

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

**CLASS: BE
BRANCH: EEE**

**SEMESTER: VII
SESSION : MO/2018**

SUBJECT : EE8221 UTILISATION OF ELECTRICAL POWER

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 is coefficient of adhesion. List all the factors on which coefficient of adhesion depends. [2]
(b) Derive the expression for specific energy consumption on a level track for an electric train [3]
- Q2 (a) List and explain the advantages of using electric braking instead of mechanical brakes. [2]
(b) A 100 tonnes locomotive is employed to drive a train weighing 500 tonnes. The effect of rotating inertia is to make the effective mass higher by 10%. The locomotive has 4 dc motors, each geared to the driving axle through a reduction gear with a = 0.25. Transmission system efficiency is 95%. Each wheel has a radius of 0.54 m. Train resistance is 30 N/tonne. Determine coupling torque per motor required to accelerate the train at 2 kmphs on a level track. [3]
- Q3 Discuss 25 kV ac traction drive employing thyristor converter controlled dc motors. Why a converter with sequence control is employed. [5]
- Q4 What are the important features of load commutated inverter fed synchronous motor dc traction drive. Explain its operation. [5]
- Q5 (a) Discuss various methods of controlling the temperature in resistance ovens. [2]
(b) Explain with neat sketch the operation of a core type induction furnace. [3]
- Q6 (a) Explain the terms: Squeeze time, weld time, hold time. [2]
(b) Explain Seam welding and butt welding. [3]

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