

Sub Code: BEET-502

ROLL NO.....

Vth SEMESTER EXAMINATION, 2022-23

IIIrd Year, B.Tech. – Electrical engineering

Power System-II

Duration: 3:00 hrs.

Max. Marks: 100

Note: - Attempt all questions. All questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1. Answer any four parts of the following.

5*4 = 20

- a) Describe the single line diagram of the power system. **CO1, L1**
- b) What do you understand by per unit system? **CO1, L1**
- c) Discuss different types of buses present in the power system? **CO2, L1**
- d) Discuss difference between the different load flow study methods. **CO2, L1**
- e) What do you understand by Power system stability concept? **CO4, L1**
- f) A three Phase generator with rating 1000KVA, 33KV has its armature resistance and synchronous reactance as $20\Omega/\text{Phase}$ and $70\Omega/\text{Phase}$. Calculate P.U. impedance of the generator. **CO1, L3**

Q 2. Answer any four parts of the following.

5*4 = 20

- a) Derive the concept of line to ground fault of unloaded synchronous generator. **CO1, L2**
- b) Discuss the automatic voltage regulator for controlling the reactive power in power system. **CO3, L1**
- c) What is swing equation for synchronous machine connected to infinite bus? **CO4, L1**
- d) Discuss characteristic impedance and surge impedance of power system. **CO5, L1**
- e) Discuss equal area criteria of power system. **CO4, L1**
- f) Two power stations A and B are located close together. Station A has four identical generator sets each rated 100MVA and having an inertia constant of 9MJ/MVA whereas the station B has 3 sets each rated 200MVA, 4MJ/MVA. Calculate the inertia constant of a single equivalent machine on a base of 100MVA. **CO4, L3**

Q 3. Answer any two parts of the following.

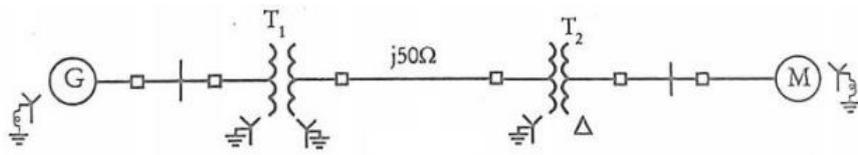
10*2 =20

- a) Discuss the equation and characteristics of L-L-L-G fault in the power system. **CO1, L3**
- b) Discuss the flow chart of newton raphson method and also define the size of jacobian matrix. **CO2, L3**
- c) A Synchronous generator and motor are rated for 30,000KVA, 13.2KV and both have sub - transient reactance of 20%. The line connecting them has a reactance of 10% on the base of machine ratings. The motor is drawing 20,000KW at 0.8 pf leading. The terminal voltage of the motor is 12.8KV. When a symmetrical three phase fault occurs at motor terminals, find the sub – transient current in generator, motor and at the fault point. **CO4,L3**

Q 4. Answer any two parts of the following.

10*2 =20

- a) Draw the reactance diagram for the power system shown in fig. Neglect resistance and use a base of 100 MVA, 220KV in 50Ω line. The ratings of the generator, motor and transformer are given below. **CO1, L4**



- b) What do you understand by transient stability and also Discuss the methods of improving transient stability? **CO4, L2**
- c) What is lattice Diagram? What are the properties of bewley's lattice diagram? & What is the application of Bewley's Lattice diagram? **CO5, L2**

Q 5. Answer any two parts of the following.

- a) A 2 pole 50Hz, 11KV turbo alternator has a ratio of 100MW, power factor 0.85 lagging. The rotor has a moment of inertia of 10,000 Kgm² . Calculate H and M. **CO4, L3**
- b) What do you understand by droop characteristics of generator? Also discuss the STATCOM and SVC in detail. **CO3, L2**
- c) For the given system form the admittance matrix by single transformation method. All values are in impedance per unit. **CO1, L4**

