P3368

[5353] - 562

TE. (Electrical)

ELECTRICAL MACHINES - II

(2015 Pattern) (End Semester)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q4, Q.5 or Q.6, Q.7 or Q8, Q.9 or Q10.*

2) *Neat Diagrams must be drawn wherever necessary.*

3) *Figures to the right side indicate full marks.*

4) *Use of electronic pocket calculator is allowed.*

5) *Assume suitable data, if necessary.*

Q1) a) Explain advantages of Rotating field type system over rotating armature system in case of synchronous generator. **[4]**

b) A 4 pole, 50 Hz star connected alternator has flux per pole of 0.12 wb. It has 4 slots per pole per phase. The conductors per slot are 4. If the winding coil span is 150°. Calculate phase value of induced emf. **[6]**

OR

Q2) a) Draw per phase equivalent circuit of alternater and mark all parameters in it. **[2]**

b) Slip test is conducted on 3 KVA, 415V, 3 phase star connected alternater. Calculate voltage regulation of alternater at full load 0.8 p.f. lag. The observation table is as given below. Take $Ra = 5\Omega/p^h$ **[8]**

V_{min} (line)	V_{max} (line)	I_{max}	I_{min}
39.9V	44.3V	1.1A	0.8A

Q3) a) Write a short note on 'synchroscope' **[4]**

b) With neat diagram, explain working of 3 phase synchronous Induction motor. **[6]**

OR

P.T.O.

Q4) a) Draw V curve and A curve of 3 phase synchronous motor. **[2]**

b) The o.c. & s.c. test results of a 3 phase, 3kvA, 415V, 4.2 amp star connected alternater are given below

O.C. Test results **[8]**

If(A)	0	0.1	0.14	0.2	0.23	0.28	0.36	0.44	0.58	0.67
Voc(l) volts	0	120	160	200	240	280	320	360	400	420

S.C. Test Results

If(A)	0.08	0.12	0.18	0.23	0.28	0.32	0.37	0.4
I$_a$sc (A)	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.2

Using must method calculate voltage regulation of alternater at full lead 0.8 pf lead.

Q5) a) Explain the operation of 3 phase Induction motor as induction generator. State advantages of induction generator. **[8]**

b) With neat diagram explain Construction & working of linear Induction motor. **[8]**

OR

Q6) a) Write a short note on 'Energy efficient 3 phase Induction motors. **[8]**

b) State different methods of controlling speed of 3 phase Induction motor. With neat diagram explain roter resistance control. Draw its speed torque characteristics for different values of roter resistances. **[8]**

Q7) a) Explain how unidirectional torque is produced when d.c. series motor is connected to A.C. supply. What are the problems associated with a.c.operation. **[8]**

b) With neat diagram explain **[8]**

   i) Conductively compensated series motor

   ii) Inductively compensated series motor

OR

Q8) a) A blocked roter test is conducted on single phase 50Hz, 230V, 6.2 A 6000 rpm series motor. The test results are as below.

Vsc	Isc	Wsc
130V	4 A	160 w

Taking voltage scale of lcm = 20V Draw circle diagram. Determine full load efficiency? Full load power factor **[10]**

b) Explain modifications necessary in the construction of d.c series motor to operate it satisfactorily on a.c. supply. **[6]**

Q9) a) With neat diagram explain the construction & working of capacitor start Induction motor. Draw the phase diagram &torque speed characterstics of this motor. **[10]**

b) Explain double revolving field theory in case of single phase induction motor. Hence draw its torque-speed characteristics. **[8]**

OR

*Q10)*a) A 220 v, 50 Hz single phase induction motor has following parameters. **[10]**

R_1= 11.4Ω, R_2^1= 13.8Ω, X_1=14.3Ω

X_2^1=14.3, X_m=275Ω R_m=0Ω

Calculate current, power factor, input power, efficiency Given-friction & windage losses =30.2 watts

b) With neat diagram explain construction &working of shaded pole Induction motor . **[8]**

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