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Continuing Education Course #381  
Motor Control Part 2  
Reduced Voltage Starters

1. The torque produced by a motor is proportional to:
  - a. voltage
  - b. voltage squared
  - c. motor load
  - d. current
  
2. The current draw of a motor is proportional to:
  - a. voltage
  - b. voltage squared
  - c. motor rpm
  - d. motor horsepower
  
3. What NEMA motor designs can have 3% rated slip?
  - a. Design A
  - b. Design B
  - c. Design C
  - d. Design D
  - e. Design A and B
  - f. Design A, B and C
  
4. What NEMA motor designs can have a 7% rated slip?
  - a. Design A
  - b. Design B
  - c. Design C
  - d. Design D
  - e. Design A and B
  - f. Design A, B and C
  
5. At what speed will a NEMA design B motor reach maximum torque?
  - a. 0 RPM
  - b. 20% of rated speed
  - c. 80% of rated speed
  - d. Rated full speed
  
6. What is the primary reason that a primary resistor starter would not be used?
  - a. It is too large
  - b. It is too expensive

- c. It is too complex
  - d. It wastes energy through heat dissipation
7. What is the primary advantage of an autotransformer starter?
- a. Compact size
  - b. Low cost
  - c. Lowest power loss
  - d. Produces the highest starting torque with the lowest line current
8. In an autotransformer starter, why is a late-break type auxiliary contact used on the RUN contactor?
- a. To ensure a closed transition from start to run
  - b. To make sure the motor starts
  - c. To limit power consumption
  - d. To reduce an overload condition
9. At what speed should an autotransformer transition from the autotransformer to by-pass?
- a. 30% of rated speed
  - b. 50% of rated speed
  - c. 80% of rated speed
  - d. 100% of rated speed
10. How many overload relays are required for a part winding starter?
- a. 1
  - b. 2
  - c. 3
  - d. 4
11. Which reduced voltage starter types can be used with a motor that has three leads?
- a. Primary resistor
  - b. Autotransformer
  - c. Part winding
  - d. Wye-delta
  - e. Solid state reduced voltage
  - f. a and b
  - g. a, b, and e
  - h. c and d
12. Which reduced voltage starter type can be used to control a motor when stopping?
- a. Primary resistor
  - b. Autotransformer
  - c. Part winding
  - d. Wye-delta
  - e. Solid state reduced voltage
13. How many SCRs are used in a solid-state reduced voltage starter for a 3-phase motor?
- a. 1
  - b. 2
  - c. 3
  - d. 6
  - e. 12

14. Which type of reduced voltage starter has an open transition in the starting sequence?

- a. Primary resistor
- b. Autotransformer
- c. Part winding
- d. Wye-delta
- e. Solid state reduced voltage

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