(6) BE - Sem- VII - Electrical - PSOC (Rev) 21/5/15

QP Code : 8457

Duration:- 03 Hours **Total Marks:-100**

Note:-

Question NO 1 is compulsory.

Solve any four questions out of remaining.

Assume suitable data if required and mention the same.

Q 1.Answer the following questions **[20]**

a) Discuss the concept of economic operation with limited fuel supply.

b) Discuss the advantages NR method for load flow solution.

c) What are the various advantages of Power Pool operations?

d) Discuss the different type's sensitivity factors.

Q2a. Discuss the NR method for load flow study [10]

Q2b The following is the system data for a load flow solution

Line Code	Admittance		Bus Code	P	Q	V	Remark
1-2	2-j 8.0		1	---	--	1.06	Slack Bus
1-3	1-j 4.0		2	0.5	0.2	1+j 0.0	PV Bus
2-3	0.666-j 2.664		3	0.4	0.3	1+j 0.0	PQ Bus
2-4	1-j 4.0		4	0.3	0.1	1+j 0.0	PQ Bus
3-4	2-j 8.0						

And system admittance matrix is

3-j12	-2+j8	-1+j4	0.0;
-2+j8	3.664-j14.664	-0.666+j2.664	-1+j4;
-1+j4	-0.666+j2.664	3.664-j14.664	-2+j8
0.0	-1+j4	-2+j8	3-j12

For bus No 2, **|V2|=1.04** and reactive power constraint is **0.2≤ Q2 ≤1.0.** Determine the voltages V2, V3 V4 staring with flat voltage profile at end of first iteration. [10]

Q3a . Discuss the AGC implementation in restructured power system. [10]

Q 3b. Derive the transfer function for steam turbine governing system and draw a block diagrammatic representation of its transfer function. [10]

Q 4a. Discuss the various reliability considerations in economic system operation. [10]

Q4b. The fuel input per hour of two plants and corresponding generating limit are as

$F_1=0.2\ P_1^2+40\ P_1+120$ Rs/hr $25 < P_1 < 100$ MW

$F_2=0.25\ P_2^2+30\ P_2+150$ Rs/hr $35 < P_2 < 125$ MW

Determine the economic operating schedule and the corresponding cost of generation if load on the both plant varies from minimum to maximum capacity of generation. If load demand is 150MW what is the total cost of generation and load shared by each generator? [10]

Q 5a. Prove that a simple two machine system is equivalent to a single machine connected to an infinite bus. [10]

Q5b. A 50 HZ, four pole generator, rated 20 MVA, 13.2 KV has an inertia constant of H=9 Kw-sec/KVA. Determine the kinetic energy stored in the rotor at synchronous speed. Determine the acceleration if input less rotational losses is 25000 HP 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 rpm at the end of 15 cycles. Assume that generator is synchronized with larger system and has no accelerating torque before 15 cycle period begins. [10]

6a. Discuss the numerical solution of swing equation. [10]
Q6b. Discuss the terms GRC, Dead band, Control area and Tie Line in automatic generation control. [10]
Q7a. Discuss the classification of various states of power system. [10]
Q7b. Discuss the static response of Two Area Load Frequency Control System in automatic generation [10]