



PHYSICS

BOOKS - U-LIKE PHYSICS (HINGLISH)

THE HUMAN EYE AND THE COLOURFUL WORLD

NCERT Exercises

1. Why do stars twinkle ?



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2. Explain why the planets do not twinkle.



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3. Why does the Sun appear reddish early in the morning?



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4. Why does the sky appear dark instead of blue to an astronaut ?



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Multiple Choice Questions

1. Stars twinkle due to

- A. atmospheric refraction.
- B. atmospheric reflection.

C. attering of light.

D. dispersion of light.

Answer: A



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2. Which of the following diagrams represents refraction of light through a prism correctly ?



A. Diagram (i)

B. Diagram (ii)

C. Diagram (iii)

D. Diagram (iv)

Answer: D



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3. When a beam of white light passes through a glass prism, it splits up into seven colours.

This phenomenon is due to

A. refraction of light.

B. dispersion of light

C. diffraction of light.

D. absorption of light.

Answer: B



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4. When white light passes through a glass prism

A. red coloured ray undergoes maximum deviation.

B. green coloured ray undergoes minimum deviation.

C. blue coloured ray undergoes minimum deviation.

D. violet coloured ray undergoes maximum deviation.

Answer: D



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5. Which of the following phenomena of light are involved in the formation of a rainbow ?

A. Reflection, refraction and dispersion.

B. Refraction, dispersion and scattering.

C. Refraction, dispersion and internal reflection.

D. Dispersion, scattering and refraction.

Answer: C





6. On account of atmospheric refraction

A. sun appears 4 minutes before actual sunrise.

B. sun disappears 4 minutes before actual sunset.

C. sun is visible 2 minutes before actual sunrise.

D. sun becomes visible 2 minutes after actual sunrise.

Answer: C



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7. At noon the sun appears white as

A. light is least scattered.

B. all the colours of the white light are scattered away.

C. blue colour is scattered the most.

D. red colour is scattered the most.

Answer: A



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8. The sky appears reddish at the sunset due to the fact, that

A. blue-violet light has been scattered least.

B. red light is scattered most.

C. blue light has been mostly scattered but red light has scattered the least.

D. for red light the angle of refraction is less than for blue light.

Answer: C



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9. Choose the correct depiction for dispersion of white light on passing through a prism.



A. Fig (a)

B. Fig (b)

C. Fig (c)

D. Fig (d)

Answer: A



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10. If the earth had no atmosphere, the sky would have looked.

A. brown

B. black

C. white

D. blue

Answer: B



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11. The clear sky appears blue because

A. blue light gets easily absorbed in the atmosphere.

B. blue-violet light gets scattered less than other colours

C. ue-violet light gets scattered more than light of all other colours by the atmosphere.

D. ultraviolet radiations are absorbed in the atmosphere.

Answer: C



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12. An astronaut lands his spacecraft on the surface of moon and observes the sky. He will find the colour of sky as

A. deep blue

B. light blue

C. white

D. dark

Answer: D



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13. Which of the following phenomena contributes significantly to the reddish appearance of the Sun at sunrise or sunset ?

- A. Dispersion of light.
- B. Scattering of light.
- C. Reflection of light.
- D. Refraction of light.

Answer: B



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14. Danger signals installed at airports and at the top of tall buildings all of red colour. These signals are visible from a distance. It is because

A. red coloured light is scattered the most from atmosphere particles.

B. red coloured light is scattered the least from atmosphere particles.

C. red coloured light is absorbed most by smoke or fog present in atmosphere

D. red coloured light suffers minimum deviation in hot air of atmosphere.

Answer: B



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15. The sky appears dark to passengers flying at very high altitudes mainly because:

A. scattering of light is not enough at such heights.

B. there is no atmosphere at great heights.

C. the size of molecules is smaller than the wavelength of visible light.

D. the light gets scattered towards the earth.

Answer: B



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16. Twinkling of stars is due to atmospheric

A. dispersion of light by water droplets.

B. scattering of light by dust particles.

C. refraction of light by different layers of
varying refractive indices.

D. internal reflection of light by clouds

Answer: C



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True Or False

1. Deviation caused by a prism is maximum for violet coloured ray because wavelength of violet light is maximum.



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2. The sky appears to be silvery white when viewed from a space craft situated at a height of 1000 km above the earth.



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3. White light is a combination of light of seven colours and these colours are separated from one another when white light is passed through a prism.



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4. Apparent elevation of a star appears to be less than its true elevation on account of atmospheric refraction



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5. Stars as well as planets appear twinkling on a clear night.



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1. _____ is the phenomenon of splitting of white light into its constituent colours while passing through a triangular prism.



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2. In a commonly observed rainbow the innermost arc is of _____ colour and the outermost arc is of _____ colour.



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3. _____ is the phenomenon due to which light gets deflected and diffused all over as a result of its interplay with tiny matter particles.



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4. Sky appears light blue on account of the phenomenon of _____ .



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5. Apparent duration of a day is _____
than the actual duration of the day .



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Assertion Reason Questions

1. Assertion (A): When white light passes through a triangular prism, the emergent light consists of light of seven colours.

Reason (R): Name of seven colours can be remembered by the acronym VIBGYOR.

- A. Both (A) and (R) are true and (R) is correct explanation of the assertion.
- B. Both (A) and (R) are true but (R) is not the correct explanation of the assertion.
- C. (A) is true but (R) is false.
- D. (A) is false but (R) is true.

Answer: B



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2. Assertion (A): The stars twinkle in night but the planets do not twinkle.

Reason (R) :The stars are much bigger in size than the planets.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is not the correct explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: B



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3. Assertion (A): Sky predominantly appears light blue on account of scattering of light.

Reason (R): Wavelength of blue light is least.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is not the correct explanation of the assertion.

C. (4) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: C



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Very Short Answer Questions

1. On which principle does a prism form the image of an object?



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2. In which direction a ray of light bends while emerging out of a prism?



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3. What is dispersion of light ?



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4. Why do we get colours when white light passes through a prism ?



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5. Name the component of white light that deviates (i) the least and (ii) the most while passing through a glass prism.



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6. What is a rainbow?



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7. Name the two phenomenon involved in the formation of rainbow.



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8. On what factor does the colour of the light depends ?



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9. What phenomenon is depicted in the given diagram [Fig. 11.4] ? Explain the phenomenon and label A and B in the diagram.



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10. Name the phenomena due to which we get light from the Sun before actual sun rise.





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11. What is Tyndall effect?



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12. Give an example of a phenomenon where Tyndall effect can be observed.



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13. List the factors on which scattering of light depends.



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14. What will be the colour of the sky when it is observed from a place in the absence of any atmosphere?



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15. What is the colour of scattered sunlight when the size of the scattering particle is relatively large ?



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16. The sky appears dark to the passengers flying at very high altitudes. Why ?



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17. Why is red colour selected for danger signal lights ?



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Short Answer Questions

1. What is a prism ? Draw a neat diagram to show refraction of a light ray through a triangular glass prism. Define angle of deviation.



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2. What is meant by the dispersion of white light ? Draw a neat diagram to show dispersion of white light by a glass prism. What is the cause of dispersion ?



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3. Explain why the planets do not twinkle but the stars twinkle.



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4. What is a rainbow ? Draw a labelled diagram to show the formation of rainbow.

OR

Describe the formation of rainbow in the sky with the help of a diagram.



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5. What is atmospheric refraction ? Briefly explain. Why does apparent position of a star

appear different from its true position ?



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6. The stars appear higher from horizon than they actually are. Explain why it is so.



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7. Explain with the help of a diagram, how we are able to observe the sunrise about two minutes before the sun gets above the

horizon. Hence, explain why does apparent duration of a day from sunrise to sunset is 4 minutes more than its actual duration.



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8. Describe an activity to show that the colours of white light splitted by a glass prism can be recombined to get white light by another identical glass prism. Also draw ray diagram to show the recombination of the spectrum of white light.



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9. What is the cause of dispersion of light ?



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10. What is scattering of light ? How does it take place in earth's atmosphere ? How does colour of scattered light depend on the size of scattering particles ?



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11. What is scattering of light ? Use this phenomenon to explain why (i) the sun appears reddish at sunrise, and (ii) the clear sky appears blue.



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12. Why does the Sun appear reddish early in the morning? Will this phenomenon be observed by an observer on the Moon ? Justify your answer with a reason.



13. Fig. 11.11 shows an experimental set up for observing a phenomenon of light in colloidal solutions. A student dissolves about 200 g of sodium thiosulphate (hypo) in about 2 L of clean water in the tank and adds about 1 to 2 mL of concentrated H_2SO_4 to the water. What would he observe after the source of light S is switched on

(i) from the three sides of the glass tank?

(ii) from the fourth side of the glass tank facing the circular hole ? Give reason.



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14. Briefly describe an experimental arrangement for observing scattering of light in colloidal solution.



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15. Briefly explain the observed blue colour of clear sky. What would have happen if there is no atmosphere on the earth?



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Long Answer Questions

1. In the Fig. 11.12, mark the angle of prism, angle of deviation for red and violet colours

and incident ray.



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2. Explain how the components of white light can be recombined after a prism has separated them. Explain with the help of figure.



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3. What is atmospheric refraction ? Use this phenomenon to explain the following natural events: (a) Twinkling of stars, (b) Advanced sunrise and delayed sunset. Draw diagrams to illustrate your answer.



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4. Explain atmospheric refraction.



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5. Traffic signals on cross roads are of red colour. Give reason for choosing only this colour.



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6. Explain why do stars twinkle but planets do not twinkle.



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7. Explain with the help of a diagram, why a pencil partly immersed in water appears to be bent at the water surface.



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8. At noon, the Sun appears as white but in morning or evening appears as reddish. Why ?



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