Q4 a) A single-phase, 50 kVA, 250 V/500 V two winding transformer has an efficiency of 95% at full load, unity power factor. If it is re-configured as a500 V/750 V auto-transformer, calculate its efficiency at rated load and unity power factor. Also show the current distribution and calculate the KVA output for both additive and subtractive polarity connection. (10)

b) Explain the procedure for conducting an open and short circuit test in a laboratory of a single Phase transformer by drawing a neat circuit diagram. Also explain the information is obtained from this test to draw the equivalent circuit of the single phase transformer ? (5)

Q5 a) Show that in a scott connected transformer if the load is balance then the three phase input current are also balanced. (5+5)
Two single phase furnaces are supplied at 250V from a 6.6kV, 3 phase system through a pair of Scott connected transformers. If the load on the main transformer is 85kW at 0.9p. f (lag) and on the teaser transformer is 69kW at 0.8 p.f (lag) Find the values of line current on the three phase side? (Neglect the magnetizing and core loss currents in the transformer).

b) Explain phasor group Dy1 & yZ11 with reference to three phase transformer showing suitable clock diagram? Also show the connection and phasor diagram for the above group. (5)

Q6 a) Explain different methods available for controlling speed of 3 phase induction motor? (10)

b) A 3 phase induction motor having a 6pole star connected stator winding runs at 240V , 50HZ supply .The rotor resistance and stand still reactances are 0.12 Ω and 0.85 Ω per phase .The ratio of stator to rotor turns is 1.8 and full load slip is 4%. Calculate the developed torque at full load and maximum torque (5)

Q7 a) A 3 phase induction motor having a 6pole star connected stator winding runs at 240V, 50HZ supply. The rotor resistance and stand still reactance are 0.12 Ω and 0.85 Ω per phase. The ratio of stator to rotor turns is 1.8 and full load slip is 4%. Calculate the developed torque at full load and maximum torque? Also calculate the slip at which maximum efficiency occurs? (10)

b) Explain various method of starting a three phase Induction motor. (5)

Q8 a) Explain double field revolving theory? (10)

b) Draw the circuit model of a single phase induction motor, and explain how the parameters can be calculated from no load and blocked rotor test. (5)

Q9 **Write short notes on any three:** (5X3)

a) Back to Back Test.
b) Starting of single phase Induction motor.
c) Crawling
d) Open Delta (V) Connection