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

Question Paper Code : 91497

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
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 the term Load curve and Load Duration Curve.
2. State the need for Load Forecasting in Power Systems.
3. List any two conditions for proper Synchronizing of Alternators.
4. Define the concept of Tie-Line Bias Control.
5. Sketch the V – I characteristics of SVC.
6. Mention the different types of Excitation System used in Power Systems.
7. What are the Constraints in Unit commitment ?
8. State the assumptions made in Economic Dispatch Problem.
9. List out the Functions of SCADA.
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 and

iv) Load factor

(OR)

b) Explain Plant Level and System Level Controls in a Power System.

12. a) Explain the Load Frequency Control of a Single Area System with neat block diagram.

(OR)

b) Two interconnected Area-1 and Area-2 have the capacity of 2000MW and 500MW, respectively. The incremental regulation and damping torque coefficient for each area on its own base are 0.2 p.u. and 0.8 p.u., respectively. Find the steady-state change in system frequency from a nominal frequency of 50Hz and the change in steady-state tie-line power following a 750 MW change in the load of Area-1.

13. a) Explain the Operation and Characteristics of Static Var Compensator for Power Systems Control applications.

(OR)

b) Derive the transfer function model of different Excitation Systems with a neat block diagram.

14. a) Describe the Dynamic Programming Solution for Unit Commitment Problem with flowchart.

(OR)

b) Explain the Lambda Iteration method for finding the solution of Economic Dispatch including transmission losses with a neat flowchart.

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 for power system monitoring and control.

(OR)

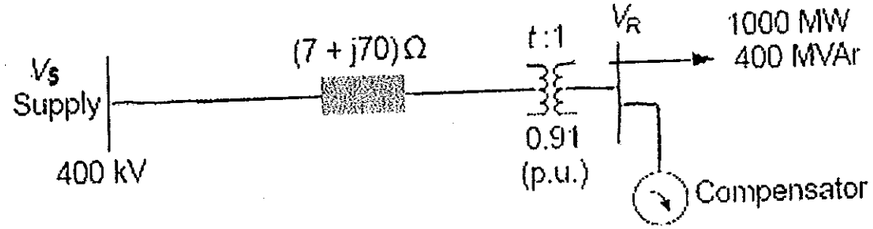
b) Explain the role of energy control centre in the modern power systems with a neat block diagram.

PART – C **(1×15=15 Marks)**

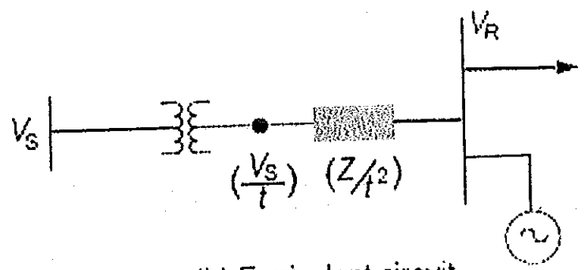
16. a) Explain the various operating states of power system. Also discuss the state transitions and control strategies using state transition diagram.

(OR)

b) A transmission link Figure (a) connects an infinite busbar supply of 400 kV to a load busbar supplying 1000 MW, 400 MVAr. The link consists of lines of effective impedance (7+j70)Ω feeding the load busbar via a transformer with a maximum tap ratio of 0.9 : 1. Connected to the load busbar is a compensator. If the maximum overall voltage drop is to be 10% with the transformer taps fully utilized, Calculate the reactive power requirement from the compensator. (Note : Refer voltage and line Z to load side of transformer in Figure (b).)



(a)



(b) Equivalent circuit