

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

00475

**Term-End Examination
December, 2014**

BIEE-022 : POWER SYSTEM

Time : 3 hours

Maximum Marks : 70

Note : Attempt any **five** questions in all. All questions carry equal marks. In case of numerical problems assume suitable data wherever not provided. Use of scientific calculator is allowed.

1. (a) Explain the per unit system of analyzing power system problems. Discuss the advantages of this method over the absolute method of analysis. 7
- (b) What is meant by a fault ? List the symmetrical and unsymmetrical faults that occur in a power system. 7
2. What are the assumptions to be made in short circuit studies ? Deduce and draw the sequence network for a line to line fault at the terminals of an unloaded generator. 14
3. Discuss the purpose of load flow studies of a power system. Write the step-by-step procedure for load flow analysis by Newton-Raphson method. 4+10=14

4. (a) A generator operating at 50 Hz delivers 1 p.u. power to an infinite bus through a transmission circuit in which resistance is ignored. A fault takes place reducing the maximum power transferable to 0.5 p.u., whereas before the fault, this power was 2.0 p.u. and after the clearance of fault it is 1.5 p.u. By the use of equal area criterion, determine the critical clearing angle. 7
- (b) Define the term Transient stability. Explain various techniques for improving transient stability. 7
5. (a) Deduce the general expression for reflection and refraction of travelling wave. 7
- (b) Why are the indoor transformers usually connected to the overhead line through short length of cables ? Discuss. 7
6. (a) An alternator with negligible damping is connected to an infinite bus bar. Write the swing equation in usual form and define the inertia constant. Deduce equal area criterion for stability analysis. 10
- (b) What are current limiting reactors ? Discuss their application and locational aspects. 4

7. Write short notes on any *two* of the following :

$2 \times 7 = 14$

- (a) Protection of power system apparatus against surges
 - (b) Computer method for short circuit calculations
 - (c) Fast decoupled method of load flow analysis
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