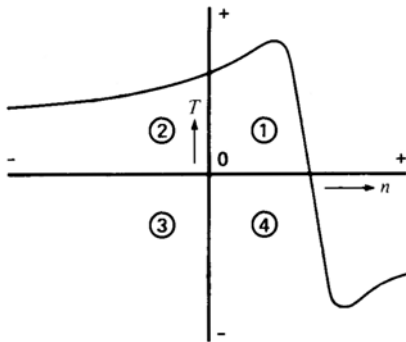


Questions from the same exercise can be combined together to increase difficulty.

20.14

In the following figure, an induction machine is represented. We denote  $n$  as the rotational speed, and  $T$  as the shaft torque. Positive and negative values of  $n$  and  $T$  declare the direction of rotational speed or torque.

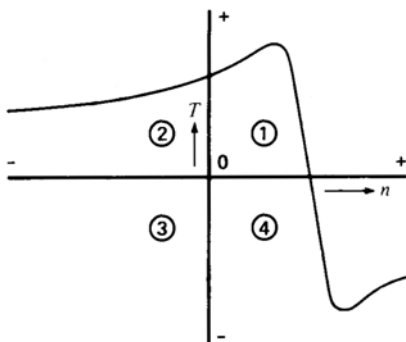


Which quadrant represents motor operation?

- a) 1
- b) 2
- c) 3
- d) 4

20.14

In the following figure, an induction machine is represented. We denote  $n$  as the rotational speed, and  $T$  as the shaft torque. Positive and negative values of  $n$  and  $T$  declare the direction of rotational speed or torque.

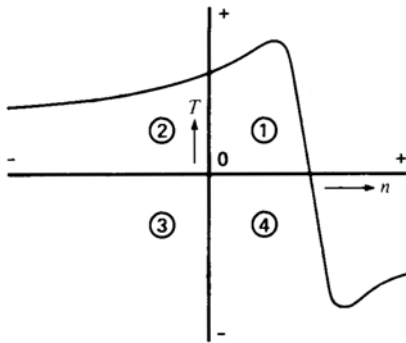


Which quadrant represents breaking operation?

- a) 1
- b) 2
- c) 3
- d) 4

20.14

In the following figure, an induction machine is represented. We denote  $n$  as the rotational speed, and  $T$  as the shaft torque. Positive and negative values of  $n$  and  $T$  declare the direction of rotational speed or torque.

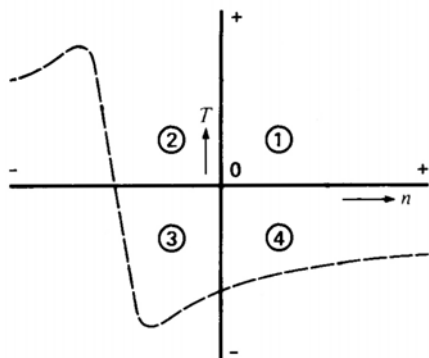


Which quadrant represents generator operation?

- a) 1
- b) 2
- c) 3
- d) 4

20.14

In the following figure, an induction machine is represented. We denote  $n$  as the rotational speed, and  $T$  as the shaft torque. Positive and negative values of  $n$  and  $T$  declare the direction of rotational speed or torque.

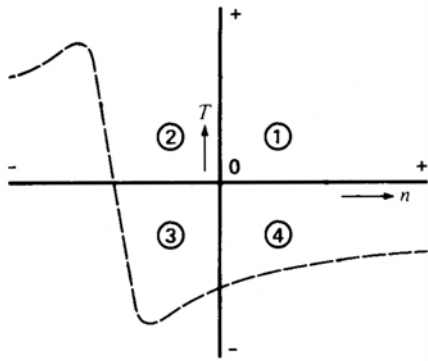


Which quadrant represents motor operation?

- a) 1
- b) 2
- c) 3
- d) 4

20.14

In the following figure, an induction machine is represented. We denote  $n$  as the rotational speed, and  $T$  as the shaft torque. Positive and negative values of  $n$  and  $T$  declare the direction of rotational speed or torque.

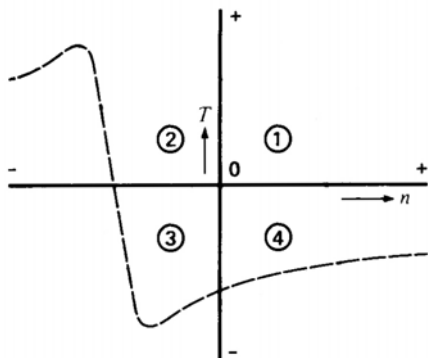


Which quadrant represents generator operation?

- a) 1
- b) 2
- c) 3
- d) 4

**20.14**

In the following figure, an induction machine is represented. We denote  $n$  as the rotational speed, and  $T$  as the shaft torque. Positive and negative values of  $n$  and  $T$  declare the direction of rotational speed or torque.



Which quadrant represents breaking operation?

- a) 1
- b) 2
- c) 3
- d) 4

**mine**

Which of the following statements doesn't cause a change in the torque-speed characteristic of a machine?

- a) Change in the input frequency.
- b) Change in the mechanical load.
- c) Interchange two of the three phase input leads.
- d) Change in the input voltage.

**mine**

With which of the following ways can one keep the shaft torque of an induction motor constant at all speeds?

- a) With a change in the input frequency only.
- b) With a change in the input voltage only.
- c) With changes in the input voltage and frequency only.
- d) None of the above.

**Example 20.5**

A three-phase, 10hp, 575V, 1750rpm, 4-pole, 60Hz squirrel-cage induction motor develops a torque of 110Nm at speed of 1440rpm. The motor is excited at a frequency of 25Hz. What is the required voltage to maintain the same flux in the machine?

- a) 240V
- b) 575V
- c) 1380V
- d) 332V