

Easy

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A DC motor has flux = constant and armature current = 20 A. 1. Torque is directly proportional to armature current under constant flux condition. 2. If current

A

1, 2 and 4 only

Correct

B

1 and 3 only

C

2 and 3 only

D

All of the above

Correct Answer: A

Full Detailed Explanation

Correct Answer: A - 1, 2 and 4 only Quick Concept Explanation The electromagnetic torque of a DC motor is proportional to the product of air-gap flux and armature current. If flux is held

constant, torque varies directly with armature current, so doubling current ideally doubles

torque. Key relation: $T = k \phi I_a$. Exam focus: Constant flux converts the general torque equation

into $T \propto I_a$. Common trap: Do not generalize constant-flux behavior into 'torque is

independent of flux'. Statement-wise Verification Statement 1 - Correct. Torque is directly

proportional to armature current under constant flux condition. The electromagnetic torque of a

DC motor is proportional to the product of air-gap flux and armature current. Statement 2 -

Correct. If current doubles, torque also doubles. If flux is held constant, torque varies directly

with armature current, so doubling current ideally doubles torque. Statement 3 -

Incorrect. Torque is independent of flux. The correct principle is: Constant flux converts the

general torque equation into $T \propto I_a$. Statement 4 - Correct. Torque depends on product of flux

and current. The electromagnetic torque of a DC motor is proportional to the product of air-gap

flux and armature current. Core Concept The electromagnetic torque of a DC motor is proportional

to the product of air-gap flux and armature current. If flux is held constant, torque varies