

I M.TECH I Semester Regular Examinations, January-2025

R24

Sub Code: R24MCC101
RESEARCH METHODOLOGY & IPR
Time: 3 hours
(MD, CSE, STRE, PID, DECS, VLSI&ES)
Max. Marks: 60
Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M			
Unit-I							
1	a	i) Explain Clearly the objectives of Research Problem			K2	1	6M
		ii) Interpret different sources of research problem by giving suitable examples			K2	1	6M
	OR						
	b	i) Explain clearly research design process and steps to be followed			K2	1	12M
Unit-II							
2	a	i) How do you design a research problem? Give an example to illustrate your answer			K2	2	6M
		ii) Discuss various issues involved in selecting a research problem. Also elaborate important features of a good research design.			K2	2	6M
	OR						
	b	i) Differentiate between qualitative research and quantitative research			K2	2	12M
Unit-III							
3	a	i) Explain the procedure to determine the size of sample and discuss on sampling size			K2	3	6M
		ii) Explain the Concepts of Statistical Population			K2	3	6M
	OR						
	b	Explain different types of sampling techniques			K2	3	12M
Unit-IV							
4	a	i) Explain new developments in Intellectual Property Rights.			K2	4	6M
		ii) Define intellectual property in research. Explain different types of intellectual property			K2	4	6M
	OR						
	b	i) Contrast the purpose and functions of trademarks			K2	4	6M
ii) Write notes on trade secrets, precautions and maintenance			K2	4	6M		
Unit-V							
5	a	i) Exemplify the basic criteria of patentability of industrial designs			K2	5	6M
		ii) Explain the fundamentals of copyright laws			K2	5	6M
	OR						
	b	i) Describe briefly how the online patent data is organized			K3	5	6M
ii) Describe the structure and content of a patent document in general.			K3	5	6M		

KL: Blooms Taxonomy Knowledge Level

CO: Course Outcome M: Marks



I M. Tech I Semester Regular Examinations, January-2025

Sub Code: R24MNC102

DISASTER MANAGEMENT

Time: 3 hours

(STRE, P&ID, MD, DECS, VLSI&ES and CSE)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

Q.No	Questions	KL	CO	M
Unit-I				
1	a i) Describe types of disasters with examples.	K2&K3	C01	6M
	ii)) Explain About The Disaster Management Cycle	K2&K3	C01	6M
	OR			
	b i) Explain how the Richter scale is used to measure the magnitude of an earthquake	K2&K3	C01	6M
	ii) Discuss various types of natural disasters in India and highlight their effects	K2&K3	C01	6M
Unit-II				
2	a Explain The causes of Floods and the effects of Floods in detail. Give one Case Study of The Floods.	K2&K3	C02	12M
	OR			
	b Explain The causes of earthquakes and effects of earthquakes in detail. Give one Case Study of The earthquake.	K2&K3	C02	12M
Unit-III				
3	a i) Explain the Earthquake zones of India	K2&K3	C03	6M
	ii) explain assessing risk and vulnerability	K2&K3	C03	6M
	OR			
	b What is drought? Explain the types of droughts. Explain drought mitigation with an integration of technology and people.	K2&K3	C03	12M
Unit-IV				
4	a i) what are the multimedia technologies of disaster risk management in remote sensing	K2&K3	C04	12M
	OR			
	b i) what are the forewarning levels of disaster management	K2&K3	C04	6M
	ii) Explain About The Mass Media and disaster Management?	K2&K3	C04	6M
Unit-V				
5	a i) what are the disaster management acts and policies in India	K2&K3	C05	6M
	ii) What are the steps for formulating a disaster risk reduction plan?	K2&K3	C05	6M
	OR			
	What are favourable conditions for cyclone formation? How do you estimate risk from cyclonic conditions and safety precautions to save lives?	K2&K3	C05	12M

I M.TECH I Semester Regular Examinations, January-2025

Sub Code: R24MPI102 ELECTRICAL MACHINE MODELLING AND ANALYSIS

Time: 3 hours

(EEE)

Max. Marks: 60

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M	
Unit-I					
1	a	i) Explain the modeling of basic 2 pole machine with necessary equations?	2	1	6M
		ii) Describe the modeling of three phase synchronous machine with damper bars?	2	1	6M
	OR				
	b	i) Explain the Kron's primitive machine with relevant relations?	2	1	6M
ii) Describe the modeling of three phase synchronous machine without damper bars?		2	1	6M	
Unit-II					
2	a	i) Derive the transfer function of separately excited DC motors?	3	2	6M
		ii) Derive and analyze the mathematical model of D.C shunt motor?	3	2	6M
	OR				
	b	i) Derive and analyze the mathematical model of D.C series motor?	3	2	6M
ii) Derive the state variable form of DC compound motor?		3	2	6M	
Unit-III					
3	a	i) Explain in detail about the process and outcomes of linear transformation?	2	3	6M
		ii) Derive and analyze the circuit model of three phase induction motor?	4	3	6M
	OR				
	b	i) Explain in detail about the process and outcomes of phase transformation?	2	3	6M
ii) Analyze the two axis models of induction motors?		3	3	6M	
Unit-IV					
4	a	i) Write and explain the importance of small signal equations of induction machines?	2	4	6M
		ii) Describe the cross field theory of single phase induction machine with necessary equations?	3	4	6M
	OR				
	b	i) Describe the signal flow graph representation of induction machines?	3	4	6M
ii) Explain the steady state analysis of single phase induction machines with necessary equations?		2	4	6M	
Unit-V					
5	a	i) Discuss in detail about the importance of synchronous machine inductances?	2	5	6M
		ii) Explain the phase coordinate model of synchronous machine with necessary equations?	2	5	6M
	OR				
	b	i) Derive and analyze the mathematical model of PM synchronous motor?	3	5	6M
ii) Explain the space phasor model of synchronous machine with necessary equations?		2	5	6M	

I M.TECH I Semester Regular Examinations, January-2025

Sub Code: R24MPI103 ANALYSIS OF POWER ELECTRONIC CONVERTERS AND INVERTERS

Time: 3 hours

(P&ID)

Max. Marks: 60

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No		Questions	KL	CO	M
1	Unit-I				
	a	i) Explain about the half controlled converter with freewheeling diode by drawing output waveforms?	2	1	6M
		ii) Summarize the performance parameters of dual converter and write their importance?	3	1	6M
	OR				
	b	i) Explain about the fully controlled converter with freewheeling diode by drawing output waveforms?	2	1	6M
		ii) Draw the circuit diagram and explain the working principle of dual converter?	3	1	6M
2	Unit-II				
	a	i) Explain the three phase AC-DC fully controlled converter with resistive load?	2	2	6M
		ii) Analyze the operation of three phase inverter with circuit diagram?	4	2	6M
	OR				
	b	i) Explain the three phase AC-DC semi controlled converter with resistive load?	2	2	6M
		ii) Explain the effect of source impedance on three phase inverter operation?	2	2	6M
3	Unit-III				
	a	i) Explain in detail about design of buck boost converter with necessary equations?	3	3	6M
		ii) Draw the circuit diagram and explain the resonant converters?	3	3	6M
	OR				
	b	i) Explain in detail about design of CUK converter with necessary equations?	3	3	6M
		ii) Draw the circuit diagram and explain the quasi resonant converters?	3	3	6M
4	Unit-IV				
	a	i) Describe the operation of full bridge inverter with output waveforms?	3	4	6M
		ii) Justify the voltage control three phase inverters by using PWM techniques?	4	4	6M
	OR				
	b	i) Describe the operation of half bridge inverter with output waveforms?	3	4	6M
		ii) Compare the 180° and 120° conduction modes of operation of inverters?	4	4	6M

5	a	i) Analyze the AC voltage controllers with RL load and draw the output waveforms?	4	5	6M
		ii) Draw the circuit diagram and explain the three phase cyclo converters?	2	5	6M
	OR				
	b	i) Analyze the AC voltage controllers with R load and draw the output waveforms?	3	5	6M
ii) Draw the circuit diagram and explain the single phase cyclo converters?		2	5	6M	

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

I M.TECH I Semester Regular Examinations, January-2025

R24

Sub Code: R24MPI104 POWER SEMICONDUCTOR DEVICES AND PROTECTION

Time: 3 hours

(P&ID)

Max. Marks: 60

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12M = 60M)

Q. No	Questions	KL	CO	M			
Unit-I							
1	a	i) Classify different uncontrolled and controlled power semiconductor devices.			K2	1	4M
		ii) Explain in detail about the I-V characteristics of Ideal switches and practical switches.			K3	1	8M
	OR						
	b	i) Classify and briefly explain the power switching devices.			K2	1	4M
ii) Draw and explain the V-I characteristics of BJT, MOSFET and IGBT under ideal and practical conditions.			K3	1	8M		
Unit-II							
2	a	i) Classify different types of power diodes.			K2	2	4M
		ii) Draw the reverse recovery characteristics of a power diode and explain how a device can regain its blocking capability by deriving the expression for reverse recovery time			K3	2	8M
	OR						
	b	i) Explain the operational difference between line frequency and fast recovery diodes.			K2	2	6M
ii) Discuss the switching characteristics of power transistor with a neat sketch and list out the advantages.			K2	2	6M		
Unit-III							
3	a	i) Draw and explain the switching characteristics of MOSFET.			K2	3	7M
		ii) Describe the process of on to off state transitions of IGBT.			K2	3	5M
	OR						
	b	i) Mention different methods to drive the MOSFETs.			K2	3	5M
ii) Draw and explain the V-I Characteristics of IGBTs.			K2	3	7M		
Unit-IV							
4	a	i) Explain dv/dt protection for power semiconductor devices.			K2	4	6M
		ii) What is snubber circuit? Why it is needed in Power converters?			K3	4	6M
	OR						
	b	i) Describe how power semiconductor devices are protected against over currents.			K2	4	6M
ii) Design a snubber circuit for any power device.			K3	4	6M		
Unit-V							
5	a	i) Explain how conduction and transition losses are computed in power devices?			K2	5	6M
		ii) Explain the electrical equivalent circuit of the thermal model with a neat sketch.			K3	5	6M
	OR						
	b	i) What is the significance of heat sink? And explain its sizing.			K3	5	6M
ii) Discuss the design of high frequency inductors and transformers.			K3	5	6M		

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

I M.TECH I Semester Regular Examinations, January-2025

R24

Sub Code: R24MPI109

SPECIAL MACHINES AND CONTROL

Time: 3 hours

(P&ID)

Max. Marks: 60

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 12M = 60M)

Q.No	Questions	KL	CO	M	
1	Unit-I				
	a	i) Compare the static and dynamic characteristics of stepper motor with necessary diagrams.	K3	1	6M
		ii) Explain the construction of multi stack Variable reluctance stepper motor with neat sketches.	K2	1	6M
	OR				
	b	i) Calculate the stator pole pitch, rotor pole pitch and full step angle of a 12/8 Variable reluctance stepper motor.	K3	1	6M
		ii) Draw the block diagram and explain the open-loop control of stepper a motor.	K2	1	6M
2	Unit-II				
	a	What is the reason for torque ripples in switched reluctance motors? With a block diagram, explain in detail the torque control of a switched reluctance motor.	K3	2	12M
	OR				
	b	i) Explain the construction and working principle of switched reluctance motor.	K2	2	6M
	ii) List the advantages, disadvantages and applications of switched reluctance motors.	K2	2	6M	
3	Unit-III				
	a	What is a commutator? What is its need in electrical machines? Compare between mechanical and electronic commutators.	K3	3	12M
	OR				
	b	i) Explain the closed loop control scheme of a PMBLDC motor drive with a suitable schematic diagram.	K3	3	6M
	ii) Explain about Square wave permanent magnet brushless motor drives.	K2	3	6M	
4	Unit-IV				
	a	i) Discuss the constructional differences between permanent magnet synchronous motor and BLDC motors.	K2	4	6M
		ii) Discuss different types of rotors in permanent magnet synchronous machines.	K2	4	6M
	OR				
	b	i) Draw and discuss the Torque-speed characteristics of permanent magnet synchronous motor.	K2	4	6M
		ii) Discuss the Vector control scheme of permanent magnet synchronous motor in detail.	K2	4	6M
5	Unit-V				
	a	i) Compare between stepper motors and servo motors.	K3	5	6M
		ii) Explain about microprocessor control of a servo motor.	K2	5	6M
	OR				
b	Explain the operating principle of AC tachometer with a neat schematic diagram. Also discuss the applications of AC tachometers.	K3	5	12M	