONICS

(2014—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 mark.

1. The passive component that opposes the change in current is ——————.

2. Colour code of a 10 ± 10 % KΩ resistor is ——————

3. Insulators have a —————— temperature co-efficient.

4. —————— is the power dissipated across a 100 Ω resistor, when connected across a 20 V supply.

5. The voltage drop across a short circuit is ——————.

6. The process of adding impurities to a pure semiconductor is called ——————.

7. —————— diode can be used as a voltage regulator.

8. BJT is a —————— controlled device.

9. The intrinsic stand-off ratio of a UJT with R_{B1} = 10 kΩ and R_{BB} = 15 kΩ.

10. A DIAC is —————— switch.

(10 × 1 = 10 marks)

Part B

Answer any **five** *questions.*
Each question carries 2 marks.

11. Define electric potential and potential difference.

12. Two resistors 10 Ω and 5 Ω are connected in parallel and connected across a 15 V supply. Determine the current through each resistor.

Turn over

13. Explain Mass action law.

14. Explain the construction of LED.

15. Explain the common emitter configuration of transistor with neat diagram.

16. Compare FET and BJT.

17. What are the applications of SCR.

<div align="right">(5 × 2 = 10 marks)</div>

Part C

Answer any **six** *questions.*
Each question carries 5 marks.

18. Explain open circuit and short circuit.

19. Explain drift and diffusion current.

20. Define an ideal diode. Draw and explain the ideal characteristics of PN- junction diode.

21. State and explain (i) Ohm's Law ; and (ii) Law of resistance.

22. Draw and explain the output characteristics of CB configuration.

23. Explain the construction of N-channel JFET.

24. Explain the construction of a UJT and its equivalent circuit.

25. Draw the VI characteristics of a TRIAC and explain.

<div align="right">(6 × 5 = 30 marks)</div>

Part D

Answer any **two** *questions.*
Each question carries 15 marks.

26. (a) Explain the effect of temperature in conductors.

    (b) A coil consists of 3000 turns of copper wire having a cross-sectional area of 0.6 mm^2. The mean length per turn is 60 cm. Find the resistance of the coil and power absorbed by the coil when connected across the 230V DC supply. The resistivity of the copper is 0.02 µΩ m.

27. Explain the construction, characteristics and applications of Zener diode.

28. What are the different types of MOSFETs ? Explain the difference in construction and characteristics between these types.

29. Explain the construction and characteristics of DIAC with neat sketches.

<div align="right">(2 × 15 = 30 marks)</div>

(Pages : 2)

Name..

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FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Electronics

ELE 1C 01—ELECTRONIC DEVICES

Time : Three Hours

Maximum : 64 Marks

Part I

*Answer **all** questions.*
Each question carries 1 mark.

1. A switch should have ——————— insulation resistance.

2. A capacitor does not allow sudden changes in ———————.

3. Addition of trivalent impurities creates ——————— semiconductors.

4. The leakage current in the crystal diode is to the ——————— carriers.

5. The direction of electric filed in an LCD is determined by the molecule's ———————.

6. The light emission of the LED increases if its ——————— current increases.

7. For the proper operation of the transistor, the collector base junction must be ——————— biased.

8. In pnp transistors, the current carriers are ———————.

9. MOSFET is a ——————— controlled ——————— source.

10. The input impedance of the JFET is ——————— than the ordinary transistor.

(10 × 1 = 10 marks)

Part II

*Answer **all** questions.*
Each question carries 2 marks.

11. What are active components ? Give two examples.

12. What is forbidden energy gap in solids ?

13. What is the working principle of LDR ?

Turn over

14. Define early effect in a BJT.

15. Why is transistor called a current controlled device ?

16. What is channel length modulation ?

17. Compute the value of transconductance (g_m) for a JFET with $I_{dss} = 8$ mA, $V_p = -4$ V and $V_{GS} = -0.5$ V.

(7 × 2 = 14 marks)

Part III

Answer any **five** *questions.*
Each question carries 4 marks.

18. Explain the two types of switching actions in switches.

19. Write a short note about Zener diode.

20. Briefly explain the structure of LCD.

21. Explain the forward transfer ratio in CE configuration. Derive the relation between α and β.

22. Compare JFET and MOSFET.

23. Explain the color coding in the resistors.

24. What are the various types of semiconductors ?

25. Write a short note on *n*-channel enhancement MOSFET.

(5 × 4 = 20 marks)

Part IV

Answer any **two** *questions.*
Each question carries 10 marks.

26. Explain various classification of resistors, inductors, and capacitors.

27. Explain the structure and operation of Light Emitting Diodes.

28. Explain the three different configurations of BJT along with its characteristics.

29. Explain the construction and working of UJT with necessary diagrams.

(2 × 10 = 20 marks)