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BTECH
(SEM VI) THEORY EXAMINATION 2023-24
POWER SYSTEM-II

TIME: 3 HRS   **M.MARKS: 100**

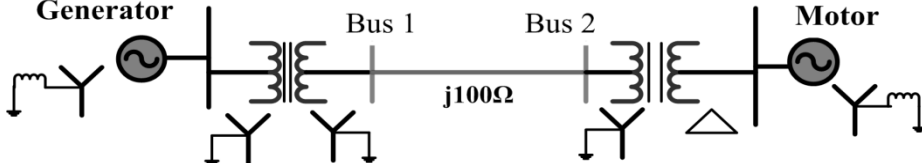**Note:** **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**

a.	What is the need of sequence components?	02
b.	What are the advantages of per unit system?	02
c.	What do you understand by load flow analysis?	02
d.	Outline the need for slack bus?	02
e.	What is meant by voltage surge?	02
f.	What do you mean by characteristic impedance loading?	02
g.	Discuss steady state and transient stability?	02
h.	What do you mean by stability limit?	02
i.	Explain various types of faults.	02
j.	Discuss the need power system protection?	02

SECTION B

2.   **Attempt any *three* of the following:**

a.	Draw the per unit impedance & reactance diagram for the power system shown below. Neglect resistance and use a base of 50 MVA, 220 kV in 100 Ω line. The rating of generator, transformers and motor are shown in Fig.	10

Generator	500 MVA	25 kV	X" = 20 %
Motor	200 MVA	11 kV	X" = 30 %
Transformer (Y-Y)	300 MVA	33Y / 220Y kV	X = 15 %
Transformer (Y-Δ)	300 MVA	11Δ / 220Y kV	X = 15 %

b.	Develop and explain the load flow equation by Gauss- Siddle Method.	10
c.	Explain the Bewley's Lattice diagram. Write a note on surge phenomenon. Define the protection against over voltages.	10
d.	Explain equal area criterion for stability by taking a suitable example of power system.	10
e.	Explain the working principle of differential relay and derive its operational condition with a suitable diagram. Why restraining coil is used in differential relay?	10

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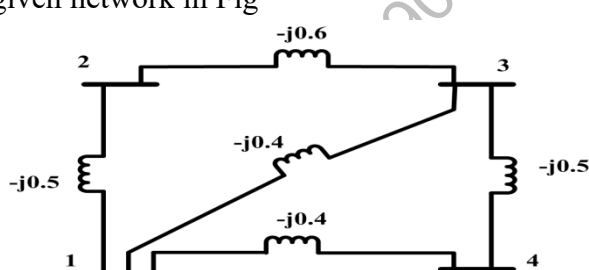
SECTION C

3. **Attempt any *one* part of the following:**

a.	Two generators rated at 10 MVA, 13.2KV and 15MVA, 13.2KV, respectively are connected in parallel to a bus. The bus feeds two motors rated at 8MVA and 12MVA respectively. The rated voltage of motors is 12.5 KV. The reactance of each generator is 15% and that of each motor 20% on its own rating. Assume 50MVA, 13.8KV base and draw reactance diagram.	10
b.	Derive the relationship to determine the fault current for a single line to ground fault. Draw and equivalent network showing the interconnection of sequence network to stimulate LG fault.	10

4. **Attempt any *one* part of the following:**

a.	What is Newton-Raphson method? How it is applied for the solution of power flow equation?	10
b.	Define different types of buses in a power system. Find the bus admittance matrix for the given network in Fig	10

5. **Attempt any *one* part of the following:**

a.	A 300 KV, 5 µ Sec rectangular surge travels along the line terminated by a capacitor of 1500pF. Determine the voltage across the capacitance and reflected voltage wave if the surge impedance loading of line is 300 ohm.	10
b.	Deduce the general wave equations for a loss less transmission line for propagation of voltage and current wave.	10

6. **Attempt any *one* part of the following:**

a.	Explain the swing equation for a machine connected to an infinite bus. If a synchronous generator is of 100MVA have inertia constant of 20MJ/MVA. Find the angular momentum.	10
b.	Explain step by step method of system stability with suitable diagrams.	10

7. **Attempt any *one* part of the following:**

a.	Explain in detail the operation of an Overcurrent Relay and Distance Protection, accompanied by a neat diagram?	10
b.	Define following: 　(i)　Recovery Voltage　(ii) Active recovery Voltage 　(iii)　Restriking Voltage　(iv) RRRV	10