LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram-521 230 :: Krishna Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

M.Tech.(I Semester) (R17) Supplementary Examinations, August 2021

TIME TABLE

TIME :10.00 AM to 01.00 PM **A.Y. 2020-21**

Date	Computer Science and Engineering	Power Electronics and Drives	Thermal Engineering	VLSI and Embedded Systems
04-08-2021 (Wednesday)	17CO01 - Android Technologies	17PE01 - Computational Mathematics	17TE01 - Advanced Thermodynamics	17VE01 - Digital VLSI System Design
05-08-2021 (Thursday)	17CO02 - Fundamentals of Data Science	17PE02 - Analysis of Power Converters	17TE02 - Advanced Heat and Mass Transfer	17VE02 - Embedded System Design
06-08-2021 (Friday)	17CO03 - Machine Learning	17PE03 - Control of Motor Drives-I	17TE03 - Internal Combustion Engines and Pollution	17VE03 - CPLD and FPGA Architectures and Applications
07-08-2021 (Saturday)	Programme Elective-I 17CO05 - Ad-hoc Networks	Programme Elective –I 17PE04 - Optimization Techniques in Electrical Engineering 17PE05 - HVDC and FACTS 17PE08 - Analysis of Special Electrical Machines	Programme Elective –I 17TE04 - Solar Energy 17TE06 - Statistical Analysis and Design of Experiments	Programme Elective – I 17VE04 - Cryptography and Network Security 17VE08 - System Modeling and Simulation 17VE09 - VLSI Design Automation
09-08-2021 (Monday)	Programme Elective-II 17CO08 - Cloud Computing	Programme Elective –II 17PE06 - Energy Auditing and Management 17PE07 - Machine Modeling and Analysis	Programme Elective –II 17TE07 - Advanced Fluid Mechanics	Programme Elective – II 17VE07 - Image and Video Processing
10-08-2021 (Tuesday)	Add-on-Course-1 17CO90 - High Performance Computing	Add-on-Course-1 17PE90 - Advanced Power Semiconductor Devices and their Protection	Add-on-Course-1 17TE90 - Thermal and Nuclear Power Plant Engineering	Add-on-Course-1 17VE90 - Advanced Computer Architecture

Note: Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.

Date: 23-07-2021

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs 2. Transport in-charge & Librarian
3. Canteen, Security & Hostels 4. All Notice Boards

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R17

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M.Tech. (I Semester) ~~Regular~~/Supplementary Examinations

17PE03-CONTROL OF MOTOR DRIVES-I
(PED)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1 (a)	Draw and elaborate basic electric drive scheme.	6M	CO2	L1
(b)	Draw the circuit diagram of a single phase semi converter fed DC series motor and describe its operation with the help of associated waveforms assuming discontinuous conduction.	6M	CO1	L2
	(OR)			
2 (a)	Describe the operation of dc series motor fed by a three phase full converter with speed torque characteristics.	6M	CO1	L2
(b)	A 220V, 1500 rpm, 50A separately excited motor with armature resistance of 0.5Ω, is fed from a three phase controlled rectifier. Available AC source has a line voltage of 440V, 50Hz. A Star-Delta connected transformer is used to feed the armature so that motor terminal voltage equals rated voltage when converter firing angle is zero. (i) Find Transformer turns ratio (ii) Determine the value of firing angle when motor is running at 1200 rpm and rated torque.	6M	CO1	L3
3(a)	Analyze the operation of Chopper fed separately excited DC motor drive with neat diagrams and expressions.	6M	CO1	L2
(b)	A 230V, 960rpm 200A separately excited DC motor has an armature resistance of 0.02Ω. The motor is fed from a chopper which provides both motoring and braking operations the source voltage is 230V. For continuous mode (i) Calculate duty ratio of chopper for motoring operation at rated torque at 350 rpm (ii) Calculate duty ratio of chopper for braking operation at rated torque and 350rpm.	6M	CO1	L3
	(OR)			
4(a)	Discuss the principle of speed control of a DC motor and show how it can be achieved by a chopper.	6M	CO1	L2
(b)	In a class A chopper circuit an ideal battery of terminal voltage 100 V supplies a series load of resistance 0.6Ω and inductance 1mH. The SCR is switched on for 1ms in an overall period of 3ms. Calculate the average values of the load voltage and current and the power taken from the battery.	6M	CO1	L3
5(a)	Discuss the stator voltage control scheme of induction motor. Also draw and explain the speed- torque characteristics.	6M	CO1	L2

(b)	A 8 pole 50Hz induction motor has full load slip of 4%. The rotor resistance/phase = 0.01Ω and stand still reactance / phase =0.1Ω. Find the ratio of maximum to full load torque and the speed at which the maximum torque occurs.	6M	CO1	L3
	(OR)			
6(a)	Derive the expression for the torque, when the induction motor is controlled by current source inverters at a fixed frequency.	6M	CO3	L2
(b)	Write merits and demerits of Voltage source fed induction motor control and current source fed inverter control of induction motor.	6M	CO3	L1
7(a)	List the advantages and disadvantages of rotor resistance control scheme.	6M	CO4	L1
(b)	A 400V, 50Hz 8 pole Star connected WRIM has the following parameters Rs=0.5 Ω, Rr=0.4 Ω, Xs=Xr=1.2 Ω Xm=50 Ω and stator to rotor turn ratio is 3.5 motor is controlled by static rotor resistance control, external resistance is chosen such that the brake down torque is produced at stand still for a duty ratio of zero. Calculate the value of (i) External resistance (ii) Duty ratio corresponding to maximum torque for motor speed is 500rpm.	6M	CO4	L3
	(OR)			
8(a)	Derive an expression for torque developed by scherbius drive.	6M	CO4	L2
(b)	Summarize the modes of operation of scherbius drive with the help of neat circuit diagram.	6M	CO4	L2
9(a)	Discuss the salient features of vector control of induction motor.	6M	CO3	L2
(b)	Describe the block diagram of feedback vector control With rotor flux orientation.	6M	CO2	L2
	(OR)			
10.	Discuss in detail about flux vector estimation using (i) Voltage model (ii) current model.	12M	CO2	L2

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M.Tech. (I Semester) Regular/Supplementary Examinations

17PE02- ANALYSIS OF POWER CONVERTERS
(PED)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	By the help of neat diagrams, present special configurations for harmonic reduction.	6M	CO1	L2
(b)	What are the harmonic standards and provide the recommended practices?	6M	CO2	L1
	(OR)			
2(a)	Discuss about PWM rectifier with necessary circuit diagram.	6M	CO2	L2
(b)	A Fully controlled 3 Phase bridge rectifier supplies a dc motor. AC line current 200A, ac line to line voltage 400V, dc voltage 360V. Find (i) firing angle (ii) power factor of fundamental component (iii) active power and reactive power.	6M	CO1	L3
3(a)	Define the Variable frequency system of power converters and discuss the scheme with necessary diagram.	6M	CO2	L2
(b)	A Step-up/Step-down chopper has input dc voltage of 200V and output voltage of 600V. If the conduction time thyristor chopper is 100μs, compute the pulse width of load voltage. In case pulse width of load voltage increased to three times its previous width, for constant frequency operation, calculate the new value of average voltage.	6M	CO1	L3
	(OR)			
4(a)	Draw power circuit of type-E and describe its working all four quadrants. Record the load voltage and current in each quadrant.	6M	CO2	L2
(b)	A dc chopper has an input voltage of 220V and connected to load of R=5Ω, L=7.5mH. Chopping frequency is 1000Hz and duty cycle of converter is 0.5. Obtain (i) Load current I_{max}, I_{min} (ii) Average load voltage.	6M	CO1	L2
5.	Illustrate the operating mode of three phase ac voltage controller for $\alpha \leq 60^0$ and also prove that rms output voltage is $\sqrt{6}\,V_s\sqrt{\left[\frac{1}{\pi}\left(\frac{\pi}{6}-\frac{\alpha}{4}+\frac{\sin 2\alpha}{8}\right)\right]}$	12M	CO2	L3
	(OR)			
6(a)	Design a cycloconverter for output frequency of converter is equal to 6 times of output frequency converter and also sketch out the related waveforms.	6M	CO1	L3

(b)	A 6 pulse cycloconverter has an input voltage of 230V per phase. Calculate the output voltage if firing angle is 30 degrees. Also find input supply p.f., form factor, voltage ripple factor, transformer utilization factor, converter efficiency.	6M	CO1	L2
7.	Analyse the following advanced modulation techniques with necessary carrier signals (i) trapezoidal modulation (ii) stepped modulation (iii) delta modulation (iv) staircase modulation.	12M	CO2	L3
	(OR)			
8(a)	Discuss the operation of 3-phase inverter with neat waveforms.	6M	CO2	L2
(b)	220VDC Inverter is connected to a load R=2Ω and ωL=10Ω. Estimate the value of i) fundamental component of load voltage and current. ii) power delivered to load due to fundamental component of load. iii) commutation time.	6M	CO1	L3
9.	For a 330VDC input of 4-level FC Multi-Level Inverter, Determine (i) reverse blocking voltage of switch (ii) number of complimentary switches (iii) number of flying capacitors Draw the power circuit diagram for all voltages levels calculated in different levels.	12M	CO1	L4
	(OR)			
10.	With an example, design a diode clamped multilevel inverter? Also illustrate the following design parameters (i) capacitors for m-level (ii) clamped diodes (iii) output voltages (iv) switching devices and (v) complimentary switches.	12M	CO1	L4

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M.Tech. (I Semester) ~~Regular~~/Supplementary Examinations

17TE01-ADVANCED THERMODYNAMICS

(TE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

Q.No	Questions	Marks	CO	BL
1(a)	What are different laws of thermodynamics? Explain them along with the properties developed based on these laws.	6M	CO1	L2
(b)	Describe Helmholtz energ'y equation of state and partial derivatives in the single-phase region.	6M	CO1	L2
	(OR)			
2(a)	State the First Law of Thermodynamics and its applications.	6M	CO1	L2
(b)	Explain the second law of thermodynamics.	6M	CO1	L2
3(a)	Develop the expressions for change in internal energy and enthalpy of non-reactive mixtures.	6M	CO2	L2
(b)	A gaseous mixture consists of 2 kg of oxygen and 10 kg of nitrogen at a pressure of 125 Kpa and a temperature of 30^{0}C. Determine the changes in internal energy, enthalpy and entropy of the mixture when the mixture is heated to a temperature of 80^{0}C at constant volume.	6M	CO2	L3
	(OR)			
4(a)	Formulate the Vander Waal's relations and explain its significance.	6M	CO2	L2
(b)	A vessel contains an ideal diatomic gas at temperature of 30^{0}C. The total translational kinetic energy of a gas molecule is 5 x 10^{-6} J. The mass of the gas is then doubled and total translational kinetic energy of the gas molecules becomes 6 x 10^{-6} J. Determine the new temperature of the gas.	6M	CO2	L3
5(a)	Determine the enthalpy of combustion gaseous phase C_8H_{18} at 15^{0}C and 8 atm.	6M	CO3	L3
(b)	State the first law for reactive gas systems.	6M	CO3	L2
	(OR)			
6(a)	Determine the enthalpy of combustion of liquid octane (C_6H_{14}) with 90% theoretical dry air. Both products and reactants are at 5 atm and 325K.	6M	CO3	L3
(b)	A constant volume chamber 0.3m^3 capacity contain 2kg of this gas at 5^{0}C heat is transferred to the gas until the temperature is 100^{0}C. Find the work done, the heat transferred and the changes in internal energy, enthalpy and entropy.	6M	CO3	L3
7(a)	Obtain the expression of Irreversibility for open and closed systems.	6M	CO4	L2
(b)	Deduce the expressions for Irreversibility of closed and open systems.	6M	CO4	L2
	(OR)			
8(a)	What is meant by availability? Formulate the availability functions for a closed system?	6M	CO4	L2
(b)	A hot flue gas expands in a gas turbine from 793 K/500 kPa to 573 K/100 kPa. Though the turbine is well insulated, there is a steady heat loss of 10 kJ to the surroundings (98 kPa /293 K) per kg of flue gas expanding. Determine on a unit mass basis of flue gas (i) decrease in availability (ii) maximum work availability (iii) Irreversibility	6M	CO4	L3
9(a)	Write a short note on Brayton cycle process and explain its wide applications.	6M	CO5	L2
(b)	Enunciate the working of advanced power cycles.	6M	CO5	L2
	(OR)			
10(a)	Frame the expression for second law analysis of gas power cycles.	6M	CO5	L2
(b)	Compare and contrast the Binary vapor cycle and Second law analysis of the cycle.	6M	CO5	L2

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