ourdiu.com | Shared by Fariha Islam Mim

Daffodil International University

Department of Electrical and Electronic Engineering
Faculty of Engineering
Final Examination, Spring – 2026

Course Code: 0713-223 | Course Title: Energy Conversion II
Section: A, B, C, D, E | Level-Term: L2-T2 | Teacher's Initial: NR, TA
Full Marks: 40 | Exam Date: May 02, 2026 | Time: 2 Hours

Notes: Answer all the questions below. The second right most column indicates the course outcomes [COs] with respective Bloom's level and the right most column indicates the allocated marks.

Q1.	With suitable phasor diagrams, explain the underexcited and overexcited synchronous motor.	CO-1 C(2)	5
Q2.	Briefly describe the followings with necessary curve for series DC motor, (i) Torque versus Armature Current Characteristic (ii) Speed versus Torque Characteristic	CO-1 C(2)	5
Q3.	Analyze how variations in field current affect the operation of a synchronous motor, and justify your analysis using an appropriate phasor diagram.	CO-2 C(4)	5
Q4.	Analyze the commutation process in a DC generator with necessary illustrative diagrams.	CO-2 C(4)	5
Q5.	A 220-V compound generator is supplying a load of 100 A at 220 V. The resistances of its armature, shunt and series windings are 0.1 Ω, 50 Ω and 0.06 Ω respectively. Evaluate the induced e.m.f. and the armature current when the machine is connected (i) short shunt (ii) long shunt (iii) how will the series amp-turns be changed in long shunt if a divertor of 0.14 Ω is connected in parallel with the series windings ? Neglect armature reaction and brush contact drop.	CO-3 C(5)	5
Q6.	A 4-pole, 250 V d.c. series motor takes 20 A and runs at 900 r.p.m. Each field coil has resistance of 0.025 ohm and the resistance of the armature is 0.1 ohm. Determine the speed that run the motor by developing the same torque if: (i) rearranging the field coils in two series and parallel groups Assume unsaturated magnetic operation.	CO-3 C(5)	5
Q7.	A d.c. shunt machine generates 250-V on open circuit at 1000 r.p.m. Effective armature resistance is 0.5 Ω, field resistance is 250 Ω, input to machine running as a motor on no load is 4 A at 250 V. Calculate speed of machine as a motor taking 40 A at 250 V. Armature reaction weakens field by 4%.	CO-3 C(5)	5
Q8.	A 75-kW, 3-ϕ, Y-connected, 50-Hz, 440-V cylindrical rotor synchronous motor operates at rated condition with 0.8 p.f. leading. The motor efficiency excluding field and stator losses is 95% and $X_s = 2.5\ \Omega$. **Evaluate:** i. mechanical power developed ii. armature current iii. back e.m.f. iv. power angle v. pull-out torque of the motor	CO-3 C(5)	5

Ourdiu.com