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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)**

**B.Tech II Year II Semester Supplementary Examinations Dec 2019
ELECTRICAL TECHNOLOGY**

(Electronics & Communication Engineering)

Time: 3 hours

Max. Marks:60

(Answer all Five Units 5 X 12 = 60 Marks)

UNIT-I

- 1 a Deduce an expression induced e.m.f. in the armature of a d.c. generator. 6M
b A 4-pole lap wound DC series generator has flux per pole of 3m wb and 720 armature coils with 6 turns per coil. If the armature and series field resistances of 0.75Ω and 0.05Ω respectively. Calculate the terminal voltage by delivering a load of 75A and running at a speed of 1000rpm. Take total brush voltage drop of 2V. 6M

OR

- 2 Draw and explain magnetization and load characteristics of DC shunt generator. 12M

UNIT-II

- 3 Write down the principle of operation of DC motor. 12M

OR

- 4 Explain various speed control methods of a DC Shunt motor with neat sketches. 12M

UNIT-III

- 5 a Explain the various losses in a transformer and derive the condition for maximum efficiency of a transformer. 6M

- b The Iron and full load copper losses in 40 KVA single phase transformer are 450 W and 850 W respectively. Find 6M
(i) Efficiency at 3/4th full load when the power factor of load 0.8 Lag.
(ii) The load KVA at which maximum efficiency occurs.
(iii) The Maximum Efficiency at 0.8 p.f lagging.

OR

- 6 The following readings were obtained from OC and SC tests on 2KVA, 115V / 230V, 50Hz transformer 12M

OC test on LV side : 115V, 1.1A, 50W

SC test on HV side : 13V, 8.7A, 100W

- (i) Draw the Equivalent circuit referred to primary
(ii) Calculate the Regulation and efficiency at 3/4th full load and 0.8 Lag pf.

UNIT-IV

- 7 a Derive torque equation of 3-phase induction motor under running condition. 6M

- b A 4 pole 3-phase induction motor operated from a 50 Hz supply system. If the machine runs at 3% slip on full load. Calculate (i) The rotor speed (ii) The frequency of the rotor current and (iii) the frequency of the rotor current at standstill. 6M

OR

- 8 A 400 V, 4 pole, 3 phases, and 50 Hz star connected induction motor has a rotor resistance and reactance per phase equal to 0.01Ω and 0.1Ω respectively. Determine i) starting torque ii) slip at which maximum torque will occur iii) speed at which maximum torque will occur iv) maximum torque v) full load torque if full load slip is 4%. Assume ratio of stator to rotor turns as 4. 12M

UNIT-V

- 9 a Explain the constructional features of 3- ϕ alternators with the help of neat diagrams. 6M
b A 200kVA, 415 V, 50 Hz, 3 ϕ alternator has effective armature resistance of 0.01Ω and an armature leakage reactance of 0.05Ω . Compute the voltage induced in the armature winding when the alternator is delivering rated current at a load p.f of (i) 0.8 Lagging (ii) 0.8 leading. 6M

OR

- 10 a Explain the working principle of operation of a synchronous motor. 6M
b A 3-phase, 16 pole alternator has 144 slots with 4 conductors/slot, the winding being double layer winding. Flux in the air gap is 50 mwb sinusoidally distributed. The coil span is 1500 (electrical). Find the EMF generated when the alternator shaft is driven at 375 rpm. 6M

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