

Instructions:

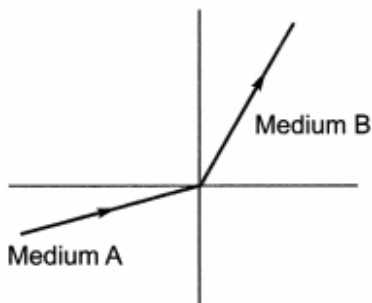
All the questions are compulsory.

Question Numbers	Question Type	Count	Points per Questions	Total
1 - 40	Multi choice	40	1	40
Grand Total				40

- Which of the following reactions will not take place? 1 Pt.
A) $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_3 + \text{Cu}$
B) $2\text{KBr} + \text{Cl}_2 \rightarrow 2\text{KCl} + \text{Br}_2$
C) $\text{Zn} + \text{MgSO}_4 \rightarrow \text{ZnSO}_4 + \text{Mg}$
D) $\text{Mg} + \text{FeSO}_4 \rightarrow \text{MgSO}_4 + \text{Fe}$
- Consider reaction: $\text{Na(s)} + \text{O}_2\text{(g)} \rightarrow \text{Na}_2\text{O(s)}$. Moles of sodium needed to balance the equation would be: 1 Pt.
A) 1
B) 2
C) 3
D) 4
- A dilute ferrous sulphate solution was gradually 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? 1 Pt.
A) KMnO_4 is an oxidising agent, it oxidises FeSO_4 .
B) FeSO_4 acts as an oxidising agent and oxidises KMnO_4 .
C) The colour disappears due to dilution; no reaction is involved.
D) KMnO_4 is an unstable compound and de-composes in presence of FeSO_4 to a colourless compound.
- When SO_2 gas is passed through a saturated solution of H_2S , which of the following reaction occurs 1 Pt.
A) $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 2\text{H}_2\text{O} + 3\text{S}$
B) $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow \text{H}_2\text{O} + 3\text{S}$
C) $\text{SO}_2 + \text{H}_2\text{S} \rightarrow \text{H}_2\text{O} + \text{S}$
D) $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{SO}_3 + \text{H}_2$
- Which of the following gives the correct increasing order of acidic strength? 1 Pt.
A) Water < Acetic acid < Hydrochloric acid
B) Water < Hydrochloric acid < Acetic acid
C) Acetic acid < Water < Hydrochloric acid
D) Hydrochloric acid < Water < Acetic acid
- Identify the correct representation of reaction occurring during chloralkali process 1 Pt.
A) $2\text{NaCl(l)} + 2\text{H}_2\text{O(l)} \longrightarrow 2\text{NaOH(s)} + \text{Cl}_2\text{(g)} + \text{H}_2\text{(g)}$
B) $2\text{NaCl(aq)} + 2\text{H}_2\text{O(aq)} \longrightarrow 2\text{NaOH(aq)} + \text{Cl}_2\text{(g)} + \text{H}_2\text{(aq)}$
C) $2\text{NaCl(aq)} + 2\text{H}_2\text{O(l)} \longrightarrow 2\text{NaOH(aq)} + \text{Cl}_2\text{(aq)} + \text{H}_2\text{(g)}$
D) $2\text{NaCl(aq)} + 2\text{H}_2\text{O(l)} \longrightarrow 2\text{NaOH(aq)} + \text{Cl}_2\text{(g)} + \text{H}_2\text{(g)}$
- The substance which, on treating with chlorine, yields bleaching powder is 1 Pt.
A) Quick lime
B) Slaked lime
C) Limestone
D) Gypsum

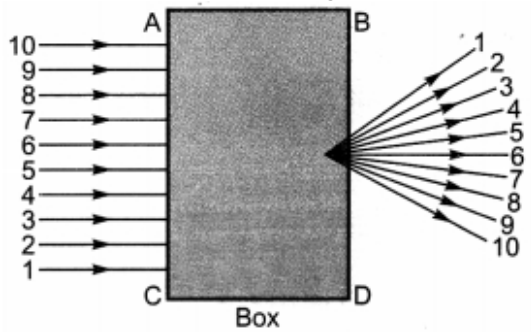
8. Which one of the following will turn blue litmus red? 1 Pt.
- A) Vinegar
 - B) Lime water
 - C) Baking soda solution
 - D) Washing soda solution
9. Generally, metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)? 1 Pt.
- A) H_2SO_4
 - B) HCl
 - C) HNO_3
 - D) All the Above
10. Which of the following represent the correct order of decreasing reactivity? 1 Pt.
- A) $\text{Mg} > \text{Al} > \text{Zn} > \text{Fe}$
 - B) $\text{Mg} > \text{Zn} > \text{Al} > \text{Fe}$
 - C) $\text{Al} > \text{Zn} > \text{Fe} > \text{Mg}$
 - D) $\text{Mg} > \text{Fe} > \text{Zn} > \text{Al}$
11. The reaction between X and Y forms compound Z. X loses electrons and Y gains electrons. Which of the following properties is not shown by Z? 1 Pt.
- A) Has a high melting point
 - B) Has a low melting point
 - C) Conducts electricity in the molten state
 - D) Occurs as solid
12. Which of the following are not ionic compounds? 1 Pt.
- (A) KCl
 - (B) HCl
 - (C) CCl_4
 - (D) NaCl
- A) (A) & (B)
 - B) (B) & (C)
 - C) (C) & (D)
 - D) (A) & (C)
13. In which mode of nutrition does an organism derive its food from the body of another living organism without killing it? 1 Pt.
- A) Saprotrophic nutrition
 - B) Parasitic nutrition
 - C) Holozoic nutrition
 - D) Autotrophic nutrition
14. Choose the function of pancreatic juice from the following : 1 Pt.
- A) Trypsin digests proteins and lipase digests carbohydrates
 - B) Trypsin digests emulsified fats and lipase digests proteins
 - C) Trypsin and lipase digest fats
 - D) Trypsin digests proteins and lipase digests emulsified fats
15. In respiration, air passes through 1 Pt.
- A) Pharynx \rightarrow nasal cavity \rightarrow larynx \rightarrow trachea bronchi \rightarrow bronchioles
 - B) Nasal cavity \rightarrow pharynx \rightarrow larynx \rightarrow trachea \rightarrow bronchi \rightarrow bronchioles
 - C) Larynx \rightarrow nasal cavity \rightarrow pharynx \rightarrow trachea
 - D) Larynx \rightarrow pharynx trachea \rightarrow lungs

16. What happens to the air as it passes through the nasal cavity? 1 Pt.
- Filtered the nostrils
 - Moistened by mucus
 - Warmed to the body temperature
 - All of these
17. Single circulation, i.e., blood flows through the heart only once during one cycle of passage through the body, is exhibited by which of the following? 1 Pt.
- Hyla, Rana, Draco
 - Whale, Dolphin, Turtle
 - Labeo, Chameleon, Salamander
 - Hippocampus, Exocoetus, Anabas
18. Each nephron has a cup-shaped upper end called ____, which contains a _____. 1 Pt.
- Bowman's capsule, Ampulla
 - Capillaries, Bowman's capsule
 - Ampulla, Glomerulus
 - Bowman's capsule, Glomerulus
19. Which of the following mirror is used by a dentist to examine a small cavity? 1 Pt.
- Convex mirror
 - Plane mirror
 - Concave mirror
 - Combination of convex and concave mirror
20. 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? 1 Pt.
- 15 cm in front of the mirror
 - 30 cm in front of the mirror
 - Between 15 cm and 30 cm in front of the mirror
 - More than 30 cm in front of the mirror
21. If a man's face is 25 cm in front of a concave shaving mirror producing an erect image 1.5 times the size of the face, the focal length of the mirror would be 1 Pt.
- 75 cm
 - 25 cm
 - 15 cm
 - 60 cm
22. A light ray enters from medium A to medium B as shown in the figure. The refractive index of medium B relative to A will be 1 Pt.



- Greater than unity
- Less than unity
- Equal to unity
- Zero

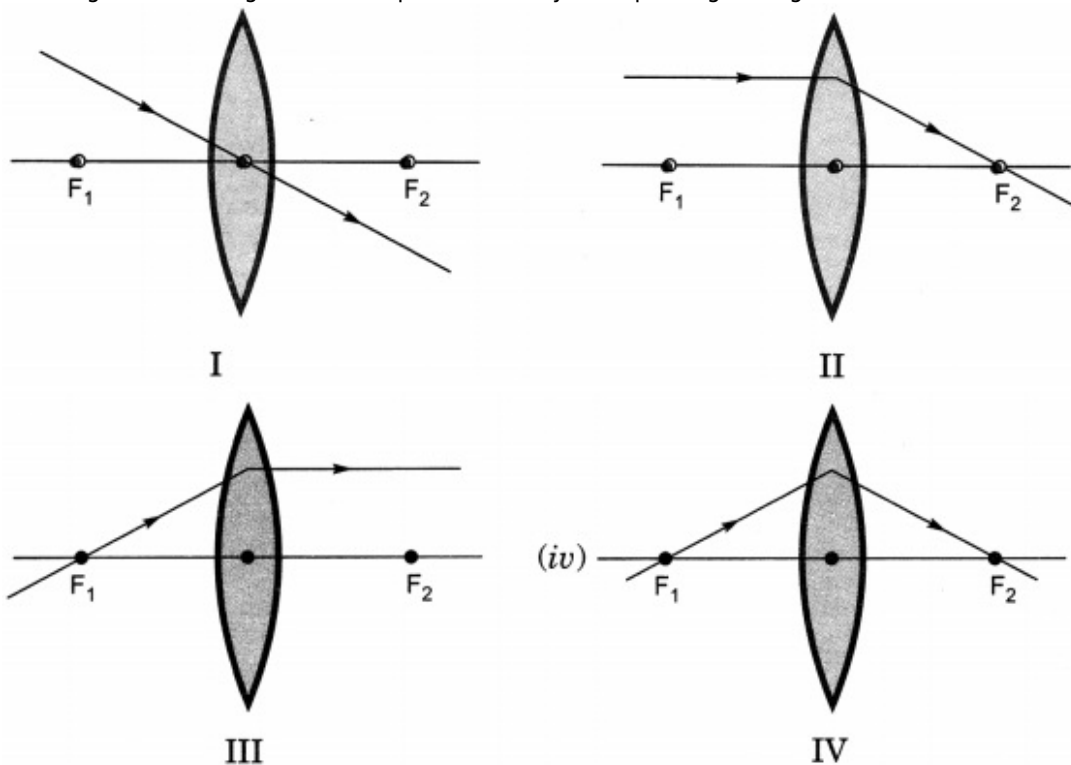
23. A beam of light is incident through the holes on side A and emerges out of the holes on the other face of the box as shown in the figure. Which of the following could be inside the box? 1 Pt.



- A) Concave lens
B) Rectangular glass slab
C) Prism
D) Convex lens
24. If in a plano-convex lens the radius of curvature of the convex surface is 10 cm and the focal length of the lens is 30 cm then the refractive index of the material of lens will be : 1 Pt.

- A) 1.33
B) 3
C) 1.66
D) 1.5

25. The diagrams showing the correct path of the ray after passing through the convex lens are 1 Pt.



- A) II and III only
B) I and II only
C) I, II, and III
D) I, II, and IV
26. A student traces the path of a ray through a glass prism for four different values of angle of incidence. On analyzing the diagrams he is likely to conclude that the emergent ray 1 Pt.
- A) Is always parallel to the incident ray.
B) Is always perpendicular to the incident ray.
C) Is always parallel to the refracted ray.
D) Always bends at an angle to the direction of the incident ray

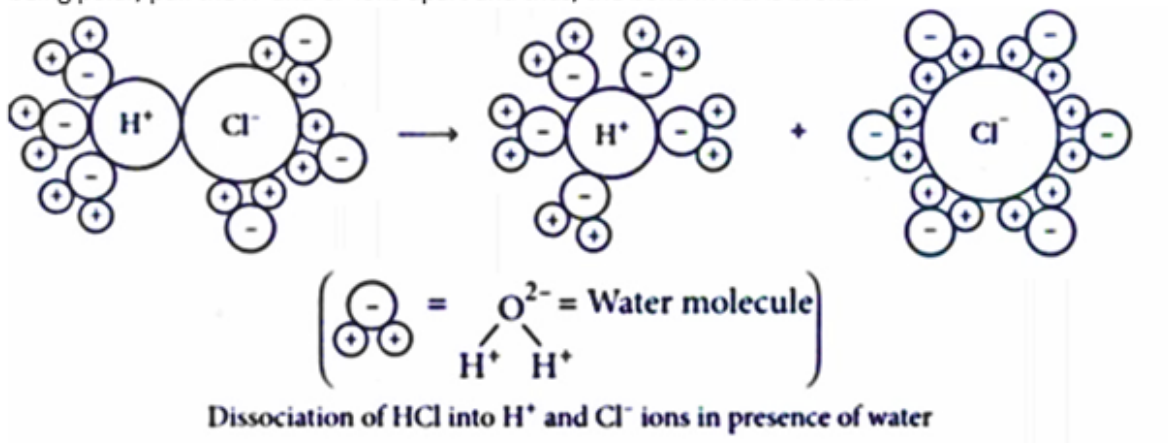
27. Which of the following phenomena of light are involved in the formation of a rainbow? 1 Pt.
- A) Reflection, refraction and dispersion
 - B) Refraction, dispersion and total internal reflection
 - C) Refraction, dispersion and internal reflection
 - D) Dispersion, scattering and total internal reflection
28. Indicate the colour of light that travels through glass with the minimum speed 1 Pt.
- A) Red
 - B) Violet
 - C) Blue
 - D) Green
29. The clear sky appears blue because 1 Pt.
- 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 lights of all other colours by the atmosphere.
 - D) Light of all other colours is scattered more than the violet and blue colour lights by the atmosphere.
30. Name the scientist who was the first to use a glass prism to obtain the spectrum of sunlight. 1 Pt.
- A) Isaac Newton
 - B) Einstein
 - C) Kepler
 - D) Hans Christian Oersted
31. One cannot see through the fog, because 1 Pt.
- A) The Refractive index of the fog is very high.
 - B) Light suffers total reflection at droplets.
 - C) Fog absorbs light.
 - D) Light is scattered by the droplets.
32. The layer of air in the atmosphere whose temperature is less than the hot layer behave as optically 1 Pt.
- A) Denser medium
 - B) Rarer medium
 - C) Inactive medium
 - D) Either denser or rarer medium

33 - 36 are based on Case Study - I

The acidic behavior of acids is due to the presence of hydrogen(H^+)ions in them. They produce hydrogen ions in the presence of water. Water is a polar solvent and this property of water helps in weakening the bond between the ions and makes them soluble. Hence, acids and bases produce ions in aqueous solutions.

It may be noted that a dry HCl gas or a solution of hydrogen chloride in organic, nonpolar solvents like toluene or benzene do not show acidic properties. This is because hydrogen chloride does not undergo ionization in toluene.

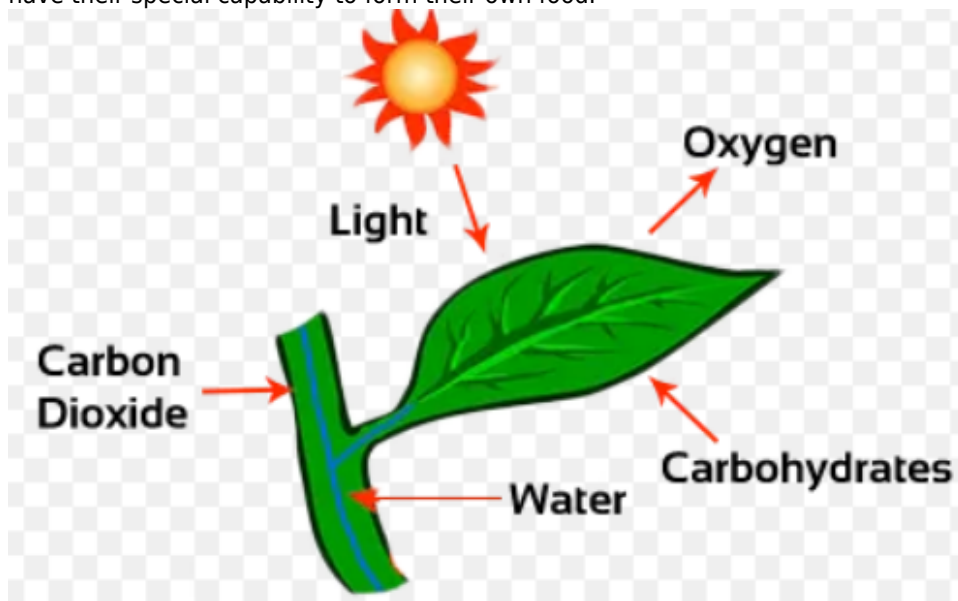
The reason why HCl splits into H^+ and Cl^- ions in presence of water lies in the fact that water molecules, being polar, pull the H^+ and Cl^- ions apart and thus, the bond in HCl is broken



33. Identify the wrong statement. 1 Pt.
- A) The higher the hydronium ion concentration, the lower is the pH value
 - B) Universal indicator is used to judge how strong a given acid or base is
 - C) As the pH value increases from 7 to 14, it represents an increase in H^+ ion concentration in the solution
 - D) A value less than 7 on the pH scale represents an acidic solution
34. If the pH of a solution is 8, then its $[H^+]$ ion is 1 Pt.
- A) $\log 10^{-8}$
 - B) 10^{-8}
 - C) 108
 - D) 8
35. In terms of acidic strength, which one of the following is in the correct increasing order? 1 Pt.
- A) Water < Acetic acid < Hydrochloric acid
 - B) Water < Hydrochloric acid < Acetic acid
 - C) Acetic acid < Water < Hydrochloric acid
 - D) Hydrochloric acid < Water < Acetic acid
36. Four solutions labeled as P, Q, R, and S have pH values 1, 9, 3, and 13 respectively. Which of the following statements about the given solutions is incorrect? 1 Pt.
- A) Solution P has higher concentration of hydrogen ions than solution R.
 - B) Solution Q has lower concentration of hydroxide ions than solution S.
 - C) Solutions P and Q will turn red litmus solution blue.
 - D) Solution P is highly acidic while solution Q is weakly basic.

37 - 40 are based on Case Study - II

Plants are living things that need some form of energy. They have cells and tissues. They also grow in size and girth likewise human beings. They are the producers of the ecosystem. So, in order to synthesize food, they do have nutrient requirements. Of course, the kind of nutrient requirements varies. Plants too have their special capability to form their own food.



37. Plants are green in colour because 1 Pt.
- A) They absorb green light only and they contain a pigment called chlorophyll.
 - B) They reflect green light and they contain a pigment called chlorophyll.
 - C) They absorb green light but reflect all other lights and they contain a pigment called chlorophyll.
 - D) None of these
38. The most important function of chlorophyll is to 1 Pt.
- A) Absorb carbon dioxide from the atmosphere
 - B) Absorb water and minerals from the soil
 - C) Give green colour to the leaves
 - D) Perform photosynthesis in the presence of sunlight
39. Which element is not present in chlorophyll? 1 Pt.
- A) Carbon
 - B) Calcium
 - C) Magnesium
 - D) Hydrogen
40. Process by which plants prepare their food is 1 Pt.
- A) Carbohydrolysis
 - B) Metabolic synthesis
 - C) Photosynthesis
 - D) Photorespiration