



Re-Continuous Assessment Test – 2 – October 2024

Programme	: B. Tech, SMEC & SCOPE	Semester	: Fall 2024 - 25
Course	: Electrical Machine Drives	Code	: BEEE214L
Faculty	: Dr. Jyotismita Mishra	Class Nbr	: CH2024250101499
Time	: 1 hr 30 Mins	Slot	: G2+TG2
		Max. Marks	: 50

Answer ALL the Questions (5 x 10 = 50 Marks)

Q.No.	Sub. Sec.	Question Description	Marks
1	(a)	A three phase, 12 pole, salient alternator is coupled to a diesel engine running at 500 rpm. It supplies an induction motor which has a full load speed of 1440 rpm. Find the percentage of slip and number of poles of the induction motor.	(5) 10
	(b)	Discuss how slip of an induction motor influences its torque characteristics, including the effect on starting torque, maximum torque, and stability during varying load condition.	(5)
2	(a)	A fully controlled single phase converter is supplying power to a 5 kW resistive load. If the input voltage is 220 V and the firing angle is 45 degree, calculate (a) the average output voltage and current supplied to the load. (b) Ripple factor for output voltage waveform (c) Draw the corresponding output voltage, each switch voltage waveform.	10
3	(a)	A design engineer is tasked with designing a converter for a specific application where an input is connected to 12 V battery and output is connected to a 24 V dc load. The converter will operate at a switching frequency of 50 kHz and is required to deliver a maximum output current of 3 A. a) Calculate the required duty cycle of the converter to achieve the desired output voltage. Show all your calculations. b) Assuming the converter has an efficiency of 90%, determine the input current when it is at its maximum load current of 3 A. Calculate the input power and output power. c) The inductor used in the converter needs to be sized appropriately. If the maximum ripple current through the output inductor is limited to 20% of the output current, calculate the inductor value required for this design.	10