

Internal Assessment Test 4– March 2022

Sub:	POWER ELECTRONICS AND INSTRUMENTATION				Sub Code:	18EC36	Branch:	ECE		
Date:	21 -03 -2022	Duration:	3 hours	Max Marks:	100	Sem / Sec:	III sem A,B,C,D			OBE
<u>ANSWER ANY 5 FULL QUESTIONS</u>								MARKS	CO	RBT
1a	With necessary sketches, explain the static V-I characteristics of SCR and its operation. Show the effect of various gate currents.						10	CO1	L2	
1b	What are the different Turn ON methods of a Thyristor? Explain each of them in brief.						10	CO1	L1	
2a	With suitable circuit diagram and waveforms explain a full wave RC triggering circuit to turn on an SCR						10	CO1	L2	
2b	Explain the working of Isolated forward SMPS with necessary circuit diagram and waveforms.						10	CO2	L2	
3a	Explain the operation of a step - down chopper with neat diagram and derive an expression for the output voltage.						10	CO2	L3	
3b	With neat circuit diagram and waveforms, explain the working of single-phase full bridge inverter with R load.						10	CO2	L2	
4a	With necessary sketches, explain the working of a single-phase full wave-controlled rectifier circuit for resistive load. Derive an expression for V_{dc} and V_{rms} .						10	CO2	L3	
4b	With a neat circuit diagram, explain the working of multirange DC Ammeter. A 1mA meter movement having an internal resistance of 100Ω is used to convert into a multirange ammeter having the range 0-20mA and 0-50mA. Determine the value of shunt resistance required.						10	CO4	L2	
5a	What are static errors? Explain each of them with examples.						10	CO3	L1	
5b	With a neat circuit diagram, explain the working of multirange DC Voltmeter. Design a multirange DC voltmeter for the ranges: 0-5 volts, 0-50 volts and 0-100 volts. The galvanometer used has full scale deflection of 10 mA, and internal resistance $R_m = 100\Omega$. (Use any one multipliers configuration).						10	CO4	L2	
6a	Explain the working of successive approximation type of DVM with necessary circuit diagram.						10	CO4	L2	
6b	What is Commutation? Differentiate between Natural and Forced Commutation. Discuss in detail Class A commutation.						10	CO1	L2	
7a	Explain the working of a Resistance firing circuit with necessary circuit diagram and waveforms.						10	CO1	L2	
7b	Describe the operation of UJT with neat sketches. Explain how a UJT firing circuit for an SCR works.						10	CO1	L2	
8a	A step down chopper has a resistive load of $R = 15\text{ ohm}$ and input voltage $E_{dc} = 200V$. When the chopper remains ON, its voltage drop is 2.5 V. The chopper frequency is 1 KHz. If the duty cycle is 50%, determine: (a) Average output voltage (b) RMS Output voltage (c) Chopper Efficiency						10	CO2	L3	
8b	With necessary sketches, explain the working of a single-phase full wave-controlled rectifier circuit for RL load. Explain the effect of freewheeling diode.						10	CO2	L2	