Science

Sample Question Paper 4
(Class 10) (Term – 1) (Session 2021-22)

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

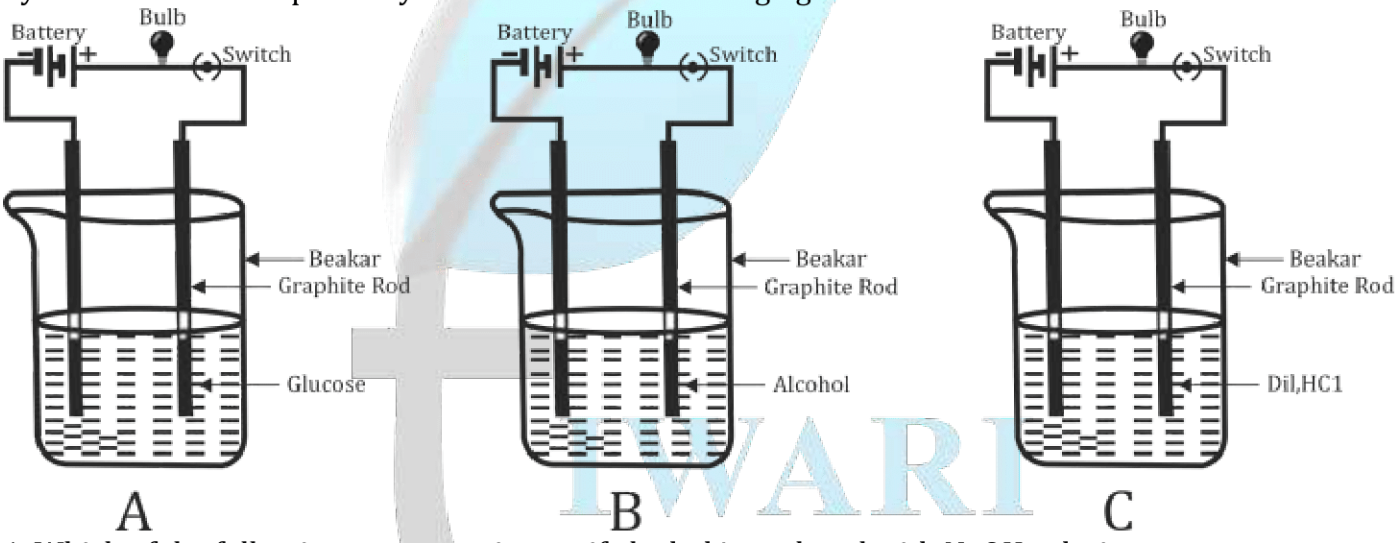
General Instructions

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.

Shyamali takes three beakers A, B and C filled with aqueous solutions of glucose, alcohol and hydrochloric acid respectively as shown in the following figure:



1. Which of the following statement is true if alcohol is replaced with NaOH solution:
[A] Bulb glows in alcohol but not in NaOH solution.
[B] Bulb will glow in NaOH solution but not in alcohol.
[C] Bulb does not glow in alcohol and neither will it glow in NaOH solution.
[D] Bulb glows in NaOH solution as well as in alcohol.

2. When the turnings are added to silver nitrate solution, a blue coloured solution is formed after some time. It is because copper:
(I) Displaces silver from the solution
(II) Forms a blue coloured complex with $AgNO_3$
(III) Is oxidized to $Cu2^+$
(IV) Is reduced to $Cu2^+$
[A] (I) and (II)
[B] (II) and (III)
[C] (I) and (III)
[D] (II) and (IV)

3. $3RSO_4$ + $2Q$ → $Q_2(SO_4)_3$ + $3R$

The given reaction shows:

[A] Q is more reactive than R

[B] Q is less reactive than R

[C] Q and R are equally reactive

[D] None of the above

4. Which of the following reaction is balanced?

(A) Mg (aq) + H_2SO_4 (aq) → $MgSO_4$ (aq) + $H_2\uparrow$

(B) Mg (s) + H_2SO_4 (aq) → $MgSO_4$ (aq) + $H_2\uparrow$

(C) Mg (s) + H_2SO_4 (l) → $MgSO_4$ (l) + $H_2(g)$

(D) Mg (s) + H_2SO_4 (l) → $MgSO_4$ (s) + H_2

5. Which among the following is (are) double displacement reaction(s)?

(i) Pb + $CuCl_2$ → $PbCl_2$ + Cu

(ii) Na_2SO_4 + $BaCl_2$ → $BaSO_4$ + 2NaCI

(iii) C + O_2 → CO_2

(iv) CH_4 + $2O_2$ → CO_2 + $2H_2O$

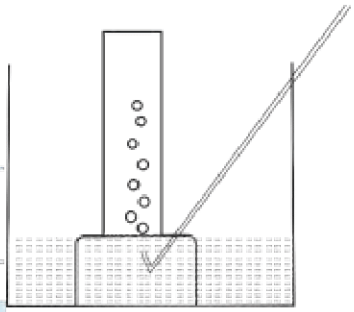
(A) (i) and (iv)

(B) (ii) only

(C) (i) and (ii)

(D) (iii) and (iv)

6. A metal is treated with dilute sulphuric acid the gas evolved is collected by the method shown in the figure:



If the metal used above is zinc, choose the correct balanced chemical equation for the evolution of the gas?

(A) $2Zn(s)$ + H_2SO_4 (dil) → $2\ ZnSO_4$ (aq) + $H_2(g)\uparrow$

(B) $Zn(s)$ + H_2SO_4 (dil) → $ZnSO_4$ (aq) + $H_2(g)\uparrow$

(C) $Zn(s)$ + $2\ H_2SO_4$ (dil) → $2\ ZnSO_4$ (aq) + $H_2(g)\uparrow$

(D) $2Zn(s)$ + H_2SO_4 (dil) → $ZnSO_4$ (aq) + $2H_2(g)\uparrow$

7. Nelu's friend suffered a fracture in her foot while riding her bicycle. She had to be admitted to the Nursing Home and the doctor plastered her foot. The chemical formula for POP is:

[A] $CaSO_4.2H_2O$

[B] $CaSO_4.H_2O$

[C] $CaSO_4.1/2H_2O$

[D] $2CaSO_4.H_2O$

8. Which of the following statements is true for Acid?

[A] Bitter and change red litmus to blue

[B] Sour and change red litmus to blue

[C] Sour and change Blue litmus to Red

[D] Bitter and change blue litmus to red

9. A visually challenged student, has to perform a lab test to detect the presence of acid in a given solution. The acid-base indicator preferred by him will be:

[A] Blue litmus

[B] Clove oil

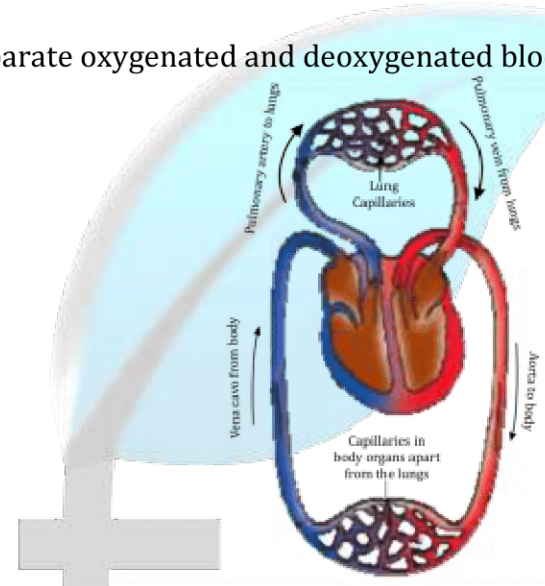
[C] Red cabbage extract

[D] Hibiscus extract

10. The primary reason behind the formation of the toxic foam is highly phosphate content in the wastewater because of detergents used in Dyeing Industries, Dhobi Ghat, Yamuna's pollution level is so bad that parts of it have been labelled "DEAD" as there is no oxygen in it for Aquatic life to survive. Which of the following statements is correct for the water with detergents dissolved in it?
[A] Low concentration of hydroxide ion (OH^-) and high concentration of hydronium ion (H_3O^+).
[B] High concentration of hydroxide ion (OH^-) and low concentration of hydronium ion (H_3O^+).
[C] High concentration of hydroxide ion (OH^-) as well as hydronium ion (H_3O^-).
[D] Equal concentration of both hydroxide ion (OH^-) and hydronium ion (H_3O^+).

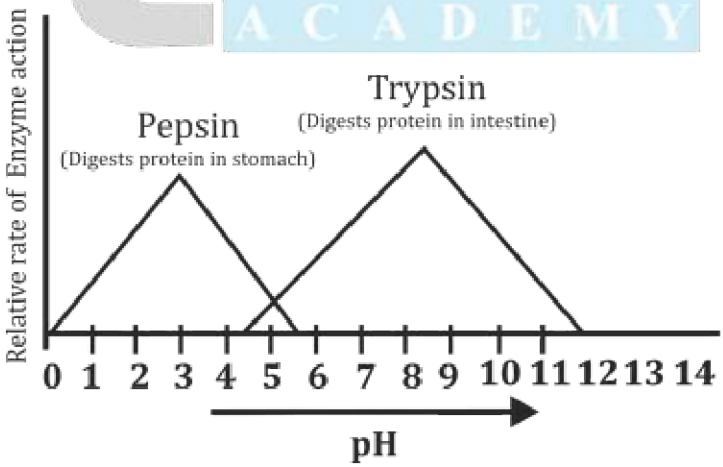
11. Single circulation, i.e., blood flows through the heart only once during one cycle of passage through the body, is exhibited by:
[A] Labeo, Chameleon, Salamander
[B] Hippocampus, Exocoetus, Anabas
[C] Hyla, Rana, Draco
[D] Whale, dolphin, turtle

12. Is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?



[A] Yes, because both needs more energy
[B] Yes, because both needs to reproduction
[C] Yes, because both can survive more than reptiles
[D] Yes, because both needs removal of waste

13. In which medium pepsin and trypsin are active:



[A] basic and acidic medium
[B] acidic and basic medium
[C] neutral medium
[D] sometimes acidic sometimes basic medium

14. Which of the following completes the given equation: Glucose + Oxygen → (?)
[A] only carbon dioxide + water + energy
[B] only carbon dioxide + water
[C] only carbon dioxide
[D] water + energy

15. In humans, the oxygen rich blood from the lungs comes to the:
[A] Left Atrium
[B] Right Atrium
[C] Left Ventricle
[D] Right Ventricle

16. Which of the following statements are incorrect about aerobic respiration?
(i) The first step is the break-down of glucose into pyruvate.
(ii) Glucose is a six-carbon molecule and pyruvate is a three-carbon molecule.
(iii) The breakdown of glucose take place in the mitochondria.
(iv) The breakdown of pyruvate using oxygen takes place in the cytoplasm.
[A] Both (i) and (iii)
[B] Both (ii) and (iv)
[C] Both (iii) and (iv)
[D] (i), (iii) and (iv)

17. A student sitting on the last bench can read the letters written on the blackboard but is not able to read the letters written in his text book. Which of the following statements is correct?
[A] The near point of his eyes has receded away.
[B] The near point of his eyes has come closer to him.
[C] The far point of his eyes has come closer to him.
[D] The far point of his eyes has receded away.

18. A clear sky appears blue, because:
[A] blue light gets absorbed in the atmosphere
[B] ultraviolet radiations are absorbed in the atmosphere
[C] violet and blue lights get scattered more than the lights of all other colours by the atmosphere
[D] lights of all other colours is scattered more than the violet and blue colour lights by the atmosphere.

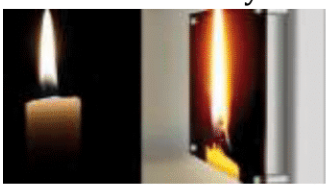
19. Renu was returning home after purchasing some medicine for her mother. It was noon and really very hot on that particular day. She tried to look at the sun but the sun was shining so brightly that she could hardly see it directly. She somehow managed to see its reflection on a window and noticed that the colour of the sun was White. 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.

20. The defects of vision hypermetropia and myopia can be corrected by:
[A] Concave and plano-convex lens
[B] Concave and convex lens
[C] Convex and concave lens
[D] Plano concave lens for both defects.

21. In your laboratory you trace the path of light rays through a glass slab for different values of angle of incidence (∠i) and in each case measure the values of the corresponding angle of refraction (∠r) and angle of emergence (∠e). On the basis of your observation your correct conclusion is:
(A) ∠i is more than ∠r, but nearly equal to ∠e
(B) ∠i is less than ∠r, but nearly equal to ∠e
(C) ∠i is more than ∠e, but nearly equal to ∠r
(D) ∠i is less than ∠e, but nearly equal to ∠r

22. Select the correct statements from the statements given below regarding refraction of light when light is incident from a medium. A having refractive index 1.85 on a glass slab having refractive index 1.50.
(i) Light will bend towards the normal in the glass slab.
(ii) Emergent ray will be parallel to the refracted ray.
(iii) Speed of light will be more in glass slab as compared to medium A.
(iv) Angle of refraction will be more than angle of incidence.
[A] Both (i) and (ii)
[B] Both (ii) and (iii)
[C] Both (ii) and (iv)
[D] Both (iii) and (iv)

23. A student obtained a sharp image of a candle flame placed at the distant end of the laboratory table on a screen using a concave mirror to determine its focal length. The teacher suggested him to focus a distant building about 1 km far from the laboratory, for getting more correct value of the focal length. In order to focus the distant building on the same screen the student should slightly move the:



[A] mirror away from the screen
[B] screen away from the mirror
[C] screen towards the mirror
[D] screen towards the building

24. Given below are statements regarding sign conventions for reflection by spherical mirrors. Select the correct statements.
(i) All distances parallel to the principal axis are measured from the pole of the mirror.
(ii) All the distances measured to the left of the origin (along - x-axis) are taken as positive while those measured to the right of the origin (along + x-axis) are taken as negative.
(iii) Distances measured perpendicular to and above the principal axis (along + y-axis) are taken as positive.
(iv) Distances measured perpendicular to and above the principal axis (along +y-axis) are taken as negative.
[A] Both (i) and (ii)
[B] Both (ii) and (iii)
[C] Both (i) and (iii)
[D] Both (iii) and (iv)

SECTION - B

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

25. Which of the following statement is correct about metals?
[A] Metals form positive ions by losing electrons
[B] Metals form negative ions by losing electrons
[C] Metals form positive ions by gaining electrons
[D] Metals form negative ions by gaining electrons

26. Amphoteric oxides are:
[A] Metal oxides which do not react with acids but reacts with bases.
[B] Metal oxides which reacts with both acids as well as bases.
[C] Metal oxides which reacts with acids but do not react with bases.
[D] Metal oxides which shows no reaction with either acids or bases.

27. Which among the following statements is incorrect for magnesium metal?
[A] It burns in oxygen with a dazzling white flame.
[B] It reacts with cold water to form magnesium oxide and evolves hydrogen gas.
[C] It reacts with hot water magnesium hydroxide and evolves hydrogen gas.
[D] It reacts with steam to form magnesium hydroxide and evolves hydrogen gas.

28. 2 ml each of conc. HCl, HNO_3, and a mixture of conc. HCl and conc. HNO_3 in the ratio of 3:1 was taken in test tubes labelled as A, B and C. A small piece of metal was put in each test tube. No change occurred in test tubes A and B but the metal got dissolved in test tube C. The metal could be:
[A] Al
[B] Au
[C] Cu
[D] Pt

29. The electronic configurations of three elements X, Y and Z are X – 2, 8; Y – 2, 8, 7 and Z - 2, 8, 2. Which of the following is correct?
[A] X is a metal
[B] Y is a metal
[C] Z is a non-metal
[D] Y is a non-metal and Z is a metal

30. Food cans are coated with tin and not with zinc because
[A] Zinc is costlier than tin
[B] Zinc has a higher melting point than tin
[C] Zinc is more reactive than Tin
[D] Zinc is less reactive than Tin

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**

31. Assertion (A): Sodium metal is stored under kerosene.
Reason (R): Metallic sodium melts when exposed to air.
[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): A rainbow is always formed in the sky after a rain shower and in the same direction as sun.
Reason (R): Water droplets act like tiny prisms.
[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): keeping a point object fixed, if a plane mirror is moved, the image will also move.
Reason (R): In case of a plane mirror, distance of object and its image is equal from any point.
[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): Digestion breaks large complex molecules to simple smaller molecules which can be easily absorbed.
Reason (R): Digestion is necessary for the absorption of all molecules.
[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): When common salt is kept open, it absorbs moisture from the air.
Reason (R): Common salt contains magnesium chloride.
[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 xylem in plants is responsible for:
[A] Transport of water
[B] Transport of food
[C] Transport of amino acids
[D] Transport of oxygen

37. A few drops of iodine solution were added to rice water. The solution turned blue-black in colour. This indicates that the rice water contains:
[A] Complex proteins
[B] Simple proteins
[C] Fats
[D] Starch

38. Each nephron has a Cup shaped upper end called _____, which contains a _____:
[A] Bowman's capsule, Ampulla
[B] Capillaries, Bowman's capsule
[C] Ampulla, Glomerulus
[D] Bowman's capsule, Glomerulus

39. Select the correct statement.
[A] Heterotrophs do not synthesise their own food.
[B] Heterotrophs utilise solar energy for photosynthesis.
[C] Heterotrophs synthesise their own food.
[D] Heterotrophs are capable of converting carbon dioxide and water into carbohydrates.

40. Which part of alimentary canal receives bile from the liver?
[A] Stomach
[B] Small intestine
[C] Large intestine
[D] Oesophagus

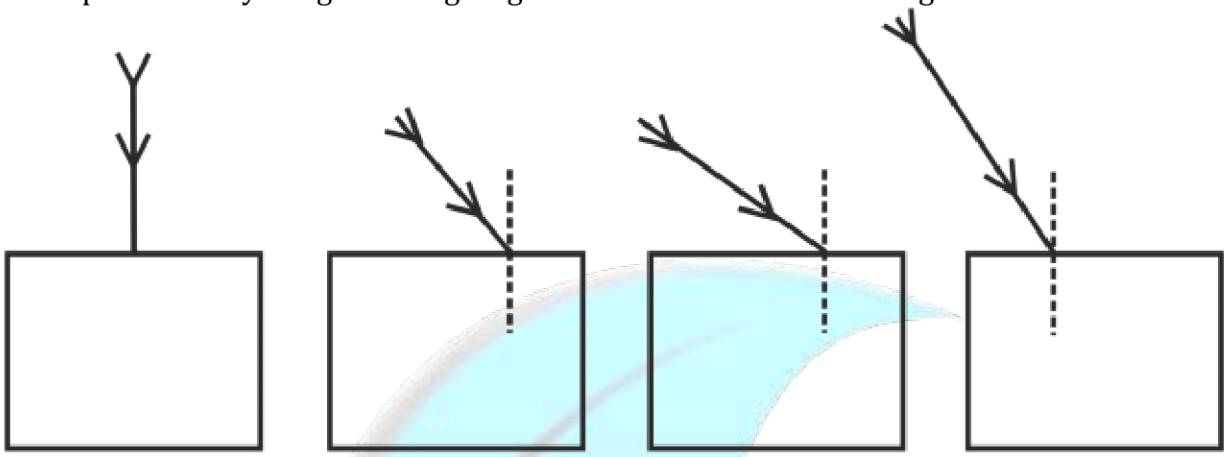
41. Which of the following take place after we exercise?
[A] Out body needs more oxygen.
[B] Our body needs to replace the energy used.
[C] Our body needs to get rid of excess carbon dioxide.
[D] All of these

42. The autotrophic mode of nutrition requires
[A] Carbon dioxide and water
[B] Chlorophyll
[C] Sunlight
[D] All of these

43. When an object is kept within the focus of a concave mirror, an enlarged image is formed behind the mirror. This image is:

[A] Real
[B] Inverted
[C] Virtual and inverted
[D] Virtual and erect

44. Study the following four experimental setup by four students A, B, C and D showing the incident ray to trace the path of a Ray of light through a glass slab. Which of these will get the best result?



(i) (ii) (iii) (iv)

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

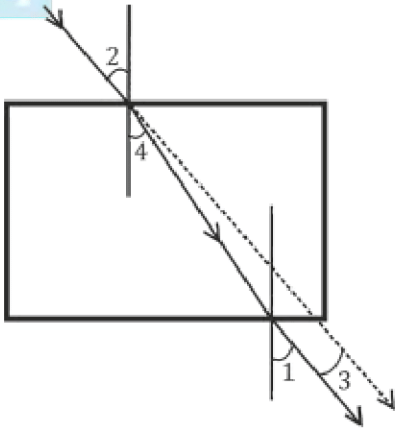
45. The relation between focal length "f" and radius of curvature "R" for a spherical mirror is:

[A] f = 2R
[B] f = R/2
[C] f = R/4
[D] f = 2/8

46. The refractive index of four substance P, Q, R and S are 1.50, 1.36, 1.77, and 1.31 respectively. The speed of light is the maximum in the substance:

[A] P
[B] Q
[C] R
[D] S

47. The correct sequencing of angle of incidence, angle of emergence, angle of refraction, and lateral displacement shown in the following diagram by digits 1, 2, 3 and 4 is:



[A] 2, 4, 1, 3
[B] 2, 1, 4, 3
[C] 1, 2, 4, 3
[D] 2, 1, 3, 4

48. An element A is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following:

[A] Mg
[B] Na
[C] P
[D] Ca

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.

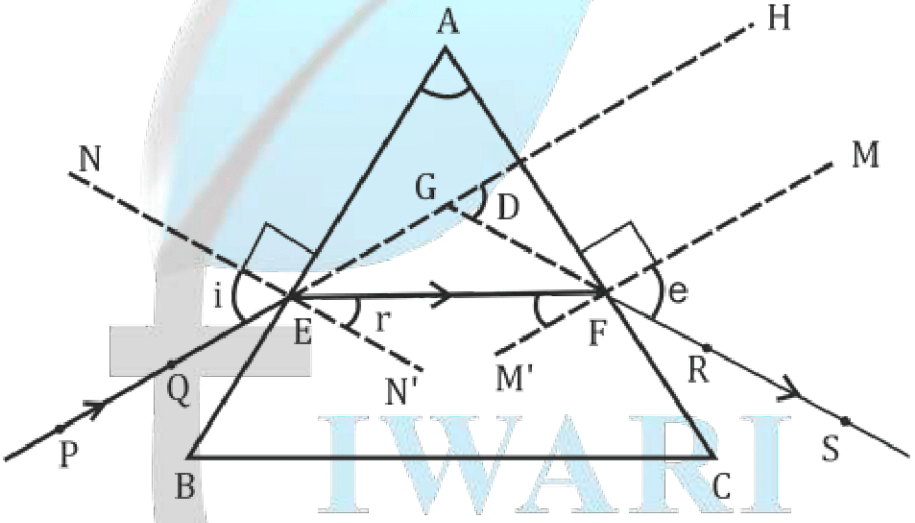
The first attempted 10 questions would be evaluated.

Case – 1:

Fix a sheet of white paper on a drawing board using drawing pins. Place a glass prism on it in such a way that it rests on its triangular base. Trace the outline of the prism using a pencil. Draw a straight-line PE inclined to one of the refracting surfaces, say AB, of the prism. Fix two pins, say at points P and Q, on the line PE as shown in Fig. below.

Look for the images of the pins, fixed at P and Q, through the other face AC. Fix two more pins, at points R and S, such that the pins at R and S and the images of the pins at P and Q lie on the same straight line. Remove the pins and the glass prism. The line PE meets the boundary of the prism at point E. Similarly, join and produce the points R and S. Let these lines meet the boundary of the prism at E and F, respectively. Join E and F.

Draw perpendiculars to the refracting surfaces AB and AC of the prism at points E and F, respectively. Mark the angle of incidence (i), the angle of refraction (r) and the angle of emergence (e) as shown in Figure.



49. Given below are four statements regarding incident ray, refracted ray, and emergent ray in the above figure. Select the incorrect statements:

(i)PE is the incident ray.

(ii) EF is the emergent ray.

(iii) EF is the refracted ray and FS is the emergent ray.

(iv) PE is the incident ray and FS is the refracted ray.

[A] Both (i) and (ii)
[B] Both (i) and (iii)
[C] Both (ii) and (iv)
[D] Both (iii) and (iv)

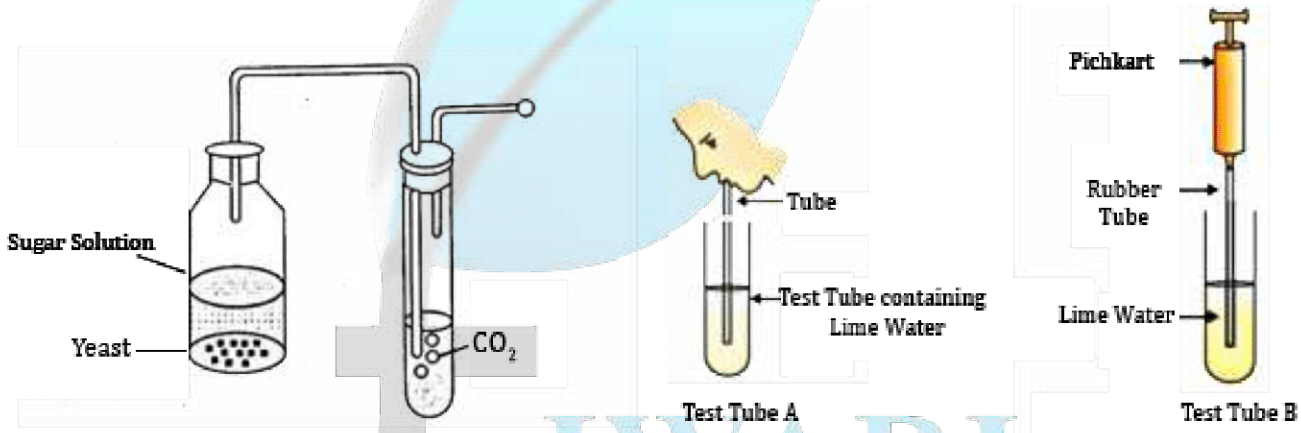
50. The angles of incidence (i), refraction (r) and emergence (e) are mentioned in the table below. Select the row containing the correct marking of angles:

Angle Of Incidence (i)	Angle Of Refraction (r)	Angle Of Emergence (e)
[A] PEN	FEN	SFM
[B] PEN	FEN	SFM
[C] PEN	GEF	SFM
[D] PEN	GEF	SFM

51. The angle of deviation is the angle between:
[A] Refracted ray and incident ray
[B] Refracted ray and emergent ray
[C] Emergent ray and face AC of the prism
[D] Emergent ray and incident ray

52. In a glass prism, the emergent ray not parallel to the incident ray as:
[A] The laws of refraction do not hold in the case of glass prism.
[B] The refracting surfaces are inclined at an angle.
[C] The angle of refraction in glass is greater than the angle of incidence.
[D] The angle of refraction in glass is greater than the angle of emergence.

Case – 2:
In the first activity, a student, Rakesh took some freshly prepared lime water in two test tubes marked A and B. He blew air through the lime water in test tube A. He then used a Pichkari and passed air through the fresh lime water in test tube B.
In the second activity, another student Siya took some fruit juice or sugar solution and added some yeast to this. She took this mixture in a test tube fitted with a one-holed cork and fitted the cork with a bent glass tube. She dipped the free end of the glass tube into a test tube containing freshly prepared lime water.



53. Rakesh recorded his observation below select the correct observation:

	Test Tube A	Test Tube B
[A]	No Change Observed	Lime Water turned milky immediately
[B]	Lime Water turned milky immediately	No Change Observed
[C]	Lime Water turned milky immediately	Lime Water turned milky after a long time
[D]	Lime Water turned milky after a long time	Lime Water turned milky immediately

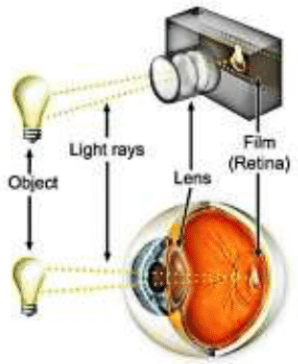
54. In the second activity, Siya observed that:
[A] Lime water in the test tube turned milky after some time
[B] Lime water in the test tube turned milky immediately
[C] No change observed in the colour of lime water
[D] Lime water in the test tube turned blue black

55. Select the correct statement: It can be concluded that:
[A] Carbon dioxide is produced as a result of digestion of food in the first activity.
[B] Carbon dioxide is produced as a result of aerobic respiration in the first activity.
[C] Oxygen is produced as a result of aerobic respiration in the first activity.
[D] Lactic acid is produced as a result of anaerobic respiration in the second activity.

56. The products of fermentation in yeast are:
[A] Carbon dioxide and energy
[B] Lactic acid and energy
[C] Ethanol, carbon dioxide and energy
[D] Water, carbon dioxide and energy immediately;

Case – 3:

The inner workings of the human eye are complex but at the same time, fascinating. Have you wondered how exactly they do work or what are the major parts of the eye involved in creating vision. It helps us in visualizing objects and also helps us in light perception, colour, and depth perception.



Besides, these sense organs are pretty much similar to cameras, and they help us see objects when light coming from outside enters into them. The structures and functions of the eyes are complex. Each eye constantly adjusts the amount of light it lets in, focuses on objects near and far, and produces continuous images that are instantly transmitted to the brain.

57. The image formed by eye lens is:
[A] Real and erect
[B] Virtual and erect
[C] Real and inverted
[D] Virtual and inverted

58. Most of the refraction for the light rays entering the eye occurs at:
[A] Outer surface of the cornea.
[B] Eye lens
[C] Pupil
[D] Vitreous humour

59. Select the correct statements:
(i) The change in the curvature of the eye lens can change its focal length.
(ii) When the ciliary muscles are relaxed, the lens becomes thin and its focal length decreases.
(iii) When the ciliary muscles contract, the lens becomes thicker and its focal length increases.
(iv) Thin lens enables us to view distant objects clearly whereas thick lens enables us to see nearby objects clearly.
[A] Both (i) and (iii)
[B] Both (i) and (iv)
[C] Both (ii) and (iii)
[D] Both (ii) and (iv)

60. The near point and far point of a young adult with normal vision is:
[A] Near point = 0 cm and Far point = 25cm
[B] Near point = 25 cm and far point = 50 m
[C] Near point = 0 m and far point = infinity
[D] Near point = 25 cm and far point infinity