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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, June 2016
(2008 Scheme)
08.702 : POWER SYSTEM ENGINEERING – III (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain bus classification in load flow analysis with their known and unknown quantities.
2. Mention the advantages of Gauss-Seidel method of load flow analysis and state the necessity of using acceleration factor in it.
3. What is meant by a spinning reserve ? State the necessity of it in power system operation.
4. What is meant by control area concept with respect to load frequency control ? Mention the control objective in two area load frequency control.
5. Classify FACTS devices on the basis of their connection.
6. List the several technical advantages of the STATCOM over a SVC.
7. Give the statement of Equal Area Criterion.
8. Define specific energy consumption and list the various factors influencing it.
9. State the advantages of HVDC transmission.
10. State the various causes of over voltages in power system. **(10×4=40 Marks)**

PART – B

Answer **any one full** question from **each** Module.

Module – 1

11. With the aid of a flow chart, explain in detail the algorithmic steps for solving load flow equations using Fast decoupled load flow method when the system contains all types of buses. Assume that the generators at the P-V buses have enormous Q-limits and hence Q-limits need not be checked. **20**

P.T.O.

12. a) What is meant by a Unit Commitment Problem ? Discuss the constraints that are to be accounted in it. 10

    b) Formulate the problem of Economic Load Dispatch and derive the exact coordination equations of it with and without loss. 10

Module – 2

13. a) State the importance of stability analysis in the planning and operation of a power system. 5

    b) Derive the Swing equation describing the rotor dynamics of a synchronous machine connected to an infinite bus. Clearly state the assumptions made in the derivation. 15

14. a) Draw the schematic diagram of a Thyristor Controlled Series Capacitor (TCSC) and explain the principle of operation of it. 10

    b) Draw and explain the one line diagram of a shunt connected VAR compensator which is used to provide the required reactive power and damp out the sub harmonic oscillations in HVDC application. 10

Module – 3

15. By stating clearly the units and notations used in the traction mechanics, derive an expression for the maximum or crest speed of a train running on a main line service. Assume trapezoidal speed-time curve. 20

16. a) Draw the layout of a typical HVDC transmission scheme and discuss in brief how power flow control is achieved in HVDC systems. 10

    b) Explain the construction and working principle of expulsion type surge diverter with a neat sketch. 10