

Reg No :

Name :

**MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM**

(Govt. Aided Autonomous Institution)

Second Semester B.Tech. Degree Examination, May, 2026

Course Code: B24ES1T08

Course Name: FUNDAMENTALS OF ELECTRONICS ENGINEERING

Max. Marks: 100

Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)**Answer all questions**

1. Define inductance of a coil.Explain the factors affecting the inductance.
2. The current flowing through a 10Ω resistor is 280mA. Select a resistor with a suitable wattage rating. Give reason.
3. Evaluate the performance of rectifier circuits based on its ripple factor.
4. Illustrate and explain the formation of depletion region in an unbiased PN junction diode.
5. Explain the reason for considering common emitter as the most preferred configuration for amplifier.
6. List the 3 regions of a transistor? Among them which is the heavily doped region and explain the reason for high doping levels.
7. Define Common Mode Rejection Ratio of an op-amp.What is its ideal value?
8. List and explain any two applications of ADC.
9. A binary number is represented as 10101100. Find its decimal and hexadecimal equivalents.
10. Explain the significance of diaphragm in a loudspeaker?

PART - B: 70 Marks (5 Qns x 14 Marks)**Answer any One full question from each module.****Module 1**

11. a) With a neat sketch, list the basic components of an electromechanical relay and explain its function. (10 marks)
b) Describe different types of relays based on pole and throw. (4 marks)
- OR
12. a) Differentiate between polar and non-polar capacitors with its symbol.With suitable diagram explain the constructional features and characteristics of any one type of polar and non polar capacitor. (10 marks)
b) List and explain the typical specifications of a capacitor. (4 marks)

Module 2

13. a) With the help of suitable waveforms at each stage, explain the block diagram of a DC power supply. (7 marks)
- b) Explain the characteristics of zener diode and how it functions as a voltage regulator with a neat circuit diagram. (7 marks)

OR

14. a) Differentiate between Avalanche breakdown and Zener breakdown. (7 marks)
- b) With the help of circuit diagram sketch and explain the V-I characteristics of a PN junction diode. (7 marks)

Module 3

15. a) Explain the working of transistor as an amplifier using RC coupled amplifier. (10 marks)
- b) Draw the input and output signal of an RC coupled amplifier and explain the reason for phase shift between input and output. (4 marks)

OR

16. a) With suitable diagrams, discuss the constructional difference and electrical characteristics of an n-channel JFET and n-channel enhancement MOSFET. (10 marks)
- b) Explain threshold voltage in an n-channel enhancement MOSFET. (4 marks)

Module 4

17. a) With the help of a block diagram, explain the components of an op-amp. (5 marks)
- b) With the help of circuit diagram and suitable wave forms, differentiate between open loop and closed loop operational amplifier configurations. (9 marks)

OR

18. a) With the help of circuit diagrams and frequency responses, differentiate between passive low pass filter and passive high pass filter. (10 marks)
- b) Explain the drawbacks of a passive filter. (4 marks)

Module 5

19. a) Explain the working principle of the following transducers with necessary diagrams. (10 marks)
- (i) Strain Gauge (ii) LVDT
- b) Convert $(456.78)_{10}$ to binary and hexadecimal. (4 marks)

OR

20. a) Differentiate between OR and NOT gate with its truth table, symbol and Boolean expression. (7 marks)
- b) Explain the procedure to find 2's complement and 1's complement of a binary number with example. (7 marks)
