Medium | Deputy Executive Engineer (Electric | 2026 | orts Authority of Gujarat / Assistant Engineer (El

With reference to Variable Frequency Drives (VFDs) in pumping systems: 1. VFDs save energy by varying the motor speed instead of using a throttle valve. 2. According

A	1 and 2 only	Correct
B	2 and 3 only	
C	1 and 3 only	
D	1, 2 and 3	

Correct Answer: A

Full Detailed Explanation

Correct Answer: A - 1 and 2 only Quick Concept Explanation For centrifugal pumps in systems dominated by friction head, affinity laws show flow approximately proportional to speed, head to speed squared and power to speed cubed. VFD speed control therefore saves much more energy than throttling when variable flow is required. Key relation: Q N; H N ; P N .Exam focus: 20% speed reduction: power 0.8 =0.512, about 49% saving. Common trap: High static-head systems reduce the benefit predicted by pure affinity laws. Statement-wise Verification Statement 1 - Correct.VFDs save energy by varying the motor speed instead of using a throttle valve.VFD speed control therefore saves much more energy than throttling when variable flow is required. Statement 2 - Correct.According to affinity laws, reducing the pump speed by 20% reduces power consumption by nearly 50%.20% speed reduction: power 0.8 =0.512, about 49% saving. Statement 3 - Incorrect.VFDs are most effective in systems with high static head.VFD savings are greatest where friction/variable head dominates; high static head reduces the cubic-law savings Core Concept For centrifugal pumps in systems dominated by friction head, affinity laws show flow approximately proportional to speed, head to speed squared and power to speed cubed. VFD speed control therefore saves much more energy than throttling when variable flow is required. Savings