Question 17 (12 marks)
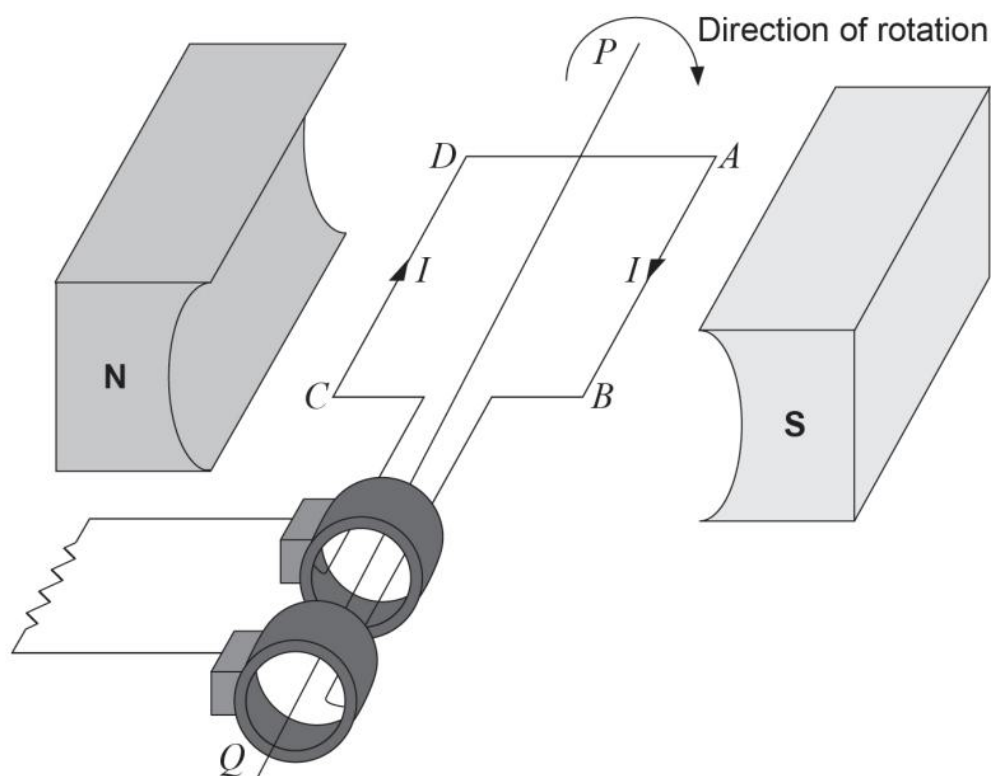

A single rectangular loop alternating current (AC) generator has dimensions 13.0 cm × 8.50 cm. It sits in a magnetic field of strength 2.37 mT and is rotated at a frequency of 10.0 Hz.

(a)   Calculate the maximum amount of flux passing through the coil at any time in a complete rotation. (3 marks)
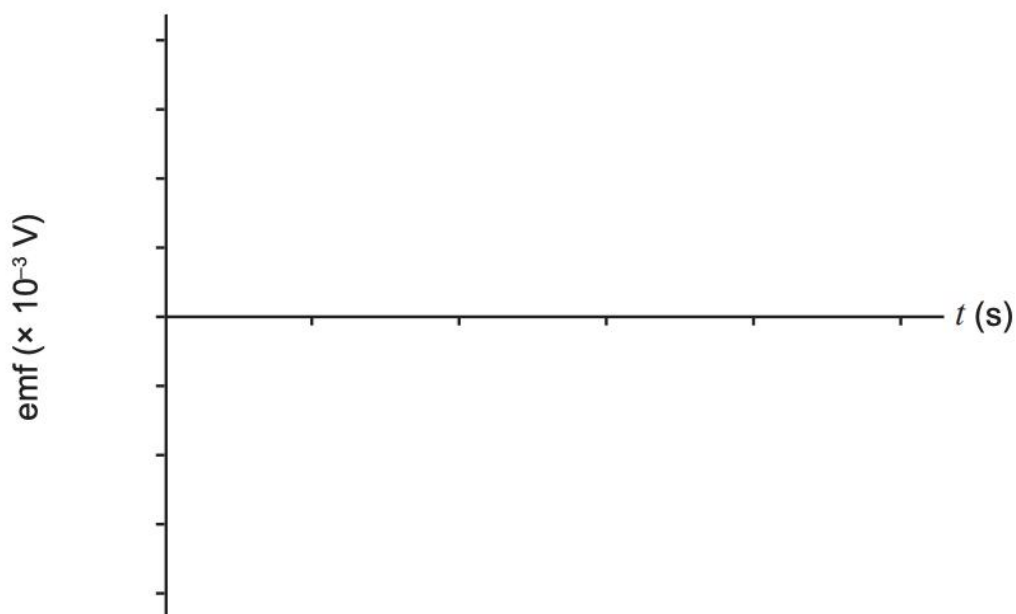
Answer: _____ Wb

(b)   On the axes below, graph the flux passing through the coil during one complete rotation. Take the starting position shown in the diagram on page 26. Include your value from part (a) on the y-axis and place actual time values on the x-axis.   (4 marks)
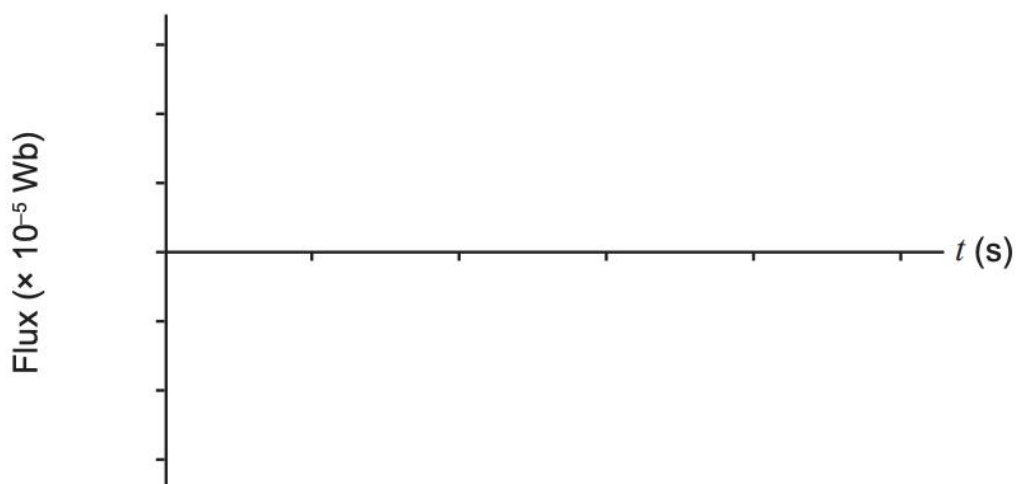
Flux ($\times 10^{-5}$ Wb)

t (s)

A spare grid is provided at the end of this Question/Answer booklet. If you need to use it, cross out this attempt and indicate that you have redrawn it on the spare grid.

(c)   On the axes below, graph the emf induced in the coil as it goes through one complete rotation. Take the starting position shown in the diagram on page 26. Include values on both axes.   (5 marks)

emf ($\times 10^{-3}$ V)

t (s)

A spare grid is provided at the end of this Question/Answer booklet. If you need to use it, cross out this attempt and indicate that you have redrawn it on the spare grid.