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**Question Paper Code : 21515**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Seventh Semester

Electrical and Electronics Engineering

EE 2401/10133 EE 701/EE 71 — POWER SYSTEM OPERATION AND CONTROL

(Regulations 2008/2010)

(Common to PTEE 2401/10133 EE 701 — Power System Operation and Control for B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering – Regulations 2009/2010)

Time : Three hours  Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the significance of load forecasting?

2. What is demand factor?

3. What is the advantage of AVR loop over ALFC?

4. What is meant by control area?

5. What is an exciter?

6. What is meant by stability compensation?

7. Draw incremental fuel cost curve.

8. Define crew constraints.

9. What are the states of power system?

10. What are the functions of control center?

PART B — (5 × 16 = 80 marks)

11. (a) Explain with help of block diagram the role of computers and implementation in power system control. (16)

Or

(b) A generating station has the following daily loads. (16)

| Time (Hours) : | 0-6 | 6-10 | 10-12 | 12-16 | 16-20 | 20-24 |
|---|---|---|---|---|---|---|
| Load (MW) : | 20 | 25 | 30 | 25 | 35 | 20 |

Sketch the load curve, load duration curve and determine

(i) Maximum demand

(ii) Units generated per day

(iii) Average load

(iv) Load factor.

12. (a) Derive the modeling of fundamental speed governing system. (16)

Or

(b) A two area power system has two identical areas with parameters and operating conditions: (16)

Rated capacity of the area = 1500MW

Normal operating load = 750MW

Nominal frequency = 50Hz

Inertia constant of the area = 5 s

Speed regulation = 3%

Damping co-efficient = 1%

Governor time constant = 0.06 s

Turbine time constant = 0.25 s

A load increase M1 = 30 MW occurs in area 1. Determine change in frequency and compare the change in frequency obtained in single area and comment on the support.

13. (a) Draw the circuit diagram for a typical excitation system and derive the transfer function model and draw the block diagram. (16)

Or

(b) Explain different types of static VAR compensators with a phasor diagram. (16)

14. (a) Draw the flow chart for obtaining the optimum dispatch strategy of N-bus system neglecting the system transmission loss. (16)

Or

(b) Obtain an optimum economic schedule of a three generators for a total load of 900MW. (16)

The details of fuel cost functions are given below.

$F_1 = 392.7 + 5.544\ P_1 + 0.001093\ P_1^2$,

$F_2 = 217 + 5.495\ P_2 + 0.001358\ P_2^2$,

$F_3 = 65.5 + 6.695\ P_3 + 0.004049\ P_3^2$,

$P_1, P_2, P_3$ in MW :

Generation limits

$150 < P_1 < 600$MW, $100 < P_2 < 400$ MW, $50 < P_3 < 200$ MW.

15. (a) Explain the hardware configuration and function of SCADA. (16)

Or

(b) Explain the different operating states in the security perspective with an example. (16)

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