

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: BE
BRANCH: EEE**

**SEMESTER: VI/ADD
SESSION : SP/2020**

SUBJECT : EE6205 INDUSTRIAL DRIVES AND CONTROL

TIME: 1.5 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 30.
 2. Candidates may attempt for all 30 marks.
 3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. The missing data, if any, may be assumed suitably.
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- Q1 (a) What are the advantages of electrical drives? List any four. [2]
(b) Explain the multi quadrant operation of a drive with the example of a hoist. [3]
- Q2 (a) What are the reasons for using load equalization in an electrical drive? [2]
(b) A weight of 500 kg is being lifted up at a uniform speed of 1.5 m/s by a winch driven by a motor running at a speed of 1000 rpm. The moments of inertia of the motor and winch are 0.5 and 0.3 kg-m² respectively. Calculate the motor torque and the equivalent moment of inertia referred to the motor shaft. In the absence of weight, motor develops a torque of 100 N-m when running at 1000 rpm. [3]
- Q3 (a) What are the advantages of electrical braking over mechanical braking? [2]
(b) Explain any two methods of current sensing. [3]
- Q4 (a) Explain the following: Short time duty, Intermittent periodic duty with starting. [2]
(b) A constant speed motor has the following duty cycle: Load rising linearly from 200 to 500 kW: 4 min, Uniform load of 400 kW: 2 min, Regenerative power returned to the supply reducing linearly from 400 kW to 0: 3 min, Remains idle: 4 min. Determine power rating of the motor assuming loss to be proportional to (power)². [3]
- Q5 (a) Draw the speed torque and torque current curves of a dc series motor and give the equations. [2]
(b) Explain how regenerative braking and dynamic braking can be obtained in a dc motor. [3]
- Q6 Explain the single phase fully controlled rectifier control of dc separately excited motor for discontinuous conduction mode. Draw the circuit, waveforms and give all the equations. [5]

::: 27/02/2020 :::M