

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2021

Electronics

ELE 1C 01—ELECTRONIC DEVICES

(2019 to 2020 Admissions)

Time : Two Hours

Maximum : 60 Marks

Part A*Answer the following questions (1-12).**Each carries 2 marks.*

1. Explain LDR.
2. What is pinch off voltage ?
3. Explain about different biasing in a diode.
4. Define dynamic drain resistance and amplification factor of a JFET.
5. What are the use of fuses ?
6. Draw the colour coding of $330\ \Omega$ and $1\ K\Omega$ resistors
7. What is static and dynamic resistance of a PN junction diode ?
8. Draw the structure of photodiode.
9. Define 3 biasing methods of a transistor.
10. Explain the various applications of a photodiode.
11. Define the term transconductance of JFET.
12. Explain avalanche break down.

(Ceiling : 20 marks)

Part B (Short Essay Questions)*Answer all questions.**Each carries 5 marks.*

13. Explain the working of a photo voltaic cell.
14. Explain about inductors. What are its uses ?

Turn over

15. Compare between N channel and P channel JFET.
16. Define thermal run away. How can it be prevented in a high power transistor ?
17. Explain the operation of a PNP transistor.
18. Explain about the working of UJT.
19. Explain the working of a transistor as a switch.

(Ceiling : 30 marks)

Part C (Essay Questions)

Answer any one question.

Each carries 10 marks.

20. Explain the transistor characteristics of a common emitter configuration.
21. Explain the steps in designing a printed circuit board.

(1 × 10 = 10 marks)

**FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021**

Electronics

ELE 1B 01—BASIC ELECTRONICS AND NETWORK THEOREMS

(2019—2020 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A

Answer the following questions (1-12).

Each question carries 2 marks.

1. Define Electric Field and Electric Potential.
2. State and explain Ohm's Law.
3. Find the power dissipated in a resistor of $10\text{ K}\Omega$, when connected across 10 V supply.
4. Find the equivalent resistance when two resistors of $100\ \Omega$ and $50\ \Omega$ are connected in (i) series (ii) parallel.
5. State and explain the Law of resistance.
6. Define a two-port network. What are the parameters associated with a two-port network ?
7. Define (i) Insulator ; and (ii) Semiconductor. Give two examples for each.
8. What is doping ? Explain.
9. What are the applications of SCR ?
10. Explain the ideal diode characteristics with a neat sketch.
11. Draw the Common Base configuration of BJT.
12. What is pinch-off in FET ? Explain.

(Ceiling : 20 marks)

Section B (Short Essay Questions)

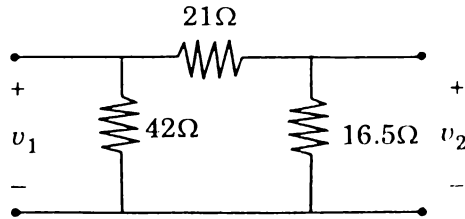
Answer all questions.

Each question carries 5 marks.

13. Explain ideal and practical voltage and current sources.
14. State and prove Maximum Power transfer Theorem.

Turn over

15. Find the Y- parameters of the given network.



16. Explain the construction and characteristics of the Zener diode.
17. Explain the following for a semiconductor :
- Intrinsic Concentration.
 - Mobility
18. How is the depletion layer formed ? How is the width of depletion layer affected by forward and reverse bias ?
19. Explain the construction of MOSFET.

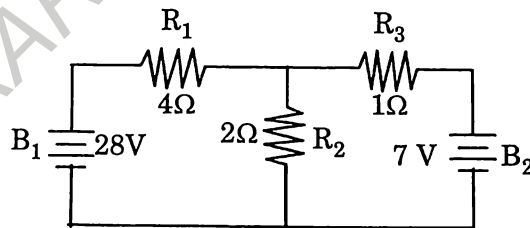
(Ceiling: 30 Marks)

Section C (Essay Questions),

Answer any one question.

The question carries 10 marks.

20. State Thevenin's Theorem. Determine the current flowing through the 2Ω resistor in the given network using Thevenin's Theorem. Verify it using Superposition Theorem.



21. Explain the operation of UJT and its characteristics with necessary figures.

(1 × 10 = 10 marks)

**FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021**

(CBCSS)

Electronics

ELE 1C 01—ELECTRONIC DEVICES

(2021 Admissions)

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. Differentiate with active and passive devices.
2. What is base spreading resistance ?
3. Explain different types of relays.
4. What is a photodiode ?
5. What is an unbiased transistor ?
6. Explain about intrinsic semiconductors.
7. Explain the structure of MOSFET.
8. Explain intrinsic standoff ratio.
9. What is a transistor ? Give its applications.
10. Mention the applications of JFET.
11. Define thermal run away.
12. Differentiate between bipolar and uni-polar devices.

(8 × 3 = 24 marks)

Turn over

Section B

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 CE configuration.
14. Briefly explain about different types of resistors.
15. Compare between BJT and JFET.
16. What are the JFET parameters? Explain them.
17. Explain the operation of LDR.
18. With the help of energy band theory, define conductors, insulators and semi-conductors.
19. Explain about the leakage current concept in the common base BJT.

(5 × 5 = 25 marks)

Section C

Answer any one question.

The question carries 11 marks.

20. Explain about PN junction diode. Draw its symbol and V-I characteristics.
21. Explain the working of UJT as a relaxation oscillator.

(1 × 11 = 11 marks)

**FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021**

(CBCSS)

Electronics

Electronics—BASIC ELECTRONICS AND NETWORK THEOREMS

(2021 Admissions)

Two Hours

Maximum : 60 Marks

Section A

Answer at least eight questions.

Each question carries 3 marks.

All questions can be attempted.

Overall Ceiling 24.

1. What is meant by passive component ? What are the different passive components ?
2. Find the potential at point P (2, 3, 1) due to a point charge of $3 \mu\text{C}$ placed at Q (3, 1, 3).
3. Determine the power drawn by resistive network that consists of two resistors 3Ω and 6Ω connected in parallel. The network is connected across a 12 V D.C. supply.
4. Draw the equivalent current source representation of a DC voltage source of open circuit voltage 3 V and internal impedance 1Ω .
5. Explain duality of networks.
6. The intrinsic carrier concentration of silicon sample at 300°K is $1.5 \times 10^{16}/\text{m}^3$. If after doping, the number of majority carrier is changed to $5 \times 10^{20}/\text{m}^3$. Determine the minority carrier density.
7. What is breakdown voltage ? Explain.
8. State Mass action Law.
9. Write the diode current equation.
10. What is drift current ? Explain.

Turn over

11. Compare BJT and FET.
12. Transistor in Common Collector configuration is called emitter follower. Why?

(8 × 3 = 24 marks)

Section B

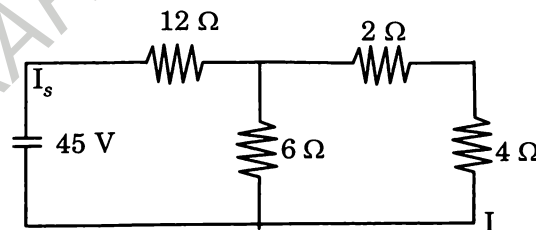
Answer at least **five** questions.

Each question carries 5 marks.

All questions can be attended.

Overall Ceiling 25.

13. A lead wire and an iron wire are connected in parallel. Their resistivities are in the ratio 49 : 24. The former carries 80 % more current than the latter and the latter is 47 % longer than the former. Determine the ratio of their cross-sectional areas.
14. (a) Explain the variation of resistance with temperature in metallic conductors.
- (b) A potential difference of 250 V is applied to a field winding at 15°C and the current is 5 A. What will be the mean temperature of the winding, when current has fallen to 3.91 A, applied voltage being constant. Assume $\alpha_{15} = 1/254.5$.
15. State the Reciprocity Theorem. Check the given network for reciprocity.



16. Explain the Y, Z and h parameters of a two-port network.
17. (a) What is meant by barrier potential of a PN junction?
- (b) Explain how the depletion layer is formed in a PN junction.

18. Explain the working principle and VI-characteristics of an LED. What are its applications ?
19. Explain the construction of a UJT. Draw its equivalent circuit.

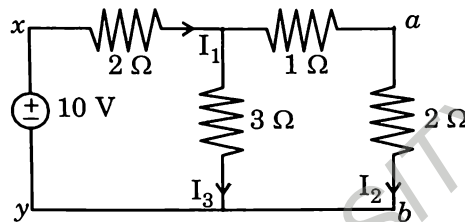
(5 × 5 = 25 marks)

Section C

Answer any **one** question.

The question carries 11 marks.

20. Determine the current flowing through the $3\ \Omega$ resistor using Kirchhoff's Voltage Law. Verify the result using Norton's Theorem.



21. Explain the construction and characteristics of N-channel JFET.

(1 × 11 = 11 marks)

**FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021**

Electronics

ELE 1C 01—ELECTRONIC DEVICES

(2016—2018 Admissions)

Time : Three Hours

Maximum : 64 Marks

Part I

Answer all questions.

Each question carries 1 mark.

1. The primary function of a fuse is to prevent excessive _____ through the circuit.
2. The unit of inductance is _____
3. A semiconductor has _____ temperature coefficient.
4. If the doping level of the diode is increased, its breakdown voltage is _____.
5. In LDR, the _____ is a function of the incident electromagnetic radiation.
6. In photovoltaic cell, the region where the electrons and holes are diffused across the junction is called _____.
7. In a CE configuration, an emitter resistor is used for _____.
8. The number of depletion layers in a transistor is _____.
9. UJT can be used as a _____ generator.
10. A JFET is also called _____ transistor.

(10 × 1 = 10 marks)

Part II

Answer all questions.

Each question carries 2 marks.

11. A resistor has a color code band sequence: yellow, violet, orange and gold. Find the range in which its value must lie so as to satisfy the manufacturer's tolerance.
12. What are intrinsic semiconductors ?

Turn over

13. Define quantum efficiency in an LED.
14. Why is common collector configuration of the BJT is called emitter follower ?
15. A certain transistor has α_{dc} of 0.98 and a collector leakage current I_{co} of $1 \mu\text{A}$. Calculate the collector and the base currents, when $I_E = 1 \text{ mA}$.
16. What is pinch off voltage ?
17. Define valley current.

(7 × 2 = 14 marks)

Part III

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

18. How are PCBs classified ?
19. Explain the breakdown mechanisms in PN diodes .
20. Write a short note on photovoltaic cell.
21. Briefly explain the C-E configuration of BJT.
- 22.. Explain the transconductance model of the FET.
23. Write a short note on fuses.
24. Explain diffusion capacitance in PN diode.
25. Compare BJT and FET.

(5 × 4 = 20 marks)

Part IV

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

26. Explain the steps involved in the design and development of PCB.
27. Explain the construction, working and V-I characteristics of a $p-n$ junction diode.
28. Explain the working of transistor as a switch.
29. Explain the construction, working and I-V characteristics of N-channel MOSFETs.

(2 × 10 = 20 marks)

**FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021**

Electronics

ELE 1B 01—BASIC ELECTRONICS

(2016—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

Part A

Answer all the following questions.

Each question carries 1 mark.

1. Ohm's Law is valid only when _____ is constant
2. The current through the open circuit is _____.
3. By adding pentavalent impurities, to an intrinsic semiconductor, the number of _____ is increased.
4. The _____ affects the drift current.
5. Zener diode is operated in _____ region.
6. In a PN junction, when the applied forward bias voltage overcomes the _____, a large current flows through it.
7. The emitter of a transistor is _____ doped.
8. In _____ region FET is used as a voltage controlled resistor.
9. An SCR has _____ PN junction.
10. A TRIAC is a _____ switch.

(10 × 1 = 10 marks)

Part B

Answer any five of the following questions.

Each question carries 2 marks.

11. Define active and passive components. Give examples for each.
12. Define Electric charge and current. What is the relation between charge and current ?
13. The intrinsic carrier concentration of silicon sample at 300°K is $2.5 \times 10^{16} / \text{m}^3$. If after doping, the number of majority carrier is changed to $7 \times 10^{20} / \text{m}^3$. Determine the minority carrier density.

Turn over

14. Differentiate intrinsic and extrinsic semiconductors.
15. Explain the pinch-off in FET.
16. Explain the common base configuration of transistor with neat diagram.
17. Draw the symbol of SCR, DIAC, TRIAC and UJT.

(5 × 2 = 10 marks)

Part C

Answer any six of the following questions.

Each question carries 5 marks.

18. What are the factors that affect the resistance of a conductor ? A lead wire and an iron wire are connected in parallel. Their resistivities are in the ratio 49 : 24. The former carries 50% more current than the latter and the latter is 75% longer than the former. Determine the ratio of their cross-sectional areas.
19. Explain energy band diagram for metal, semiconductor and insulator.
20. How is depletion layer formed in a PN junction ? Explain.
21. Explain the construction and CV-characteristics of a varactor diode.
22. Explain the common collector configuration of BJT and explain the characteristics.
23. What is MOSFET ? What are the different types ? List the differences between these types.
24. Explain the relaxation oscillator using UJT.
25. What are the methods employed to turn ON the SCR ?

(6 × 5 = 30 marks)

Part D

Answer any two of the following questions.

Each question carries 15 marks.

26. (a) Explain Direct Current and Alternating Current. (6 marks)
- (b) Explain the concept of load resistance, load current, short circuit and open circuit. (9 marks)
27. Explain the construction tunnelling effect and characteristics of Tunnel diode.
28. Explain the working and characteristics and parameters of a JFET.
29. Explain the construction and characteristics of TRIAC.

[2 × 15 = 30 marks]