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Question Paper Code : 41238

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Electrical and Electronics Engineering

080280055 — POWER SYSTEM ANALYSIS AND STABILITY

(Common to 080280049 – Power System Analysis and Stability for B.E. (Part-Time), Fifth Semester, Electrical and Electronics Engineering)

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Differentiate between steady state and transient state.

2. State the advantages of per unit representation.

3. What is meant by primitive network?

4. Draw the circuit representation of a line with off nominal tap settings at both ends of a line.

5. List the different types of buses in power system.

6. State the assumptions made in fast decoupled load flow.

7. Distinguish between subtransient and transient reactance of generator.

8. What is the need for short circuit analysis?

9. Define equal area criteria for stability.

10. Define steady state stability limit of power system.

PART B — (5 × 16 = 80 marks)

11. (a) Discuss the general aspects relating to power flow, short circuit and stability analysis of power system.

Or

(b) Draw the reactance diagram of the system shown in Fig. (1). The generator is 11 KV, 30,000 KVA with subtransient reactance of 15%. The generator supplies power to two motors through a transmission line having transformers at both the ends. Motors have rated input 10,000 KVA at 11 KV with subtransient reactances of 20%. Each transformer is 35,000 KVA, 11/110 KV with leakage reactance of 10%. Series reactance of transmission line is 80 ohms.

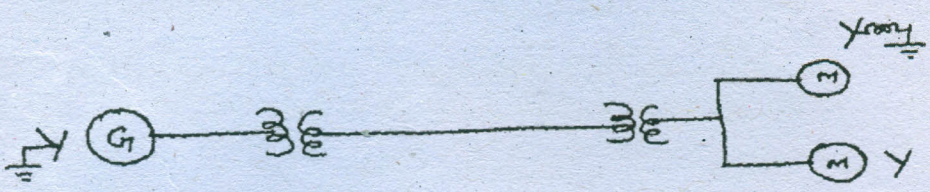

Fig. (1)

12. (a) Obtain Z_{bus} for the 4 bus transmission network shown in Fig. (2) with bus 1 as reference. The data is given in Table 1.

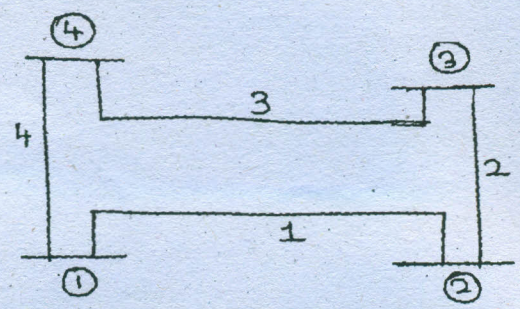

Fig. (2)

No	Bus code p-r	Z_{prpr}
1	1-2	0.5
2	2-3	0.6
3	3-4	0.4
4	1-4	0.3

Table 1

Or

(b) Discuss in detail about the modelling of generator, transformer, transmission line and load for power system analysis.

13. (a) Two generators rated 11 KV, 3000 KVA having 20% reactances are interconnected by a 100 km long transmission line. The reactance of line is 0.10 ohms per km. The transformers near the generators are rated 6000 KVA, 11 KV/66 KV and have 5% reactance. A 3 phase fault occur at a distance of 20 km from one end of the line when the system is on no load but at rated voltage. Calculate fault MVA and fault current.

Or

(b) A simple power system consists of a star connected generator having reactances $X_1 = 0.2$ p.u, $X_2 = 0.2$ p.u and $X_0 = 0.1$ p.u is connected to delta connected motor. Calculate the fault current for a single line to ground fault at the motor terminal, neglecting load current.

Rating of machines are as follows :

Generator 11 KV, 1500 KVA

Motor 11 KV, 1500 KVA p.u reactances of motor are same as that of the generator. Generator neutral is solidly grounded. Reactance of tie bar is negligible.

14. (a) Explain the Newton Raphson load flow method in detail.

Or

(b) Explain in detail about Gauss-Seidal method to find the solution for load flow.

15. (a) Discuss in detail about the method of finding solution for Swing equation by Euler's method.

Or

(b) For a system shown in Fig. (3) a three phase fault is applied at point P. Find the critical clearing angle for clearing the fault with simultaneous opening of the breakers 1 and 2. Assume that the generator is delivering 1.0 p.u at the instant proceeding the fault.

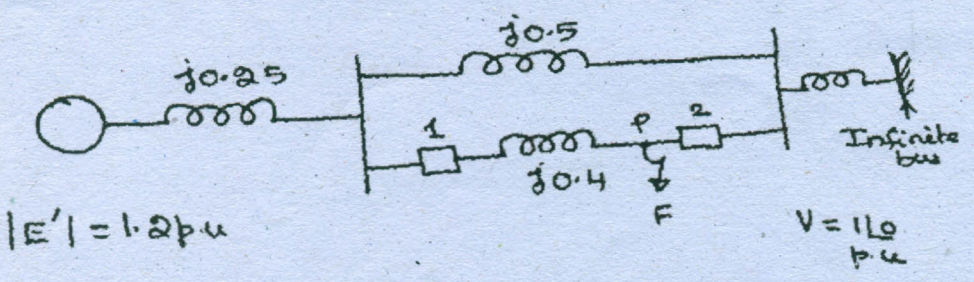

Fig. (3)