Exam. Code: 0936
Sub. Code: 6986

1058

B. Engg. (Electrical & Electronics Engg.)

6th Semester

EE-601: Computer Aided Power System Analysis

(May-2015)

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt <u>five</u> questions in all, including Q. No. 1 which is compulsory and selecting atleast <u>two</u> questions from each Unit.*

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I. Attempt the following: -

(a) Why it is important to consider ore bus as reference bus in load flow analysis?

(b) What are the bolted faults?

(c) How value of α in load flow analysis affects the convergence of a solution algorithm?

(d) For a given n-bus system, what will be the size of z bus for s.c. studies.

(e) What is meant by control area and ACE? (5×2)

UNIT-I

II. (a) Draw the per unit circuit and determine the per unit impedances and per unit source voltage of the given circuit in Fig. 1. Use base value of 50MUA and 230 V in zone 1. Also calculate load current both in per unit and in amperes.

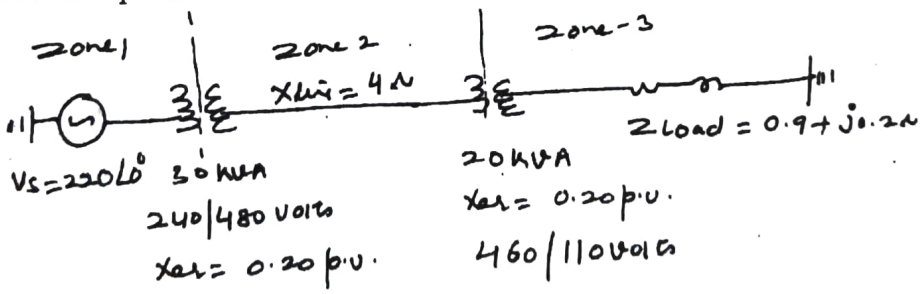

Fig.1

(b) A power system operates an economic load dispatch with a system λ of 60 ₹/Mwh. If raising the O/P of plant-2 by 100 kw (while the other output is kept constant) results in increased power losses of 12kw for the system, what is the approximate additional Co st/hr if the output of this plant is increased by 2MW? (5+5)

III. For the given system shown in Fig. 2, the reactive power limits for Bus-2 are $Q_2min=0$ and $Q_2max=0.8$p.u. Update the voltage ad phase angles using NR method perform one iteration. Neglect the charging admittances.

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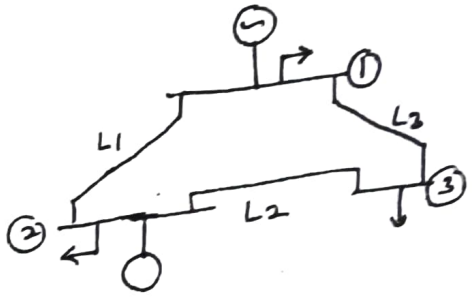

Line	Series impedance
L_1	$0.025+j0.1$
L_2	$0.025+j0.2$
L_3	$0.025+j0.1$

Fig 2.

Bus data

Bus NO	Generation P_{gi}	Generation Q_{gi}	Load P_{oi}	Load Q_{oi}	V_i
1	—	—	0.9	0.4	1.02
2	1.4	—	—	—	1.03
3	—	—	1.1	0.4	—

All values are in per unit. (10)

IV. (a) Develop the block diagram of the LFC of a single area system.

(b) Derive an expression for swing equation during transient state.

(c) Find the critical fault clearing angle for clearing in fault with simultaneous opening of breakers CB_2 and CB_4. The generator is delivering 1.0pu MW at instant preceding the fault. All the p.u. quantities on common MVA.

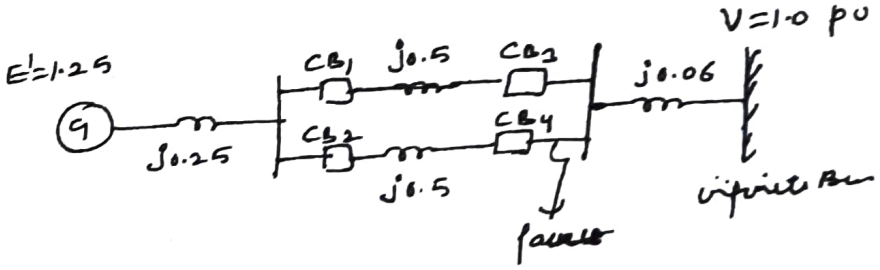

Fig. 3 (3+3+4)

UNIT-II

V. A synchronous generator is supplying 60MUA power to a synchronous motor through a transmission line. All values are in p.u. computed on common basevalues of 100MVA, 11kv. The motor is drawing

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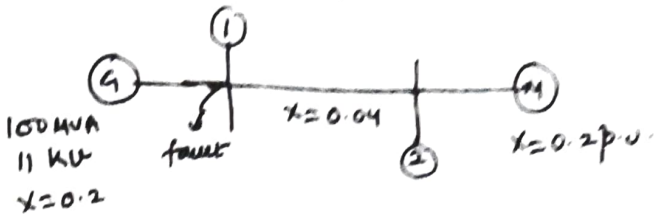
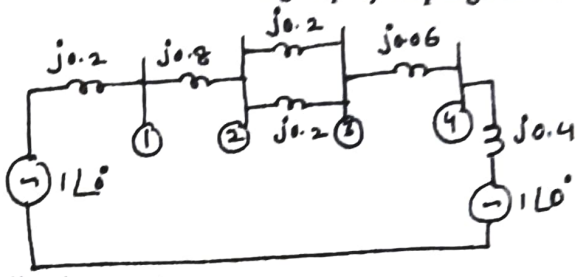


Fig. 4

50mw at 0.8pf (lead). Terminal voltage of motor is 10.9nv A 3ϕ fault occurs at bus-1. Considering pre-fault load current, compute the total generator and motor currents under faulty conditions. (10)

VI. (a) Prove that 3ϕ complex power can be computed from symmetrical components of voltages and line currents of an unbalanced 3ϕ circuit.

(b) Obtain Z bus matrix using step-by-step algorithm.

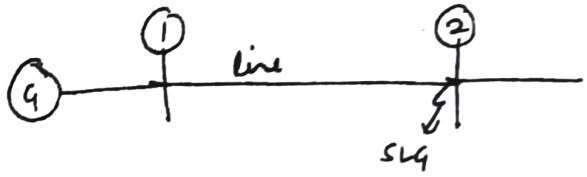


All values are in p.u.

Fig. 5 (4+6)

VII. (a) Derive an expression and draw sequence network for LLG fault in the presence of fault impedance on a synchronous m/c.

(b) Determine in fault current magnitude if the generator natural is solidly grounded and Zf=0; if the generator neutral is solidly grounded Zf=0.1 pu. on 40 MUA, 33kv if generator neutral is reactance grounded Xn=0.1 pu. on 40MUA, 33kv, Zf=0 pu. on 40 MUA, 33 kv. (5+5)



(5+5)

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