Reg. No. : | | | | | | | | | | | | |

Question Paper Code : X 20495

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
AND APRIL/MAY 2021
Sixth Semester
Electrical and Electronics Engineering
EE 6603 – POWER SYSTEM OPERATION AND CONTROL
(Regulations 2013)
Common to PTEE 6603 – Power System Operation and Control for B.E. (Part-Time) – Sixth Semester – Electrical and Electronics Engineering – Regulations 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. What is the objective of tie-line bias control ?
4. Define area control error.
5. State the advantage of switched capacitors in voltage control.
6. What are the different types of Static VAR Compensator ?
7. Write the coordination equation taking the effect of transmission losses.
8. Write about the term incremental operating cost of a power system.
9. List out the conditions for normal operation of a power system.
10. Define energy control centre.

PART – B **(5×13=65 Marks)**

11. a) A generating station has the following daily load cycle :

Time (hours) :	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW) :	40	50	60	50	70	40

Draw the load curve and find

i) Maximum demand

ii) Units generated per day

iii) Average load

iv) Load factor. **(13)**

(OR)

b) Discuss the overview of system operation and control. **(13)**

12. a) Develop linear model for single area ALFC and explain the static and dynamic analysis for controlled input.

(OR)

b) A two area system connected by a tie line has the following parameters with base MVA for each area with the frequency of 50 Hz and synchronizing power co-efficient T_{12} = 2 pu. A load change of 400 MW occurs in area 1. Determine the steady state frequency deviation and the change in tie line flow.

Area	1	2
Turbine output power	2000 MVA	1000 MVA
Inertia constant	3%	4%
Generator gain constant	50 Hz/pu MW	40
Governor time constant	0.3	0.2
Turbine time constant	0.6	0.4

13. a) Develop the block diagram of AVR and obtain its transfer function and explain the static and dynamic response.

(OR)

b) Explain the role of tap changing transformer in voltage control.

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) Explain with state transition diagram, the different state of the power system and the various control actions taken under every state to maintain or bring back the system to normal operating mode.

(OR)

b) Explain briefly the typical functions of the ECC. What are the main functions common to all SCADA system and the main tasks of control centre at different levels ?

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)**

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