

- 6 (a) State Faraday's law of electromagnetic induction.
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[1]

- (b) Two parallel rails of negligible resistance are placed 15.0 cm apart as shown in Fig. 6.1. Two metal rods, AB and CD, which can slide smoothly along the rails, are being pulled by external forces. Rod AB is being pulled at a constant speed of 3.0 m s^{-1} while rod CD is being pulled at a constant speed of 5.0 m s^{-1} in the opposite direction. There is a uniform magnetic flux density of 0.20 T applied perpendicular to the plane of the rails into the paper.

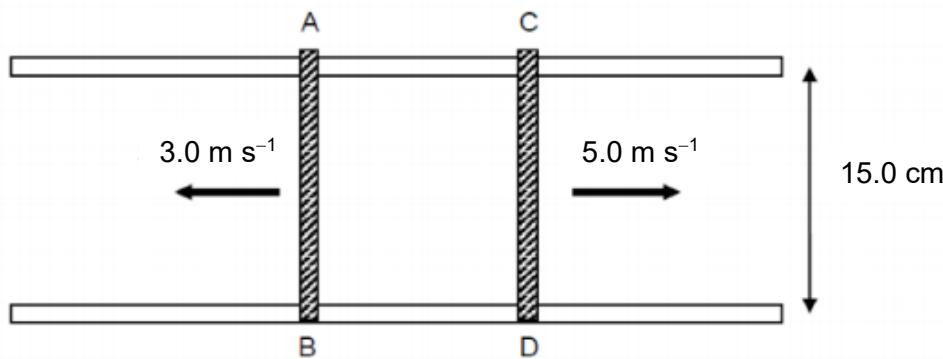


Fig. 6.1

- (i) Calculate the e.m.f. induced in the loop ABDCA.

induced e.m.f. = V [3]

- (ii) Describe and explain, using Lenz's law, the direction of the induced current in the loop ABDCA.

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[2]

- (iii) Explain why there is a need for external forces to be applied to allow the rods to move at constant speed.

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[2]

[Total: 8]

