Sample Question Paper 1 (Answers)
(TERM – I) (Session 2021-2022)
Class X
Science (086)

SECTION – A

Section - A consists of 24 questions.
The first attempted 20 questions would be evaluated.

1. ANSWER: [D]
Explanation: During the preparation of hydrogen chloride gas, the gas is usually passed through the guard tube containing calcium chloride during humid climate, as calcium chloride is a good drying agent and absorbs moisture from the gas.

2. ANSWER: [B]
Explanation: Calcium phosphate $Ca_3(PO_4)_2$ is a basic salt, as it is formed by the combination of a weak acid (phosphoric acid) and slightly stronger base (calcium hydroxide).

3. ANSWER: [C]
Explanation: The pH value of saliva after meal is around 5.8 due to the increased activity of bacteria on the food that we eat at any time.

4. ANSWER: [D]
Explanation: The chemicals used in soda acid fire extinguisher as sodium hydrogen carbonate and sulfuric acid. The gas evolved when the two reactants react is carbon dioxide which is used for extinguishing electrical fires. Reaction will be between two chemicals are:
$2NaHCO_3 + H_2SO_4 \rightarrow Na_2SO_4 + 2CO_2 + 2H_2O$

5. ANSWER: [B]
Explanation: As detergent are basic in nature, the concentration of Hydroxide ions will be high and concentration of hydronium Ions will be less.
[Note: When bases are dissolved in water they dissociate into Hydroxide ions]

6. ANSWER: [D]
Explanation: Inert gases like Helium on Nitrogen both can be used for the storage of fresh sample of oil for a long time, as they do not react with most elements, including oxygen. Thus, these gases create an inert environment for the oil and prevent its reaction or oxidation with any element in the environment and can be used to prevent become rancid.

7. ANSWER: [A]
Explanation: When Ammonium hydroxide solution is added to aluminium chloride solution, a white precipitate of aluminium Hydroxide is formed along with ammonium chloride solution.

8. ANSWER: [B]
Explanation: The given reaction is the reaction between Nitric Acid and Calcium Hydroxide to form Calcium Nitrate (a salt and water). The reaction between an acid and a base is known as "neutralization reaction". It also involves formation of new compounds by the exchange of ions between reactants, it is also called "Double Displacement Reaction".

9. ANSWER: [D]
Explanation: The chemical reaction between dilute hydrochloric acid and granulated zinc is represented as:
$Zn + 2HCl \rightarrow ZnCl_2 + H_2 \uparrow$
The product zinc chloride, does not turn the reaction milky. Hydrogen gas evolved is colourless and odourless and released by the formation of bubbles. Hence, your answer will be option [D].

10. ANSWER: [C]
Explanation: When blue coloured powder of copper (II) nitrate is heated, it decomposes to form black coloured substance which is copper oxide, oxygen gas and brown gas Nitrogen dioxide.
The chemical equation for the reaction taking place is:
$2Cu(NO_3)_2\ (s) \rightarrow$ (Thermal Decomposition) $2CuO(s) + 4NO_2 + O_2\ (g)$

11. ANSWER: [D]
Explanation: The amount of carbon dioxide is more in exhaled air and very less in the atmosphere. The lime water turns milky immediately in test tube A as the exhaled air contains large amount of carbon dioxide gas where as it takes lot of time to turn milky in test tube B as fermentation by yeast is very slow process.

12. ANSWER: [A]
Explanation: Rings of cartilage which ensures that the air passage does not collapse while going into the lungs.

13. ANSWER: [C]
Explanation: Food digestion process begins in the mouth. Mouth contains salivary glands that secrete saliva. Saliva contains an important enzyme known as salivary amylase that breaks down starch into simple sugars.
Pepsin is a protein digesting enzyme. Stomach contains gastric glands that secrete mucus, hydrochloric acid, and pepsin.

14. ANSWER: [C]
Explanation: The digestion of food is the break down of complex food substances by the enzymes secreted by various parts of the digestive system. Hormones are secreted by the endocrine glands and act on specific targets.

15. ANSWER: [C]
Explanation: The human excretory system consists of a pair of Kidneys, a pair of ureters, urinary bladder, and urethra.

16. ANSWER: [D]
Explanation: As a melting and boiling points of ionic compounds are very high, the compounds “A” and “D” are ionic compounds.

17. ANSWER: [D]
Explanation: Ray of light parallel to the principal axis towards the mirror after reflection from the mirror will pass through the focus.

18. ANSWER: [D]
Explanation: Angle of incidence equals to angle of reflection. On rotating the plane Mirror by 10° about "O" in the anticlockwise direction. The position of the incident ray does not change but the position of the normal does.
Angle of incidence = 45° + 10° = 55°
By the second law of reflection, angle of reflection equals to angle of incidence which is 55°. Hence, angle between incident and reflected rays is 110°.

19. ANSWER: [A]
Explanation: Convex mirror is used as a rear-view mirror in vehicles. It forms virtual, erect and diminished images of the objects. As magnification is defined as the ratio of the height of the image to the height of the object, hence, magnification produced by a rear-view mirror, fitted in vehicles is less than one.

20. ANSWER: [B]
Explanation: As light travels from a denser medium water to a rarer medium air, the light rays undergo refraction and bend away from the normal. To an observer the position of fish in water appears to be raised as shown in the figure above therefore. The Apparent depth of the fish in water is less than the actual depth due to the refraction of light.

21. ANSWER: [D]
Explanation: If you look at this picture carefully, you will be able to understand that in the given diagram parallel rays converge at a point and emerge from face B. So, there will be a convex lens inside the box.

22. ANSWER: [B]
Explanation: A concave mirror forms a real and inverted image of a distant object, such as tree, at its focus.

23. ANSWER: [D]
Explanation: Concave mirror - it is also called converging mirror. It reflects light inward to one focal point. It is used to focus light.

24. ANSWER: [A]
Explanation: Convex mirror is used as a rear-view mirror in vehicles. It forms virtual, erect and diminished images of the objects.
As magnification is defined as the ratio of the height of the image to the height of the object, so magnification produced by a rear-view mirror, fitted in vehicles is less than one.

SECTION - B

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

25. ANSWER: [C]
Explanation: We know that, in electrolytic refining process, impure metal forms the anode, which is positive electrode, where as pure metal forms the cathode which is negative electrode. Here, are given option [C] shows the process of correct electrolyte refining of copper metal. Copper from impure anode dissolves into the solution. Copper ions from the solution are deposited on the cathode and impurities settle down below the anode.

26. ANSWER: [C]
Explanation: Aqua regia is a mixture of concentrated hydrochloric acid and concentrated nitric acid in the ratio of 3:1 Aqua regia, being a strong acid, dissolves gold.

27. ANSWER: [D]
Explanation: The colour of flame observed when the given metals are heated is given below:
Aluminium = silver white
Copper = Blue
Sodium = Yellow
Magnesium = White

28. ANSWER: [A]
Explanation: Thermite reaction is a reaction between iron oxide (III) or fe_2O_3 and Aluminium. It is a highly exothermic process and iron is produced in the molten state. It is used to join is used to join railway tracks or cracked machine parts.

29. ANSWER: [B]
Explanation: No reaction take place as zinc is less reactive than aluminium and cannot displace aluminium from its salt solution $Al_2(SO_4)_3$.

30. ANSWER: [C]
Explanation: Out of the metals Mg, Zn, Fe and Al, Mg will react most vigorously with dilute acid, followed by Al, Zn and Fe

Question No. 31 to 35 consists of two segments – **Assertion (A) and Reason (R).**
[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. ANSWER: [D]
Explanation: Baking soda, being alkaline, neutralises the acidity in the stomach and removes it.

32. ANSWER: [C]
Explanation: Calcium hydroxide is present in white wash. It reacts slowly with the carbon dioxide in air to from a thin layer of calcium carbonate on the walls. Calcium carbonate is formed after two to three days of white washing. Hence the shiny white finish appears after two to three days on the walls.

33. ANSWER: [B]
Explanation: Minerals are naturally occurring chemical substances in the earth's crust obtained by mining. But a mineral is called an ore when the metal can be extracted from it conveniently and economically. Thus, all ores are minerals but all minerals are not ores.

34. ANSWER: [B]
Explanation: There is no mixing of oxygenated and deoxygenated blood due to presence of inter auricular and inter ventricular septum. On the other hand, valves are present in the heart which allows the movement of blood in One Direction only.

35. ANSWER: [D]
Explanation: If the rays cross focal point of convex lens, they become diverging.

36. ANSWER: [D]
Explanation: X = KOH pellets, Y = Wet germinating seeds.
Potassium hydroxide, also known as lye is an inorganic compound with the chemical formula KOH. Also commonly referred to as caustic potash, it is a potent base that is marketed in several forms including pellets, flakes, and powders.

37. ANSWER: [D]
Explanation: End products of aerobic respiration are carbon dioxide and water. And end products of anaerobic respiration are lactic acid (ethyl alcohol) and carbon dioxide

38. ANSWER: [B]
Explanation: Cloudy days will cause the rate of photosynthesis to decrease due to the low availability of Sunlight.

39. ANSWER: [C]
Explanation: As we got evident from the graph with the increase in the temperature the enzyme activity is also influenced by the temperature. Thus, this point is valid in the context of the graph.

40. ANSWER: [A]
Explanation: Since the arteries carry the pure or the oxygenated blood from the heart to the different body parts while the veins carry the deoxygenated or the impure blood from the different body parts to back to the heart. Thus, the force that blood exerts against the wall of a vessel is more in arteries and less in veins.

41. ANSWER: [C]
Explanation: We know that the external medium is hypertonic (where a solution containing lower concentration of solutes as compared to another cell) the root cells in contact with the soil actively take up ions. This creates a difference in the concentration of these ions between the root and the soil. Water therefore, moves into the route from the soil to eliminate this difference.

42. ANSWER: [B]
Explanation: At night, when there is no sunlight, transpiration is very low but the absorption of substances by roots is high.

43. ANSWER: [A]
Explanation: The experiment should be performed on the same wall as the window. Rays from infinity will be focus at the focal point of the mirror.

44. ANSWER: [A]
Explanation: All the reflected light rays converge and pass through the focus (F) of a concave mirror. Since the focus of a concave mirror is in front of the mirror, the screen has to be placed parallel in front of the mirror.

45. ANSWER: [C]
Explanation: As the student has focussed a distant blue coloured building on the screen using a convex lens, a real inverted and diminished image is formed at the principal focus of the convex lens.
As object is quite far, a diminished image will be formed at the principal focus. The colour of image will be same as colour of the object because no change in colour takes place during refraction.

46. ANSWER: [D]
Explanation: Out of the given four materials the refractive index of glycerine is highest. So, greatest deviation of incident light ray is observed in case of glycerine.

47. ANSWER: [C]
Explanation: The angle of refraction must be less than the angle of incidence. While angle of emergence is equal to angle of incidence.

48. ANSWER: [D]
Explanation: When calcium is treated with water, it reacts vigorously with water and to produce a cloudy white precipitate of calcium hydroxide and hydrogen gas is released as bubbles.
$Ca(s) + 2H_2O(g) \rightarrow Ca(OH)_2\ (s) + H_2\ (g) \uparrow$

SECTION – C

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

Case – 1:
49. ANSWER: [C]
Explanation: When MnO_2 to react with HCl, the following reaction takes place in which chlorine gas is also evolved, which has bleaching properties.
$MnO_2 + HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$
In this reaction, hydrochloric acid is oxidised to chlorine and manganese dioxide is reduced to manganese dichloride. As both oxidation and reduction are taking place in this reaction, it is a redox reaction.

50. ANSWER: [A]
Explanation: Bleaching powder is produced by the action of chlorine on dry slaked lime.
$Ca(OH)_2 + Cl \rightarrow CaOCl_2 + H_2O$

51. ANSWER: [A]
Explanation: In the reaction between MnO_2 and HCl, MnO_2 is getting reduced to manganese dichloride as it is losing oxygen atoms. Whereas HCl is getting oxidized to chlorine by the removal of oxygen.

52. ANSWER: [B]
Explanation: As MnO_2 reacts with HCl to form salt, water, and chlorine gas, it is basic oxide since it reacts with an acid. Moreover, oxides of metal are basic in nature whereas oxides of non-metals are acidic in nature.

Case – 2:
53. ANSWER: [B]
Explanation: Part 1 is ureter. It transports urine from kidney to urinary bladder.

54. ANSWER: [B]
Explanation: Nephrons are the structural and functional filtration unit of kidney that serve in filtration, re-absorption, and secretion.

55. ANSWER: [B]
Explanation: Dialysis is the procedure to remove waste products and excess fluid from the blood, when the kidneys stop working properly. It often involves diverting blood to a machine to be cleaned.

56. ANSWER: [B]
Explanation: Urea is the main waste present in the urine.

Case – 3:
57. ANSWER: [C]
Explanation: He should use a concave mirror, as it forms real images.

58. ANSWER: [B]
Explanation: He should place the candle flame between the focus and centre of curvature of the mirror to get the magnified image on the wall.

59. ANSWER: [A]
Explanation: To get the diminished image of the candle flame, the object must be placed at infinity.

60. ANSWER: [B]
Explanation: If the image formed by this mirror is inverted and real, the magnification will be negative.