23.5.17 (15)

T.E Electrical V-CBSGS

Q. P. Code : 584102

(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. Attempt any four. **20**

(a) Explain oscillating neutral phenomenon in three phase star connected transformer.

(b) Draw circuit diagram, torque slip characteristic and state applications of capacitor start capacitor run phase single phase induction motor.

(c) Draw torque-slip characteristic of three phase induction motor for v/f control method and explain the sections in brief.

(d) "The starting current of three phase induction motor is 5 to 7 times than its full load current" justify the statement.

(e) Why to perform no load and blocked rotor test on three phase induction motor?

(f) Draw phasor diagram and connection diagram for Dy1 and Yd 11 transformer. State the significance of number 11 and 1 in the same.

2. (a) A three phase , star connected , 400V, 50Hz, 4 pole induction motor has the following per phase constants in ohm referred to stator. **10**

R_1=0.15, X_1=0.45, R_2=0.12, X_2=0.45, X_m=28.5

Fixed losses (core and friction and windagelosses)= 400 w. compute stator current, rotor speed , output torque and efficiency when motor is operated at rated voltage and frequency at a slip of 4%

(b) What is Switching inrush current phenomena in 3-phase transformer? **10**

3. (a) Explain torque-speed characteristic of three phase Induction motor. **08**

(b) A 15 KW, 400V, 4 pole, 50 Hz, 3-phase star connected IM gave following test result: **12**

	Line current (A)	Power i/p (w)	Line voltage (v)
N.L. test	9	1310	400
Blocked rotor test	50	7100	200

Stator and rotor ohmic losses at standstill are assumed equal. Draw Circle diagram for Induction motor and Calculate: Line current power factor, slip, torque, efficiency at full load, Max. Power output and max. Torque.

TURN OVER

T.E Electrical 2 V-CBSGS 23.5.17 (15)

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4. (a) Illustrate double field revolving theory for single phase induction motor. **10**

(b) A 220 volts, 50 Hz, 4 pole single phase induction motor has the following equivalent circuit parameters $R_{1m} = 2.2\Omega$, $R_2 = 4.5\Omega$ $X_2 = 2.6\Omega$, $X_{1m} = 3.1\Omega$, $X_m = 80\Omega$. **10**

Friction windage and core loss= 40 watts. For slip of 0.04, calculate: 1) input current 2) power factor, 3) developed power, 4) output power, and 5) efficiency.

5. (a) Illustrate the conditions required for successful parallel operation of 3-phase transformers. **10**

(b) Two three phase transformers rated at 600 KVA and 450 KVA respectively are connected in parallel to supply a load of 1100 KVA at 0.8 p.f. 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 power factor at which each transformer operates. **10**

6. Write short note on any two: **20**

(a) Open delta connection of three phase transformer.

(b) Double cage squirrel cage induction motor.

(c) Harmonics in three phase transformers.

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