Roll No. ....

24228

B. Tech. 5th Semester (EE) (Common With Special Chance)

Examination – December, 2019

POWER SYSTEMS - I

Paper : EE-315-F

Time : Three Hours]   [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Advantages and drawbacks of per unit system   5

   (b) Write short note on importance of load flow Analysis in Power system.   5

   (c) Write short note on comparison of load flow Methods.   5
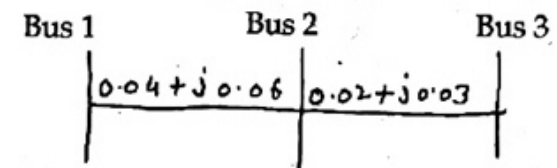
24228-2,050-(P-4)(Q-9)(19)   P. T. O.

(d) Write short note on area control Error.   5

SECTION – A

2. (a) Explain the sequence impedances of Transmission lines.   10

   (b) A 30 MVA, 11KV generator has a reactance of 0.2 PU referred to its ratings as bases. Determine the per unit reactances when referred to base KVA of 50,000 KVA and base KV of 33 KV.   10

3. Derive the expression of complex Power in power system for single phase as well as three phase case.   20

SECTION – B

4. Obtain the complex bus bar Voltage at bus 2 at the end of the first iteration using the guass - siedel method line impedances shown in the figure are in P. U. given Bus 1 is slack bus with $V_1 = 1.0 \angle 0°$, $P_2 + JQ_2 = -5.96 + J1.46, |V_3| = 1.02\ PU$.

Assume $V_3^0 = 1.02 \angle 0°$ and $V_2^0 = 1.0 \angle 0°$ 20

24228-2,050-(P-4)(Q-9)(19)   (2)

5. Derive the Load flow equation in a Power system and explain the Newton - Raphson Method of load flow Analysis with flow chart. **20**
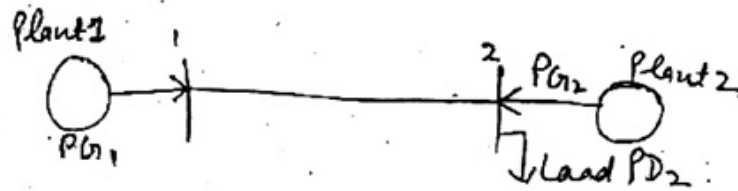
SECTION – C

6. In a two bus system 100 MW is transmitted from Plant 1 to the load, a transmission lass of 10 MW is incurred find the required generation for each plant and the power received by the Load when the system λ is Rs 25/MWh

The incremental fuel cast of the two Plants are given below : **20**

$$dC_1 / dPG_1 = 0.02PG_1 + 16.00 \, Rs / MWh$$
$$dC_2 / dPG_2 = 0.04PG_2 + 20.00 Rs / MWh$$

7. What is Unit Commitment ? Compare Economic load dispatch with it ? Also explain needs for unit commitment. **20**

SECTION – D

8. (a) A 100 MVA synchronous generator aperates on full Load at a frequency of 50 Hz. The Load is suddenly reduced to 50 MW. Due to time lag in governer system the team value begins to close after 0.45. Determine the change in frequency that occurs in this time. **10**

Given H = 5 kWs/ KVA of generator capacity.

(b) Explain state space model of the two area power system in Deregulated Environment. **10**

9. (a) Explain Automatic voltage control. **10**

(b) Explain Model of speed goverwning system in single area case. **10**