Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B.TECH. MAKE UP EXAMINATIONS, JUNE 2019

ENERGY CONVERSION TECHNOLOGIES [ELE 3285]

OPEN ELECTIVE – I

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 21 June 2019** **Max. Marks: 50**

Instruction to students:

- Answer **ALL** the questions.

1A. Classify single-phase transformers based on the constructional aspects. Draw neat sketches of each type and explain. ***(05)***

1B. A 1 kVA, 230 / 110 V, 50 Hz, single-phase transformer has iron losses of 40 W and rated copper losses of 45 W. Determine:

a) full load current of the primary winding

b) full load current of the secondary winding

c) efficiency when the full load operates at 0.8 lagging power factor ***(03)***

1C. In comparison with the rotating machinery, transformer has the highest efficiency. What are the reasons? ***(02)***

2A. Why do large induction motors use the wound rotor construction? Explain the constructional features found in this motor. ***(03)***

2B. Why is a starter required for an induction motor? With a neat schematic diagram, explain the working of a star-delta starter. ***(03)***

2C. Single-phase induction motor with one winding alone can not produce a starting torque. With neat sketches, explain the theory behind this behaviour. ***(04)***

3A. Explain the constructional details found in a 3-phase synchronous generator employed in a hydroelectric power plant. ***(04)***

3B. With reference to a synchronous generator, explain armature reaction. What effects does it produce? ***(03)***

3C. Explain the operation of a synchronous motor on load. ***(03)***

4A. With a neat sketch, explain the construction and working of a DC motor. ***(04)***

4B. Draw the schematic diagram of a 3-point starter and explain its working. ***(03)***

4C. A 440 V DC shunt motor has an armature resistance of 0.8 Ω and field resistance is 200 Ω. It is loaded to produce an output power of 7.46 kW and operates at 85 % efficiency. Determine:

a) field current

b) armature current

b) back emf ***(03)***

5A. Discuss the constructional features, working and applications of a switched reluctance motor. ***(04)***

5B. Discuss the constructional features, working and applications of a servo motor. ***(04)***

5C. What are the applications of BLDC motors? ***(02)***