

**B.E. DEGREE EXAMINATIONS: NOV/DEC 2012**

Seventh Semester

**ELECTRICAL AND ELECTRONICS ENGINEERING**

EEE118: Power System Analysis And Stability

**Time: Three Hours****Maximum Marks: 100****Answer All Questions:-****PART A (10 x 1 = 10 Marks)**

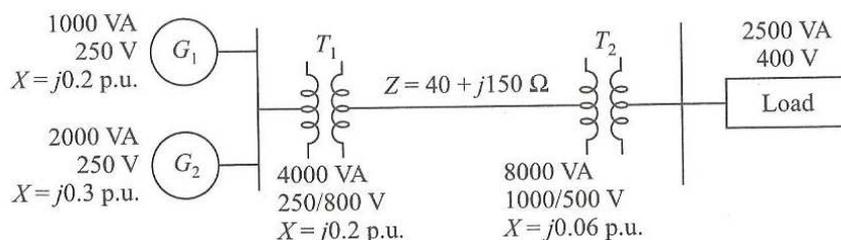
- If  $MVA_{base}$  and  $kV_{base}$  are 100 and 132 respectively, the base impedance value is  
 A)  $1.32\Omega$                       B)  $174.24\Omega$                       C)  $13200\Omega$                       D)  $100\Omega$
- Which one of the following is not correct while drawing a reactance diagram?  
 A) Neutral reactances are neglected                      B) Resistances are represented in pu.  
 C) Static loads are neglected                      D) Capacitance of transmission lines are neglected
- For the slack bus the specified quantities are,  
 A)  $|V|$  and  $\delta$                       B) P and Q                      C) P and  $|V|$                       D) Q and  $\delta$
- Which of the following is correct for the Newton Raphson method?  
 A) Less memory                      B) More iterations                      C) Accurate                      D) Simple program
- Which of the following is true with respect to the sequence operator 'a'?  
 A)  $a = 1 \angle 90^\circ$                       B)  $a^3 = -1$                       C)  $1+a+a^2 = 0$                       D)  $1-a-a^2 = 0$
- The value of pre-fault voltage in the case of symmetrical fault analysis is  
 A) 1 pu                      B) 0.5 pu                      C) 0 pu                      D) Infinity
- For  $a = 0.96$ , find the value of open end voltage and percentage error caused by omitting the term  $(r^2C / 4l)$   
 A) 0.9723 & 2.5%                      B) 0.9992 & 0.08%                      C) 1 & 0.08%                      D) 0.9992 & 2.5%
- The Power Standing Wave Ratio (PSWR) is defined as  
 A) Square root of VSWR                      B) Square of VSWR  
 C) Equal to VSWR                      D) Two times VSWR
- Power angle equation of a two machine system is  
 A)  $P = \frac{V_s V_R}{X} \tan \delta$                       B)  $P = \frac{V_s V_R}{X}$                       C)  $P = \frac{V_s V_R}{X} \cos \delta$                       D)  $P = \frac{V_s V_R}{X} \sin \delta$
- A two pole, 50 MVA, 11 kV generator is supplying full load at 0.8 pf lagging. If the inertia constant of the moving parts of the generator is 6 MJ/MVA, what is the kinetic energy stored when the generator is running at synchronous speed?  
 A) 66 MJ                      B) 100MJ                      C) 240 MJ                      D) 300 MJ

**PART B (10 x 2 = 20 Marks)**

11. What are the advantages of per phase analysis in power system?
12. A single phase transformer is rated at 110/440V, 2.5 kVA and its leakage reactance measured from LT side is  $0.06 \Omega$ . Determine the leakage reactance in pu.
13. Mention the advantages of Gauss-Seidel method of load flow analysis.
14. What is the need for load flow analysis?
15. List the types of unsymmetrical faults.
16. Write down the boundary conditions for double line to ground fault.
17. What are the specifications of a travelling wave?
18. How is the transmission lines classified?
19. What is transient stability?
20. What are the methods of finding the solution of swing equation?

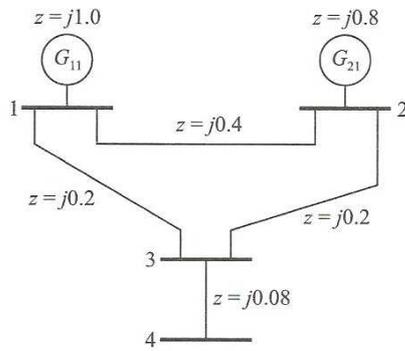
**PART C (5 x 14 = 70 Marks)**

21. a) For the power system shown in figure draw the impedance diagram with pu values on a common 5MVA base and common system base voltage of 250V.



**(OR)**

- b) (i) Draw the per phase modelling of synchronous generator, two winding transformer and static load (9)
- (ii) Given (5)
- Generator 1: 100MVA, 33kV, reactance 10%
- Generator 2: 150MVA, 32kV, reactance 8%
- Generator 3: 110MVA, 30kV, reactance 12%
- Determine the new per unit reactance of generators corresponding to the base values of 200MVA and 35 kV.
22. a) (i) What are the different types of buses in a power system and tabulate the specified quantities and quantities to be determined. (4)
- (ii) Determine the [Ybus] matrix of the power system shown in figure. (10)



**(OR)**

b) Write the algorithm and flow chart of the FDLF method.

23. a) Write the steps for the fault calculation of an n bus system using bus impedance matrix.

**(OR)**

b) Derive the equation of fault current for an L-L fault

24. a) Derive the expression for reflection coefficient and refraction coefficient and explain the behavior of travelling waves at short circuited line.

**(OR)**

b) Explain the Bewley's lattice diagram with an example.

25. a) What is the principle behind the equal area criterion in determining stability? Explain the equal area criterion to a single machine infinite bus system.

**(OR)**

b) Derive the swing equation and what is swing curve?

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