

Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic : 7_ Magnetic Field 1

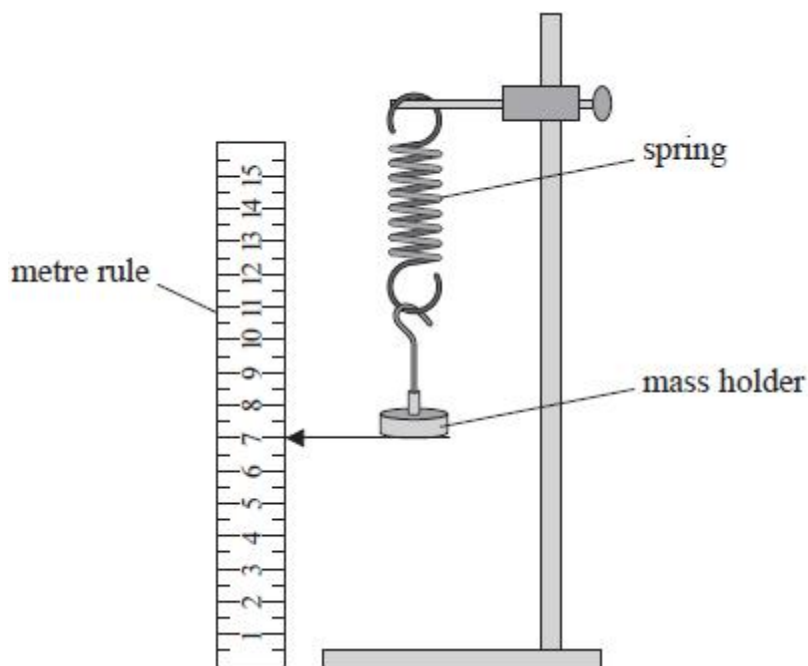
Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Q1.

A student investigated the behaviour of a spring under tension. The spring was hung vertically with a mass holder attached.

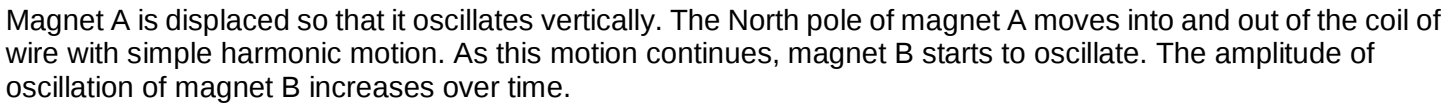


The position of the bottom of the mass holder was recorded. The spring was stretched by adding masses to the mass holder and the new positions were recorded. The extension of the spring each time was calculated.

The student produced the following table.

Mass added / g	Extension / cm	Stretching force / N
50	1.9	0.49
70	3	0.69
90	3.5	0.9
110	4.5	1.08
130	5.3	1.28
150	5.8	1.47

* Identical bar magnets are suspended from identical springs, with the North pole of each magnet inside a coil of wire as shown. The two coils are connected together with conducting leads.

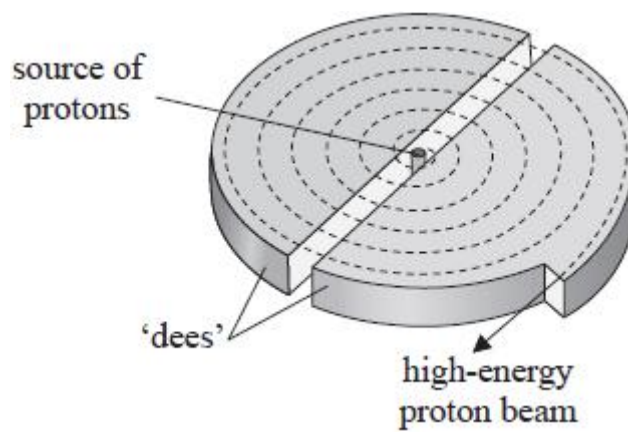


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[illegible]

(Total for question = 6 marks)

Proton beam therapy is being introduced in the UK as a new cancer treatment. A beam of protons is accelerated by a cyclotron to an energy of 23 MeV and is then focused onto a tumour.



* Explain how the cyclotron produces the high-energy proton beam.

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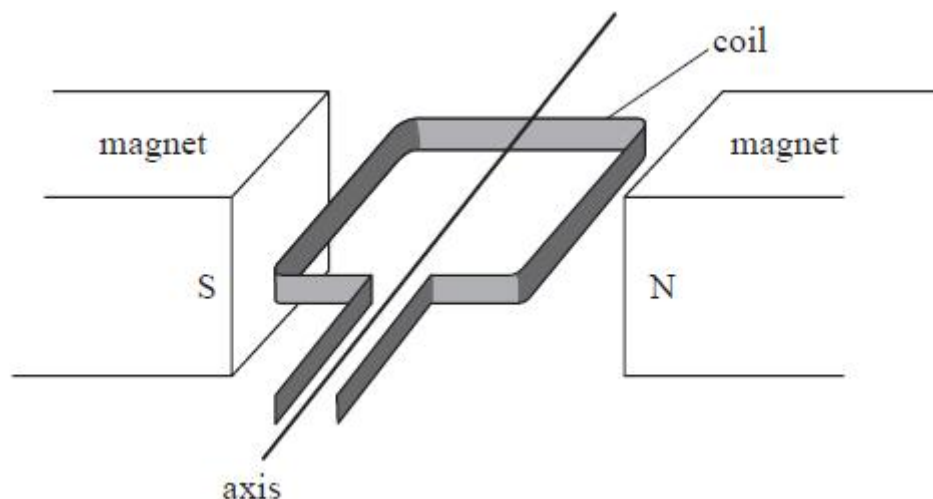
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(Total for question = 6 marks)

Q3.

&Hybrid electric vehicles (HEV) use the same device both as a generator to charge the car battery and as an electric motor to support the propulsion system. A simplified diagram of the device is shown. The coil can rotate freely around the axis.



Describe how the device can be used as both a generator and an electric motor.

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(Total for question = 6 marks)