



**ELECTRICAL AND ELECTRONICS ENGINEERING**

**QUESTION BANK**

Course Title : POWER ELECTRONICS

Course Code : 23EE501

Regulation : NR23

**UNIT-III**

**DC-DC Converters (Chopper/SMPS)**

S.No	Questions	BT	CO	PO
<b>Part - A (Short Answer Questions)</b>				
1	What are the applications of dc chopper?	L1	CO3	PO1
2	What is meant by step-up and step-down chopper?	L1	CO3	PO1
3	What are the two types of control strategies?	L1	CO3	PO1
4	What is meant by FM control in a dc chopper?	L1	CO3	PO1
5	What are the disadvantages of FM control?	L1	CO3	PO1
6	Write down the expression for the average output voltage for step down and step up chopper.	L1	CO3	PO1
7	Differentiate between constant frequency & variable frequency control	L1	CO3	PO1
8	What are the advantages of SMPS over phase controlled rectifiers?	L1	CO3	PO1
9	Define current limit control in DC-DC converter?	L1	CO3	PO1
10	Distinguish between time ratio control and current limit control?	L1	CO3	PO1
<b>Part - B (Long Answer Questions)</b>				

11	a)	A step-up chopper has input voltage of 220 V and output voltage of 660 V. If the non-conducting time of thyristor chopper is 100 $\mu$ s, compute the pulse width of output voltage. In case pulse width is halved for constant frequency operation, find the new output voltage.	L1	CO3	PO1
	b)	Explain the various modes of operation of Boost DC-DC converter with necessary waveforms.	L1	CO3	PO1
12	a)	Explain the working of Buck-Boost converter with sketch and waveforms and also derive the expression for output voltage	L1	CO3	PO1
	b)	Discuss the principle of operation of DC-DC step up chopper with suitable waveform. Derive an expression for its average DC output voltage.	L1	CO3	PO1
13	a)	Discuss the principle of operation of DC-DC step down chopper with suitable waveform. Derive an expression for its average DC output voltage.	L1	CO3	PO1
	b)	A step-down dc chopper has a resistive load of $R = 15\Omega$ and input voltage $E_{dc} = 200$ V. When the chopper remains ON, its voltage drop is 2.5 for a duty cycle of 0.5. Calculate  (1) Average and r.m.s value of output voltage  (2) Power delivered to the load.	L3	CO3	PO1, PO2, PO3
14	a)	Draw the circuit of Buck-Boost regulator and explain its working principle with necessary waveform in detail.	L1	CO3	PO1
	b)	Draw the circuit of buck regulator and explain its working principle with necessary waveforms.	L1	CO3	PO1
15	a)	Write short notes on switch mode power supply	L1	CO3	PO1
	b)	Explain the various modes of operation of Boost DC-DC converter with necessary waveforms.	L1	CO3	PO1
16	a)	A dc chopper input voltage of 200V and resistive load of $R = 8\Omega$ resistance. Voltage drop across thyristor is 2V and chopping frequency 800 Hz the duty cycle is 0.5. Calculate	L2	CO3	PO1, PO2

		(1) Average and r.m.s value of output voltage (2) Chopper efficiency and input resistance by the source.			
	b)	Draw the circuit of buck regulator and explain its working principle with necessary waveforms.	L3	CO3	PO1, PO2, PO3