

**B.Tech. – VIEP – ELECTRICAL ENGINEERING  
(BTCLVI)**

**Term-End Examination**

**June, 2016**

00016

**BIEE-022 : POWER SYSTEMS**

*Time : 3 hours*

*Maximum Marks : 70*

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**Note :** Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is allowed. Missing data, if any, may be suitably assumed.

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1. (a) Explain the per unit system of analyzing power system problems. How does it reduce the efforts of power system engineers ? 7

(b) A single-phase two-winding transformer is rated 20 kVA, 480/120 volts, 60 Hz. The equivalent leakage impedance of the transformer referred to the 120 volts winding, denoted winding 2, is  $Z_{eq_2} = \underline{0.0525} \ 78.13 \ \Omega$ . Using the transformer ratings as base values, determine the per-unit leakage impedance referred to winding 2 and referred to winding 1. 7

2. (a) What are short circuit studies ? Explain in detail. 7
- (b) Deduce and draw the sequence network for a line-line to ground fault at the terminals of an unloaded generator. 7
3. (a) Explain the flow chart of Gauss-Seidel method used for load flow study in power system. 10
- (b) Discuss the purpose of load flow studies of a power system. 4
4. (a) Explain Equal Area criterion for transient stability during a three-phase fault. 7
- (b) Why is steady state stability limit higher than transient stability limit ? Explain the various techniques for improving transient stability. 7
5. (a) Deduce the general expression for reflection and refraction of travelling wave. 7
- (b) Determine the reflection and refraction for short circuit transmission line. Why is the grid sub-station usually connected to the overhead line through short length of cable ? 7

6. (a) Derive an expression for Swing Equation for an alternator with negligible damping connected to an infinite bus-bar. 7
- (b) Discuss about the current limiting reactors. Write where are they used with their suitable application. 7
7. Write short notes on any *two* of the following :  $2 \times 7 = 14$
- (a) Role of computer method in power systems
- (b) Newton-Raphson method for load flow analysis
- (c) Velocity of propagation
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