GREENLAWNS SCHOOL, WORLI

Final Examination 2018

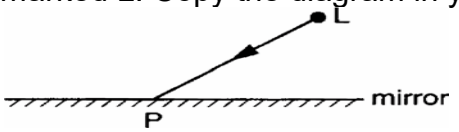
PHYSICS

STD: IX Marks: 80

Date: 22/02/2018 Time: 2hrs

Question 1

a. Figure shows a view from above of a vertical mirror. A small lamp is placed at the point marked L. Copy the diagram in your answer paper complete it as instructed.



I. One ray, LP, from the lamp has been drawn
- i. At P, draw and label the normal to the mirror ray.
- ii. At P, draw and label the reflected
- iii. Mark, using an X for each, two angles which are equal.

II. Carefully mark, using a clear dot, the position of the image of the lamp. **[2]**

b. Distinguish between real image & virtual image. (any two points) **[2]**

c. Explain why a hollow glass sphere which floats with its entire volume submerged in water at 4°C, sinks when water is heated above 4 °C. **[2]**

d. Give two advantage and limitation of using the nuclear energy**.** **[2]**

e. State the Cartesians sign conventions for the measurement of distance. **[2]**

Question 2

a. sketch the graph you would expect to get if you plotted values of the potential difference V across a metallic conductor at constant temperature and the current *I* through it. How would you use the graph to find the resistance of the conductor? **[2]**

b. Define Potential difference. State its SI unit. **[2]**

c. State two economical measures to minimize the impact of global warming. **[2]**

d. Give two characteristics of wave motion. **[2]**

e. Ocean wave of time period 10 s have a wave velocity 15 m/s. Find
- i. The wave length and frequency
- ii. The horizontal distance between a wave crest and its adjoining wave trough. **[2]**

Question 3

a. Give any two points of difference between primary cell and secondary cell. **[2]**
b. State two causes of global warming. **[2]**
c. Define the focus of convex and concave mirror, with help of a diagram. **[2]**

d. why a soft iron is used in as the core of the electromagnet in an electric bell. **[2]**

e. Draw a labelled diagram to make an electromagnet from a soft iron bar AB. Mark the polarity at its ends. **[2]**

Question 4

a. What is responsible for the flow of current through?
- **i.** A metallic conductor.
- **ii.** An electrolyte. **[2]**

b. Name and state the law which governs the flow of energy in process of entrance, transformation and diffusion in ecosystem. **[2]**

c. State the consequences of increase and decrease in proportion of green house gases in earth's atmosphere**.** **[2]**

d. In a dark room, a parallel beam of light falls on a plan mirror and another parallel beam of light falls on a white wall. The light reflected by the mirror can be seen only in a certain direction, but the reflected light from the wall can be seen from anywhere. Give reason. **[2]**

e. Explain why iron filings which are sprinkled on a sheet of cardboard over a bar magnet, take up a definite pattern when cardboard is slightly tapped. **[2]**

Question 5

a. State and explain three factors on which the resistance of a wire depends. **[3]**

b. What do you mean by anomalous expansion of water? And draw graph to show the variation of density of water with temperature in the temperature range from 0°C to 10°C. **[3]**

c.
- **i.** State any two means to efficient use of energy. **[2]**
- **ii.** Draw magnetic field lines of a bar magnet when its north pole is facing the geographic north. **[2]**

Question 6

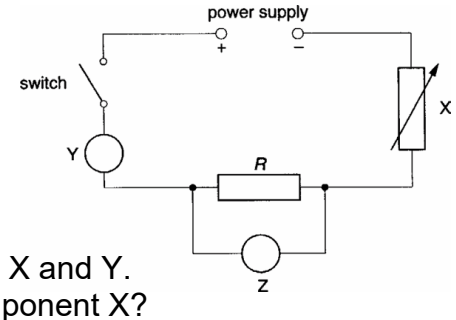
a.
- **i.** Assuming that the fixed resistor has a resistance of 100 Ω and that the potential difference of the power supply is 3.0 V, calculate the maximum current $I_{max\ in}$ the circuit
- **ii.** In order to calculate the value for I_{max} in **(i)** above, what assumption did you make about the resistance of the circuit? **[3]**

b.
- **i.** Name the types of waves which are used for a sound ranging.
- **ii.** Why are this waves mentioned above not audible to us.
- **iii.** Give one use of sound ranging? **[3]**

c. **i.** Draw a ray diagram to represent the formation of a magnified and virtual image in a spherical mirror.
ii. Name the mirror which always gives a virtual and diminished image.
iii. How will you differentiate the mirrors in question I and ii without touching. **[4]**

Question 7

a. The circuit shown in Figure was used to determine *R*, the resistance of a resistor, using the equation $R = \frac{V}{I}$.



i. Name the components labelled X and Y.
ii. What is the purpose of the component X? **[3]**

b. A sound wave in air is made up of compressions and rarefactions
I. State what is meant by a *rarefaction* and compression
II. The distance between two consecutive rarefactions in a sound wave is 2.5 m. The speed of sound in air is 330 m / s. Calculate the frequency of this sound wave. **[3]**

c. An object is placed at a distance of 15 cm in front of a convex mirror of radius of curvature 10 cm. (i) where will the image form? (ii) Find the magnification m. (iii) what will be the nature of image. **[4]**

Question 8

a. How many images are formed for a point object kept in between two plane mirrors M_1& M_2 at right angles to each other? Show them by drawing a ray diagram. **[3]**

b. i. State two laws of reflection
ii. Explain Lateral inversion.
iii. State Ohm's law.

c. Draw displacement - time graph and displacement - distance graph of sound wave and show on it amplitude, Time period and wave length. **[4]**

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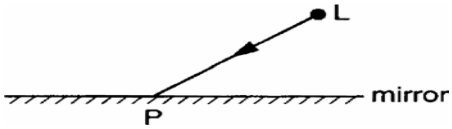
Answer key

Question 1

a. Figure shows a view from above of a vertical mirror. A small lamp is placed at the point marked L. Copy the diagram in your answer paper complete it as instructed.



I. One ray, LP, from the lamp has been drawn

i. At P, draw and label the normal to the mirror ray.

ii. At P, draw and label the reflected

iii. Mark, using an X for each, two angles which are equal.

II. Carefully mark, using a clear dot, the position of the image of the lamp. **[2]**

b. Distinguish between real image & virtual image.(any two points) **[2]**

Ans. Real image: Image is obtained on the screen .Image is obtained due to actual intersection of refracted ray. Image formed is inverted with respect to object
Virtual image: image is not obtained on the screen .Image is obtained due to refracted ray of appears to meet. Image formed is erect with respect to object.

c. Explain why a hollow glass sphere which floats with its entire volume submerged in water at 4°C, sinks when water is heated above 4 °C. **[2]**

d. Give two advantage and limitation of using the nuclear energy **.** **[2]**

e. State the Cartesians sign conventions for the measurement of distance. **[2]**

Question 2

a. sketch the graph you would expect to get if you plotted values of the potential difference V across a metallic conductor at constant temperature and the current *I* through it. How would you use the graph to find the resistance of the conductor? **[2]**

b. Define Potential difference. State its SI unit. **[2]**

Ans. Work done in carrying unit positive charge from one point to another .
S.I unit is volt.

c. State two economical measures to minimize the impact of global warming. **[2]**

d. Give two characteristics of wave motion. **[2]**

e. Ocean wave of time period 10 s have a wave velocity 15 m/s. Find

i. The wave length and frequency

ii. The horizontal distance between a wave crest and its adjoining wave trough. **[2]**

Question 3

a. Give any two point of difference between primary cell and secondary cell. **[2]**

Ans. Primary cell: It is not rechargeable .It is cheap and light. It has high resistance
Secondary cell: It is rechargeable .It is costly and heavier. It has Low resistance

b. State two causes of global warming.

c. Define the focus of convex and concave mirror, with help of a diagram. **[2]**

d. why a soft iron is used in as the core of the electromagnet in an electric bell. **[2]**

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Question 4

a. What is responsible for the flow of current through?

i. A metallic conductor.

ii. An electrolyte. **[2]**

Ans. i. free electrons

ii. Ions

b. Name and state the law which governs the flow of energy in process of entrance, transformation and diffusion in ecosystem. **[2]**

c. State the consequences of increase and decrease in proportion of green house gases in earth's atmosphere**.** **[2]**

d. In a dark room, a parallel beam of light falls on a plan mirror and another parallel beam of light falls on a white wall. The light reflected by the mirror can be seen only in a certain direction, but the reflected light from the wall can be seen from anywhere. Give reason. **[2]**

e. Explain why iron filings which are sprinkled on a sheet of cardboard over a bar magnet, take up a definite pattern when cardboard is slightly tapped. **[2]**

Question 5

a. State and explain three factors on which the resistance of a wire depends. **[3]**

Ans. Length of conductor: more the length larger will be resistance
Area of cross section: more the area of cross section less is the resistance
Temperature of conductor: greater the temperature larger is the resistance.

b. What do you mean by anomalous expansion of water? And draw graph to show the variation of density of water with temperature in the temperature range from 0°C to 10°C. **[3]**

c. i. State any two means to efficient use of energy. **[2]**

ii. Draw magnetic field lines of a bar magnet when its north pole is facing the geographic north. **[2]**

Question 6

a. i. Assuming that the fixed resistor has a resistance of 100 Ω and that the potential difference of the power supply is 3.0 V, calculate the maximum current $I_{max\ in}$ the circuit

ii. In order to calculate the value for I_{max} in **(i)** above, what assumption did you make about the resistance of the circuit? [3]

Ans. (i) I_{max} = 3 / 100 A or 30 mA

(ii) No other resistance in the circuit or 3 volt across 100 Ω or maximum resistance is 100 Ω

b. i. Name the types of waves which are use for a sound ranging.
ii. Why are this waves mentioned above not audible to us.
iii. Give one use of sound ranging? **[3]**

Ans. i. ultra sonic waves
ii. because of higher frequency
iii. To detect the presence of obstacle for ship while travelling

c. **i.** Draw a ray diagram to represent the formation of a magnified and virtual image in a spherical mirror.
ii. Name the mirror which always gives a virtual and diminished image.
iii. How will you differentiate the mirrors in question I and ii without touching. **[4]**

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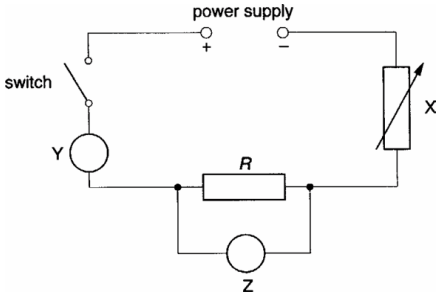
a. The circuit shown in Figure was used to determine *R*, the resistance of a resistor, using the equation $R = \frac{V}{I}$.



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b. A sound wave in air is made up of compressions and rarefactions
I. State what is meant by a *rarefaction* and compression
II. The distance between two consecutive rarefactions in a sound wave is 2.5 m. The speed of sound in air is 330 m / s. Calculate the frequency of this sound wave. **[3]**

Ans. **(i)** a place of higher pressure / air molecules closer together is compression
a place of lower pressure / air molecules further apart is rarefaction

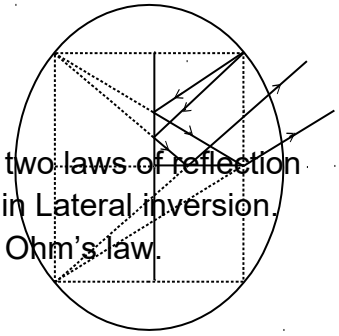
(ii) wavelength = 2.5 m
Speed = 330 m / s.
Frequency = 330 / 2.5
= 130 Hz

c. An object is placed at a distance of 15 cm in front of a convex mirror of radius of curvature 10 cm. (i) where will the image form? (ii) Find the magnification m. (iii) what will be the nature of image. **[4]**

Question 8

a. How many images are formed for a point object kept in between two plane mirrors M_1 & M_2 at right angles to each other? Show them by drawing a ray diagram. **[3]**

Ans. For two mirrors kept perpendicular to each other, three images are formed for an object kept in between them at right angles to each other? Show them by drawing a ray diagram.



b. i. State two laws of reflection
ii. Explain Lateral inversion.
iii. State Ohm's law. . **[3]**

Ans. I i) Incident ray, reflected ray and normal at the point of incidence lie in the same plane
ii) Angle of incidence = angle of reflection

II. The interchange of the left and right sides in the image of an object in a plane mirror is called Lateral inversion.
The image of 'ATOM' word in a plane mirror will be 'MOTA', this is due to lateral inversion.

c. Draw displacement - time graph and displacement - distance graph of sound wave and show on it amplitude, Time period and wave length. **[4]**

b. (2) If a current I flows through a wire when potential difference across the ends the wire is V,the resistance offered by the wire to the flow of current is R.