বাংলাদেশ আর্মি ইন্টারন্যাশনাল ইউনিভার্সিটি অব সায়েন্স এন্ড টেকনোলজি (বিএআইইউএসটি), কুমিল্লা
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Department of Electrical and Electronic Engineering
Level-2, Term-II
Mid Term Examination, Spring-2023
Course Code: EEE 205
Course Title: Energy Conversion II

Time: 1 Hour

Notes:

a. Each question carries 30 marks. **Full Marks: 60**

b. Figure on the right of each question indicate marks for respective question.

Answer Any Two Questions Including Question No.1

1. a. A short-shunt d.c. compound generator supplies 200 A at 200 V. The resistance of armature, series field windings are 0.04, 0.03 and 60 ohms respectively. Calculate the emf generated. Also calculate the emf generated if the same machine is connected as a long shunt generator. **(15)**

   b. A long shunt generator delivers 190A at terminal voltage of 250 V. The armature Resistance, series field and shunt field resistance are 0.05 Ohms, 0.3 Ohms and 60 Ohms respectively.The iron and friction losses equal 850W. Calculate **(15)**
   i. E.M.F generated
   ii. Total Cu losses
   iii. Output of the prime mover
   iv. Commercial, Mechanical and Electrical efficiencies.

2. a. Describe the voltage induced process in a simple rotating loop between curve pole faces. From this, derive that the voltage generated in the machine is equal to the product of the flux inside the machine and the speed of rotation of the machine, multiplied by a constant representing the mechanical construction of the machine. **(20)**

   b. A four –pole generator, having wave-wound armature winding has 51 slots, each slots containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7.0 mWb? **(10)**
   If the armature winding is lap wounded then what will be the voltage generated in same machine.

3. a. Describe the speed control methods of a shunt d.c. motor. **(15)**

   b. A d.c. shunt motor takes an armature current of 110 A at 480 V. The armature circuit resistance is 0.2 ohm. The machine has 6-poles and the armature is lap-connected with 864 conductors. The flux per pole is 0.05 Wb. Calculate **(15)**
   i. The speed
   ii. The gross torque developed by the armature
   iii. If the shaft power of the generator is 8214 W , calculate the shaft torque of the motor