Practice Question Set For GCSE
Subject : Physics
Paper-2 Topic : 13_Electromagnetic Induction

Name of the Student:_____
Max. Marks : 27 Marks **Time : 27 Minutes**

Q1.

A teacher is demonstrating electromagnetic induction.
The teacher has a bar magnet, a coil of wire and a sensitive voltmeter.

(i) Draw a diagram to show how the teacher should arrange the apparatus.

(1)

(ii) Explain how the teacher could use this apparatus to demonstrate the factors affecting the size and direction of the induced potential difference.

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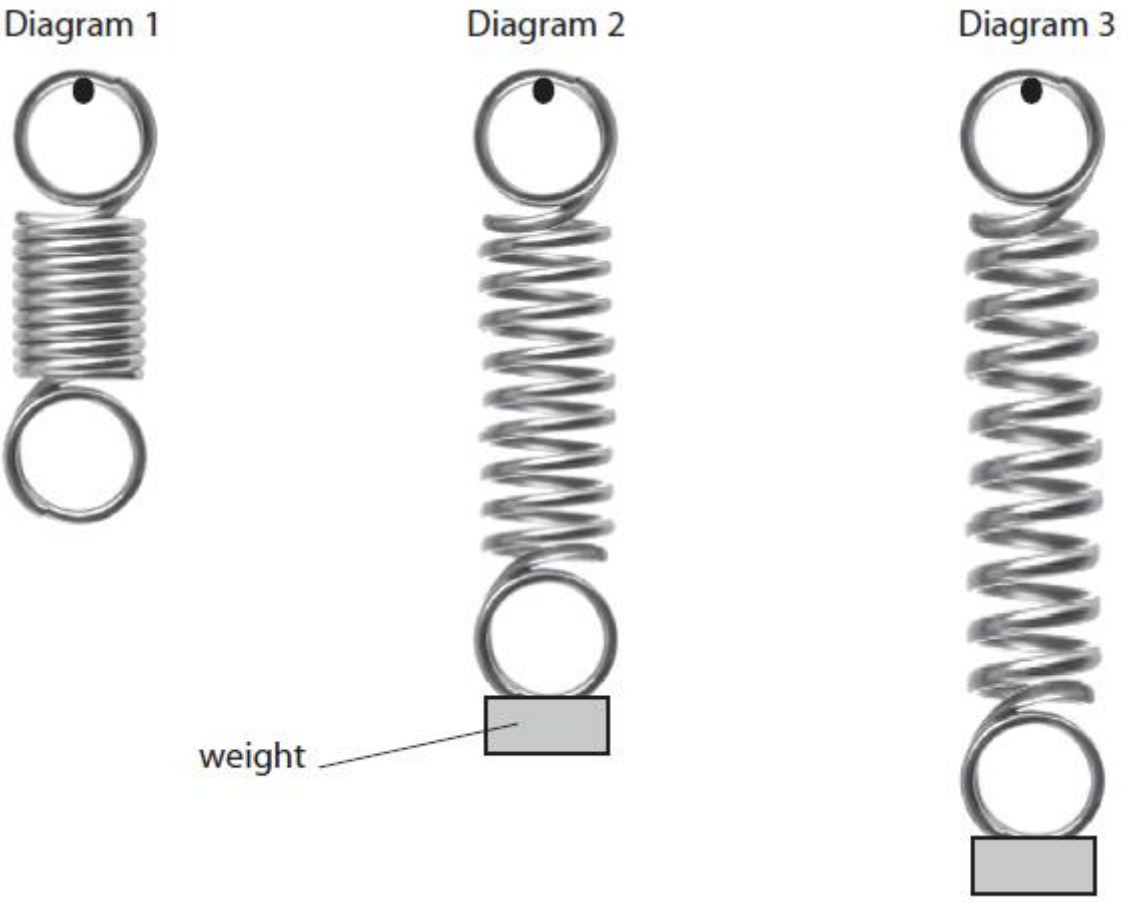
(Total for question = 5 marks)

Q2.

(a) The diagrams show a spring hanging from a nail.

- In Diagram 1 there is no weight on the spring.
- Diagram 2 shows the spring after a weight is added.
- Diagram 3 shows the spring after the weight has been pulled down slightly.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.
When held stationary as in Diagram 3,

(1)

- ☒ **A** the spring has zero elastic potential energy
- ☒ **B** the weight has equal amounts of elastic potential and kinetic energy
- ☒ **C** the weight has more kinetic energy than gravitational potential energy
- ☒ **D** the spring has more elastic potential energy than the weight has kinetic energy

(ii) The spring is stretched from the position shown in Diagram 2 to the position shown in Diagram 3.
The spring is then released.
Describe the energy changes that take place until the spring stops vibrating.

(3)

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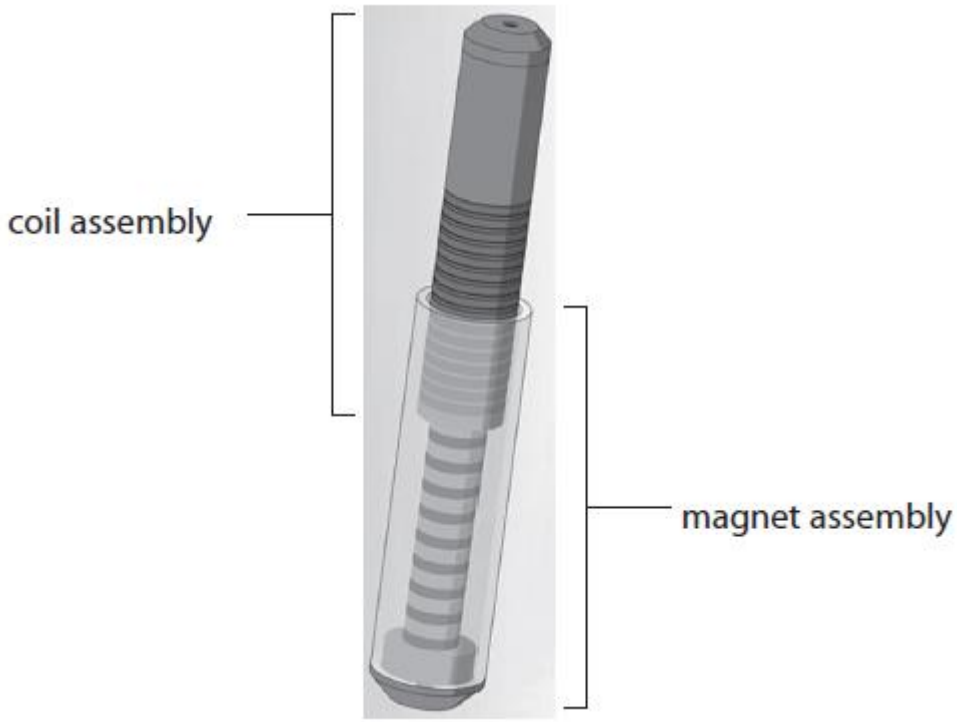
(b) Shock absorbers with springs are used on some motorcycles.
These shock absorbers reduce the bounce on an uneven road.
A new shock absorber has been developed to convert some of the movement energy into another form.

It consists of magnets which slide inside a coil when the motorcycle goes over a bump.



Some of the energy which would otherwise be wasted can be recovered and so fuel is saved.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

- ☒ **A** increase the thermal energy obtained from the fuel
- ☒ **B** increase the efficiency of the motorcycle
- ☒ **C** decrease the speed of the motorcycle
- ☒ **D** decrease the braking power of the motorcycle

(ii) Explain how this new type of shock absorber can provide electrical energy.

(2)

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(iii) The diagram shows the bumps on the surface of two roads, L and M.

why the device will transfer more energy on road L than on road M for a motorcycle travelling at the same speed.

(3)

road L

road M

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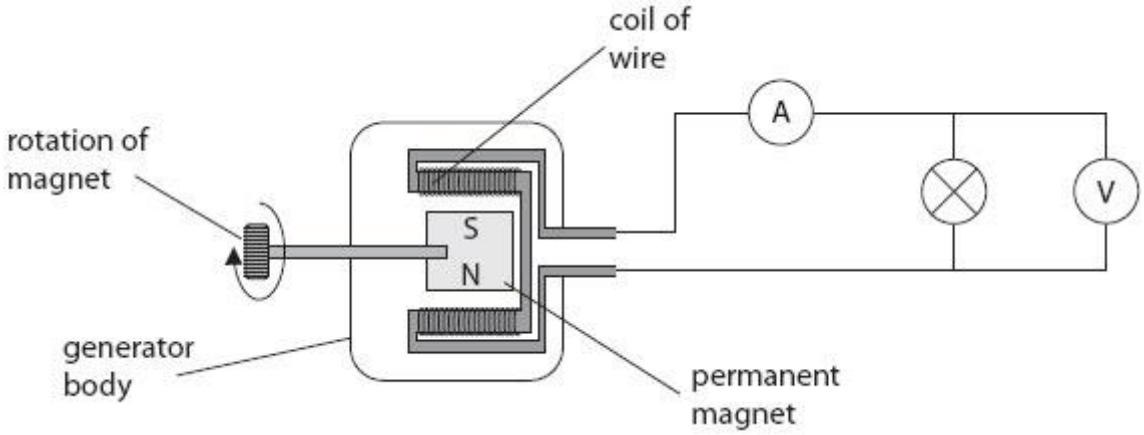
(Total for Question = 10 marks)

Q3.

(a) The diagram shows a simple generator connected to a lamp.



The magnet is made to spin at a steady speed.
The ammeter gives a reading of 1.5 A.
The voltmeter gives a reading of 6 V.
(i) Calculate the output power of the generator.

(2)

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(ii) State two changes to the design of the generator that would give a larger output power for the same speed of rotation.

(2)

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(iii) This generator supplies an alternating current (AC) to the lamp.
Other types of generators supply a direct current (DC).
Describe the difference between charge movement in a direct current and in an alternating current.

(2)

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*(b) The first public power station was built in the centre of New York.

It used generators to supply direct current at 110 V. The cables had to go underground and they could only supply
nearby shops and offices.

The electricity was mainly used for electric light.

The development of alternating current generators led to major changes in the way electricity is transmitted and used.

Compare the modern National Grid system with the early system in New York.

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(Total for Question is 12 marks)