

Sample Question Paper 4 (Answers)
(TERM – I) (Session 2021-2022)
Class X
Science (086)
SECTION – A

Section - A consists of 24 questions.

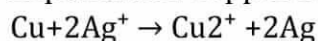
The first attempted 20 questions would be evaluated.

1. ANSWER: [B]

Explanation: After replacement, bulb glows in B as NaOH solution contains Na^+ and OH^- ions, which are responsible for electrical conductivity.

2. ANSWER: [C]

Explanation: Copper is placed above silver in electrochemical series and thus reaction occurs



3. ANSWER: [A]

Explanation: The given reactions shows that Q is the most reactive as it has replaced both P and R from their compounds.

4. ANSWER: [B]

Explanation: $\text{Mg (s)} + \text{H}_2\text{SO}_4 \text{ (aq)} \rightarrow \text{MgSO}_4 \text{ (aq)} + \text{H}_2 \uparrow$ is the balanced chemical reaction. A balanced equation is the one in which the atoms of every element will be the same on both the sides of the equation.

5. ANSWER: [B]

Explanation: Double displacement reaction is the reaction in which two different atoms or group of atoms are mutually exchanged. In this reaction, sodium and barium were mutually exchanged.

6. ANSWER: [B]

Explanation: The balanced chemical equation is : $\text{Zn(s)} + \text{H}_2\text{SO}_4 \text{ (dil)} \rightarrow \text{ZnSO}_4 \text{ (aq)} + \text{H}_2 \text{ (g)} \uparrow$

7. ANSWER: [C]

Explanation: Chemical name of POP is calcium sulphate hemihydrate. It is written in this form because two formula units of CaSO_4 share one molecule of water.

8. ANSWER: [C]

Explanation: You must know that acid turns blue Litmus solution to red. They have a sour taste as in the case of vinegar and are sticky to touch. Hence, your answer will be option [C].

9. ANSWER: [B]

Explanation: Generally, Clove oil is an olfactory indicator. These are the substances which have one type of scent as acidic way so a visually challenged student prefers to use clove oil as an acid-base indicator. You should go with the option [B] as answer.

10. ANSWER: [B]

Explanation: Detergents are bases. Bases ionise to form OH^- and thus there will be high concentration of OH^- .



11. ANSWER: [B]

Explanation: Fishes have heart which is two-chambered and they exhibit single circulation. Remember, four-chambered heart of birds and mammals exhibit double circulation and three-chambered heart of amphibians and reptiles depicts double circulation also. Hence, your answer should be option [B].

12. ANSWER: [A]

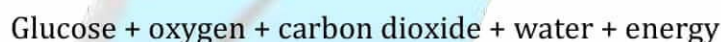
Explanation: As a living organism, it is necessary to separate the oxygenated blood from mixing with deoxygenated blood as mammals and birds both need high energy because they constantly require energy to process their body organisms and maintain their body temperature. Hence, students should choose the option [D].

13. ANSWER: [B]

Explanation: Remember, Pepsin works in the acidic medium and trypsin works in the basic medium to digest the proteins in the stomach and in the intestine respectively. So, choose option [B].

14. ANSWER: [A]

Explanation: The given equation represents aerobic respiration.



15. ANSWER: [A]

Explanation: The oxygen rich blood from the lungs comes to the Left Atrium when it dilates. The right Atrium receives the deoxygenated blood from the body.

16. ANSWER: [C]

Explanation: The first step is the break-down of glucose, then, a six-carbon molecule, into a three-carbon molecule called pyruvate and it takes place in the cytoplasm. You must know that Breakdown of pyruvate using oxygen takes place in the mitochondria.

Further, the pyruvate may be converted into $\text{C}_2\text{H}_5\text{OH}$ (ethanol) and carbon dioxide (CO_2). It occurs in yeast during fermentation. And this process takes place in the absence of air (which is oxygen), so, it is called anaerobic respiration.

17. ANSWER: [A]

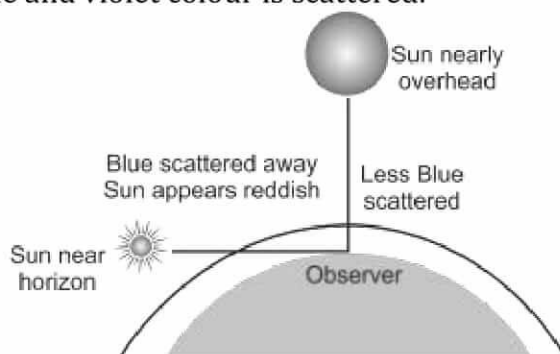
Explanation: The student can see the object which is far from him but can't see nearby objects. It means that the near point of his eyes has receded away. This condition is known as hypermetropia or far sightedness.

18. ANSWER: [C]

Explanation: Our atmosphere is consisting many gases which have fine particles. When sunlight passes through our atmosphere, the fine particles which are present in air - scatter the blue colour more strongly than red colour. Remember, blue light has shorter wavelengths. And we can see objects, when scattered light enters our eyes. Similarly, sky appears blue, because the scattered blue light enters our eyes and the sky appears blue. Hence, your answer will be option [C].

19. ANSWER: [A]

Explanation: At noon the sun is directly overhead and have lesser here to travel through you and hence it will be reduced if the distance to be travelled in air is reduced less scattering leads to Sun appearing white as only a little of the blue and violet colour is scattered.



20. ANSWER: [C]

Explanation: Eye related problems generally cured by glass or lenses. Similarly, hypermetropia or farsightedness can be corrected by using convex lens of appropriate power and myopia by concave lens of appropriate power. Hence, your answer should be option [C].

21. ANSWER: [A]

Explanation: Generally, light travels in a straight line but in certain condition it bends. When a ray of light passes through the glass slab, but the angle of incidence is to be nearly equal to angle of emergence and greater than angle of refraction. Therefore, your answer should be option [A].

22. ANSWER: [D]

Explanation: You must know that, light bends away from the normal, when light travels from a denser to a rarer medium. Therefore, angle of refraction ($\angle r$) will be greater than the angle of incidence ($\angle i$). Remember here, light is incident from the "A- MEDIUM" having higher refractive index than glass, speed of light will be less in "A- MEDIUM" as compared to glass. Hence, you should go with the option [D].

23. ANSWER: [C]

Explanation: Remember, If the object is at infinity, screen should be moved towards mirror, so you will obtain to sharp image. Hence, as per the question, your answer will be Option [C].

24. ANSWER: [C]

Explanation: All the distances measured to the right of the origin (along + x-axis) are taken as positive while those measured to the left of the origin (along - x-axis) are taken as negative. Distances measured perpendicular and below the principal axis (along -y-axis) are taken as negative.

SECTION - B

Section - B consists of 24 questions (Sl. No. 25 to 48).

The first attempted 20 questions would be evaluated.

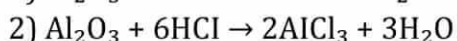
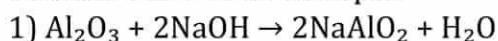
25. ANSWER: [A]

Explanation: You must know that, those elements which form positive ions by losing electrons are called metals. So, option [A] is correct.

26. ANSWER: [B]

Explanation: All we know that - metal oxides which react with both acids as well as bases to produce salt and water are called Oxides of Amphoteric or Amphoteric oxides.

You can write as an example:



27. ANSWER: [B]

Explanation: Magnesium metal never reacts with cold water but reacts with both hot water and steam to form magnesium hydroxide and hydrogen gas.



28. ANSWER: [B]

Explanation: "C- Test tube" contains chemical mixture called "AQUA-REGIA". It is a mixture of concentrated HCl (hydrochloric acid) and concentrated HNO₃ (Nitric acid), in the ratio of 3:1. Aqua-regia dissolves gold (Aurum - Au) and platinum (Pt) in it, while HCl (hydrochloric acid) and HNO₃ (Nitric acid), do not. Gold (Au) is a metal that couldnot be dissolved in dilute acids and dissolves only in aqua regia. Hence, the metal in test tube C must be gold (Au). You must go with the option [B] as an answer.

29. ANSWER: [D]

Explanation: Atomic number of X is 10, so this must be Ne (Neon), a noble or inert gas. This gas has complete octet configuration. Atomic number of Y is 17 as [2, 8, 7], so this must be chlorine (Cl). Chlorine is a non-metal. Non-metals have 5 to 7 electrons in their valence shell. Atomic number of Z is 12 as [2, 8, 2], so this must be magnesium (Mg). Magnesium is a metal. Metals have 1, 2 or 3 electrons in their valence shell.

30. ANSWER: [C]

Explanation: Food cans are coated with tin and not with zinc because zinc is more reactive than tin.

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: [C]

Explanation: Sodium is a very reactive metal. It is kept in kerosene to prevent it from coming in contact with oxygen and moisture. If this happens, it will react with the moisture present in air and form sodium hydroxide. This is a strongly exothermic reaction, and lot of heat is generated.

32. ANSWER: [D]

Explanation: Remember, a rainbow is always formed in the sky in a direction which is opposite to the sun. The water droplets (as vapour) present in the sky which they act as tiny prisms. Prism generally refract and disperse sun white light, then reflect it internally and finally refract it again when it comes out of the raindrop.

33. ANSWER: [A]

Explanation: Mirror have some character. When anything kept in front of the mirror, image formed in a plane mirror is at the same distance behind the mirror as the object is in front of mirror. So, if the object or mirror is moved then image will also move. You should go with the option [A].

34. ANSWER: [C]

Explanation: Digestion breaks large complex organic molecules to simple smaller ones which can be easily absorbed. However, certain molecules such as glucose, vitamin C etc, do not need any digestion before their absorption.

35. ANSWER: [A]

Explanation: Magnesium chloride present in common salt is deliquescent substance i.e., it absorbs moisture from the air when kept in open.

36. ANSWER: [A]

Explanation: Xylem tissues include tracheids, parenchyma, vessels, and fibres and serve in the ascent of sap or water and minerals.

37. ANSWER: [D]

Explanation: Solution of Iodine is often used for testing the presence of starch in the food particles, as we know that. But, when iodine is added to starch, it turns blue-black. Rice water it turns blue-black because it contains starch, hence when iodine solution is added to rice water it turns blue-black. You must have also done such a science experiment. Hence option [D] is correct answer.

38. ANSWER: [D]

Explanation: The "UPPER CUP" shaped end of a nephron is called "Bowman's capsule". It contains Glomerulus which is a group of blood capillaries.

39. ANSWER: [A]

Explanation: Heterotrophs are those organisms which cannot make their own food from inorganic substances like oxides of carbon. And water as they do not have chlorophyll to trap solar energy. For their food, they depend on other organisms. Using the method of photosynthesis by Autotrophs, they synthesize their own food e.g., green plants.

40. ANSWER: [B]

Explanation: Firstly, it performs two functions: (1) makes the food alkaline and (2) breaks the fats present in food into small globules by the process of emulsification. Bile stored in the gall bladder but it is secreted by the liver and from where it enters the small intestine via a common duct. Hence, you should go with the option [B].

41. ANSWER: [D]

Explanation: You must know that when we do exercise our body requires more energy. Due to exercise the body is able to get rid of excess carbon dioxide (CO_2). But remember, we get energy by the oxidation of food.

42. ANSWER: [D]

Explanation: The autotrophic mode of nutrition requires carbon dioxide, water, chlorophyll, and sunlight.

43. ANSWER: [D]

Explanation: Remember, an enlarged image is formed behind the mirror but condition is that when an object is kept within the focus of a concave mirror. This image is virtual and erect.

44. ANSWER: [D]

Explanation: Try to understand in this way. As:

In (i), the incident ray is along the normal, so no refraction of light will take place.

In (ii), the two pins on the incident ray are placed too close to each other.

In (iii), the angle of incidence appears to be more than 60° .

Hence, (iv) is the best experimental set-up for tracing the path of a ray of light through the glass slab because in this setup, the following conditions are being met or completed:

First, is the angle of incidence should lie between 30° and 60° . Second, there should be a minimum gap of 5 cm between the two pins on the incident ray. Third, the point of incidence of the incident ray air-glass interface should be on the left side such that the emergent ray can be easily located within the board.

45. ANSWER: [B]

Explanation: The focal length of a spherical mirror is half of the radius of curvature, i.e., $f = R/2$.

46. ANSWER: [D]

Explanation: We know that refractive index (n) = speed of light in air / speed of light in a material. According to this formula speed of light will be maximum in the substance whose refractive index is minimum. Therefore, speed of light will be maximum in the substance "S" whose refractive index is 1.31.

47. ANSWER: [B]

Explanation: Angle 2 is angle of incidence, as it is formed between the incident ray and the normal. Angle 1 is angle of emergence, as it is formed between the emergent ray with normal. Angle 4 is angle of reflection as it is formed between the refracted and the normal. 3 shows the lateral displacement. Therefore, the correct answer is 2, 1, 4, 3.

48. ANSWER: [B]

Explanation: Sodium is so soft that can be cut using a knife. It reacts with oxygen or moisture present in air readily and reacts with water vigorously. Because of this sodium is stored in kerosene oil to prevent any reaction or accident.

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: You must know that when light undergoes refraction in the glass prism and bends away from the normal and hence EF is the refracted ray. The ray FS is the emergent ray as light emerges out of the face AC of the prism along this direction. Try to understand as very simple way, Here PE is the ray of incident; EF is the ray of refracted and FS is the emergent ray. PE is the incident ray as light is incident on the prism face AB. Hence, your answer will be option [C].

50. ANSWER: [A]

Explanation: The angle of incidence is the angle between the incident ray PE and the normal NN' drawn at the point of incidence = PEN

The angle of refraction is the angle between the refracted ray EF and the normal NN' drawn at the point of incidence = FEN'

The angle of emergence is the angle between the emergent ray FS and the normal MM' drawn at the point of emergence SFM.

51. ANSWER: [D]

Explanation: A glass slab where ray of emergent is parallel to the ray of incident, in a glass prism the emergent ray (ER) is not parallel to the incident ray. The angle of deviation (denoted by D) is the angle between the ray of emergent and ray of incident. Hence, you should go with the option [D].

52. ANSWER: [B]

Explanation: As the two refracting surfaces AB and AC are not parallel to each other, the emergent ray is also not parallel to the incident ray. Whereas, in a glass slab, the two refracting surfaces are parallel to each other which explains why the emergent ray is parallel to the incident ray.

Case – 2:

53. ANSWER: [C]

Explanation: Lime water turns milky when CO_2 as carbon dioxide gas is passed through it as a white precipitate of CaCO_3 (calcium carbonate) is formed when lime water (calcium hydroxide - Ca(OH)_2) reacts with CO_2 gas.

Lime water turns milky in "A test tube" as the exhaled air is rich in CO_2 . Whereas, lime water takes a lot of time to turn milky in "B test tube" as the amount of CO_2 present in atmospheric air is very less as compared to exhaled air and hence carbon dioxide is produced after a very long period. Hence, your answer will be option [C].

54. ANSWER: [A]

Explanation: The lime water becomes milky after some time as carbon dioxide is produced as a result of fermentation of sugar on mixing yeast. The other product formed is alcohol.

55. ANSWER: [B]

Explanation: Carbon dioxide is produced as a result of aerobic respiration in the first activity.

56. ANSWER: [C]

Explanation: Yeast is added to sugar solution, it undergoes a fermentation which is anaerobic respiration as it takes place in the absence of oxygen. In this process, the pyruvate is converted into ethanol and carbon dioxide ($\text{C}_2\text{H}_5\text{OH} + \text{CO}_2$). Hence, you should choose option [C].

Case – 3:

57. ANSWER: [C]

Explanation: The eye lens forms an inverted and real image of the object on the retina as eye lens is a convex lens.

58. ANSWER: [A]

Explanation: Our eyes have functioned very crucial work. It has simple organs to focus the objects. Lens (crystalline) which provides the length adjustment (focal length for focus the object and remaining the blur) which is required to focus the objects at different distances on the retina of the eye. Generally, it works similar like camera. Focus the objects blur the background. Lots of the refraction for the light rays entering the eye at the cornea. Remember, but in outer surface of cornea.

59. ANSWER: [B]

Explanation: Try to understand, the change in the curvature of the eye lens can change its focal length.

1) When our eye muscles are relaxed, the lens becomes thin and its focal length increases. This enables us to see distant objects clearly.

2) The eye lens then becomes thicker when objects is near within the focal length. Focal length of the eye lens decreases. We see nearby objects clearly.

3) When we are looking at objects closer to the eye, the ciliary muscles contract which increases the curvature of the eye lens.

4) The eye lens then becomes thinner when objects is far away, lens tries to take to object within the focal length. That we can see the distant object clearly.

5) The curvature of the eye lens can be modified to some extent by the ciliary muscles

60. ANSWER: [D]

Explanation: Mentioned in option [D], It is also called the near point of the eye and it is 25 cm for a young adult with normal vision. The far point is the farthest point up to which the eyes can see objects clearly and is infinity for a normal eye.

