Total No. of Questions : 8] [Total No. of Printed Pages : 3

Roll No. .....MTeA.....

MEPE–203(A)

M. E./M. Tech. (Second Semester) EXAMINATION, Oct., 2009

POWER ELECTRONICS APPLICATIONS TO POWER SYSTEMS

(Elective – I)

[MEPE – 203(A)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Develop a mathematical model of an OLTC. 10

   (b) Discuss the problems associated with reactive power transfer over a long transmission line. 10

2. (a) Following data are available for a long transmission line : 10

   No-load receiving end voltage = 400 kV

   Lengh of transmission line = 400 km

   Operating frequency = 50 Hz

   Obtain sending end voltage under no-load condition.

   (b) Bus impedance matrix of a three bus three line system is given as :

$$Z_{bus} = \begin{bmatrix} 0{\cdot}20 & 0{\cdot}10 & 0{\cdot}15 \\ 0{\cdot}10 & 0{\cdot}25 & 0{\cdot}18 \\ 0{\cdot}15 & 0{\cdot}18 & 0{\cdot}28 \end{bmatrix}$$

   A transmission line having reactance $j0{\cdot}2$ p. u. is connected between bus No. 2 and 3. Obtain modified bus impedance matrix. 10

3. (a) Derive the following : 10

   (i) GSDF

   (ii) LODF

   (b) Explain various levels of power system security. 10

4. (a) Suggest any method along with suitable performance index for contingency ranking based on transmission line power flow. 10

   (b) "Voltage stability is said to be load driven." Explain. 10

5. (a) How will you obtain minimum Eigen value of reduced load flow Jacobian ? 10

   (b) Discuss the methods for increasing stability margin of long transmission line. 10

6. Explain basic thyristor switched capacitor. Discuss with the help of waveform the necessary conditions for transient free switching for the thyristor switched capacitor with different residual voltages. 20

7. Explain the operation of the following FACTS devices : 20

   (i) TCSC

   (ii) TCR

8. Write short notes on any *three* of the following : 20

(a) Shunt compensation

(b) SCED →

(c) Loadability

(d) STATCOM → C-L → 714

(e) Corrective rescheduling