(Time: 3 Hours) **(Total Marks: 80)**

N.B.:- (1) Question No.1 is compulsory.
(2) Attempt any three questions out of remaining five questions.
(3) Figures to the right indicate full marks.

Q 1. Answer the following questions. **20**

a) Explain connection and phasor diagram of Dd0 & Yy0?.

b) Illustrate the application of single-phase induction motor.

c) Compare auto transformer and two winding transformers. State application of auto transformer

d) Describe the need of parallel operation of transformer and explain condition for parallel operation.

Q.2 a) Explain No load and blocked rotor test of 3 phase induction motor. **10**

Q.2 b) A 3-phase star connected 400V, 50 Hz, 4 pole induction motor has the following per phase parameters in ohm referred to stator. $R_1 = 0.6\Omega$, $X_1 = 1.1\Omega$, $R'_2 = 0.3\Omega$, $X'_2 = 0.5\Omega$, $Xm = 25\Omega$.The mechanical losses 1000W and stator core losses are 500 W. The slip is 3%. Calculate 1) Stator current 2) Gross torque 3) Efficiency. **10**

Q.3 a) Describe harmonics and Suppression of harmonics in three phase transformers. **10**

Q.3 b) Write short note on Open delta Connection. **10**

Q.4 a) Explain capacitor start and run single phase induction motor. **10**

Q.4 b) Two single phase transformers share a load of 400 KVA at power factor 0.8 lagging. Their equivalent impedance referred to secondary windings are(1+j2.5) Ω, and (1.5+j3) Ω respectively. Calculate the load shared by each transformer **10**

Q.5 a) Draw and explain Scott connection of transformer in detail. **10**

Q.5 b) Explain about copper saving in auto transformer. **10**

Q.6 a) Explain the different speed control methods of three phase induction motor in detail. Describe pole changing Method in detail. **10**

Q.6 b) Describe Sumpner's test on single phase transformers **10**
