

**KERALA AGRICULTURAL UNIVERSITY**  
**B.Tech (Agrl. Engg) 2013 Admission**  
**V<sup>th</sup> Semester Final - Examination- December-2015**

Cat. No: Fpme.3111

Marks: 50.00

Title: Electric Machines and Power Utilization (2+1)

Time: 2 hours

**I Fill up the blanks**

(10 x 1=10)

1. Unit of magnetic flux is \_\_\_\_\_
2. In an ideal transformer ,windings have \_\_\_\_\_ resistance
3. In a three phase induction motor having  $N_s = 1500$  rpm and running with  $s = 0.03$ , rotor speed is \_\_\_\_\_ rpm
4. In the expression for three phase power ( $\sqrt{3} V_L I_L \cos \phi$ ),  $\phi$  is the angle between voltage and current

**State True or False**

5. In DC series motor ,armature current is not equal to the field current
6. Three phase induction motor is a self starting machine
7. At starting of single phase induction motor , forward rotating torque is equal to the backward rotating torque

**Define**

8. Critical speed
9. Speed regulation of DC motor
10. Power factor

**II Write short notes on any FIVE questions**

(5 x 2=10)

1. What do you meant by absolute and relative permeability of a medium
2. Draw the phasor diagram of single phase transformer with resistive load
3. Write short notes on armature winding of a DC machine
4. What do you mean by friction and windage losses in DC generator
5. What is the effect of inter poles in a DC machine
6. Draw and explain internal characteristics of DC shunt machine
7. Draw and explain speed –torque curves of DC series and shunt motor

**III Write short essay on any FIVE questions**

(5 x 4=20)

1. Explain the constructional details of single phase transformer
2. Explain different types of DC generators

3. Draw and explain OCC of a DC shunt generator .What are the conditions for voltage build up in a separately excited DC shunt generator
4. A 250 kW, 250 V DC shunt generator has armature and shunt field resistance of  $0.06 \ \Omega$  and  $100 \ \Omega$  respectively .Determine the total armature power developed when working as (a) a generator delivering 20 kW output and (b) motor taking 20 kW input
5. Draw and explain 4 point starter for DC shunt motor
6. Explain different types of three phase induction motors
7. Draw and explain the phasor diagram of three-phase induction motor

**IV Write essay on any ONE**

(1 x 10=10)

1. a) Explain SC and OC test of single phase transformer  
 b) A 20 kVA, 2500/250 V, 50HZ, single phase transformer has the following test results:  
 O.C Test ( L.v side ): 250 V, 1.4 A, 105 W  
 S.C Test (h.v side): 104 V , 8A , 320W  
 Compute the parameters of the equivalent circuit referred to the low voltage side and draw the equivalent circuit
2. a) Explain different starters used in three phase induction motors  
 b) A 18.65 kW, 4 pole, 50 Hz, 3 phase induction motor has friction and windage loss of 2.5 % of the output .The full load slip is 4% .Compute for full load, (a) the rotor Cu loss (b) the rotor input and (c) the shaft torque