00821

B.Tech. IN ELECTRICAL ENGINEERING

Term-End Examination

December, 2013

BIEE-022 : POWER SYSTEM

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions in all. All questions carry **equal** marks. Use of **scientific calculator** is allowed.*

1. (a) What are the advantages of per unit computations ? List out the factors to be considered while selecting common base kVA and base kV in per unit method. 7

   (b) What is impedance and reactance diagram ? What are the factors that need to be eliminated for an impedance diagram to reduce it to a reactance diagram ? 7

2. (a) In fig. 1, the schematic diagram of a radial transmission system is shown. The ratings and reactances of the various components are shown, along with the nominal transformer line voltages. A load of 50 MW at 0.8 P.f. lagging is taken from the 33 kV substation which is to be maintained at 30 kV. Calculate the terminal voltage of the 10

synchronous machine. The line and transformers may be represented by series reactances. The system is three phase.

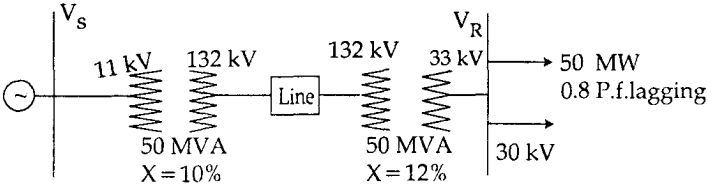

Fig. 1

(b) What do you mean by nodal admittance matrix ? 4

3. (a) Broadly classify the transmission lines on the basis of their length and transmission voltage. Represent them in the form of equivalent circuits. 7

(b) What do you understand by load flow study ? Develop load flow solution using Gauss-Siedal method. 7

4. (a) Describe the various unsymmetrical faults in a power system. 7

(b) Describe the need for short circuit studies or fault analysis and explain the reason of transients during short circuits. 7

5. (a) Derive the expression for fault current in Line-to-Line fault on an unloaded generator in terms of symmetrical components. **10**

(b) Name the faults which cause to flow of zero sequence currents. **4**

6. (a) Explain equal area criterion and step by step method for transient stability analysis of a system. **10**

(b) What are the factors affecting steady state stability ? **4**

7. (a) Discuss the behaviour of a travelling wave when it reaches : **10**

(i) Short circuited end of transmission line

(ii) Line terminated with an inductance

(b) Write wave equation for uniform transmission line. **4**