PVP 12

Code: **EEPC1T4**

I M.Tech-I Semester-Regular Examinations-April 2015

REACTIVE POWER COMPENSATION & MANAGEMENT

(POWER SYSTEM CONTROL AND AUTOMATION)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1 a) Draw the reactive power characteristics and also explain with neat figures and circuit diagrams. 7 M

b) Develop an expression to find the magnitude of reactive power requirement for voltage control in long lines. 7 M

2 a) Derive and explain the performance of the transmission line connected to an unity power factor. 7 M

b) Explain the effect of series capacitor connected at the midpoint of the Symmetrical Transmission System. 7 M

3 A 400 kV, 50 Hz, 600 km long symmetrical line is operated at the rated voltage. Given L = 1 mH/km, C = 11.1 nF/km. 14 M

a) What is the theoretical maximum power carried by the line? What is the midpoint voltage corresponding to this condition?

b) A series capacitor is connected at the midpoint of the line to double the power transmitted. What is its reactance?

c) A shunt capacitor of value 450 ohms is connected at the midpoint of the line. If the midpoint voltage is 0.97, compute the power flow in the line corresponding to this operating point.

4 a) What is Reactive Power Coordination? Explain how this is effecting the transmission system? 7 M

b) Explain the causes and effect for the sag and swells in voltages in transmission systems 7 M

5 a) What are the different load patterns available and also explain the basic methods of load shaping? 8 M

b) Explain how the penalties levied for voltage flickers present in power supply 6 M

6 a) What is Reactive power planning? What are the transmission benefits when reactive power dispatching strategy is applied to improve power system operation? 10 M

b) What are the different types of system losses? 4 M

7 What is the purpose of using capacitors on user side for reactive power management? What are the deciding factors for the selection of capacitors? 14 M

8 a) Discuss the reactive power requirements for a electric traction system ? 7 M

b) Discuss the power factor of an arc furnace in detail. 7 M