MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(GOVERNMENT AIDED AUTONOMOUS ENGINEERING COLLEGE)

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

First Sessional Examination, October 2026

B24EE1T02 ELECTRONIC CIRCUITS 1 (S1 EA & EB)

Max. Marks: 40 Time :1 hr 30 mins

Answer all questions

Part A (4 x 3 = 12 marks)

1. Define reverse saturation current. Why does it occur in a PN junction diode? [CO1]
2. The forward current in a silicon diode is 15 mA at 27°C. If the reverse saturation current is 0.24 nA, find the forward bias voltage. [CO1]
3. Explain how a diode is used for wave shaping application. [CO2]
4. Sketch an RC integrator's sample input and output waveform. Write down the equation of its time constant. [CO2]

Part B (2 x 14 = 28 marks)

5. (a) Draw and explain the circuit of a half-wave rectifier. Derive the equations for rms output current, I_{rms} and average output current, I_{avg}. [CO1] (8 marks)

   (b) A single-phase half-wave diode rectifier is supplied from a 230 V, 50 Hz AC source and is connected to a 100 Ω resistive load. Assume the diode to be ideal. Calculate:
   i. The peak value of the input voltage.
   ii. The average (DC) output voltage.
   iii. The RMS value of the output voltage.
   iv. The average DC load current
   v. The RMS load current.
   vi. The rectifier efficiency. [CO1] (6 marks)

6. (a) With neat circuit diagrams and waveforms, explain the working of a positive clipper circuit. [CO2] (10 marks)
   (b) Explain the working of an RC differentiator with the help of a circuit diagram and waveforms. [CO2] (4 marks)

Students will be able to:

CO 1: Understand the fundamental concepts of diodes, applications, and analysis.
CO 2: Describe the various transistor configurations and characteristics.

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Mould technically competent and morally strong Engineers
Achieve dynamic leadership through quality Education
Cater the needs of industry and community through Emulation
Empower the students to serve the nation with Dedication