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

B.Tech I Year II Semester Regular & Supplementary Examinations October-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 the working principle of DC Generator and draw neat sketches of it. **L1 6M**
 b A 8 pole lap wound armature of a DC machine has 960 conductors, a flux of 40 mwb per pole and speed of 400 rpm. Calculate the e.m.f generated on open circuit. **L4 6M**
 If the above armature were wave connected at what speed must it be driven to generate 400V.

OR

- 2 a Explain different types of generators with equations. **L1 6M**
 b In a 220 V compound generator, the resistances of the armature, shunt and series winding are 0.07 ohms, 27 ohms and 0.05 ohms respectively. The load current is 100 A at 220 V. Find the induced e.m.f and armature current when the machine is connected as i) long shunt ii) short shunt. **L4 6M**

UNIT-II

- 3 a Explain the speed control methods for DC shunt Motor. **L1 6M**
 b A 250 V, DC shunt Motor has armature resistance of .25 ohm, on load it takes an armature current of 45 A and runs at 750 rpm. If the flux of Motor reduced by 5% without changing the load torque, find the new speed of the Motor. **L4 6M**

OR

- 4 a Explain swinburne's test for determining the efficiency of a D.C Motor. **L1 6M**
 b Explain the principle of operation of DC Motor. **L1 6M**

UNIT-III

- 5 a Explain the working principle of single phase Transformer and derive e.m.f equation. **L1 6M**
 b A 25 KVA Transformer has 500 turns on the Primary and 50 turns on the secondary winding. The primary is connected to 3000V, 50 Hz supply. Find the full load primary and secondary currents, the secondary e.m.f and the maximum flux in the core. Neglect leakage drops and no load primary current. **L4 6M**

OR

- 6 a Draw the phasor diagram of a single phase transformer for lagging power factor load. **L3 6M**
 b A 5 KVA, 500/250 V, 50 Hz 1 ϕ Transformer gave the following readings. **L4 6M**
 O.C test(L.V side): 250 V, 1 A, 50 W
 S.C test(H.V side): 15 V, 6 A, 21.6 W.
 Determine the efficiency for full load and half full load at a p.f of 0.8 lagging.

UNIT-IV

- 7 **a** Explain the construction details of 3 ϕ Induction Motor. **L1 6M**
b A three phase, 50 Hz Induction Motor has a full load speed of 710 R.p.m. (assume **L3 6M**
 Ns.).For this Motor calculate,
 (i) Number of poles
 (ii) Full load slip
 (iii) Rotor current frequency.

OR

- 8 **a** Derive the expression for the running torque of an Induction Motor. **L2 6M**
b A 3 ϕ , 6 pole, 50 Hz Induction Motor has a slip of 1% at no load, and 3 % at full **L3 6M**
 load. Determine (i) Synchronous speed (ii) no load speed (iii) full load speed (iv)
 frequency of rotor current at standstill (v) frequency of rotor current at full load.

UNIT-V

- 9 **a** Explain the construction of an Alternator. **L1 6M**
b Derive the e.m.f equation of an Alternator. **L2 6M**

OR

- 10 **a** Explain the operation of Synchronous Motor. **L1 6M**
b A 200 KVA, 415 V, 50 Hz, 3 ϕ Alternator has effective armature resistance of **L4 6M**
 0.01 Ω and an armature leakage reactance of 0.05 Ω . compute the voltage induced
 in the armature winding when the Alternator is delivering rated current at a load
 p,f, of (a) 0.8 lag (b) 0.8 lead.

*** END ***