

## ELECTRONIC DEVICES

**Paper Code: ETEC-106**  
**Paper : Electronic Devices**

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### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75**

1. This is the first introductory course in Electronics Engineering to the students of all the branches of engineering during the first year.
2. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions from each unit. It should be of 25 marks.
3. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: Objective of the paper is to facilitate the student with the basics of electronic aspects that are required for his understanding and applications in their respective field of study. The pre-requisites are, to have a basic understanding of Applied Physics and Mathematics.*

Unit-I

**EVALUATION OF ELECTRONICS: INTRODUCTION & APPLICATION OF ELECTRONICS, ENERGY BAND THEORY OF CRYSTALS, ENERGY BAND STRUCTURES IN METALS, SEMICONDUCTORS AND INSULATORS, THEORY OF SEMICONDUCTORS: CLASSIFICATION OF SEMICONDUCTORS, CONDUCTIVITY OF SEMICONDUCTORS, CARRIER CONCENTRATION IN INTRINSIC & EXTRINSIC SEMICONDUCTORS, PROPERTIES OF INTRINSIC AND EXTRINSIC SEMICONDUCTORS, VARIATION IN SEMICONDUCTORS PARAMETERS WITH TEMPERATURE, FERMI-DIRAC FUNCTION, FERMI LEVEL IN A SEMICONDUCTOR HAVING IMPURITIES, BAND STRUCTURE OF OPEN-CIRCUITED P-N JUNCTION, DRIFT AND DIFFUSION CURRENTS, CARRIER LIFE TIME, CONTINUITY EQUATION (ELEMENTARY TREATMENT ONLY)**

**[T1][T2][T3][NO. OF HOURS: 12]**

### **Unit – II**

**Theory of p-n junction Diode:** Diode Current Equation, Diode Resistance, Transition Capacitance, Diffusion Capacitance, (Elementary treatment only), Effect of Temperature on p-n Junction Diode, Switching Characteristics, Piecewise Linear Model, **Special Diodes:** Zener Diode, Varactor Diode, Tunnel Diode, Photodiode, Light Emitting Diodes, Schottky Barrier Diode, **Applications of Diodes:** Half-Wave Diode Rectifier, Full-Wave Rectifier, Clippers and Clampers (Elementary treatment only).

**[T1][T2][T3][No. of Hours: 11]**

### **Unit – III**

**Bipolar junction transistor:** Introduction of transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-moll's model.

**[T1][T2][T3][No. of Hours: 11]**

### **Unit – IV**

**Application of BJT:** CB, CE, CC configurations, hybrid model for transistor at low frequencies, Introduction to FETs and MOSFETs.

**Fundamentals of digital electronics:** Digital and analog signals, number systems, Boolean algebra, logic gates with simple applications, logic gates, karnaugh maps.

**[T1][T2][T3][No. of Hours: 11]**

Text Books

1. S. Salivahanan, N. Suresh Kr. & A. Vallavaraj, "Electronic Devices & Circuit", Tata McGraw Hill, 2008
2. Millman, Halkias and Jit, "Electronic devices and circuits" McGraw Hill
3. Boylestad & Nashelsky, "Electronic Devices & Circuits", Pearson Education, 10<sup>TH</sup> Edition.

## **Reference Books**

1. Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, VI Edition
2. Robert T. Paynter, "Introducing Electronic Devices & Circuits", Pearson Education, VII Edition, 2006

