Subject Code:24EC11RC01 **R-24** **Reg No:** | | | | | | | | | | | |

GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
(Affiliated to Andhra University, Visakhapatnam)
B.Tech. - I Semester Regular / Supplementary Examinations, January – 2026

ELECTRONIC DEVICES AND CIRCUITS

(Electronics and Communication Engineering)

1. All questions carry equal marks
2. Must answer all parts of the question at one place

Time: 3Hrs. **Max Marks: 70**

UNIT-I

1. a) Derive the expression for intrinsic carrier concentration in semiconductors and explain its temperature dependence. 7M
   b) Derive the expression for Hall coefficient and explain its significance in measuring Carrier mobility. 7M

(OR)

2. a) Explain the Volt–Ampere characteristics of a PN junction diode under forward and Reverse bias. 7M
   b) A PN junction diode has a reverse saturation current I_0=20 nA. Calculate the diode Current at forward bias voltages of 0.3 V and 0.7 V at 300K. (Assume V_T=26 mV). 7M

UNIT-II

3. a) Explain the working of a full-wave rectifier using a center-tap transformer. 7M
   b) A half-wave rectifier has an input of 24 V (rms) and load resistance of 2 kΩ. Calculate DC output voltage, DC current and efficiency (assume ideal diode). 7M

(OR)

4. a) Draw and explain the V–I characteristics of a Zener diode in forward and reverse Bias. 7M
   b) Explain the principle of Schottky barrier diode and discuss its advantages over PN junction diode. 7M

UNIT-III

5. a) Compare the NPN and PNP transistors in terms of biasing requirements, current flow, and applications. 7M
   b) Explain the concept of thermal stability in transistor biasing and derive the stability factor for fixed bias. 7M

(OR)

6. a) Draw and explain the output characteristics of a transistor in CC configuration. 7M
   b) Compare CE, CB, and CC configurations with respect to current gain, input resistance, and output resistance. 7M

UNIT-IV

7. a) Derive the expressions for current gain and input resistance of a CB amplifier using h–parameters. 7M
   b) Explain the role of coupling capacitors in multistage amplifiers. 7M

(OR)

8. a) Derive the expressions for voltage gain, input resistance, and output resistance of a CE amplifier using h–parameters. 7M
   b) Explain the frequency response of an RC coupled amplifier and define bandwidth. 7M

UNIT-V

9.	a)	Explain the common source JFET amplifier biasing using fixed bias method. Derive expressions for Q-point values.	7M
	b)	Explain the construction and operation of MOSFET in enhancement mode with neat diagram	7M

(OR)

10.	a)	Explain the working and drain characteristics of depletion MOSFET.	7M
	b)	Discuss the applications of JFET and MOSFET in amplifier and switching circuits.	7M