Science

Sample Question Paper 5
(Class 10) (Term – 1) (Session 2021-22)

Time: 1 hour 30 minutes **Number of Questions: 50**

General Instructions

1. The Question Paper contains three sections.
2. Section A has 24 questions, Attempt any 20 questions.
3. Section B has 24 questions, Attempt any 20 questions.
4. Section C has 12 questions, Attempt any 10 questions.
5. All questions carry equal marks.
6. There is no negative marking.

SECTION – A

Section - A consists of 24 questions. Attempt any 20 questions from this section.
The first attempted 20 questions would be evaluated.

1. Which of the following is not a physical change?
[A] Boiling of water to give water vapour
[B] Melting of ice to give water
[C] Dissolution of salt in water
[D] Combustion of liquefied petroleum gas LPG

2. A dil. ferrous sulphate ($FeSO_4$) solution was added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?
(A) Potassium permanganate is an oxidising agent, it oxidises $FeSO_4$.
(B) $FeSO_4$ acts as an oxidising agent and oxidises potassium permanganate
(C) The colour disappears due to dilution; no reaction is involved.
(D) Potassium permanganate ($KMnO_4$) is unstable compound & decomposes in presence of ferrous sulphate to a colourless compound.

3. Sodium calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by Liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form a solution called lime water.
Which among the following is true about slaking of lime and the solution formed?
(i) it is an endothermic reaction
(ii) it is an exothermic reaction
(iii) the pH of the resulting solution will be more than 7
(iv) the pH of the resulting solution will be less than 7
[A] (i) & (ii)
[B] (ii) & (iii)
[C] (i) & (iv)
[D] (iii) & (iv)

4. The iron rod is covered with reddish brown layer which damages the surface of rod. Which of the following Method can be used to prevent its damage?
[A] By covered it with layer of base
[B] By covered it with layer of zinc.
[C] By covered it with layer of dilute acid
[D] By covered it with layer of copper

5. A metal "X" when treated with cold water gives the metal Hydroxide "Y" and starts floating. The metal "X" and compound "Y" could be:

	Metal "X"	**Compound "Y"**
(i)	Mg	$Mg(OH)_2$
(ii)	Ca	$Ca(OH)_2$
(iii)	Na	NaOH
(iv)	K	KOH

Select the correct option:
[A] Only (i)
[B] Only (ii)
[C] Both (i) & (iii)
[D] Both (ii) & (iv)

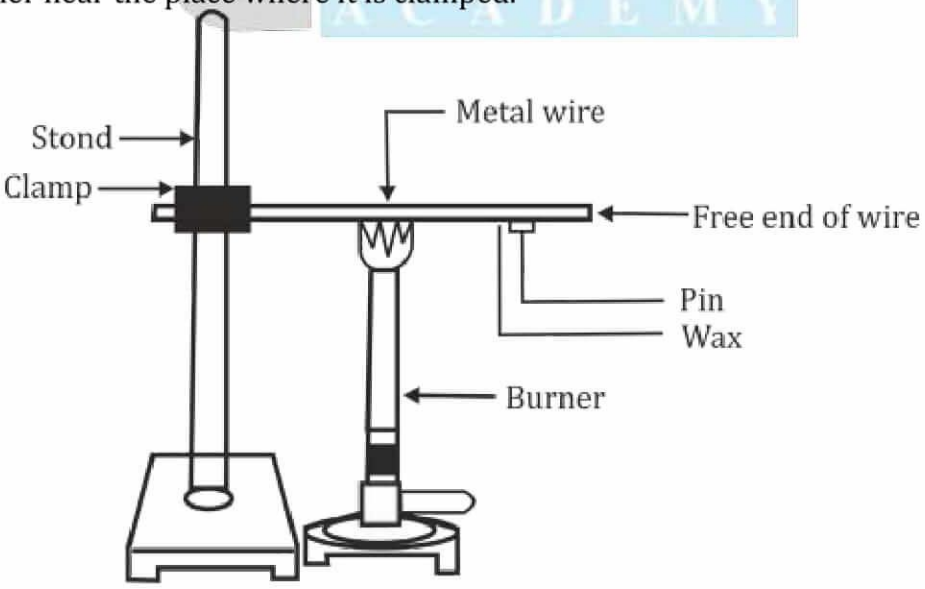
6. Which of the following can be used as an acid base indicator by a visually impaired student?
[A] Litmus
[B] turmeric
[C] Vanilla essence
[D] Petunia leaves

7. During the preparation of hydrogen chloride gas on a humid day, the gas is usually passed through the guard tube containing calcium chloride. The role of calcium chloride taken in the guard tube is to
(A) absorb the evolved gas.
(B) moisten the gas.
(C) absorb moisture from the gas
(D) absorb Cl- ions from the evolved gas.

8. Which of the following statements is not correct?
[A] All metal carbonates react with acid to give a salt, water, and carbon dioxide
[B] All metal oxides react with water to give salt and acid
[C] Some metals react with acids to give salt and hydrogen
[D] Some non-metal oxides react with water to form an acid

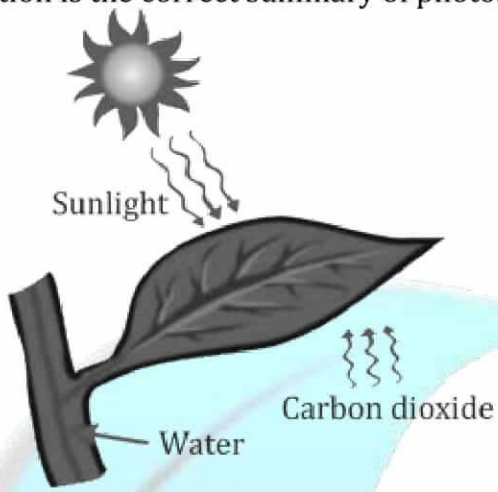
9. A blue litmus paper was first dipped in dil. HCl and then in dil. NaOH solution. The colour of the litmus paper will be
(a) changed first to red and then to blue
(b) changed first to blue and then colourless
(c) remains blue in both times
(d) changed to red

10. A student took an aluminium or copper wire and clamped this wire on a stand, as shown in figure. Then he fixed a pin to the free end of the wire, using wax and heated the wire with a spirit lamp, candle, or a burner near the place where it is clamped.



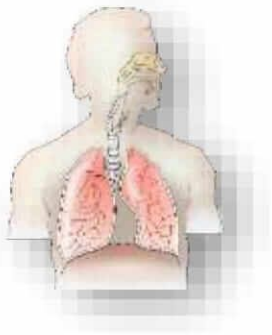
The activity performed by the student shows that:
(a) Metals are good conductors of heat and have low melting points.
(b) Metals are poor conductors of heat and have high melting points.
(c) Metals are good conductors of heat and have high melting points.
(d) Metals are poor conductors of heat and have low melting points

11. Which of the following equation is the correct summary of photosynthesis?



[A] $6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$
[B] $6CO_2 + H_2O + \text{Sunlight} \rightarrow C_6H_{12}O_6 + O_2 + 6H_2O$
[C] $6CO_2 + 12H_2O + \text{Chlorophyll} + \text{Sunlight} \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$
[D] $6CO_2 + 12H_2O + \text{Chlorophyll} + \text{Sunlight} \rightarrow C_6H_{12}O_6 + 6CO_2 + 2H_2O$

12. Which of the following is the first site for the exchange of inhaled air?
[A] Blood capillaries of lungs
[B] Alveoli of lungs
[C] Left auricle of the heart
[D] Blood capillaries adjacent to body cells

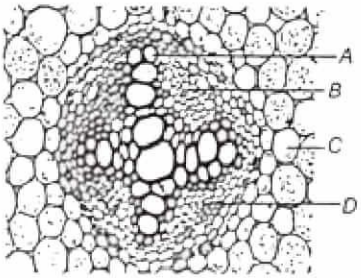


13. Lymph does not comprise of:
[A] Red blood corpuscles
[B] lymphocytes
[C] White blood corpuscles
[D] nitrogenous waste

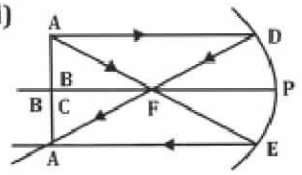
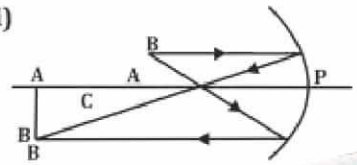
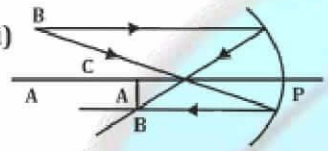
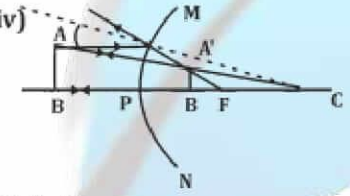
14. The blood leaving the tissues becomes richer in
(A) Carbon dioxide
(B) water
(C) Haemoglobin
(D) oxygen

15. The breakdown of pyruvate to give carbon dioxide water and energy takes place in
[A] Cytoplasm
[B] mitochondria
[C] Chloroplast
[D] nucleus

16. The diagram shows a transverse section from the middle of a root a Dicotyledonous plant. In which tissue are sugars and amino acids transported?
[A] Tissue marked as A
[B] Tissue marked as B
[C] Tissue marked as C
[D] Tissue marked as D



17. Match column I with column II. And choose the most appropriate option from the codes given below:

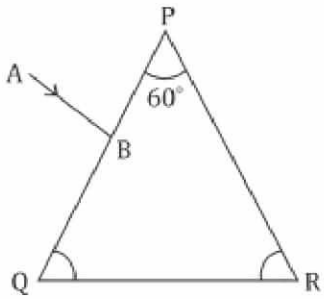
Column I (Nature and Size of image)	Column II (Ray diagram)
(a) Virtual erect and diminished	(i) 
(b) Real, inverted and same size as that of object	(ii) 
(c) Real, inverted and enlarged	(iii) 
(d) Real, inverted and diminished	(iv) 

[A] (i)-A, (ii)-B, (iii)-C, (iv)-D
[B] (iv)-A, (i)-B, (ii)-C, (iii)-D
[C] (iv)-A, (iii)-B, (ii)-C, (i)-D
[D] (i)-A, (iii)-B, (iv)-C, (ii)-D

18. Speed of light in vacuum is 3×10^8 m/s. Then speed of light in glass (refractive index 1.5) will be:
[A] 4.5×10^8 m/s
[B] 2.0×10^6 m/s
[C] 3.0×10^6 m/s
[D] 2.0×10^8 m/s

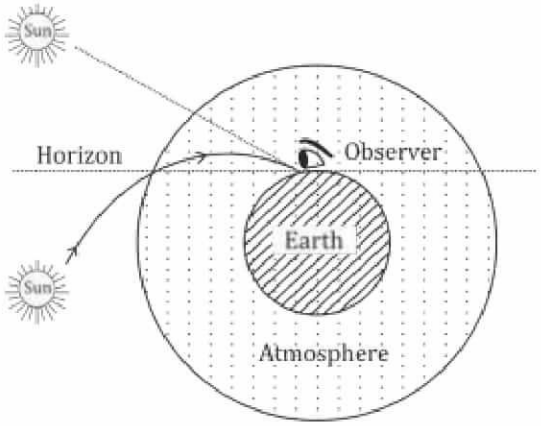
19. Consider the following properties of virtual images:
A. cannot be projected on the screen
B. are formed by both concave and convex lens
C. are always erect
D. are always inverted
The correct properties are
[A] (A) and (D)
[B] (A) and (B)
[C] (A), (B) and (C)
[D] (A), (B) and (D)

20. In given figure, a light ray AB is incident normally on one face PQ of an equilateral glass prism. Find out the angle at face PR.



[A] 60°
[B] 30°
[C] 45°
[D] 90°

21. Which phenomenon is depicted in the diagram given below?



[A] Early sunrise and late sunset change in shape of the sun during sunrise and at moon both a and b neither a nor b.
[B] Change in shape of the sun during sunrise and at noon.
[C] Both [A] and [B].
[D] Neither [A] nor [B].

22. Magnification produced by a rear-view mirror fitted in vehicles:
[A] is less than 1
[B] is more than 1
[C] is equal to 1
[D] can be more than or less than one depending upon the position of the object in front of it.

23. A student obtains a blurred image of a distant object on a screen using a convex lens. To obtain a distinct image on the screen he should move the lens
(A) away from the screen
(B) towards the screen
(C) to a position very far away from the screen
(D) either towards or away from the screen depending upon the position of the object

24. A spherical mirror and a thin spherical lens have each a focal length of -15 cm. The mirror and the lens are likely to be
(A) both concave.
(B) both convex.
(C) the mirror is concave and the lens is convex.
(D) the mirror is convex, but the lens is concave.

SECTION - B

Section - B consists of 24 questions (Sl. No. 25 to 48). Attempt any 20 questions from this section.
The first attempted 20 questions would be evaluated.

25. Which one of the following metals does not react with cold as well as hot water?
[A] Na [B] Ca
[C] Mg [D] Fe

26. Alloys are homogeneous mixtures of a metal with a metal or non-metal. Which among the following alloys contain non-metal as one of its constituents?
[A] Brass [B] Bronze
[C] Amalgam [D] Steel

27. Which one of the following metals are obtained by electrolysis of their chlorides in molten state?
(I) Na (II) Ca (III) Fe (IV) Cu
[A] (I) and (IV)
[B] (III) and (IV)
[C] (I) and (III)
[D] (I) and (II)

28. Which of the following are not ionic compounds?
(I) KCL (II) HCL (III) CCL4 (IV) NaCL
[A] (I) and (II)
[B] (II) and (III)
[C] (III) and (IV)
[D] (I) and (III)

29. Arrange the following metal in the decreasing chemical activity series.
(I) Potassium (II) Magnesium (III) Gold (IV) Iron
[A] (I), (II), (III) and (IV)
[B] (I), (III), (IV) and (II)
[C] (I), (II), (IV) and (III)
[D] (I), (IV), (II) and (III)

30. Galvanisation is a method of protecting iron from rusting by coating it with a thin layer of:
[A] Gallium
[B] Aluminium
[C] Zinc
[D] Silver

Question No. 31 to 35 consists of two segments **– Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:**
[A] Both **A** and **R** are **True** and **R** is the correct explanation of **A**.
[B] Both **A** and **R** are **True** and **R** is NOT the correct explanation of **A**.
[C] **A** is **True** but **R** is **false**
[D] **A** is **False** but **R** is **true.**

Q.31. Assertion (A): A chemical reaction becomes faster at higher temperatures
Reason (R): At higher temperatures, molecular motion becomes more rapid.
[A] Both A and R are True and R is the correct explanation of A.
[B] Both A and R are True and R is NOT the correct explanation of A.
[C] A is True but R is false
[D] A is False but R is true.

32. Assertion (A): When white light passes through a glass prism, red colour is deviated the least.
Reason (R): Red colour has the minimum speed in the glass prism.
[A] Both A and R are True and R is the correct explanation of A.
[B] Both A and R are True and R is NOT the correct explanation of A.
[C] A is True but R is false
[D] A is False but R is true.

33. Assertion (A): Plane mirror may form real image.
Reason (R): Plane mirror forms virtual image, if object is real.
[A] Both A and R are True and R is the correct explanation of A.
[B] Both A and R are True and R is NOT the correct explanation of A.
[C] A is True but R is false
[D] A is False but R is true.

34. Assertion (A): Photosynthesis is an anabolic process.
Reason (R): The process of photosynthesis occurs in chlorophyll.
[A] Both A and R are True and R is the correct explanation of A.
[B] Both A and R are True and R is NOT the correct explanation of A.
[C] A is True but R is false
[D] A is False but R is true.

35. Assertion (A): Sodium hydrogen carbonate is an acidic salt.
Reason (R): It is a salt produced by the neutralization reaction between a strong base (NaOH) and a weak acid (H_2CO_3).
[A] Both A and R are True and R is the correct explanation of A.
[B] Both A and R are True and R is NOT the correct explanation of A.
[C] A is True but R is false
[D] A is False but R is true.

36. The inner lining of stomach is protected by one of the following from hydrochloric acid. Choose the correct one.
[A] Pepsin
[B] Mucus
[C] Salivary amylase
[D] Bile

37. Which one of the following statements is correct about the human circulatory system?
[A] Blood transports only oxygen and not carbon dioxide
[B] Human heart has five chambers
[C] Valves ensure that the blood does not flow backwards.
[D] Both oxygen-rich and oxygen-deficient blood gets mixed in the heart

38. Most of the digestion and absorption of the food takes place in the:
[A] Small intestine
[B] Liver
[C] Stomach
[D] Large intestine

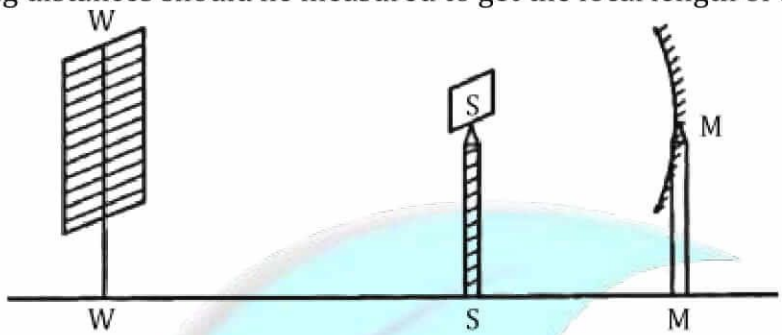
39. As air passes through the nasal cavity, it is
(A) Filtered in the nostrils
(B) Moistened by mucus
(C) Warmed to the body temperature
(D) All of these

40. Choose the correct statement that describes arteries:
(A) They have thick elastic walls, blood flows under high pressure; collect blood from different organs and bring it back to the heart.
(B) They have thin walls with valves inside, blood flows under low pressure and carry blood away from the heart to various organs of the body.
(C) They have thick elastic walls, blood flows under low pressure; carry blood from the heart to various organs of the body.
(D) They have thick elastic walls without valves inside, blood flows under high pressure and carry blood away from the heart to different parts of the body.

41. Which of the following is an incorrect statement?
(A) Organisms grow with time.
(B) Organisms must repair and maintain their structure.
(C) Movement of molecules does not take place among cells.
(D) Energy is essential for life processes

42. Choose the event that does not occur in photosynthesis.
(a) Absorption of light energy by chlorophyll
(b) Reduction of carbon dioxide to carbohydrates
(c) Oxidation of carbon-to-carbon dioxide
(d) Conversion of light energy to chemical energy

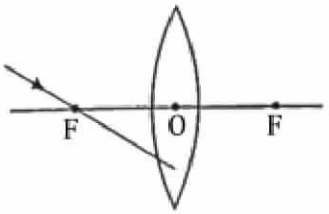
43. A student obtains a sharp image of the distant window (w) of the school laboratory on the screen (s) using the given concave mirror (m) to determine focal length.
Which of the following distances should he measured to get the focal length of the mirror?

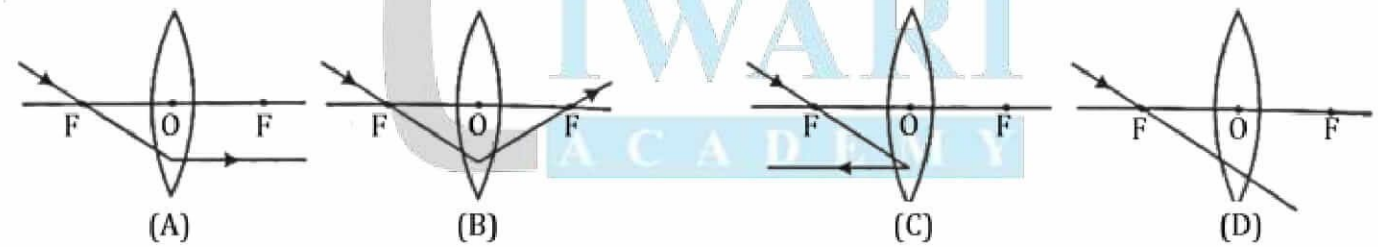


[A] MW
[B] MS
[C] SW
[D] MW-MS

44. A small bulb is placed at the focal point of a converging lens. When the bulb is switched on, the lens produces:
(A) a convergent beam of light.
(B) a divergent beam of light.
(C) a parallel beam of light.
(D) a patch of coloured light.

45. Which of the following ray diagrams is correct for the ray of light incident on a lens shown in figure?





(A) (B) (C) (D)

[A] A
[B] B
[C] C
[D] D

46. Rays from sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed so that size of its image is equal to the size of the object?
(A) 15 cm in front of the mirror.
(B) 30 cm in front of the mirror.
(C) Between 15 cm and 30 cm in front of the mirror.
(D) More than 30 cm in front of the mirror.

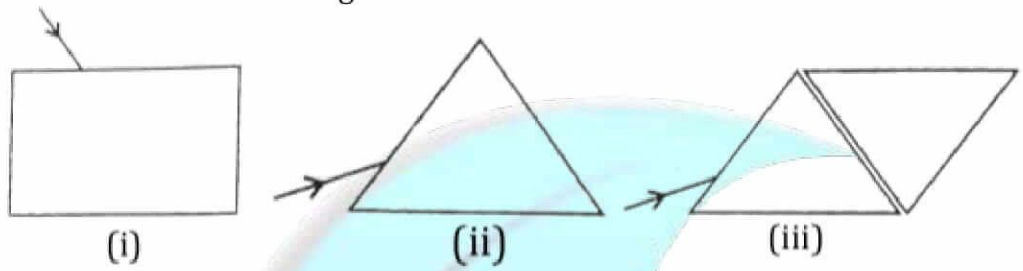
47. Refractive indices of turpentine oil, sapphire, water, and crown glass are 1.47, 1.77, 1.33, and 1.52 respectively. In which of these media will a ray of light incident obliquely at the same angle from air would bend the least?
[A] Turpentine oil
[B] Sapphire
[C] Water
[D] Crown glass

48. Electrical wires have a coating of an insulating material. The material, generally used is:
[A] Sulphur
[B] Graphite
[C] PVC
[D] All can be used

SECTION – C

Section - C consists of three Cases followed by questions. There are a total of 12 questions in this section. Attempt any 10 questions from this section.
The first attempted 10 questions would be evaluated.

Case – 1:
A very thin narrow beam of white light is made incident on three glass objects shown below. Study the nature and behaviour of the emergent beam in all the three cases:



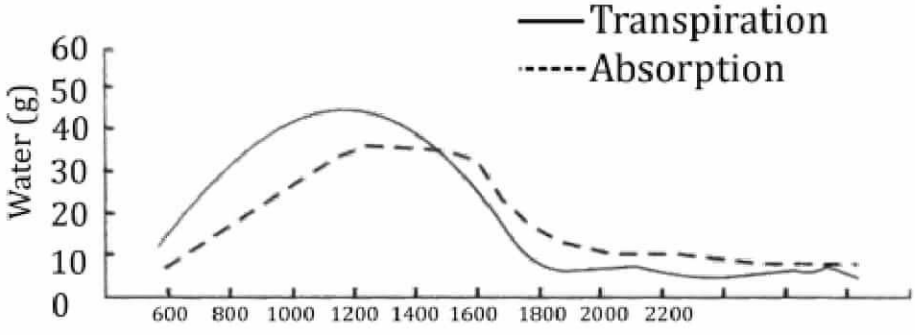
49. Following are the possibility of two emergent beams being similar. Choose the correct answer:
(A) (i) and (ii)
(B) (i) and (iii)
(C) (ii) and (iii)
(D) No similar emergent beams

50. When light enters from air to glass, the angles of incidence and refraction in air and glass are 45° and 30°, respectively. Find the refractive index of glass.
(Given that, sin 45°= $1/\sqrt{2}$, sin = 30°= ½)
[A] $\sqrt{2}$
[B] $2\sqrt{2}$
[C] $1/\sqrt{2}$
[D] 1

51. The light changes its path as its medium changes. Which of the following is an incorrect statement?
[A] Speed of light is different in different media.
[B] Light changes its path because light only travels in straight line.
[C] Speed of light is dependent on medium through which it is passing.
[D] The light chooses the path with minimum time, as it changes its medium.

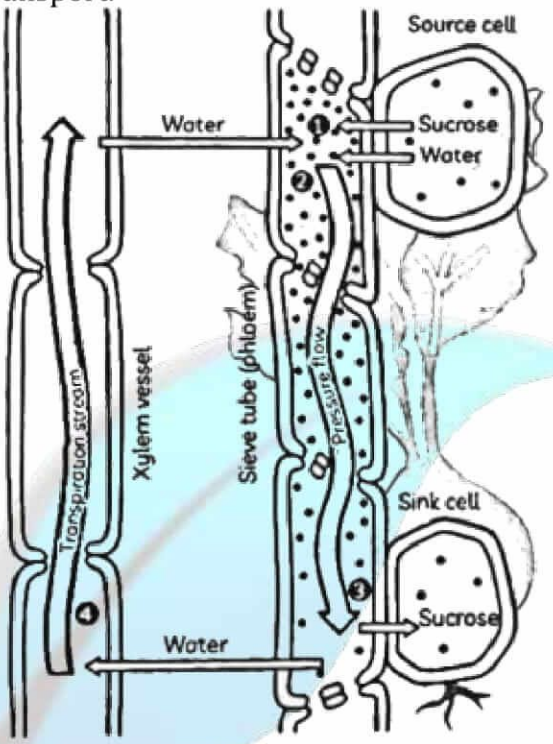
52. What is the unit of refractive index?
[A] Pascal
[B] Joule
[C] No unit
[D] μ m

Case – 2:
Multicellular organisms with small surface area to volume ratios need transport systems. Water and mineral salts are transported through a plant in xylem vessels. Transpiration is the process of water movement through a plant and its evaporation from aerial parts, such as leaves, stems,



and flowers. Water is necessary for plants but only a small amount of water taken up by the roots is used for growth and metabolism. The pattern of water uptake and loss by sunflower plant during 24 h is shown in the graph below:

The movement of sucrose and other substances like amino acids around a plant is called translocation. Translocation of organic solutes such as sucrose occurs through living phloem sieve tubes. Both xylem vessels and phloem sieve tubes show unique structural features which are adaptations to their roles in transport.



53. Root pressure is maximum when
(a) Transpiration is very high and absorption is very low
(b) Transpiration is very low and absorption is very high
(c) Both transpiration and absorption are very high the absorption and
(d) Both transpirations are very low

54. Select the row containing incorrect information:

	Cell	Vascular Tissue
[A]	Vessels	Xylem
[B]	Sieve Tube	Xylem
[C]	Tracheids	Xylem
[D]	Companion cell	Xylem

55. Given below are some statements about transport in plants:
(i) Xylem transports water, amino acids and other substances in plants.
(ii) Phloem transports soluble products of photosynthesis in plants.
(iii) Transpiration helps in absorption of water.
(iv) Material like sucrose is transferred into phloem tissue using energy from ATP.
Select the correct statement (s):
[A] Both (i) and (ii)
[B] Both (ii) and (iii)
[C] (i), (ii) and (iv)
[D] (ii), (iii) and (iv)

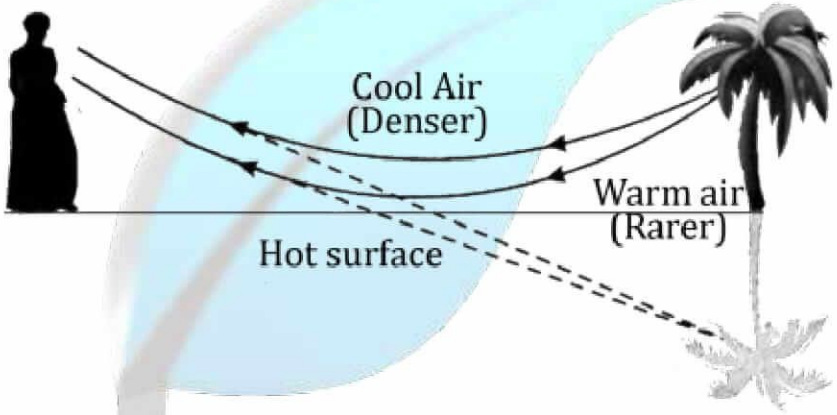
56. The major driving force in the movement of water from ground to the root during day is:
[A] Osmosis
[B] Imbibition
[C] Transpiration pulls
[D] Plasmolysis

Case – 3:

We've all seen that part in the movie where the weary desert wanderer has been walking for hours and is dying of thirst. Then he happens upon a vast body of water on the horizon. He runs towards the water, it grows closer and closer, until he springs himself into the air only to land back down in the sand and no water in sight. Well, that is due to an optical illusion called Mirage.

Mirage is an optical phenomenon which creates an illusion of the presence of water d and is a result of refraction of light from a non- uniform medium. Mirage is observed mainly during sunny days when driving on a roadway. Normally, light waves from the sun travel straight through the atmosphere to your eye.

But, light travels at different speeds through hot air and cold air. Mirages happen when the ground is very hot and the air is cool and a ray of light gets refracted more and more away from the normal. At a particular angle when a ray of light exceeds critical angle, total internal reflection takes place and ray of light gets reflected in the same medium. When the reflected ray reaches our eye, it appears as coming from tree or sky and hence the inverted image of tree creates an impression from a pond of water.



57. Mirage is an example of:
[A] Reflection of light and Refraction of light.
[B] Dispersion of light.
[C] Total Internal Reflection.
[D] Refraction of light and Total Internal Reflection of light.

58. Mirages are more common in:
[A] Rainforests
[B] Dry forests
[C] Deserts
[D] Highlands

59. Mirage is formed because:
(i) Air above the ground is very hot and air above is cooler
(ii) Air above the ground is cool and air above is warmer.
(iii) Light rays from a distant object bend towards the normal when coming towards the ground.
(iv) Light rays from a distant object bend away from the normal when coming towards the ground.
[A] Both (i) and (iii)
[B] Both (i) and (iv)
[C] Both (ii) and (iii)
[D] Both (ii) and (iv)

60. Atmospheric refraction occurs because:
[A] Refractive index in medium is gradually changing.
[B] Of presence of dust particles in atmosphere.
[C] Large amount of moisture is present in atmosphere on a humid day.
[D] Sun's rays travel the most when sun is near the horizon.