

Reg No :

Name :

MAR ATHANASIOUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Govt. Aided Autonomous Institution)

First Semester B.Tech. Degree (SAY) Examination, February, 2026

Course Code: B24EE1T02

Course Name: Electronic Circuits I

Max. Marks: 100

Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)

Answer all questions

1. Explain the operating principle of a Zener Shunt Regulator circuit.
2. Explain how voltage across the diode and current through the diode are related.
3. A sinusoidal input voltage of $V_{\text{peak-peak}}$ 20V, is applied to a diode clipper circuit, where the diode is forward biased and a clipping voltage of 6V is used. Assume the diode's forward voltage drop is 0.7V. Sketch the input and output waveforms of the circuit.
4. Explain why the base is made thin in BJT.
5. Define the stability factor.
6. What is the purpose of DC biasing in a BJT circuit?
7. What is small signal condition? Why hybrid parameters are used in analyzing low frequency network?
8. List any 3 characteristics of an amplifier which are modified by negative feedback.
9. What is the primary purpose of using a crystal in an oscillator circuit?
10. How does a Class B amplifier differ from a Class A amplifier?

PART - B: 70 Marks (5 Qns x 14 Marks)

Answer any one full question from each module.

Module 1

11. Draw and explain working of Half wave rectifier with diode current and output voltage waveforms. Also derive expression for DC. output voltage and RMS value of load current.

OR

12. Capacitor filter improve the performance of a half-wave rectifier, Justify.

Module 2

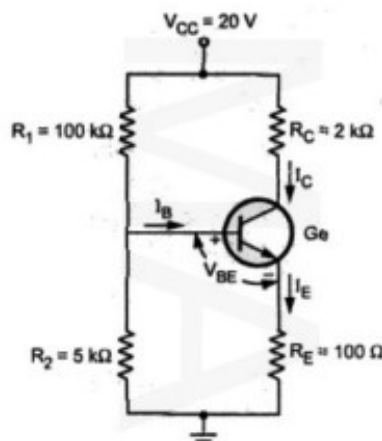
13. a. Discuss the operation of the NPN transistor with a diagram. (7 marks)
b. Regarding BJT, explain the significance of width difference in emitter, base and collector regions. (7 marks)

OR

14. a. Explain the operation of a UJT. (7 marks)
b. Describe the main characteristics of a UJT. (7 marks)

Module 3

15. For the circuit shown in figure, $V_{CC}=20V$, $R_C=2k\Omega$, $\beta=50$, $V_{BE}=0.2V$, $R_1=100k\Omega$, $R_2=5k\Omega$ and $R_E=100\Omega$. Calculate I_B , V_{CE} , I_C and stability factor, S .



OR

16. Develop the expression for stability of Voltage Divider Bias?

Module 4

17. a. With block diagram explain the need of multistage amplifiers. (5 Marks)
b. Explain the frequency response curve of RC coupled amplifier. (9 Marks)

OR

18. a. Draw the hybrid model for CE transistor and derive the parameters. (8 Marks)
b. Consider a single stage amplifier with $R_s=1\text{kohm}$, $R_1=50\text{kohm}$, $R_2=2\text{K}\Omega$, $R_c=1\text{K}\Omega$, $R_L=1.2\text{K}\Omega$, $h_{ie}=1.1\text{K}\Omega$, $h_{oe}=25\mu\text{A/V}$, $h_{fe}=50$, $h_{re}=2.5 \times 10^{-4}$. Find current gain and voltage gain. (6 Marks)

Module 5

19. a. How would you determine the frequency of operation in an RC Phase Shift oscillator based on its components? (10 Marks)
b. Explain Barkhausen's criterion of oscillation. (4 Marks)

OR

20. a. How would you use an astable multivibrator to generate a clock signal in a digital circuit? (8 Marks)
b. What role does the transistor play in controlling the sweep signal in a BJT sweep generator? (6 Marks)
