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SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY

Subject Code: BEC-201

Subject: Fundamentals of Electronics Engineering

Course: B.Tech.Semester: 2nd

THIRD SESSIONAL EXAMINATION, EVEN SEMESTER, (2024-2025)

Branch: (CS, CE, EC, ME, EE)

Time –1hr. 30 min.

Maximum Marks – 30

1. Attempt any FIVE questions:

Q N	QUESTIONS	Marks	CO	BL
a.	Differentiate between avalanche and zener breakdown.	2	CO1	L2
b.	Discuss the formation of depletion layer in diode.	2	CO1	L1
c.	Why is silicon preferred over germanium in diodes?	2	CO1	L2
d.	What is doping? Why is it required?	2	CO1	L1
e.	Draw and briefly discuss the voltage tripler circuit.	2	CO1	L1
f.	In the bridge rectifier circuit the secondary voltage, $V_s = 200 \sin 100 \pi t$ and load resistance is $3 \text{ K}\Omega$. Calculate DC current and RMS value of current.	2	CO1	L3

2. Attempt any ONE of the following:

Q N	QUESTIONS	Marks	CO	BL
a.	<p>Explain positive and negative clamper using suitable circuit diagram and input/output waveform. Also draw the output waveform of the circuit shown in figure 1.</p> <p>(Figure 1)</p>	5	CO1	L3
b.	<p>Explain any two of the following:</p> <ol style="list-style-type: none"> Tunnel diode LED Varactor diode Zener diode 	5	CO1	L3
c.	Explain the working of half wave and full wave bridge rectifier.	5	CO1	L3

3. Attempt any FIVE questions:

Q N	QUESTIONS	Marks	CO	BL
a.	What is difference between BJT and JFET?	2	CO2	L2
b.	Why is BJT called a current controlled device?	2	CO2	L2
c.	A transistor with $\alpha = 0.975$ and reverse saturation current $I_{CBO} = 10 \mu A$ is operated in CE mode. Calculate I_E and I_C if the base current is $250 \mu A$.	2	CO2	L3
d.	Derive the relation between α , β , and γ .	2	CO2	L3
e.	What is trans-conductance in FET?	2	CO2	L1
f.	Describe the construction of an NPN transistor in CE configuration with respect to size and doping.	2	CO2	L1

4. Attempt any ONE of the following:

Q N	QUESTIONS	Marks	CO	BL
a.	Explain the construction and working of enhancement type MOSFET along with their transfer characteristics.	5	CO2	L1
b.	Explain the construction and working of N-channel JFET. Draw the drain and transfer characteristics.	5	CO2	L1
c.	Draw and explain common-base (CB) configuration with their input and output characteristics. Indicate active, cut-off and saturation region on the output characteristics.	5	CO2	L1

Bloom's Taxonomy Level (BL):

Remember (L1)

Understanding (L2)

Apply (L3)

Analyze (L4)

Evaluating (L5)

Creating (L6)