University of Sargodha
College of Engineering and Technology
Department of Electrical Engineering

Quiz # 01

Course Title: Electrical Machine II (ET-222) **Date:** Feb. 27, 2020

Course Teacher: Dr. Ateeq-Ur-Rehman Shaheen **Semester & Section:** 4th

Total Marks: 20 **Time:** 25 mins

Student Name_____ **Student ID**._____

Instructions:

1. Manage your answers in the provided space and be neat and precise.
2. Do any solutions and rough work on the blank side of this paper.
3. Execution of any forbidden actions during the exam will result in your quiz cancellation.
4. Total time: 20 minutes.

Q. No. 1. Marks: (3+2) +2+2+1 PLO: 04 CLO: 01

A. A 6-pole, 50-Hz, 3-Φ induction motor running on full load with 4% slip develops a torque of 149.3 N-m at its pulley rim. Calculate:
(a) Rotor speed?
(b) Output in horse power?

B. What is slip? What will be the value of Slip when rotor is running at Synchronous speed or/and Standstill?

C. Why it is impossible for an induction motor to operate at synchronous speed?

D. In the equivalent circuit of an induction motor, which electrical element has the most direct control over the speed at which the starting torque occurs?

Q. No. 2. Marks: 4+6 PLO: 04 CLO: 01

A 208-V, four-pole, 60-Hz, Y-connected wound-rotor induction motor is rated at 30 hp. Its equivalent circuit components are

$R_1 = 0.100\ \Omega$, $R_2 = 0.070\ \Omega$, $X_m = =10.0\ \Omega$, $X_1 = 0.210\ \Omega$, $X_2 = 0.210\ \Omega$

$P_{mech}= 500W$, $P_{misc}= 0W$, $P_{core}= 400W$

For a slip of 0.05, find

(a) The line current I_L

(b) The induced torque τ_{ind} ?