

B.Tech. 5<sup>th</sup> Semester (F) Scheme (EE)

Examination, December-2018

## POWER SYSTEMS-I

## Paper-EE-315-F

*Time allowed : 3 hours] [Maximum marks : 100*

*Note : Question No. 1 is compulsory. Attempt one question from each section.*

1. (a) In a load flow studies when a PV bus is treated as PQ bus? What is importance of slack bus? 04
- (b) What are the advantages of per unit calculations? 04
- (c) What are the assumptions made in decoupled load flow studies? 04
- (d) Explain ACE in brief. 04
- (e) Two plants generate power as  $P_{G1} = 50\text{MW}$  and  $P_{G2} = 100\text{MW}$ . If the loss coefficients of the two plants are,  $B_{11} = 0.002$ ,  $B_{22} = 0.0015$ ,  $B_{12} = 0.0011$ . Calculate power lost. 04

## SECTION-A

2. (a) Explain steady state model of synchronous machine. 10
- (b) Describe the steps used for obtaining the per unit impedance diagram from one line diagram. Also write down the formula for P.U. Impedance referred to new base from old base. 10
3. Show that the per-unit impedance of a single-phase, two-winding transformer calculated using rated primary voltage and primary referred impedances is the same as

(2)

24228

that calculated using rated secondary voltage and secondary referred impedances. Calculate the per-unit impedance of a 5kVA, 200/400V 50 Hz transformer having an equivalent series impedance of  $(0.12 + j0.32)\Omega$  referred to the primary (low-voltage) side, using first the primary referred values and then the secondary referred values. Take the rated value of voltage as the voltage base. 20

### SECTION-B

4. (a) Draw the flowchart for load flow solution by Newton Raphson method using Y-bus. 10
- (b) What are the assumptions of static load flow equations? Derive static load flow equation of power system. 10
5. Compare the performance of Gauss-Seidel method and Newton-Raphson method for load flow solution using nodal admittance approach for the formulation of load flow equations. 20

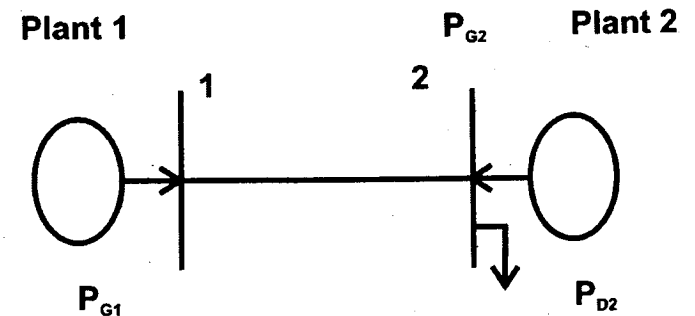
### SECTION-C

6. (a) What is unit commitment? Explain dynamic programming method of UC by considering an example. 10
- (b) Describe optimal operation of generator and derive exact coordination equation. 10
7. (a) Describe optimal load flow solution. 10
- (b) In a two bus system as shown below in figure, if 100 MW is transmitted from plant 1 to the load, a transmission loss of 10 MW is incurred. Find the

(3)

24228

required generation for each plant and the power received by the load when the system  $\lambda$  is 25/MWh. 10



### SECTION-D

8. (a) Draw block diagram of automatic voltage regulator and describe function of each block. 10
- (b) Explain relevancy of economic dispatch control in load frequency control. 10
9. Explain optimal two area load frequency control with the help of state model. 20