| | Utech |
|---------------------------|-------------------------------------|
| Name: | |
| Roll No.: | A design of Exercising 2nd Explored |
| Invigilator's Signature : | |

CS/M.TECH(EE)/SEM-2/CAM-205B/2011 2011

POWER SYSTEM OPERATION AND CONTROL

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* questions. $5 \times 14 = 70$

- 1. a) Explain the process of Optimal power flow using Linear programming method.
 - b) Derive the optimum condition for short-term hydrothermal scheduling using modern approach method.

7 + 7

2. a) What is an exciter? What is its role in AVR loop? Show the complete block diagram of an AVR loop taking into acount modern static exitation system of the alternator.

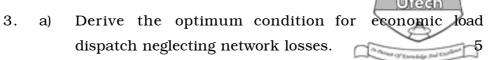
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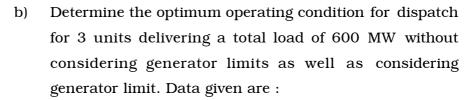
b) What is the open loop gain of an AVR loop if the static frequency error is less than 3%?

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Unit 1:

$$P_{\text{max}} = 600 \text{ MW}, P_{\text{min}} = 150 \text{ MW}$$

$$F_1(F_1) = 550 + 7.7 P_1 + 0.00165_1^2 Rs/hr$$

Unit 2:

$$P_{\text{max}} = 500 \text{ MW}, P_{\text{min}} = 125 \text{ MW}$$

$$F_2(P_2) = 300 + 7.88 P_2 + 0.0025 P_2^2 Rs/hr$$

Unit 3:

$$P_{\text{max}} = 600 \text{ MW}, P_{\text{min}} = 75 \text{ MW}$$

$$F_3 (P_3) = 80 + 7.99 P_3 + 0.005 P_3^2 Rs/hr.$$
 9

- 4. A sub-grid has a total capacity 2500 MW. It encounters a load increase of 50 MW if the normal operating load is 1000 MW. Assume inertia constant to be 5 secs and regulation of the generators in the system as 2Hz/pu MW. Find:
 - i) ALFC loop parameters
 - ii) static frequency drop
 - iii) transient response of ALFC loop.

(Assume load frequency dependency to be linear).

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- 5. a) What is deregulation? Discuss the motivational factors which lead to deregulaton and the current electricity market in India.
 - b) Discuss the issues and benefits of deregulation. 7
- 6. a) Explain Dynamic programming method with the help of a suitable example.9
 - b) What is unit commitment? What are the constraints in UC problem? 5