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

B.Tech II Year II Semester Supplementary Examinations February-2022

ELECTRICAL TECHNOLOGY

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

- 1 a Explain how voltage builds up in D.C shunt generator. 6M
 b A 4 pole lap wound generator has 56 coils and 6 turns per coil. The speed is 1150 rpm. What must be the flux per pole in order to generate an induced emf of 265V. How many commutator bars are required for generator? 6M

OR

- 2 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

UNIT-II

- 3 Write down the principle of operation of DC motor. 12M
OR
 4 What are the different losses in a DC machine? Which of them are variable losses? Derive the condition for maximum efficiency of a DC machine. 12M

UNIT-III

- 5 a Explain the working principle of operation of single - phase transformer. 6M
 b A 3000/200V, 50Hz single phase transformer is built on a core having an effective cross sectional area of 150 sq.cm and have 80 turns in low voltage winding. Calculate (i) the value of maximum flux density (ii) the no.of turns in HV winding. 6M

OR

- 6 a Explain the various losses in a transformer and derive the condition for maximum efficiency of a transformer. 6M
 b A 20KVA, 2000v / 200v 1-phase transformer has the following parameters: 6M
 HV winding: $R_1 = 3\Omega$, $X_1 = 5.3\Omega$ LV winding $R_2 = 0.05\Omega$ $X_2 = 0.1\Omega$
 (i) Find voltage regulation at UPF, 0.8 Lag pf & 0.707 Lead pf.
 (ii) At what power factor regulation is Zero & Maximum.

UNIT-IV

- 7 a Explain the principle of operation of Induction motor. 8M
 b Explain why the rotor of 3-phase induction motor can never attain synchronous speed. 4M

OR

- 8 a Explain the torque slip characteristics of 3-phase induction motor. **8M**
b Explain why the rotor of 3-phase induction motor can never attain synchronous speed. **4M**

UNIT-V

- 9 a Explain the constructional features of 3- Φ alternators with the help of neat diagrams. **6M**
b A 3- Φ 4-pole, 24 slot alternator has its armature coils short pitched by one slot. Find **6M**
(i) Pitch factor (ii) Distribution factor.

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 **6M**
double layer winding. Flux in the air gap is 50 mwb sinusoidally distributed. The coil span is 150° (electrical). Find the EMF generated when the alternator shaft is driven at 375 rpm.

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