

2001 HIGHER SCHOOL CERTIFICATE EXAMINATION

Physics

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Centre Number

Section I – Part B (continued)

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Student Number

Marks

Question 21 (3 marks)

A fan that ventilates an underground mine is run by a very large d.c. electric motor. This motor is connected in series with a variable resistor to protect the windings in the coil.

3

When the motor is starting up, the variable resistor is adjusted to have a large resistance. The resistance is then lowered slowly as the motor increases to its operating speed.

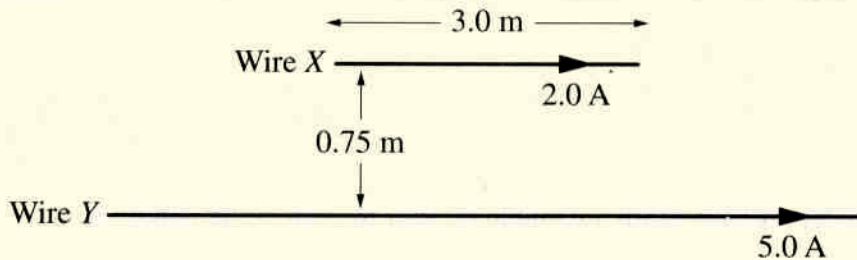
Explain why no resistance is required when the motor is running at high speed, but a substantial resistance is needed when the motor is starting up.

Substantial resistance is needed when the motor is starting up in order to keep windings in the coil in ~~best~~ working order and not break them with a sudden surge of power. The resistance can then be decreased slowly without any damage occurring.

Marks

Question 22 (7 marks)

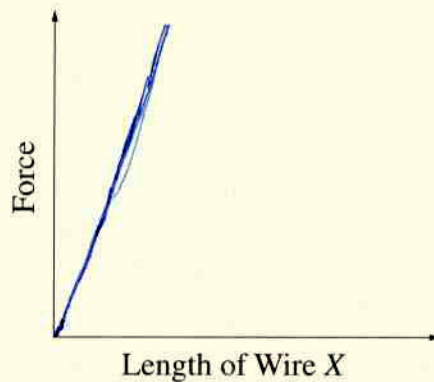
Two parallel wires are separated by a distance of 0.75 m. Wire X is 3.0 m long and carries a current of 2.0 A. Wire Y can be considered to be infinitely long and carries a current of 5.0 A. Both currents flow in the same direction along the wires.



- (a) What is the direction of the force that exists between the two wires? 1

Down

- (b) On the axes, sketch a graph that shows how the force between the two wires would vary if the length of Wire X was increased. 2



- (c) In your Physics course you have performed a first-hand investigation to demonstrate the motor effect. Explain how your results demonstrated that effect. 4

The results of the motor effect experiment that was conducted showed us how different conductors of energy react to ~~although~~ AC and DC generators outlining the motor effect.

Marks

Question 23 (6 marks)

Discuss the effects of the development of electrical generators on society and the environment.

6

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Developments over the years have seen electrical generators, instead of being here & there, & and risky to be near. There development has seen more electrical circuits being run on one electrical generator for a whole grid with the generators being substations for major supply grids. Now there are small generators then can back up electricity when there is a blackout effects on the environment have reduced also. Although there is some concern if lightning hits generators that aren't properly fixed or hooked that it could start fires. If in the bush this would be a major concern. In suburbs major shopping centres have back up generators in case of black outs. The environment is still at risk but there are measures being taken to try and prevent any more damage to the environment.