Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Mark Schemes

Q1.

(a) (i) graph showing two pulses one at start and the other at the end with no emf between the pulses

Positive and negative pulses shown

Similar shaped 'curved' pulses : negative between 0 and 0.22 ± 0.02 s and positive pulse 0.58 ± 0.02 and 0.8

3

(ii) emf induced when the flux is changing or induced emf depends on the rate of change of flux

emf induced when flux changes between 0 and 0.2(2) s and / or between 0.6(0.58)s and 0.8 s
OR
no change in flux between 0.2 and 0.6 so no induced emf

Induced emf / current produces a field to oppose the change producing it.

Flux linking bracelet increases as the bracelet enters the field produced by C and decreases as it leaves so opposite emfs

4

(b) (Takes 0.21 s or 0.22 s for flux to change from 0 to maximum so)
diameter = 0.28 × 0.21 = 0.059 (0.588) (m)
or 0.28 × 0.22 = 0.062 (0.616) (m)
must be to at least 2sf

1

(c) Area of bracelet = 3.14×0.031^2

$B = 1120 \times 10^{-6} / (3.14 \times 0.031^2) = 0.38$ (T)
$B = 0.40$ T if 3 cm used for radius
Condone incorrect power of 10
Allow answers in range 0.38T to 0.41 T (depends on value used for r)

2

(d) Use of steepest gradient of graph or tangent drawn on Figure 2
Correct data from tangent or points on the steepest part of the graph
10 to 11 mV

3

[13]

Downloaded from www.merit-minds.com

Q2.

(a) emf = $\Delta(BAN) / t$
Change in flux = $A \times \Delta B$ or $12 \times (23 - 9)$ seen

C1

Substitution ignoring powers of 10

C1

1.2 V

A1
3

(b) Reduced

M0

Magnet will move (with the case)

A1

Increased

M0

Flux linkage increases or emf is proportional to *N*

A1
2

(c) (i) Formula used
$2\pi\sqrt{\frac{8\times10^{-3}}{2.6}}$ seen

B1

0.348 / 0.349 seen to at least 3 sf

B1
2

(ii) Period consistent at 0.35 s or V_o = 8 V

B1

Shape shows decreasing amplitude

M1

At least 3 cycles starting at 8 V

A1
3

[10]

Downloaded from www.merit-minds.com