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Total Number of Pages : 02

M.TECH

M.TECH 1ST SEMESTER REGULAR EXAMINATIONS, DECEMBER 2017

ADVANCED POWER SYSTEMS

Branch: PE, Subject Code:MPEPC1020

Time: 3 Hours

Max Marks : 70

The figures in the right hand margin indicate marks.

PART-A**(10 X 2=20 MARKS)****1. Answer the following questions.**

- What is the purpose of optimal power flow program?
- What is near-optimal ordering?
- Why is one of the buses taken as slack bus in load flow analysis?
- What is called available transfer capability?
- List any two advantages of fast de-coupled power flow method.
- Define the term sensitivity factor in power system?
- What are the three types of buses in the power network?
- Which method of load forecasting would you suggest for very short term?
- Mention the harmonic sources from industrial loads.
- What are Inter-area transactions.

PART-B**(5 X 10=50 MARKS)****Answer any five questions from the following.**

- Perform a load flow study for the system of Problem. The bus power and voltage specifications are given in Table. Compute the unspecified bus voltages all bus powers and all line flows. Assume unlimited Q source the NR method.

Bus	Bus power, pu		Voltage magnitude, pu	Bus type
	Real	Reactive		
1	Unspecified	Unspecified	1.02	Slack
2	0.95	Unspecified	1.01	PV
3	- 2.0	- 1.0	Unspecified	PQ
4	- 1.0	- 0.2	Unspecified	PQ

- Explain Fast Decoupled Load Flow (FDLF).

3.a. The fuel inputs per hour of plants 1 and 2 are given as

$$F_1 = 0.2P_1^2 + 40P_1 + 120 \text{ Rs/hr}$$

$$F_2 = 0.25P_2^2 + 30P_2 + 150 \text{ Rs/hr}$$

Determine the economic operating schedule and the corresponding cost of generation if the maximum and minimum of loading on each unit is 100 MW and 25 MW, the demand is 180 MW, and the transmission losses are neglected. If the load is equally shared by both the units, determine the saving obtained by loading the units as per equal Incremental production cost.

b. Draw and explain the block diagram of ALFC control of single area system.

4.a. Two generators rated 200 MW and 400 MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively from no load to full load. The speed changers are so set that the generators operate at 50 Hz sharing the full load of 600 MW in the ratio of their ratings. If the load reduces to 400 MW, how will it be shared among the generators and what will the system frequency be? Assume free governor operation.

b. Explain the block diagram of Automatic Voltage Control.

5. a. Explain the various causes and effects of voltage sags.

b. What are the different voltage sag mitigation techniques? Explain in detail.

6. a. Write short notes on power quality measurement system. What are the characteristic of power quality measurement equipment's?

b. Define voltage flicker. Discuss some of the flicker sources. Write notes on common methods for mitigation of flicker.

7. a. Explain the Role of independent generators and system operator in Electrical Market .

b. Explain the factors affecting load forecasting methods .

8. a. State and explain the constraints in Unit- commitment .

b. A power plant has three units with the following cost characteristics

$$C_1 = 0.5P_1^2 + 215P_1 + 5000 \text{ Rs/hr}$$

$$C_2 = 1.0P_2^2 + 270P_2 + 5000 \text{ Rs/hr}$$

$$C_3 = 0.7P_3^3 + 160P_3 + 9000 \text{ Rs/hr}$$

Where P_i are the generating powers in MW. The maximum and minimum loads allowable on each unit are 150 and 39 MW. Find the economic scheduling for a total load of 320 MW.