B.E. (Electrical) VIII (Old) 31/5/08

Flexible Ac Trans Sys.

Con. 2981–08. (OLD COURSE) CO–3692

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the remaining **six** questions.
(3) Assume **suitable** data if **necessary**.

1. Explain the following :–
   (a) Mid-point Compensation. 5
   (b) Operation, Configuration and V-I Characteristic of Combined TCR/TSC Compensator. 5
   (c) Concept of Unified Power Flow Controller. 10

2. (a) Explain load balancing using compensators, in a three phase system. 10
   (b) Explain the importance of symmetrical transmission line with specific reference to mid-point compensation. 10

3. (a) Explain the behaviour of an open circuited line connected with a shunt reactor at the open end. 10
   (b) Explain Flicker control and reactive power compensation in arc furnaces. 10

4. (a) Draw the ideal compensator characteristic and explain the following terms :– 10
      (i) Knee-point voltage; V_k
      (ii) Max. or rated reactive power; $Q_{Ymax.}$
      (iii) Compensator gain; k_r
      (iv) Stiff-system.
   (b) Define voltage sensitivity and derive an expression for voltage sensitivity in terms of system shortcircuit level and compensator gain. 10

5. Explain different types protection schemes and cooling systems for thyristors used in various types of compensators and controllers. 20

6. (a) Explain the sources and effects of harmonics on the performance of electrical systems. 10
   (b) Explain the following terms :–
      (i) Surge impedance loading 5
      (ii) Synchronous voltage source. 5

7. Explain the following :–
   (a) Dynamic Compensation 8
   (b) Reactive power bias 6
   (c) Ferranti-effect. 6

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