

**Question 11** (4 marks)

The current flows in a clockwise direction. 1 mark

Change: There is an increasing field out of the page and therefore a change in external flux in the coil. 1 mark

Oppose: The coil opposes this increase by providing its own flux into the page. 1 mark

Direction: Using the right-hand grip rule, the induced current is in a clockwise position. 1 mark

**Question 12** (8 marks)

a. The slip rings are permanently connected to the same sides of the coil. 1 mark

The induced current in the coil alternates in direction. 1 mark

The slip rings carry this alternating current to the external circuit. 1 mark

b. 
$$T = \frac{1}{50}$$

$$= 0.02$$

$$T\left(\frac{1}{4}\right) = \frac{0.02}{4}$$

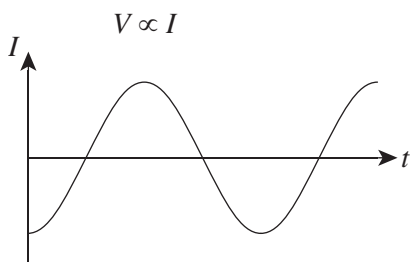
$$= 0.005$$
1 mark

$$\text{EMF} = \frac{N\Delta\phi}{\Delta t}$$

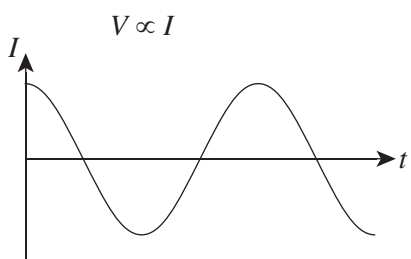
$$= 50 \frac{(0 - 0.2 \times 0.02)}{0.005}$$
1 mark

$$= 40.0 \text{ V}$$
1 mark

c.



OR



2 marks

1 mark for shape of graph.

1 mark for current being a maximum amplitude at  $T = 0$ .