

परमाणु ऊर्जा शिक्षा संस्था , मुंबई

Atomic Energy Education Society, Mumbai

Session : 2023 – 24

Class: X

Subject: SCIENCE(PHYSICS)

WORKSHEET NO.- 1

**Name of the Chapter : HUMAN EYE AND THE COLOURFUL WORLD**

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**General Instructions:**

1. There are 5 sections in this worksheet.
2. Section – A has 10 multiple choice questions of 1 mark each.
3. Section – B has 10 very short answer questions of 1 mark each.
4. Section – C has 10 short answer questions of 2 marks each.
5. Section – D has 5 short answer questions of 3 marks each.
6. Section – E has 5 long answer questions of 5 marks each.
7. Draw neat diagrams wherever necessary.
8. Use of calculator is not permitted

**Section A**

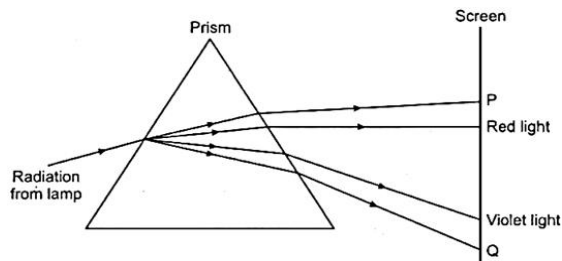
- 1 Which of the following phenomena is based on atmospheric refraction [1]
1. Sun appears to rise 2 minutes before and 2 minutes later
  2. Stars have seen higher than they actually are
  3. Rainbow
  4. The blue colour of clear sky
- a) A and C  
b) A and B  
c) A and D  
d) B and C
- 2 Person suffering from cataract has [1]
- a) weakened ciliary muscles
  - b) opaque eye lens
  - c) elongated eyeball

- d) excessive curvature of eye lens
- 3 Which is the correct condition for the total internal reflection to occur? [1]
- a) All of these
- b) light should pass from rarer to denser medium
- c) light should pass from denser to rarer medium
- d) Critical angle should be greater than angle of incidence
- 4 Which of the following colours is least scattered by fog, dust or smoke? [1]
- a) Blue
- b) Yellow
- c) Red
- d) Violet
- 5 The light - sensitive cell present on the retina and is sensitive to the intensity of light is: [1]
- a) Cones
- b) Rods
- c) Both rods and cones
- d) None of these
- 6 At noon the sun appears white as [1]
- a) light is least scattered
- b) all the colours of the white light are scattered away
- c) red colour is scattered the most
- d) blue colour is scattered the most
- 7 The bluish colour of water in deep sea is due to [1]
- a) absorption of light by the sea
- b) scattering of light
- c) reflection of sky in water
- d) the presence of algae and other plants found in water

- 8 The wavelength corresponding to violet, yellow & red light are  $\lambda_v$ ,  $\lambda_y$  and  $\lambda_r$  respectively. [1]
- a)  $\lambda_v < \lambda_y < \lambda_r$
- b)  $\lambda_v > \lambda_y > \lambda_r$
- c)  $\lambda_y < \lambda_r < \lambda_v$
- d)  $\lambda_y < \lambda_v < \lambda_r$
- 9 Which of the following phenomena of light are involved in the formation of a rainbow? [1]
- a) Reflection, refraction and dispersion
- b) Dispersion, scattering and total internal reflection
- c) Refraction, dispersion and total internal reflection
- d) Refraction, dispersion and internal reflection
- 10 When a light passes through a prism, it splits into its component colours. This phenomenon is called. [1]
- a) Reflection
- b) Spectrum
- c) Dispersion
- d) Refraction

### Section – B

- 11 Name the principle on which a prism form the image of an object? [1]
- 12 A person is advised to wear spectacles with convex lenses. What types of defect of vision is he suffering from? [1]
- 13 Give two precautions to be observed in the experiment to trace the path of light through prism. [1]
- 14 What do you mean by a rainbow? [1]
- 15 Which part of the human eye provides most of the refraction for the light rays entering the eye? [1]
- 16 In which direction a ray of light bends while emerging out of a prism? [1]
- 17 Why are dangerlight signalsred in color? [1]
- 18 The diagram shows radiations from a lamp passing through a prism. [1]

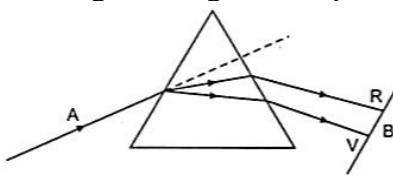


Which type of radiations are found at P and Q?

- 19 How can you identify the type of defect of vision a person is suffering from by physically touching his spectacles? [1]
- 20 Define power of accommodation? [1]

### Section – C

- 21 A student uses spectacles of focal length - 2.5 m. [2]
1. Name the defect of vision he is suffering from.
  2. Which lens is used for the correction of this defect?
  3. List two main causes of developing this defect.
  4. Compute the power of this lens.
- 22 Calculate maximum power of accommodation of a person having normal vision. [2]
- 23 A student sitting at the back of the classroom cannot read clearly the letters written on the blackboard. What advice will a doctor give to her? Draw the ray diagram for the correction of this defect. [2]
- 24 State one main function each of iris, pupil, and cornea. [2]
- 25 What is accommodation ? [2]
- 26 What phenomenon is depicted in the given diagram? Explain the phenomenon and [2]



label A and B in the diagram.

- 27 Write the structure of eye lens and state the role of ciliary muscles in the human eye. [2]
- 28 1. List two causes of hypermetropia. [2]
2. Draw ray diagrams showing (i) a hypermetropic eye and (ii) its correction using a suitable optical device.
- 29 Differentiate between a glass slab and a glass prism. What happens when a narrow beam of [2]
1. a monochromatic light, and

2. white light passes through

- a. glass slab and
- b. glass prism?

30 Under very dim light, we are able to see all the objects but cannot distinguish between their colours. Explain. [2]

#### Section – D

31 Why do we observe difference in colours of the Sun during sunrise, sunset and noon? [3]

32 Why do different rays deviate differently in the prism? [3]

33 A camera in many ways is similar to the human eye, still, there are some basic differences in image formation between the two. Explain. [3]

34 How can changes of size of eyeball be one of the reason for [3]

1. myopic and

2. hypermetropic eye? Compare the size of eyeball with that of a normal eye in each case. How does this changes of size affect the position of image in each case?

35 1. State two main causes of a person developing near - sightedness. With the help of a ray diagram, suggest how he can be helped to overcome his disability? [3]

2. The far point of myopic person is 100 cm in front of the eye. Calculate the focal length and power of a lens required to enable him to see distant objects clearly.

#### Section – E

36 What is meant by scattering of light? Mention the factor on which it depends. Explain, why the colour of the clear sky is blue? An astronaut in space finds sky to be dark. Explain reason for this observation. [5]

37 What is atmospheric refraction? Use this phenomenon to explain the following natural events. [5]

1. Twinkling of stars.

2. Advanced sunrise and delayed sunset. Draw diagrams to illustrate your answers.

38 A 14 year old student is not able to see clearly the questions written of the black board placed at a distance of 5 m from him. [5]

1. Name the defect of vision he is suffering from?

2. Draw the diagram to show this defect?

3. Name the type of lens used to correct this defect?

4. Name two possible cause of this defect.

5. Draw the diagram to show how this defect can be corrected.
- 39 Differentiate between presbyopia and cataract. **[5]**
- 40 When do we consider a person to be myopic or hypermetropic? List two causes of hypermetropia. Explain using ray diagrams how the defect associated with hypermetropia eye can be corrected. **[5]**