Mid-West University

Examinations Management Office

End Semester Examinations 2081

Bachelor level/ B.E. Computer/ 3rd Semester — Full Marks: 50

Time: 3 hours — Pass Marks: 25

Subject: Electrical Machine (EL431/EL502)

- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. a) Explain Hysteresis loss and Eddy current loss. **[2+2]**

b) A 20 KVA, 250 / 2500V, 50HZ single phase transformer has the following parameters, R_o=500Ω, X_o=167 Ω, R_{o1}=0.08 Ω, X_{o1}=0.18 Ω, Calculate: **[5]**

i. The iron loss of transformer.

ii. Efficiency of the transformer when the load is 10KW with 0.8 pf lagging.

2. a) What is instrument transformer? Explain potential transformer with proper block diagram. **[1+4]**

b) Explain how emf is induced in dc generator along with the importance of commutator segment and Carbon brush. **[5]**

3. a) A 240 DC shunt motor draw an armature Current of 30A at full load and the corresponding speed is 1200 rpm. It has armature winding resistance of 0.6 Ω and field winding resistance of 120 Ω. If a resistance of 1 Ω is Connected in series with the armature winding and the load torque is increased by 15%, calculate the new speed. **[5]**

b) Define pole pitch and coil pitch. Explain the operating principle of synchronous generator with load. **[2+3]**

4. a) Define synchronous speed and slip. Explain the torque slip characteristic of three phase induction motor. **[2+3]**

b) Why synchronous motor is not a self-starting motor and explains any one method of starting it. **[3+2]**

5. a) A 8–pole, 50HZ, 3 phase induction motor develops a starting torque of 45N. The rotor winding has an impedance of (0.6+ j4) Ω per phase. Calculate the maximum torque developed by induction motor and also calculate at what speed rotor will developed maximum torque. **[5]**

b) Explain split phase induction motor with proper diagram. **[6]**

The End