

1)

A horizontal cutter is required to cut at a rate of 0.2mm per rev for a depth of 35cms. The cutter is independently driven @ 3000rpm. The cutter is attached to a base which has a combined mass of 375kgs. A drive screw is used to drive the cutter base along a rail. The drive screw has a thread pitch of 0.5 mm and is directly connected to a drive motor (motor x). Assume no drive or friction losses.

Perform the necessary calculations to generate a specification for a suitable induction motor (motor x) to drive the cutter base and justify your selection.

2)

An inverter for the light-rail train (LRT) locomotive operates from a DC supply of 900 V. The locomotive is rated at 85 kW. The induction motor is to run from standstill up to 400 Hz, with power switching frequencies up to 9KHz. Propose a suitable power switching device for use in the control circuit and explain your reasoning.

3)

An induction motor has a rated power of 2.5KW at a rotational speed of 1200rpm. What is the torque of the motor at this speed.

4)

In ac motor power drives what is the reason for including low pass filtering before providing the drive output to the motor.

5)

Explain the differences between a delta, mesh and star connected 3 phase motor. Give the advantages and disadvantages of each.

6)

How does an induction motor work? Briefly describe the operation of an induction motor.

7)

When describing the operation of an induction motor 'slip' is always mentioned. What is 'slip' and explain its importance in the operation of an induction motor.

8)

Explain in detail the starting procedure of a single phase induction motor.