

## DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

Course Code & Name: **23EET103 & ELECTRIC CIRCUITS AND ELECTRON DEVICES**

Course Faculty : Dr INDU NAIR V

### Question Bank

#### Unit V - Rectifiers and Power Supplies

##### PART – A (2 Marks)

S.No	Question	CO	BL	Company / GATE
1	Define a rectifier.	CO-5	L1	GATE EE 2021
2	What is ripple factor?	CO-5	L1	GATE EE 2019
3	State the need for filters in rectifier circuits.	CO-5	L1	TEXAS INSTRUMENTS
4	Define peak inverse voltage (PIV).	CO-5	L1	GATE EE 2020
5	What is the ripple frequency of a full-wave rectifier?	CO-5	L1	GATE EE 2018
6	Mention any two disadvantages of half-wave rectifier.	CO-5	L2	SIEMENS
7	Define voltage regulation.	CO-5	L1	QUALCOMM
8	What is line regulation?	CO-5	L1	GATE EE 2017
9	What is a linear mode power supply?	CO-5	L1	INTEL
10	State any two advantages of SMPS.	CO-5	L2	GATE EE 2022
11	What is UPS?	CO-5	L1	SCHNEIDER
12	Define heat sink.	CO-5	L1	NVIDIA
13	Why are cooling fans used in electronic systems?	CO-5	L2	AMD
14	What is a bridge rectifier?	CO-5	L1	GATE EE 2016
15	Mention any two applications of SMPS.	CO-5	L2	SAMSUNG

##### PART – B (13 Marks)

S.No	Question	CO	BL	Company / GATE
1	Explain the working of a half-wave rectifier with neat circuit diagram and waveforms. Derive expressions for DC output voltage and efficiency.	CO-5	L3	GATE EE 2019
2	With neat diagrams, explain the operation of a full-wave rectifier and derive the expression for ripple factor.	CO-5	L3	GATE EE 2020

S.No	Question	CO	BL	Company / GATE
3	Draw and explain the working of a bridge rectifier. Compare it with center-tapped full-wave rectifier.	CO-5	L4	GATE EE 2022
4	Explain the need for filters. Describe capacitor filter and inductor filter with advantages and disadvantages.	CO-5	L3	SIEMENS
5	Explain the working of $\pi$ -filter and compare it with other filters.	CO-5	L4	GATE EE 2018
6	Explain Zener diode voltage regulator and define line and load regulation.	CO-5	L3	GATE EE 2021
7	Explain the block diagram and working of a linear mode power supply.	CO-5	L3	INTEL
8	Compare linear power supply and SMPS with respect to efficiency, size and heat dissipation.	CO-5	L4	GATE EE 2022
9	Explain the working principle of SMPS with neat block diagram.	CO-5	L3	TEXAS INSTRUMENTS
10	Explain online and offline UPS with block diagrams and applications.	CO-5	L4	SCHNEIDER

**PART – C (15 Marks)**

S.No	Question	CO	BL	Company / GATE
1	Design a regulated DC power supply to convert 230 V, 50 Hz AC into 12 V, 1 A DC. Explain the selection of rectifier, filter and voltage regulator with neat block diagram.	CO-5	L6	GATE EE 2023
2	A computer system requires uninterrupted power and efficient thermal management. Design a suitable UPS system and explain the role of battery charger, inverter, heat sink and cooling fan.	CO-5	L6	SCHNEIDER
3	A high-power SMPS experiences overheating. Analyze the causes and propose suitable thermal management techniques for reliable operation.	CO-5	L5	NVIDIA
4	Compare linear power supply and SMPS for industrial applications and justify the choice of SMPS for aerospace and medical systems.	CO-5	L5	ISRO / GE
5	Case Study: A hospital requires zero power interruption and stable voltage. Suggest a complete power conditioning system and justify your design.	CO-5	L6	GATE EE 2024