Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations December 2018
ELECTRICAL MACHINES-II
(Electrical & Electronics Engineering)

Time: **3 hours**   Max. Marks: **60**

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

UNIT-I

1 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.   12M

OR

2 With relevant phasor diagrams, explain the operation of a practical single phase transformer under no load condition.   12M

UNIT-II

3 a. In a 50KVA Transformer, the iron loss is 500W and full load copper loss is 800W. Find the efficiency at full load and half load at 0.8 power factor lagging.   6M
   b. Explain the procedure for conducting Sumpner's test along with all precautions to be taken while Conducting the test with neat diagram   6M

OR

4 A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging. Calculate (i) Full load efficiency (ii) the load at which maximum efficiency occurs and (iii) maximum efficiency.   12M

UNIT-III

5 a. Describe the constructional details of cage and wound rotor induction machines.   6M
   b. A 6-pole, 3-phase 50HZ induction motor is running at full load with a slip of 4%. The rotor is Star connected and its resistance and standstill reactance are 0.25 Ω and 1.5 Ω per phase. The emf between slip rings is 100V. Find the rotor current per phase and power factor assuming the slip rings are Short circuited.   6M

OR

6 A 3-phase induction motor runs at 1440 rpm at full load when supplied power from 50 Hz, 3- phase line.
Calculate: (i) The number of poles.   (ii) Slip of full load.
(iii) Speed of the stator field w.r.t Stator structure and rotor structure.
(iv) Speed of the rotor field w.r.t Stator structure and rotor structure.   12M

UNIT-IV

7 Draw the circle diagram of a 20HP, 400V, 50 Hz, 4 pole, 3-phase star connected induction motor from the following test data (line values): No-load: 400V; 9A; cosϕ0 = 0.2 Blocked Rotor: 200V; 50A; cosϕsc = 0.4 From the circle diagram Find (a) Line current, P.f and full load slip
(b) Starting torque and maximum torque, both in N-m
(c) the slip for maximum torque
(d) the maximum output and maximum input
(e) Efficiency of motor.   12M

OR

8   a.   From fundamentals, deduce a relationship between Rotor power input, rotor copper
         loss and mechanical power developed in case of Induction motor.   6M
    b.   Explain various losses in an induction motor and draw power flow diagram.   6M

UNIT-V

9   A 3-phase cage induction motor has a short circuit current equal to 5 times the full load
    current. Find the starting torque as the % of full load torque, if the motor is started by (i)
    DOL starter (ii) Star-Delta starter (iii) an Auto Transformer starter with X% tapping (iv)
    Rotor resistance starter. Starting Current in (iii) and (iv) is to be limited to 2.5 times the
    full load current. Full load slip is 4%.   12M

OR

10 Explain how the speed of induction motor is controlled by injecting emf into the rotor
    Circuit.   12M

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