PVP 14

Code: EE4T2

II B.Tech - II Semester – Regular / Supplementary Examinations
October - 2020

ELECTRICAL MACHINES-II
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks:70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22M

1.

a) What is the function of a transformer? Differentiate between step up and step down transformers.
b) What are the different losses occurring in a transformer on load ?
c) What is the difference between off load tap changing transformers and on load tap changing transformers?
d) What is meant by circulating current in parallel operation of two transformers?
e) What is slip of an induction motor?
f) Write short notes on double cage induction motor?
g) What are the main advantages of a cage motor?
h) Why do you require starters for starting of 3-phase induction motors?
i) What factors does the speed of an induction motor depend?
j) Why single phase capacitor type induction motors are superior in performance?

k) Why the starting torque of a capacitor start induction motor is better than that of a resistance start motor?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Derive the emf equation of single phase transformer and explain voltage transformation ratio. 8 M

b) A 5 kVA distribution transformer has a full load efficiency at unity p.f of 95%, the copper and iron losses then being equal. Calculate its all day efficiency if it loaded through on the 24 hours as follows :
No load for 10 hours, Half load for 5 hours, Quarter load for 7 hours and Full load for 2 hours. Assume load p.f of unity. 8 M

3.a) Explain the working principle and construction of an auto transformer. 8 M

b) Draw the Scott connection of transformers and mark the terminals and turn ratio. 8M

4. a) Derive the expression for developed torque in a 3-phase induction motor and find the condition for maximum torque. 8 M

b) A 3-phase, 500 V, 50 Hz induction motor with 6 pole gives an output of the 20 kW at 950 rpm with a p.f of 0.8. The mechanical losses are equal to 1 kW. Calculate for this Load Slip, rotor copper loss, input if the stator losses are 1500 W and line current. 8 M

5. A 3-phase, 400V induction motor gave the following test readings : 16 M
No load : 400V, 1250W, 9 A;
Short circuit : 150 V, 4kW, 38 A .
Draw the circle diagram. If the normal rating is 14.9 kW, find from the circle diagram, the full load value of current, p.f.

6. a) Explain why a single phase induction motor does not self start. Discuss its operation based on double revolving field theory. 8 M

b) Derive the equivalent circuit of a single phase induction motor with the help of double revolving field theory. 8 M