Code No.: **40419** | **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-2018

Subject: **Microprocessors and Microcontrollers**

Branch: **Common to EEE & ECE**

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

PART – A

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

1. What is the difference between segment register and general purpose register?
2. What is an assembler directive? Give an example.
3. What is the need for interrupt controller?
4. What is a Microcontroller?
5. List out various flags in 8051

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Write the special functions carried by the general purpose registers of 8086.
2. Write the flags of 8086.
3. Define opcode and operand.
4. What is addressing? What are the various addressing modes available in 8086?
5. What are the different scan modes of 8279?
6. What is USART? What are the functions performed by INTEL 8251A?
7. Give the alternate functions for the port pins of port3?
8. List the features of 8051 microcontroller?
9. What are the addressing modes of 8051 microcontroller?
10. Write down the different operating modes for serial communication of 8051

PART-B

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

Q1.a) With a neat architectural diagram, explain the functioning of an 8086.

b) What is memory segmentation? Explain how segmentation provides effective task switching mechanism.

(OR)

Q2. a) Write the addressing modes of 8086 microprocessor with an example.

b) Explain the following 8086 instructions with examples

(i) MUL (ii) IMUL (iii) DIV (iv) IDIV

Q3. a) Write an ALP to find the multiplication of two 16-bit Hex numbers?

b) Explain the branch and call instructions of 8086 with examples.

(OR)

Q4. a) Write an 8086 program to perform the addition of two matrices.

b) What are the loop instructions of 8086? Explain the use of DF flag in the execution of string instructions.

Q5. a) Draw and explain 8251 USART architecture.

b) Draw a schematic to interface keyboard and display with 8086 using 8255 and explain.

(OR)

Q6. a) With neat diagrams, explain about I/O modes of 8255 (PPI).

b) Briefly explain about control words of 8259 (PIC).

Q7. a) With neat diagrams, explain about timers and counters in 8051 microcontroller.

b) Discuss briefly about RAM of 8051.

(OR)

Q8. a) Give the format of SCON register in 8051 and explain each bit in the format.

b) Explain the architecture of 8051 microcontroller.

Q9. a) With examples, describe the instruction set of 8051.

b) Briefly explain about the interrupt priorities in 8051.

(OR)

Q10 a) Write 8051 program to generate 2 kHz square waves on pin P1.0 of port 1 using Timer interrupt.

b) Write a 8051 assembly language program to find the largest number from an array of 10 numbers. The array is located in the data memory and the start address of Array is 20H.

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: **STATIC DRIVES**

Branch: **EEE**

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

PART – A

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

1. Write the speed and torque expression for separately excited DC motor.
2. Write the Speed expression for three phase semi-converter fed separately excited D.C motor. When it is in braking mode.
3. Write the general equation for average load voltage in chopper circuit.
4. What is stator frequency control?
5. What are types of the slip power recovery schemes?

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Explain the choice of selection of the motor for different loads.
2. Write the armature Voltage, speed and torque equation for DC series motor drive
3. Draw the wave form of three phase fully control of dc separately excited motor.
4. Write the advantages of 3-phase over single phase converters.
5. Draw the power circuit of plugging for both separately excited and series excited DC motor.
6. In which quadrant does the step down chopper operate and write the average output voltage expression.
7. Discuss merits and demerits of variable frequency control of induction motor.
8. Write the Advantages of a converted fed induction motor over a line fed induction motor.
9. List the differences between Induction motor and synchronous motor.
10. Draw the speed-torque characteristic of a cylindrical-rotor synchronous motor with variable frequency supply.

PART-B

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

1. Derive the relation between speed and torque of a single phase semi wave converter feeding a DC series motor drive for continuous mode of operation and draw the power circuit, voltage, current wave forms and its speed-torque characteristics?

(OR)

2. Draw the mechanical (or) speed –torque characteristics of all type of DC Motors.

3. Explain the operation of a three phase full converter fed DC Separately excited motor drive for continuous mode of operation with necessary power circuit, 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. Describe different braking methods employed for electrical motors.

(OR)

6. Explain the operation of four quadrant DC chopper drive.

7. Discuss speed control of induction motor from stator side with speed-torque curves. Derive the Torque equation of 3-phase induction motor.

(OR)

8. A 2.8kW, 400V, 50Hz, 4 pole, 1370rpm, delta connected squirrel cage induction motor has following parameters referred to the stator. Rs=2 Ω, Rr'=5 Ω, Xs=Xr'=5 Ω, Xm=80 Ω. Motor speed is controlled by stator voltage control. When driving a fan load it runs at rated speed at rated voltage. Calculate i) Motor terminal voltage, current and torque at 1200rpmand ii) motor speed, current and torque for terminal voltage of 300V.

9. Draw the circuit diagram and explain the operation of rotor- resistance control of Induction motor. Mention the advantages and disadvantages of the above method of control.

(OR)

10. Describe operation of self controlled synchronous motor by VSI in detail.

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III B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

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 a network graph?
2. What is generator bus?
3. How is an alternator represented for short circuit studies?
4. Define $\frac{dp}{d\delta}$.
5. What are the units of Inertia constant?

II. Answer ALL questions of the following **10x2Mark=20 Marks**

1. Write the modified Z_{BUS} matrix equation when an old bus is connected to reference through a branch of impedance Z_b.
2. Define bus?
3. What are the three types of buses of a power system used in power flow analysis? What are the quantities to be specified and to be computed for each class during power flow solution?
4. Write the active and reactive power equations for 'n' bus system in rectangular form.
5. Name the faults in which all the three sequence component currents are equal and in which positive and negative sequence currents together is equal to zero sequence current.
6. Explain the effects of Short Circuits.
7. Define positive sequence network with neat diagram.
8. List Methods to improve Steady State Stability.
9. Explain how HVDC link improve the Transient Stability.
10. What are the assumptions made to study Transient Stability?

PART-B

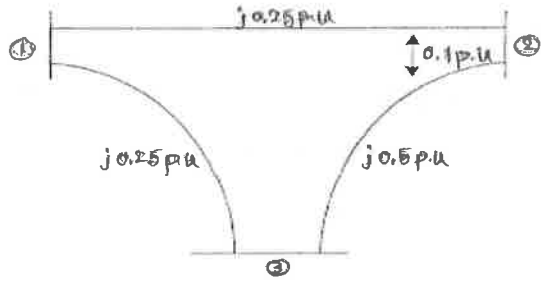
Answer ALL questions of the following **5x10 Marks= 50Marks**

1. 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(1)	0.6		
4	1-2(2)	0.4	1-2(1)	0.2
2	1-3	0.5	1-2(1)	0.1
3	3-4	0.5		
5	2-4	0.2		

(OR)

2. a) Describe the algorithm for formation of bus impedance matrix for addition of a branch.
   b) Compute the bus impedance matrix for the system shown in figure by adding element by element. Take bus (1) as reference bus



3. a) How do you improve rate of convergence of a GS method? **(3M)**
   b) In a 3-Bus power system with generation at Bus-1 (slack bus), $V_1=1.05\angle 0^0$, Y_{12} = 10-j20 p.u., Y_{13}=10-j30 p.u., Y_{23}=16-j32 p.u., with P_2= -1.566 p.u., Q_2= -1.162 p.u., P_3= -1.4 p.u. and Q_3= - 0.5 p.u.. Using GS method, determine the voltages at load buses 2 and 3 after one iterations. **(7M)**

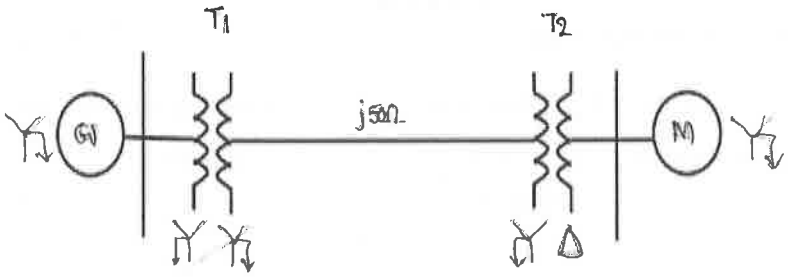
(OR)

4. Consider the 3-bus system which consists of three transmission lines between every two of the buses. The system has two generators connected to buses 2 and 3, each with a admittance of 0.2 pu. Each of the three lines has a series admittance of (0.2+j0.8)p.u. and line charging shunt admittance of j0.02p.u.

Bus No.	P_D(p.u.)	Q_D(p.u.)	P_G(p.u.)	Q_G (p.u.)	V
1	1.5	1.0	?	?	1.04 ∟0°
2	0.0	0.0	0.5	?	1.04∟?
3	1.5	0.6	0.0	0.0	?

   Find the voltages of all the buses at the end of first iteration using decoupled and fast decoupled methods.

5. Draw the per unit reactance diagram for the power systems shown below. Neglect resistance and use a base of 100MVA, 220KV in 50 ohms line. Determine the fault current when a LLLG fault has occurred at the terminals of the motor. The ratings of the generator, motor and transformers are as follows:



- G1: 40MVA, 25KV, X'' = 20%
- M: 50MVA, 11KV, X'' = 30%
- T1: 40MVA, 33 Y/ 220Y KV, X = 15%
- T2: 30MVA, 11 Δ / 220Y KV, X = 15%

(OR)

6. A synchronous generator and a synchronous motor each rated 20MVA, 12.66KV having 15% reactance are connected through transformers and a line as shown in fig. The transformers are rated 20MVA, 12.66/66KV and 66/12.66KV with leakage reactance of 10% each. The line has a reactance of 8% on base of 20MVA, 66 KV. The motor is drawing 10MW at 0.8 leading power factors and a terminal voltage 11KV when symmetrical three phase fault occurs at the motors terminals. Determine the generator and motor currents. Also determine the fault current.

7. a) Derive the power angle equation of a synchronous machine connected to an infinite bus and also the expression for maximum power transferable to the bus.
   b) Derive the formulae for constants M & H with relevant equations.

(OR)

8. Describe briefly the various methods employed for the enhancement of steady state stability Limit.

9. a) Explain Equal Area Criteria from basics. **(4M)**
   b) Explain how clearing time of breaker effects the stability of the power system. **(6M)**

(OR)

10. a) Prove $P_a = M \frac{d^2\delta}{dt^2}$

    b) A 50Hz four pole turbo generator rated 20 MVA 13.2 KV has an inertia constant of H= 9.0 KW-sec/KVA. Determine the kinetic energy stored in the rotor at synchronous speed. Determine the acceleration if the input less the rotational losses is 25000HP and the electric power developed is 15000KW.If the acceleration computed for the generator is constant for a period of 15 cycles; determine the change in torque angle in that period and the rpm at the end of 15 cycles.