Code No.: 40216

MR14

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **STATIC DRIVES**

Branch: **EEE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. Draw the speed torque characteristics of DC motor.
2. Draw the circuit for the 3-phase full converter.
3. Write the general equation for average load voltage in chopper circuit.
4. Draw equivalent circuit diagram of Induction Motor.
5. List out the merits and demerits of schebius drive.

II. Answer ALL questions of the following **10x2Marks=20 Marks**

1. What is the purpose of a freewheeling diode in converters when fed to DC motors?
2. Write the methods of armature voltage control methods for AC, DC motors.
3. Draw the wave forms of 3-phase semi-converter and speed torque characteristics.
4. Write the advantages of 3-phase over single phase converters.
5. What is electric braking?
6. Explain the first quadrant chopper controlled separately excited dc motor.
7. Volt/Hz speed control characteristics.
8. Explain the advantages of variable frequency drives.
9. In which way a static kramer control is different from static scherbius drive.
10. What are the Applications of static Kramer drive?

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. A single phase fully controlled thyristor bridge converter, operating from 230v, 50HZ mains , supplies the armature of a separately excited dc motor running at a speed of 1000rpm. The motor has an armature resistance of 0.5Ω and a back emf constant of 0.1v/rpm. Assuming continuous current operation for a firing angle of 30°,estimate the average armature current and the torque developed by the motor.

OR

2. A single phase Full-converter with freewheeling diode drives a separately excited dc motor at 900 rpm with firing angle 60°. When this motor is fed from 1-phase semi converter with firing angle 60°, find the motor speed?

3. Explain the operation of 3-phase full converter connected to a separately excited DC motor, describe the voltage, current wave forms and also draw its speed-torque characteristics.

OR

4. Derive the average output equation of three phase semi converter fed DC series motor and draw the speed torque characteristics.

5. Explain the operation of the DC Drive in all four quadrants when fed by a single phase dual converter.

OR

6. Explain two quadrant operations with load voltage wave forms.

7. A separately excited dc motor with Ra =0.3Ω and La=15mA is to be Dc chopper speed controlled over a range of 0-2000rpm. The Dc supply is 220V. The load torque constant and requires average armature current of 25A. Calculate the range of mark space ratio require if the motor design constant (Ke ∅) has a value of 0.00167 Vs per revolution.

OR

8. Explain the speed control of a 3-phase induction motor using 3-phase bridge inverter with 120° Mode of conduction.

9. How is the output voltage of a VSI improved by PWM techniques? Explain how you will use this converter for speed control of a synchronous motor.

OR

10. Describe the open loop method of speed control of synchronous motor using VSI.

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019

Subject: **COMPUTER METHODS IN POWER SYSTEMS**

Branch: **EEE**

Time: 3 hours **Max. Marks: 75**

PART – A

I. Answer ALL questions of the following **5x1Mark=5 Marks**

1. What is the advantage of sparsity?
2. What are different types of buses? Name them.
3. List Symmetrical Components.
4. Explain Transfer Reactance.
5. Define power system stability.

II. Answer ALL questions of the following **10x2Marks=20 Marks**

1. Explain Element Node incidence matrix with example.
2. What are the advantages of Y_{bus}?
3. What is load flow analysis? Give the significance in power system analysis.
4. What are the various types of buses in load flow studies?
5. Classify different types of faults.
6. Why are series reactors used in power systems?
7. Mention the Methods to improve steady state stability.
8. List Methods to improve Steady State Stability.
9. Give an expression for swing equation. Explain each term along with their units.
10. How can the transient stability be improved?

PART-B

Answer ALL questions of the following **5x10 Marks= 50Marks**

1. Derive the equation for self and mutual impedance of Z_{Bus}.for the addition of a branch.

OR

2. For the data shown in the table below obtain the $Y_{bus,}$ matrix by singular transformation.

Element number	Self		Mutual	
	Bus code	Admittance	Bus code	Admittance
1	1-2	0.2		
4	1-3	0.3		
2	2-3	0.5		
3	1-4	0.4	1-2	0.2
5	3-4	0.2		

3. Develop Load flow Equations Suitable for solution by NR Method in rectangular co-ordinates when both PQ and PV buses are present.

OR

4. Explain the load flow solution of gauss-seidal method with a neat flow chart.
5. a) What are the assumptions to be made in short circuit studies? Deduce and draw the sequence network for a line fault at the terminal of an unloaded generator.

   b) A 11 KV, 100 MVA alternator having a sub-transient reactance of 0.25 p.u is supplying a 50 MVA motor having a sub-transient reactance of 0.2 p.u through a transmission line. The line reactance is 0.05 p.u on a base of 100 MVA. The motor is drawing 40 MW at 0.8 p.f leading with a terminal voltage of 10.95 KV when a 3-phase fault occurs at the generator terminals. Calculate the total current in generator and motor under fault condition.

OR

6. Derive the expressions for fault currents and voltages of an alternator for the following faults.
   a) SLG b) LL
7. a) Derive the power angle equation for a SMIB system. Also draw the power-angle curve.

   b) Derive the formulae for constants M & H with relevant equations.

OR

8. a) Explain the condition for steady state stability using the solution of swing equation.

   b) The generalized constants of a power system are:

      i. $A=D= 0.98\angle 2^0$
      ii. $B=83 \angle 78^0$ ohms
      iii. $C=0.00040 \angle 90^0$ mho

   Find the steady state stability of the system, if |Vs| and |Vr| are held constant at 220kV.
9. How can you determine transient state stability using equal area criterion?

OR

10. a) Derive an expression for critical clearing angle with neat diagram.

    b) Derive the expression for critical clearing time from swing equation.