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Question Paper Code : 52962

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Sixth Semester

Electrical and Electronics Engineering

EE 6603 – POWER SYSTEM OPERATION AND CONTROL

(Regulation 2013)

(Common to PTEE 6603 – Power System Operation and Control for B.E. (Part-Time) – Sixth Semester – Electrical and Electronics Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Daily Load Curve and Monthly Load Curve.

2. What is Diversity factor?

3. State the different types of ALFC for interconnected power system.

4. Give the two conditions for proper synchronizing of alternators.

5. What are the sources of reactive power? How it is controlled?

6. What is the use of off-load tap changer and TCUL?

7. What are the techniques available for the solution of unit commitment problem?

8. What is blackout in power grid?

9. What is SCADA?

10. Define state estimation.

PART B — (5 × 13 = 65 marks)

11. (a) (i) A generating station has following daily load cycle: (8)

Time in Hrs:	0-6	6-10	10-12	12-16	16-20	20-24
Load in MW	20	25	30	25	35	20

Draw the load curve and Calculate (1) Maximum Demand (2) Units generated per day (3) Average load (4) Load factor.

(ii) Explain any one load forecasting method in power system operation. (5)

Or

(b) (i) The quantity of fuel used in KWhr by an electric utility is given below. Forecast the Quantity of fuel to be used in the year 2030by fitting the following trend curve and Extrapolating method of Exponential curve. (8)

Year :	1980	1990	2000	2010	2020
Fuel Quantity:	90	95	110	135	150

(ii) Explain briefly about plant level and system level control of a power system. (5)

12. (a) With a neat block diagram, explain the Single area load frequency control system with Different modules. (13)

Or

(b) A two area system connected by tie-line has the following parameters with base MVA for each area

Area	1	2
Turbine output power	2000 MVA	1000 MVA
Nominal frequency	50Hz	50Hz
Speed regulation	3%	5%
Power system gain (Kp)	50 Hz/P.u MW	40 Hz/P.u MW
Governor time constants	0.3	0.2
Turbine time constants	0.6	0.4

The synchronizing power coefficient is computed from the initial operating condition T_{12} =2.0 P.u.a load change of 400 MW occurs in area 1. Determine the steady state frequency and the change in the Tie-line flow, comment on the results. (13)

13. (a) List out the Voltage Control methods in power system and explain each type in detail. (13)

Or

(b) Explain Different types of static VAR compensators with a phasor diagram and Applications. (13)

14. (a) The fuel inputs per hour of plants 1 and 2 are given below as:

$F_1 = 0.2P_1^2 + 40P_1 + 120$ Rs/hr

$F_2 = 0.25P_2^2 + 30P_2 + 150$ Rs/hr

Determine the economic operating schedule and the corresponding cost of generation. The maximum and minimum loading on each unit is 100 MW and 25 MW. Assume that the transmission losses are ignored and the demand is 180 MW. Also determine the saving obtained if the load is equally shared by both the units. (13)

Or

(b) State the unit commitment problem. With the help of a flow chart, explain forward Dynamic programming solution method of unit commitment problem. (13)

15. (a) Draw the block diagram to show the hardware configuration of a SCADA for a Power system operation and explain the application of SCADA in monitoring and control of power system. (13)

Or

(b) What is EMS? What are its major functions in power system and Control? (13)

PART C — (1 × 15 = 15 marks)

16. (a) What are the various functions of Excitation systems? Explain each type briefly. (15)

Or

(b) Enumerate the various operating states and the control strategies of a power system with a neat schematic. (15)