D 90274 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, NOVEMBER 2015

EE/PTEE 09 701—POWER SYSTEM ANALYSIS

Time : Three Hours Maximum : 70 Marks

Answer **all** *questions.*

Part A

1. Give the equation for load impedance and load admittance per phase of a balanced star connected load.
2. What are the information that are obtained from a load flow study ?
3. Distinguish between economic despatch and unit commitment ?
4. What is meant by symmetrical fault ?
5. Define dynamic stability with an example.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Write the load flow equation of Gauss and Gauss-Seidel method.
7. What is Jacobian matrix ? How the elements of Jacobian matrix are computed ?
8. Write short notes on automatic voltage regulation.
9. Express the symmetrical components Va1, Va2 and Va0 in terms of unbalanced vectors Va, Vb and Vc.
10. Write the equation for subtransient and transient internal voltage of the Generator and motor.
11. What are the machine problems seen in the stability study ?

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. (a) Write the equations to calculate Slack bus power, Transmission losses and Line flows.

(10 marks)

Or

(b) Explain the step by step computational procedure for the Gauss-Seidel method of load flow studies.

(10 marks)

Turn over

13. (a) State the unit commitment problem. Explain the unit commitment problem using priority ordering load dispatch.

(10 marks)

Or

(b) The fuel inputs per hour of plants 1 and 2 are given 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 generation. The maximum and minimum loading on each unit is 100 MW and 25 MW. Assume the transmission losses are ignored and the total demand is 180 MW. Also determine the saving obtained if the load is equally shared by both the units.

(10 marks)

14. (a) What are the various types of faults ? Discuss their frequency of occurrence and severity ? Find the fault current when an L-L-G fault occurs at the terminals of an unloaded generator.

(10 marks)

Or

(b) Explain the short circuit model of a synchronous machine under short circuit conditions.

(10 marks)

15. (a) Discuss the various factors affecting the transient stability of the system. (10 marks)

Or

(b) With the help of a neat flowchart, explain the modified Euler method of solving the swing equations.

(10 marks)

[4 × 10 = 40 marks]