Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U2502

M.E. DEGREE EXAMINATION, APRIL / MAY 2025

Second Semester

Power Electronics and Drives

21PPE202 - EMBEDDED CONTROL OF POWER ELECTRONIC DRIVE SYSTEMS

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART – A (5 x 20 = 100 Marks)

1.	(a)	Assume that you are having a robot in your company. The forearm of the robot is set in the upward direction. Make your robot to invite your visitors by giving handshake to them with the use of TMS320C5X Instruction set.	CO2 -App	(20)
		Or		
	(b)	Implement an assembly language subroutine to read the speed of an electric drive motor using a DSP? Explain the process.	CO2 -App	(20)
2.	(a)	Explain how the microprocessor handles a situation when it receives three interrupts at a time from the interrupt pins INT3_, RINT0 and RESET.	CO1 - U	(20)
		Or		
	(b)	Explain how interrupts are used to enhance the safety and reliability of power electronic systems.	CO1 - U	(20)
3.	(a)	Design a 12 bit ADC which is operating with 1μS clock period and with total conversion time of 14 μS.	CO3 -App	(20)
		OR		
	(b)	Convert an analog input of 6.6V to the corresponding digital output using 4 bit counting ADC and Successive Approximation type ADC. Assume the resolution of ADC is 0.5V	CO3 -App	(20)

4.	(a)	Evaluate the cost-effectiveness of deploying FPGA-based versus DSP-based solutions for controlling electrical drives, considering factors such as initial hardware costs, development expenses, and long-term maintenance.	CO4 -Ana	(20)
		OR		
	(b)	Analyze the impact of the integration of PowerPC processors in FPGA devices, such as the Virtex II Pro series, on the performance and versatility of motor control applications.	CO4 -Ana	(20)
5.	(a)	Develop VHDL code to generate a control signal for auto tracking solar panel.	CO2 -App	(20)
		OR		
	(b)	Develop the assembly language program to implement a PWM (Pulse Width Modulation) controller for a DC motor using a specific DSP. Explain how you would ensure the accuracy and stability of the PWM signal.	CO2 -App	(20)