

SAMAGRA SHIKSHA, KERALA
Summative Assessment - Term 2025 - 26

PHYSICS

Standard : X

Time : 1½ hour

Total Score : 40

Instructions

- The first 15 minutes is cool-off time. This time is meant for reading the questions and planning your answers.
- This question paper includes 18 questions in sections A, B, C, D.
- Questions 5, 11, 13, 14 and 18 contain choices.

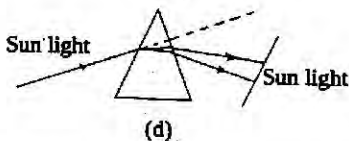
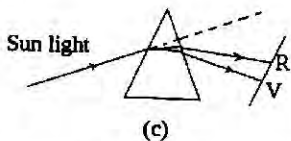
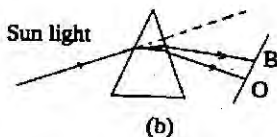
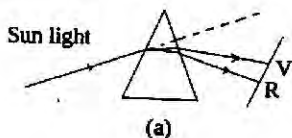
Section - A

Write down the correct answer by choosing from the given options for questions 1 to 4.

Each question carries 1 score.

(4 × 1 = 4)

1. The spectrum obtained on a screen when sunlight passes through a prism is depicted. Which of the following is the correct image? (1)



2. **Statement :** The speed of a wave through a medium depends on the characteristics of the medium. (1)

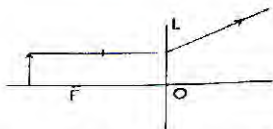
Reason : When speed is constant, frequency of the wave is inversely proportional to the wavelength

- a) Statement and reason are correct; the reason explains the statement.
- b) Statement and reason are correct; however, the reason does not explain the statement.
- c) both the statement and the reason are incorrect.
- d) Statement is incorrect; reason is correct

3. In the figure L denotes a lens.

What type of lens is indicated in the picture?

- a) Concave b) Convex
c) Plano convex d) None of These



(1)

4. A convex lens forms real, inverted, and magnified image, based on this some statements are given. (1)

- A convex lens is a diverging lens.
- The object is placed between the focus and the lens.
- The object is placed between the focus and $2F$.
- The object is placed at the focus.

Pick out the correct option from the following.

- a) i Only b) i and iii c) ii Only d) iii and iv

Section - B

Write down the answers to the questions 5 to 11. Questions 5 and 11 have choices.

Each question carries 2 score.

(7 × 2 = 14)

5. A. Focal length of a lens is $+20$ cm.

- a) What type of lens is this? (1)
b) What is the power of this lens? (1)

OR

5. B. A lens forms an erect and magnified image of an object.

- a) What type of lens is this? (1)
b) What are the characteristics of the image formed? (1)

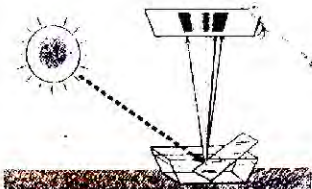
6. The figure shows three wires (A, B, C) of different lengths fixed to a wooden block.



When the wooden block was vibrated, all the wires underwent forced vibration.

- Which wire piece vibrates with a higher frequency? What is the reason? (1)
 - If wire B takes 1 s for 100 vibrations, what will be its period? (1)
7. When volcanic eruptions and earthquakes occur, some times large-scale displacement of ocean water results in disasters.
- By what name are the resulting ocean waves known? (1)
 - What measures can be taken to escape from this disaster? (1)

8. A bat produces sound waves and receives the reflected wave from an insect 0.1 s later. If the speed of sound in air is 350 m/s, how far away is the insect? (2)
9. What type of mechanical wave is sound wave? What are the characteristics of motion of particles in a medium when this wave passes through it? (2)
10. The figure shows a plane mirror kept inclined in a trough of water. A spectrum is made by making sunlight fall on the mirror.



- a) What is the reason for sunlight splitting up into component colours? (1)
- b) Which are the phenomena of light that the ray of light falling undergoes? (1)
11. A. An object is placed at $2F$ of a convex lens.

Draw the ray diagram showing the image formation. Write down the characteristics of the image? (2)

OR

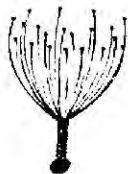
11. B. The focal length of a camera lens is 10 cm. We have to take the photograph of the object 50 cm away from the lens of the camera. With the help of the ray diagram drawn find out what distance from the lens should the film be placed (Use suitable scale). (2)

Section - C

Write down the answers to questions 12 to 17. Questions 13 and 14 have choices. Each question carries 3 score.

(6 × 3 = 18)

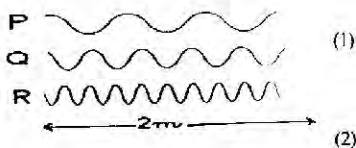
12. The electromagnetic spectrum is the orderly distribution of solar radiations.
 - a) Arrange the following radiations in the ascending order of wavelength. (1)
(X-rays, Gamma rays, Visible light, Ultraviolet rays, Infrared rays)
 - b) Which solar radiation is helpful in burning paper by passing solar radiation through a convex lens? (1)
 - c) Write one use of ultraviolet radiation. (1)
13. A. In a physics class, while doing an experiment using the apparatus shown in the figure
 - a) When a longer wire is made to vibrate, some students opined that all wires vibrate. What is your opinion? Justify your answer. (1)
 - b) When a shorter wire is made to vibrate, it is observed that only the shorter ones vibrate with a large amplitude. Why? Explain. (1)
 - c) If a small wire takes 0.5 s to vibrate 100 times, what will be its frequency? (1)



OR

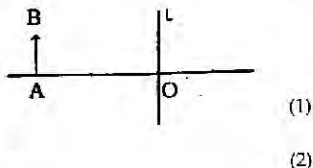
13. B. Observe the waveforms P, Q, and R given in the figure and answer the questions below.

- Which wave has a higher frequency?
 - Which wave has a longer wavelength?
- b) The waves indicated in the figure take 0.1 s to travel a distance of 2 m. If the wavelength of wave Q is 0.2 m, what is its frequency?



14. A. In the figure AB is an object placed on the principal axis of lens L. The image formed by the lens is erect, diminished, and virtual.

- Identify the lens indicated in the figure and draw its shape.
- Draw the ray diagram of the image formation.



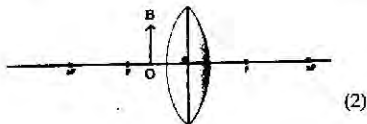
OR

14. B. You can see objects magnified using a magnifying lens, right?

- Where should an object be placed in front of a lens used as a magnifier to see an enlarged, erect image?
- Draw the ray diagram of the image formation.

15. An object OB is placed between focus and convex lens.

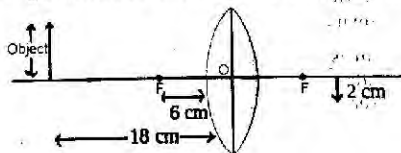
- If height of the object is 3 cm and height of the image formed is 9 cm, find magnification of the image.
- Can you project the image on a screen? Justify your answer.



16. You know that telescopes are used to observe very distant objects.

- If your science lab has two convex lenses with focal lengths of 5 cm and 50 cm respectively, which lens would be used as the eyepiece to construct a telescope?
- Explain how a telescope forms the image of a very distant object.

17. The figure shows the formation of an image of an object placed beyond $2F$ of a convex lens. (Using the Cartesian sign convention, find the answers to the questions given below)



- How far from the lens is the image formed?
- What is the height of the object?

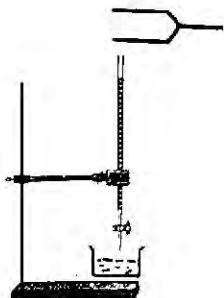
Section - D

18th question has a choice. Answer any one of the two questions.
Each question carries 4 score.

(4 x 1 = 4)

18. A. A burette full of water is fixed vertically on a stand. After opening the burette's tap, a tuning fork with a frequency of 512 Hz was excited and held at the top.

- a) The loudness of the sound heard seemed to increase. What could be the reason for this? (1)
- b) After some time, the sound was heard much louder, and then it decreased. What would be the vibration frequency of the air column inside when the sound was heard much louder? (1)
- c) Some students opined that to hear the sound loudly again, a tuning fork with a lower frequency than the first one should be used, while other students suggested a tuning fork with a higher frequency. What is your opinion? Justify your answer. (1)
- d) When the sound was heard much louder from inside the burette, another object nearby was seen to vibrate with a high amplitude. What would be the natural frequency of that object? (1)



OR

18. B. A police officer working at a busy traffic signal point hears sounds of various frequencies. Some frequencies of the sound reaching him are given below:

28000 Hz, 5 Hz, 150 Hz, 1200 Hz, 500 Hz, 16000 Hz

- a) Which frequencies of sound can the police officer hear? (1)
- b) What is the range of sound audible to humans (audible range)? (1)
- c) By what name is sound with a frequency lower than the human audible lower limit known? (1)
- d) Write two uses of sound with a frequency higher than the human audible upper limit. (1)