Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	**: Electrical & Electronics Engineering**	**Semester**	**: 7th**
Title of the Course	**: Solid State Drives**	**Course Code**	**: EE401**

Time: 2 Hours **Maximum Marks: 30**

Note : 1. Answer all the questions.

2. Do not write anything on the question paper except Roll number

3. Assume any data suitably if found missing

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1. In a paper mill, a paper strip emerges at a speed of 20 m/s with a tension of 8.2 N. Compute the input power required for the motor to drive the paper strip. The efficiency of the motor is approximated as 75%. **[2]**
2. Differentiate active load torque from passive load torque. **[2]**
3. Deduce the system matrix and the control matrix of a separately excited dc motor drive. **[3]**
4. With appropriate examples, explain how the steady state stability of a motor-load system can be ascertained. **[3]**
5. State the essential parts of electrical drives. What are the four functions of power modulator? **[4]**
6. A drive has following parameters: $J = 1$ kg-m^2, $T = 15 - 0.01N$, N-m, Passive load torque $T_l = 0.005N$, N-m, where N is the speed in rpm. Initially the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristic is altered such that $T = -15 - 0.01N$, N-m for positive as well as negative values of N. Calculate the reversal time. **[5]**
7. Explain how the variable speed drive allows saving of energy in pump drives. **[5]**
8. With the aid of neat figures, explain the four quadrant operation of a motor driving a hoist load. **[6]**