Q.P. Code: 24377

Time: 3 Hours **Total marks : 80**

Note: 1) Question No.1 is compulsory.
2) Attempt any three questions out of remaining five question.
3) Assume suitable data if required.

1. Solve any four each carry equal marks. 20

a) Define and explain inrush current in 3 phase transformer.

b) Explain the operating principle of three phase induction motor.

c) Name the different methods of starting of 1-phase Induction motor and explain any one.

d) Explain need of parallel operations of transformers and write necessary condition for parallel operation.

e) Draw and explain torque slip characteristics of 3 phase I.M.

2)a. Describe in brief connection and phasor diagram of various phasor groups in 3-phase transformer. 10

b. Two three phase transformers rated at 500 KVA and 450 KVA respectively and connected in parallel to supply a load of 1000 KVA at 0.8 PF lagging.The per phase leakage resistance and reactance of the first transformer is 2.5% and 6% respectively and of second transformer 1.6% and 7% respectively.Calculate the KVA load and PF at which each transformer operates. 10

3.a Explain different speed control methods of 3-phase induction motor. 10

b. An 18.65 KW,4 pole, 50 Hz, 3-phase induction motor has friction and windage losses of 2.5% of the output. The full load slip is 4%.Find for full load (i)Rotor copper loss (ii) Rotor input (iii)Shaft torque. 10

4. a. Explain the need of starter for 3 phase I.M. and explain auto-transformer starter in detail. 10

b. A 14.9KW , 400V , 4pole , 50Hz 3 phase star connected I.M. give the following test result

	Line current(A)	Power i/p (w)	Line voltage(v)
N.L. test	9	1250	400
Blocked rotor test	38	4000	150

Assume stator and rotor ohmic losses are equal at standstill. Draw circle diagram and find line current , power factor , slip , and efficiency at F.L. 10

5. a . Draw equivalent circuit diagram of single phase I.M. based on double field revolving theory and explain the double field revolving theory. 10

b. Explain shaded pole 1 phase I.M. in detail. 10

6. Write short note on any two 20

a. Scott connection of two 3 phase transformers.

b. Induction generator.

c. Mechanical forces in 3-phase transformer.

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