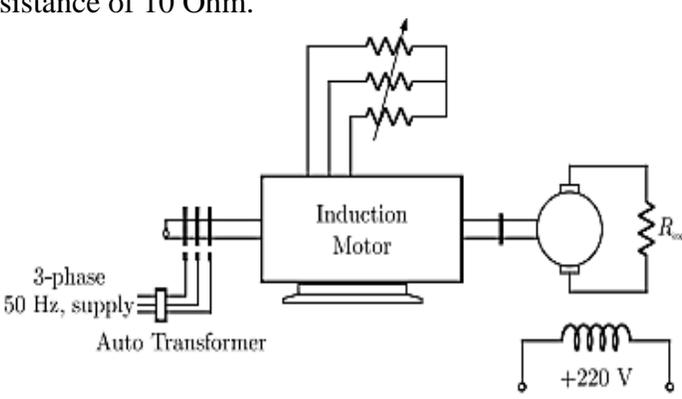


Name:			
Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, May 2023			
Course: Electrical Machines II Program: B Tech (Electrical) Course Code: EPEG 2011		Semester: 4 th Time : 03 hrs. Max. Marks: 100	
Instructions: Assume suitable data as per the subject.			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Can we add extra resistance in series with squirrel cage rotor? State the reason? Why is an induction motor called rotating transformer?	4	CO3
Q 2	Determine the pitch factor for a winding having 36 stator slots, 4 poles and coil spans 1 to 8.	4	CO1
Q 3	For a 1.8°, 2-phase bipolar stepper motor, the stepping rate is 100 steps/second. Calculate the rotational speed of the motor in rpm.	4	CO4
Q 4	What is synchronous condenser? When does a synchronous motor get over excited?	4	CO2
Q 5	How rotating field is developed in three phase machines. Explain briefly.	4	CO1
SECTION B (4Qx10M= 40 Marks)			
Q 6	Describe pitch factor, winding factor, and distribution factor. What is fractional pitch winding?	10	CO1
Q 7	What are the three methods of determining voltage regulation for a synchronous machine? Explain any one in detail. Or Explain the procedure for determination of synchronous reactance from open circuit and short circuit tests with the help of suitable plots.	10	CO2
Q 8	A synchronous motor is connected to an infinite bus at 1.0 pu voltage and draws 0.6 pu current at unity power factor. Its synchronous reactance is 1.0 pu resistance is negligible. Calculate the excitation voltage (E) and load angle (delta).	10	CO2
Q 9	Explain double field revolving theory. Based on double field revolving theory, prove that a single-phase induction motor is not self-starting.	10	CO4

SECTION-C
(2Qx20M=40 Marks)

<p>Q 10</p>	<p>What are the various tests performed on single-phase induction machine. Explain the procedure for conducting these tests with the help of suitable single line connection diagrams.</p> <p style="text-align: center;">Or</p> <p>Explain the construction, principle of operation and applications of Reluctance Motor.</p>	<p>20</p>	<p>CO4</p>
<p>Q 11</p>	<p>Describe the working principle of an induction generator with the help of suitable diagrams. A 3-phase, 440 V, 50 Hz, 4-pole slip ring induction motor is fed from the rotor side through an autotransformer and the stator is connected to a variable resistance as shown in the figure. The motor is coupled to a 220 V, separately excited dc generator feeding power to fixed resistance of 10 Ohm.</p> <div style="text-align: center;">  </div> <p>The two-wattmeter method is used to measure the input power to an induction motor. The variable resistance is adjusted such the motor runs at 1410 rpm and the following readings were recorded $W_1 = 1800 \text{ W}$, $W_2 = -200 \text{ W}$. Determine the speed of rotation of stator magnetic field with respect to rotor structure. Neglecting all losses of both the machines, calculate the dc generator power output and the current through resistance R_{ex}.</p>	<p>20</p>	<p>CO3</p>