

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY  
THIRD SEMESTER M. TECH DEGREE EXAMINATION**

**Electrical and Electronics Engineering**

**(Power Systems)**

**04 EE 7415- REACTIVE POWER COMPENSATION AND MANAGEMENT**

Max. Marks : 60

Duration: 3 Hours

**PART A**

*Answer All Questions*

*Each question carries 3 marks*

1. List out the parameters that are needed to be considered while specifying a load compensator.
2. What is an ideal compensating network?
3. What do you mean by Ferranti effect?
4. What do you mean by line-length compensation?
5. Define reactive power management.
6. What is radio frequency interference?
7. What do you mean by Reconfiguration of distribution networks?
8. Briefly explain the method of retrofitting of capacitor banks.

**PART B**

*Each question carries 6 marks*

9. Prove that any unbalanced linear ungrounded three phase load can be transformed into a balanced, real three-phase load without changing the real power exchange between source and load.

OR

10. Explain the approximate reactive power characteristics.
11. Derive the expression for line voltage profile and current profile of an uncompensated line on open circuit. Draw the voltage and current profiles.

OR

12. Explain briefly surge impedance and natural loading of an uncompensated transmission line.
13. Explain how shunt compensation is obtained by means of Midpoint shunt reactor or capacitor in transmission lines.

OR

14. A 200 km line with  $B_c/Y_o = X_l/Z_o = \theta = 0.4054$  pu. For 100% compensation of the line capacitance  $B_r = B_c/2 = 0.2027$  per-unit of  $Y_o$ . At 500 kV with  $Z_o = 250 \Omega$ , calculate the required compensating shunt reactance and midpoint voltage.

15. Explain the transmission benefits to an electric utility on the application of reactive power dispatching strategy.

OR

16. Define harmonics. What are the harmful effects of harmonics.
17. Explain Reconfiguration methods and Optimizing power flows method used for reduction of losses in power systems.

OR

18. Write note on system losses and the procedures for arriving at losses in power systems.

19. Explain how user side reactive power management is obtained by means of capacitors.

OR

20. Explain the deciding factors in selection of a capacitor.