

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS

DEPARTMENT ELECTRICAL ENGINEERING

EE – 360 Electric Energy Engineering

DESIGN PROJECT (071)

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Design Problem # 1

Two three-phase induction motors, motor A draws 25 kVA at 0.65 power factor lagging and motor B draws 15 kVA at 0.75 power factor lagging from 230-V, 60 Hz supply. It is required to design and install a capacitor bank across the load to ensure that the overall power factor is improved to, at least, 0.95 lagging.

- (a) Discuss all the possible connections of the capacitor bank. Show the wiring connections and other illustrations.
- (b) Evaluate the importance of the capacitor bank in terms of the line current before and after the capacitor bank is installed.

Design problem # 2

A 20 kW, 200 V, 1200 rpm DC shunt motor has armature resistance = 0.1Ω . Determine the starting current. Determine also the value of the starting resistance to be inserted to limit the starting current to twice of the full load value. If a starter box is used, design the resistances required in the starter box such that the armature current is constrained within 100 to 200 % of its rated value during the start-up. (Hint: Motor Starting-
Ch 6)