

Medium

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Consider the following statements regarding Induction Motor Torque: 1. The maximum torque developed by an induction motor is independent of rotor resistance under

A

3 and 4 only

B

1 and 3 only

C

2 and 3 only

D

All of the above

Correct

Correct Answer: D

Full Detailed Explanation

Correct Answer: D - All of the above Quick Concept Explanation For a given supply, the value of maximum torque is approximately independent of rotor resistance, while the slip at which it

occurs is proportional to rotor resistance. Adding rotor resistance in a slip-ring motor can improve starting torque and shift maximum torque toward standstill. Key relation:

$s_{max} \propto R_2 / X_2$ (referred form, simplified); $T \propto s R_2 / (R_2^2 + (sX_2)^2)$. Exam focus: Rotor

resistance shifts the torque-slip curve horizontally; it does not materially raise T_{max} . Common trap: Maximum torque does not occur at synchronous speed because slip is zero there.

Statement-wise Verification Statement 1 - Correct. The maximum torque developed by an induction motor is independent of rotor resistance under constant supply conditions. Induction-motor torque

depends on slip and rotor resistance. Statement 2 - Correct. Increasing rotor resistance improves the starting torque of a slip-ring induction motor. Adding rotor resistance in a slip-ring motor

can improve starting torque and shift maximum torque toward standstill. Statement 3 -

Correct. The slip corresponding to maximum torque is directly proportional to rotor

resistance. For a given supply, the value of maximum torque is approximately independent of rotor resistance, while the slip at which it occurs is proportional to rotor resistance. Statement 4 -