1. A cylindrical rotor machine is supplying a load of 0.8 PF lagging at an infinite bus. The ratio of the excitation voltage to the infinite bus voltage is found to be 1.25. Compute the power angle δ. (10%)

2. A manufacturing plant has a load of 3600 kVA at a lagging power factor of 0.707. A 500-hp synchronous motor having an efficiency of 90% is installed and is used to improve the overall power factor to 0.90 lagging. (16%)

   (a) Draw the kVA vector diagram to represent these conditions. Label each vector clearly.

   (b) Calculate the kilovolt-ampere input rating of the synchronous motor and the power factor at which it must operate.

3. In a system of 132 kV, the line to ground capacitance is 0.01 μF and the inductance is 5 henries. Determine the voltage appearing across the pole of a C.B. if a magnetizing current of 5 amps (instantaneous value) is interrupted. Determine also the value of resistance to be used across the contacts to eliminate the restriking voltage. (12%)

4. A 132 kV, 3-phase, 50 Hz transmission line 192 km long consists of three conductors of effective diameter 20 mm, arranged in a vertical plane with 4 m spacing and regularly transposed. Find the inductance and kVA rating of the arc suppressor coil in the system. (12%)

5. Explain each of the following terms: (20%)

   (i) Protective margin

   (ii) Shielding failure

   (iii) Fringing effect

   (iv) Synchronous condenser

   (v) Surge impedance loading

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6. 簡答題

a. 直流机電刷之材料成份為何？各有何功用？　(7%)

b. 常用直流机電樞繞組有那幾種？其優、劣點為何？(8%)

c. 三相外鐵式變壓器及內鐵式變壓器各有何特點？　(8%)

d. 討論同步机模型中,何謂 Blondel Transformation (BT)？(7%)