

International Islamic University Chittagong (IIUC)

Department of Computer Science and Engineering (CSE)

Mid-term Examination, Spring-2024

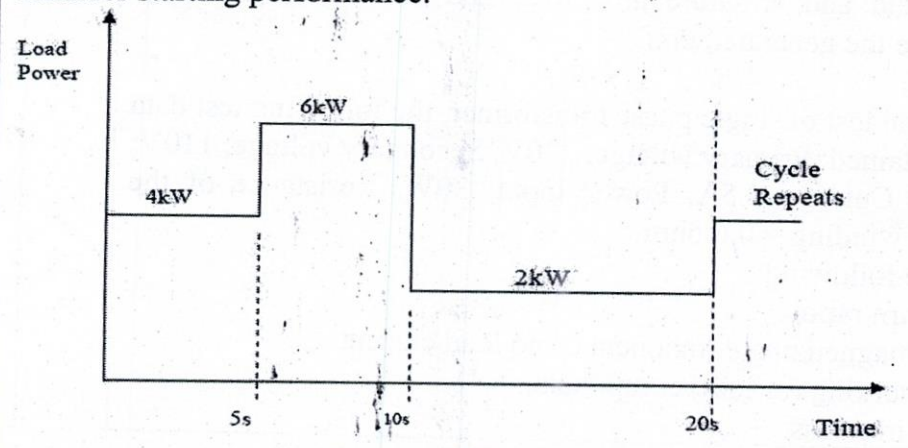
Program: BSc in CSE

Course Title: Electrical Drives and Instrumentation

Course Code: EEE-2421

Time: 1 hour 30 minutes

Full Marks: 30

1(a)	Define Machine. Describe the operation of motor with proper net sketch.	CO1	R	4
1(b)	The load torque profile shown in figure 1(b) was measured for a constant speed load. Choose an appropriately sized motor to drive this load assuming a service factor of 25%. You do not need to consider starting performance.  Figure: 1(b)	CO2	An	3
1(c)	What is motor duty class? Write the different types of motor duty class with appropriate timing diagram.	CO1	U	3

2(a)	Define transformer. Why transformer is rated on VA?	CO1	R	2
2(b)	A single phase transformer has 400 primary and 1000 secondary turns. The net cross sectional area of the core is 60 cm^2. If the primary winding be connected to a 50 Hz supply at 520V, calculate- i) the peak value of flux density in the core ii) the voltage induced in the secondary winding.	CO1	An	3
2(c)	A 230/460 V transformer has a primary resistance of 0.2Ω and reactance of 0.5Ω and the corresponding values for the secondary are 0.75Ω and 1.8Ω respectively. Find the secondary terminal voltage when supplying 10A at 0.8 power factor (p.f.) lagging. OR	CO2	An	5

	A 50kVA, 4400/220-V, 50-Hz transformer has a high voltage winding resistance (R_1) of 3.45Ω and a leakage resistance (X_1) of 5.2Ω . The low voltage winding resistance (R_2) is 0.009Ω and the leakage resistance (X_2) is 0.015Ω . Find the equivalent winding resistance, reactance and impedance referred to the- i) high voltage side and ii) low voltage side.			
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3(a)	Draw the equivalent circuit of transformer with proper notation.	CO1	R	2
3(b)	Write the faraday's law of electromagnetic induction. A coil that has 700 turns develops an average induced voltage of 50V. What must be the change in the magnetic flux occur to produce such a voltage if the time interval for this change is 0.7s.	CO1	An	3
3(c)	A shunt generator delivers 450 A at 230V and the resistance of the shunt field and armature are 50Ω and 0.03Ω respectively. Calculate the generated emf. OR In no-load test of single phase transformer, the following test data were obtained: Primary voltage: 220V; Secondary voltage: 110V; Primary Current: 0.5A; Power Input: 30W. Resistance of the primary winding = 0.6 ohm Find the following: i) The turn ratio ii) The magnetizing component of no load current iii) Its working (or loss) component iv) The iron loss.	CO2	An	5