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

B.Tech II Year I Semester Regular Examinations Feb-2021

ELECTRICAL MACHINES – I

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

- 1 a How demagnetizing and cross magnetizing ampere turns per pole are calculated in a DC Machine? **6M**
- b The brushes of a certain lap connected 400kw, 6-pole generator are given a lead of 18° electrical. From the data given, calculate (i) the demagnetizing ampere-turns (ii) The cross-magnetizing ampere turns (iii) series turns required to balance the demagnetizing component. The full load current is 750A and total numbers of conductors are 900 and the leakage coefficient is 1.4. **6M**

OR

- 2 a Write the purpose of the commutator? **2M**
- b Draw and explain the characteristics of DC series and DC Shunt Generators. **10M**

UNIT-II

- 3 a Distinguish between generator and motor action. Derive the equation for the back e.m.f of DC motor? **6M**
- b Find the torque exerted by a 4-pole series motor whose armature has 1200 conductors Connected up in wave winding. The motor current is 10A and the flux per pole is 0.02Wb. **6M**

OR

- 4 a Define torque? **2M**
- b Explain the operation of four point starter for a DC motor with neat diagram? **10M**

UNIT-III

- 5 a Write the condition for maximum efficiency? **2M**
- b Describe Field's test in detail. What are its advantages and disadvantages? **10M**

OR

- 6 a Which losses are called variable losses? **2M**
- b Explain Swinburne's test on DC machines? What are its advantages and disadvantages? **10M**

UNIT-IV

- 7 a What is an ideal transformer? Also explain the operation of an ideal single phase transformer under no load condition. **6M**
- b An ideal 25KVA transformer has 500 turns on the primary winding and 40 turns on the secondary winding. The primary is connected to 3000V, 50HZ supply. Calculate (i) primary and secondary currents at full load (ii) secondary emf and (iii) the maximum core flux. **6M**

OR

- 8 a What are the various losses taking place in transformer? How these losses can be minimized? 6M
- b The No-Load current of a 4400/440 V, 1- Φ , 50 Hz transformer is 0.04 A. It consumes power 80 W at no-load when supply is given to LV side and HV side is kept open. Calculate the following: (i) Power factor of no-load current. (ii) Iron loss component of current. (iii) Magnetizing component of current. 6M

UNIT-V

- 9 A 2 kVA, 115/230 V, 50HZ transformer gave the following test results: 12M
- Short-circuit test: 13 V, 8.7 A, 100 W
- Open circuit test : 115 V, 1.1 A, 50 W
- Determine (i) the transformer equivalent circuit referred to primary and insert all the values in it. (ii) Calculate the voltage regulation and efficiency at full load at 0.8 power factor lagging. (iii) Maximum efficiency at 0.8 power factor lagging.

OR

- 10 a Draw the Connection diagram of open delta connected three-phase transformer. 6M
- b Compare a Three-phase transformer with single phase transformer in detail. 6M

*** END ***