Code No: 80403 | MR18(2019-20) | HT.NO:

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

Maisammaguda, Dhulapally, (Post Via Kompally), Secunderabad-500100.

B.TECH III YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2022

SUBJECT: Digital Electronics

BRANCH: EEE

Time: 3 hours **Max. Marks: 70**

Answer all questions **5X14M=70 M**

All Questions carries equal marks

Q.NO	QUESTIONS	MARKS	*BT LEVEL	CO
1.	a) Convert the following $(FACE.865)_{16}$ hexadecimal number into their equivalent decimal and octal number. b) Convert the following to Binary and then to gray code: i) $(AB33)_{16}$ ii) $(3323)_8$	7 7	L3	1
	OR			
2.	a) What is a Hamming code? and encode data bits 0101 into a 7 -bit even parity Hamming code. b) Subtract 2781 from 4951 using the excess-3 subtractor.	7 7	L3	1
3.	a) Simplify the following expression using Boolean theorems Y = (A + B) (A + C') (B' + C') b) Reduce the following function using K -Map Technique and implement using universal gate. f(P,Q,R,S) = Σ m (0,1, 4, 8,9,10) + d (2 ,11)	7 7	L4	2
	OR			
4.	a) Expand f(A,B,C,)= A +AB +BC in to Minterms and Maxterms b) Simplify the following function using Quine McClusky's method f(w,x,y,z)= Σ m(0,2,3,6,7,8,10,12,13)	6 8	L3	2
5.	a) Draw the logic diagram of full adder using two half adders and explain its operation. b) Explain a 4-bit binary parallel adder with look ahead carry scheme.	7 7	L4	3
	OR			
6.	a) What is a decoder? Construct a 4×16 decoder with two 3×8 decoders. b) Using 8:1 multiplexer, realize the Boolean function f(A, B,C,D)= Σm(0,3,4,8, 9,12,14)	7 7	L3	3
7.	a) Convert D flip-flop to T flip-flop. b) Construct a MOD-5 synchronous counter using D flip flop.	7 7	L3	4
	OR			
8.	a) Explain the operation of RS flip-flop with timing diagram. b) Explain the operation of JK master slave flip-flop with suitable diagram.	7 7	L3	4

9.	A sequential circuit has two D flip-flop's A and B an input 'x'and output 'y' is specified by the following next state and output equations. a. A (t+1)= Ax + Bx b. B (t+1)= A'x c. Y= (A+B) x' (i) Draw the logic diagram of the circuit. (ii) Derive the state table. (iii) Derive the state diagram.	14	L4	5
	OR			
10.	a) Explain the capabilities and limitations of finite state machines. b) With a neat block diagram, explain the Moore model of a clocked synchronous sequential circuit.	7 7	L3	5

*Bloom's Taxonomy Level (BT Level): L1-Remember, L2- Understand, L3- Apply, L4- Analyse, L5- Evaluate, L6- Create.

Code No: 80213 | MR18(2019-20) | HT.NO:

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

Maisammaguda, Dhulapally, (Post Via Kompally), Secunderabad-500100.

B.TECH III YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2022

SUBJECT: AC Machines

BRANCH: EEE

Time: 3 hours **Max. Marks: 70**

Answer all questions **5X14M=70 M**

All Questions carries equal marks

Q.NO.	QUESTIONS	MARKS	*BT LEVEL	CO
1.	a) Explain the construction and working principle of three phase induction motor.	7	L2	1
	b) What is meant by stand still reactance of induction motor rotor? How does it vary with speed? Explain.	7	L2	
	OR			
2.	a) A three-phase induction motor, at no-load, operates at a very low power factor and at full-load, operates at good power factor. Justify?	7	L4	1
	b) Draw and explain the phasor diagram of a three-phase induction motor?	7	L2	
3.	a) Explain the procedure of conducting of blocked rotor test on three phase induction motor.	7	L2	2
	b) A 6-pole, 50 Hz, 3-phase induction motor running on full-load develops a useful torque of 160 N-m and the rotor emf is observed with 120 cycles/min. Calculate net mechanical power developed. If the torque loss in windage and friction is 12 N-m, find the copper-loss in the rotor windings, the input to the motor and efficiency. Assume stator losses as 800W.	7	L3	
	OR			
4.	a) Derive the general expression for the torque developed in the three-phase induction motor?	7	L3	2
	b) A 10 kW, 400V, 3-phase, 4 pole, 50 Hz delta connected induction motor is running at no load with a line current of 10A and an input power of 600W. At full load, line current is 18A and input power is 11kW. Stator effective resistance per phase is 1Ω and friction, windage loss is 420W. For negligible rotor ohmic losses at no load, calculate (i) stator core loss (ii) total rotor losses at full load (iii) total rotor ohmic losses at full load.	7	L3	
5.	a) Explain the construction and operation of Capacitor start-run motor.	7	L2	3
	b) Describe the construction and principle of operation of shaded pole motor.	7	L2	
	OR			
6.	a) Discuss the construction and operation of split phase 1-phase induction motor.	7	L2	3
	b) Explain double revolving field theory of single-phase induction motor.	7	L2	

7.	a) Explain in detail the synchronous impedance method for obtaining voltage regulation of 3-phase alternator. b) A 4-pole alternator has an armature with 25 slots and 8 conductors per slot and rotates at 1500 rpm and the flux per pole is 0.05 Wb. Calculate the EMF generated, if winding factor is 0.96 and all the conductors in a phase are in series.	7 7	L4 L3	4
	OR			
8.	a) A 3-phase, star-connected alternator is rated at 1600 kVA and 13500V the armature effective resistance and synchronous reactance per phase are 1.5 Ω and 30 Ω respectively, calculate the percentage regulation for a load of 1280 kW at P.F of, (i) 0.8 lagging. (ii) unity and (iii) 0.8 leading. b) Describe the factors which affect the sharing of load between two alternators operating.	 7 7	 L3 L4	4
9.	a) Draw and explain the 'V-curves' and 'inverted V-curves' of synchronous motor. b) Derive the expression for the maximum power developed by a synchronous motor.	7 7	L4 L2	5
	OR			
10.	a) Explain the different methods of starting of synchronous motors. b) A 3-phase synchronous motor has 12-poles and operates from a 440V, 50Hz supply. Calculate its speed if it takes a line current of 100A at a p.f of 0.8 leading. Determine the torque developed by the motor. Neglect losses.	7 7	L2 L3	5

*Bloom's Taxonomy Level (BT Level): L1-Remember, L2- Understand, L3- Apply, L4- Analyse, L5- Evaluate, L6- Create.

Code No: 80214 | MR18(2019-20) | HT.NO:

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

Maisammaguda, Dhulapally, (Post Via Kompally), Secunderabad-500100.

B.TECH III YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2022

SUBJECT: Power Transmission Systems

BRANCH: EEE

Time: 3 hours | **Max. Marks: 70**

Answer all questions | **5X14M=70 M**

All Questions carries equal marks

Q.NO.	QUESTIONS	MARKS	*BT LEVEL	CO
1.	a) Explain the various factors affecting the distribution system planning.	7	L2	1
	b) Obtain the relation between the load factor and loss factor.	7	L3	
	OR			
2.	a) Explain the load characteristics of distribution system.	7	L3	1
	b) Explain briefly the classification of loads and modeling of load in distribution networks.	7	L3	
3.	a) Starting from first principles deduce expressions for ABCD constants of a long line in terms of its parameters.	7	L2	2
	b) A 3-phase transmission line has the following constants. Resistance/ ph/ km = 0.16 ohm; reactance/ ph/km = 0.25 ohm. Shunt admittance/ph/km = 1.5×10^{-6} mho. Calculate by rigorous method the sending end voltage and current when the line is delivering a load P-20MW at 0.8 p.f lagging. The receiving end voltage is kept constant at 110 kV.	7	L4	
	OR			
4.	a) Explain the surge impedance loading with necessary expressions.	7	L3	2
	b) A 3- phase transmission line is 480km long and serves a load of 400MVA, 0.8p.f lag at 345kV. The ABCD constants of the line are $A=D=0.818\angle1.3^0$; $B=172.2\angle84.2^0$; $C=0.001933\angle90.4^0$mhos. Determine the sending end line to neutral voltage, the sending end current and the percent voltage drop at full load.	7	L4	
5.	a) Explain different types of OH line insulators used in transmission system.	7	L3	3
	b) What is corona and what factors will affect the corona in transmission lines.	7	L2	
	OR			
6.	a) Explain in detail about the effects of power system transients.	7	L3	3
	b) A 3-phase, 50 Hz, 144 kV transmission line has conductors in equilateral formation spaced 2.2 metres apart. The conductor diameter is 1.02 cm and the surface factor is 0.86. The air pressure and temperature are 76 cm of Hg and 28°C respectively. Determine the critical visual voltage for corona and the corona loss per km per phase of the line, mv = 0.75.	7	L4	

7.	a) Explain in detail propagation constant and its importance in the long transmission lines. b) The ends of two long transmission lines A and B are connected by a cable C 1.5 km long. The lines have capacitance of 10 pF/m and inductance 1.6×10^{-6} H/m and the cable has capacitance 89 pF/m and inductance 5×10^{-7} H/m. A rectangular voltage wave of magnitude 10 kV and of long duration travels along line A towards the cable. Find the magnitude of the second voltage step occurring at the junction of the cable and line B. What will be the voltage at the junction of line A and the cable 20 μsec after the initial surge reaches this point?	7 7	L3 L4	4
	OR			
8.	a) Develop equivalent circuit for analyzing the behavior of traveling waves at transition point's transmission lines. b) An overhead transmission line having a surge impedance of 450 ohms runs between two substations A and B; at B it branches into two lines C and D, of surge impedances 400 and 50 ohms respectively. If a travelling wave of vertical front and magnitude 25 kV travels along the line AB, calculate the magnitude of the voltage and current waves which enter the branches at C and D.	7 7	L2 L4	4
9.	a) Mention The Essential Requirements Of Underground Cables. b) Explain the concept of capacitance grounding in underground cables.	7 7	L4 L3	5
	OR			
10.	a) Explain the general construction of 3-core cable with neat sketch. b) Define insulation resistance. Derive the expression for the insulation resistance.	4 10	L3 L4	5

*Bloom's Taxonomy Level (BT Level): L1-Remember, L2- Understand, L3- Apply, L4- Analyse, L5- Evaluate, L6- Create.

Code No: 80215 | MR18(2019-20) | HT.NO:

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

Maisammaguda, Dhulapally, (Post Via Kompally), Secunderabad-500100.

B.TECH III YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2022

SUBJECT: Power Electronics

BRANCH: EEE

Time: 3 hours | **Max. Marks: 70**

Answer all questions | **5X14M=70 M**

All Questions carries equal marks

Q.NO.	QUESTIONS	MARKS	*BT LEVEL	CO
1.	a) Draw and explain the forward characteristics of SCR using two transistor model of SCR.	7	L2	1
	b) Describe the UJT triggering circuit with neat sketch.	7	L3	
	OR			
2.	a) Explain the operation of two transistor analogy?	7	L3	1
	b) Discuss the circuit arrangements that are necessary for proper operation of parallel connected thyristors.	7	L4	
3.	a) Explain the effect of source inductance in the operation of single phase fully controlled converter, indicating clearly the conduction of various thyristors during one cycle.	10	L2	2
	b) Summarize the roles of freewheeling diode in a Full converter.	4		
	OR			
4.	a) Summarize the operation of single phase fully controlled midpoint converter with relevant voltage and current waveforms.	10	L4	2
	b) A fully controlled converter is fed with a 230V, 50 Hz supply. The load on the converter is a pure resistance of R=10 Ω. Obtain the average output voltage for a firing angle of α =135°	4		
5.	a) A 3-phase 6 pulse full converter is connected to resistive and inductive load of 10Ω and 1H respectively from 3-phase, 220V, 50 HZ, Y-connected supply. For firing angle of 30°, determine (i) average output voltage (ii) average output current and (iii) rms output current.	9	L3	3
	b) Compare 3 pulse and 6 pulse converters.	5		
	OR			
6.	a) Deduce the average load voltage with R load of three phase three pulse converter.	8	L2	3
	b) The full-wave three-phase controlled rectifier has a three phase 415V, 50Hz source (240 V Phase), and provides a 100A constant load current. Determine: (i) The average and rms thyristor current. (ii) The rms and fundamental line current.	6	L3	

7.	Explain in detail the different modes of operation of load commutated and current commutated choppers with relevant circuit diagram.	14	L2	4
	OR			
8.	a) Explain the operation of step up chopper and derive an expression for its output voltage. b) For a dc-dc buck-boost converter with a dc input voltage of 50V and output voltage of 100V, calculate (i) duty cycle (ii) value of inductor if inductor ripple current ΔI =10mA. Given the switching frequency is 10 kHz.	9 5	L4	4
9.	Describe the principle of operation of 3-phase voltage source inverter with 120^0 conduction mode with necessary waveforms and circuits.	14	L4	5
	OR			
10.	Design a single phase to single phase step down cyclo converter with centre –tapped transformer configuration and also explain the operation with output current and voltage waveforms.	14	L4	5

*Bloom's Taxonomy Level (BT Level): L1-Remember, L2- Understand, L3- Apply, L4- Analyse, L5- Evaluate, L6- Create.

Code No: 80222 | MR18(2019-20) | HT.NO:

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

Maisammaguda, Dhulapally, (Post Via Kompally), Secunderabad-500100.

B.TECH III YEAR I SEMESTER REGULAR EXAMINATIONS, JANUARY-2022

SUBJECT: High Voltage Engineering

BRANCH: EEE

Time: 3 hours | **Max. Marks: 70**

Answer all questions | **5X14M=70 M**

All Questions carries equal marks

Q.NO.	QUESTIONS	MARKS	*BT LEVEL	CO
1.	a) Explain how the electric stress can be estimated and controlled. b) Illustrate the gas or vacuum as a insulator.	7 7	2 3	1 1
	OR			
2.	Discuss different insulating materials used in circuit breakers, power transformers and cables.	14	1	1
3.	a) State and explain Paschen"s law. b) Explain thermal breakdown in solid dielectrics and its significance.	7 7	2 2	2 2
	OR			
4.	Explain the process of ionization by collision, photo ionization and secondary ionization.	14	2	2
5.	a) Describe with a neat sketch the working of a Van de Graff generator. b) An electrostatic voltmeter has an effective plate diameter of 50cm with a gap separation of 30cm. Find the force between the plates when measuring a dc voltage of 100kv. What is the maximum voltage that can be measured if the electric field E is to be not more than 5 kv/cm?	7 7	2 3	3 3
	OR			
6.	Draw the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistances?	14	3	3
7.	What are the characteristics of switching over voltages? Explain their effect in EHV and UHV systems.	14	2	4
	OR			
8.	Explain the different aspects of insulation design and insulation coordination adopted for EHV systems.	14	2	4
9.	Explain the different electrical tests done on isolators and circuit breakers.	14	2	5
	OR			
10.	Explain the importance of Radio interference voltage measurements for EHV power apparatus.	14	2	5

*Bloom's Taxonomy Level (BT Level): L1-Remember, L2- Understand, L3- Apply, L4- Analyse, L5- Evaluate, L6- Create.