FIRST TERM MODEL QUESTION PAPER 2024 WITH ANSWER KEY SET 2

PHYSICS - Standard IX

Time: 1.5 hours

Max. Marks: 40

(Prepared by www.educationobserver.com)

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1. 15 minutes is given as cool-off time.
2. This time is to be used for reading the question paper.
3. You are not supposed to write anything during the cool-off time.
4. Attempt the questions according to the instructions.

Section A: Multiple Choice Questions (1 mark each)

1. Which of the following is a scalar quantity?
   - (a) Velocity
   - (b) Force
   - (c) Speed
   - (d) Acceleration
2. The property of light responsible for the bending of light when it enters a different medium is:
   - (a) Reflection
   - (b) Refraction
   - (c) Dispersion
   - (d) Diffraction
3. Which type of mirror is used in vehicle rearview mirrors to provide a wider field of view?
   - (a) Concave mirror
   - (b) Plane mirror
   - (c) Convex mirror
   - (d) Cylindrical mirror
4. The speed of light is fastest in:
   - (a) Water
   - (b) Air
   - (c) Glass

- (d) Diamond

5. Which of the following phenomena is responsible for the formation of a rainbow?
   - (a) Reflection
   - (b) Refraction and dispersion
   - (c) Diffraction
   - (d) Total internal reflection

5 × 1 = 5 Marks

Section B: Short Answer Type Questions (2 marks each)

(Attempt any 4 out of 5)

6. What is meant by uniform circular motion? Give an example.
7. Explain why objects appear bent when partially immersed in water.
8. What factors affect the speed of sound in a medium?
9. Why does the sky appear blue during the day?
10. Define refraction and state its cause.

4 × 2 = 8 Marks

Section C: Descriptive Questions (3 marks each)

(Attempt any 4 out of 5)

11. Describe how a rainbow is formed, explaining the roles of refraction and dispersion.
12. Explain the difference between concave and convex lenses with suitable examples of their uses.
13. How does the speed of sound vary in different media? Explain with examples.
14. Discuss the concept of apparent depth and how it relates to refraction.
15. How does dispersion of light lead to the formation of colors when white light passes through a prism?

4 × 3 = 12 Marks

Section D: Application and Experiment Questions (4 marks each)

(Attempt any 4 out of 5)

16. A car accelerates uniformly from rest to a speed of 25 m/s in 5 seconds. Calculate the acceleration and the distance covered during this time.
17. A light ray enters water from air at an angle of 45°. Explain the phenomenon of refraction and how the direction of light changes.
18. Explain how mirages occur in deserts. Include the concepts of refraction and total internal reflection in your explanation.
19. Describe an experiment to observe the bending of light when it passes through a glass slab.
20. Explain how optical fibers work based on the principle of total internal reflection. Provide examples of their applications.

4 × 4 = 16 Marks

Total: 40 Marks

Answer Key

Section A: MCQs

1. (c) Speed
2. (b) Refraction
3. (c) Convex mirror
4. (b) Air
5. (b) Refraction and dispersion

Section B: Short Answer Type Questions

6. Uniform circular motion occurs when an object moves in a circular path at constant speed. Example: A satellite orbiting Earth.
7. Objects appear bent when partially immersed in water because light rays bend (refract) as they pass from water (denser medium) to air (rarer medium).
8. The speed of sound depends on factors like the medium's density, temperature, and elasticity. Sound travels fastest in solids and slowest in gases.
9. The sky appears blue due to the scattering of shorter (blue) wavelengths of sunlight by atmospheric particles.
10. Refraction is the bending of light as it passes from one medium to another due to a change in speed.

Section C: Descriptive Questions

11. A rainbow forms when sunlight is refracted, dispersed, and internally reflected within raindrops, separating the white light into different colors.
12. A concave lens diverges light rays and is used in spectacles for correcting nearsightedness. A convex lens converges light rays and is used in magnifying glasses.
13. The speed of sound is fastest in solids, slower in liquids, and slowest in gases. For example, sound travels faster in steel than in air.
14. Apparent depth occurs when an object underwater appears closer to the surface due to the bending of light as it moves from water to air.
15. Dispersion occurs when white light splits into its component colors as it passes through a prism, forming a spectrum due to different refractive indices for each color.

Section D: Application and Experiment Questions

16.

Initial velocity $u = 0$ m/s,

Final velocity $v = 25$ m/s,

Time $t = 5$ s

Acceleration $a = \frac{v-u}{t} = \frac{25-0}{5} = 5$ m/s^2

Distance covered $s = ut + \frac{1}{2}at^2 = 0 + \frac{1}{2} \times 5 \times (5)^2 = 62.5$ m

17. When light enters water from air at an angle, it bends towards the normal due to a decrease in speed, causing refraction.
18. Mirages occur when light bends due to varying temperatures and densities in the air, resulting in total internal reflection, creating the illusion of water.
19. Shine a laser through a glass slab at an angle and trace the incident, refracted, and emergent rays. The refraction causes the light to bend as it enters and exits the slab.
20. Optical fibers use total internal reflection to transmit light signals over long distances with minimal loss. They are used in telecommunications and medical imaging.