

M.A. B. N.

(REVISED COURSE)

(3 Hours)

[Total Marks : 100

5/6/07

- N.B. : (1) Question No. 1 is compulsory.
 (2) All questions carry equal marks.
 (3) Assume suitable data if necessary.
 (4) Answer five question in all.

1. (a) Why voltage-sourced converters are often preferred over current sourced converters for FACTS application.
 (b) The mid point of the transmission is the best location for providing compensation, how ?
 (c) Write down the functional requirement of reactive shunt compensator.

(d) Show that the voltage sensitivity for load reactive power is $\frac{dv}{/ \theta_l} = \frac{-E/S_{sc}}{1 + \frac{K_v E}{S_{sc}}}$

2. (a) Using short-circuit fault level of a system obtain the approximate relationship between system voltage and reactive power.
 (b) Explain, how a compensator is used for regulation of voltage of bus in power system.

3. (a) Show that for a symmetrical line the mid-point voltage is higher than terminal voltage if it is loaded less than natural load i.e. $P < P_0$.
 (b) Explain shunt compensation by synchronous voltage source.

4. (a) Prove that the natural loading the line has flat voltage profile.
 (b) Using phaser diagram to illustrate different operation of UPFC.

5. (a) Obtain the wave equation for transmission line from Fundamental Maxwell equations. 8
 (b) Obtain the relation for virtual Z_0 and virtual θ in forms of degree of series compensation and shunt compensation. 12

6. (a) Explain the operation and V-I characteristics of TCR.
 (b) Compare :-
 (i) Static compensation with dynamic compensation.
 (ii) Passive compensation with active compensation.

7. Write short notes on (Any two) :-
 (a) Reactive power control by using transformer.
 (b) Effect of harmonics on system components and performance.
 (c) Series compensation by synchronous voltage source.
 (d) 3 ϕ load balancing.