

Sample Question Paper 5 (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 combustion of petroleum gas (which is liquified), it forms carbon dioxide (CO_2) and water. Hence, your answer will be option [D].

2. ANSWER: [A]

Explanation: You must know that – when, a dil. FeSO_4 solution was slowly added to the beaker which containing acidified solution of permanganate. The light purple colour of the solution of KMnO_4 fades and at last it, disappears. The reason behind it, as it is because KMnO_4 is relatively an unstable compound, it tends to decompose in the presence of ferrous sulphate & changes the colour of the solution (from purple to colourless). Hence, you answer should be option [A].

3. ANSWER: [B]

Explanation: Remember you can write, as an example of exothermic reaction is “Slaking of lime” because a large amount of heat is produced during the reaction. We can feel the heat energy by touching the beaker from the outside. It easily turns indicators (red litmus) solution to blue and hence proves that it to be a basic solution. Hence the pH of the solution will be more than 7. You should go with the option [B] as an answer.

4. ANSWER: [B]

Explanation: The layer of Zinc metal can prevent corrosion easily. Remember that, the iron rod can be protected from corrosion by coating a thin layer of zinc metal. The process of coating zinc cover over iron is called galvanization. It is used in broad way. Hence, your answer will be option [B].

5. ANSWER: [B]

Explanation: You should know that - out of the metals Mg, Ca, Na, & K both Na and K reacts (violently) with water that the hydrogen gas evolved immediately and catches fire. The reaction of Ca with cold water is violent but less and Calcium starts floating because the bubbles of hydrogen gas formed stick to the surface of the metal.

And one important thing is that - mg does not react with cold water but reacts with hot water to form $\text{Mg}(\text{OH})_2$ and hydrogen gas. Hence, you should go with the option [B] as an answer.

6. ANSWER: [C]

Explanation: Vanilla essence can be used as an acid base indicator by visually impaired students as it is an olfactory indicator whose smell changes in acidic or basic media.

7. ANSWER: [C]

Explanation: We must know that - During the preparation of hydrogen chloride gas on a humid day, the role of calcium chloride (CaCl_2) taken in the guard tube is to absorb moisture from gas. This is because CaCl_2 is used gas as a drying agent which absorbs moisture from the hydrogen chloride gas. Simply, you can go with the option [C] as an answer.

8. ANSWER: [B]

Explanation: Remember, that - most of the oxides of metal are insoluble in water but some of these (such as Na_2O , CaO) dissolve in water to form alkalis, not salt and acid.

9. ANSWER: [A]

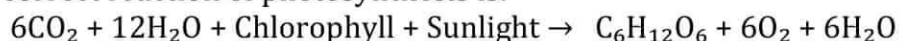
Explanation: You must know that - in acid blue Litmus changes to Red. Generally, litmus are indicators. And in basic solution red litmus changes to Blue. Hence, Blue litmus first changes its colour to Red and then to Blue. Your answer will be option [A].

10. ANSWER: [C]

Explanation: Metals are generally good conductors of heat and have a high melting point. Most metals are also good conductors of electricity.

11. ANSWER: [C]

Explanation: The correct reaction of photosynthesis is:



Hence, your answer will be option [C].

12. ANSWER: [B]

Explanation: As we know that exchange of inhaled air occurs initially in the alveoli of lungs.

13. ANSWER: [A]

Explanation: Lymph does not contain RBC and platelets, but it is rich in lymphocyte or WBC count.

14. ANSWER: [A]

Explanation: You must know that, in human heart, the anterior vena cava collects, deoxygenated blood from the head, chest, and arms and enters the right atrium while the inferior vena cava collects blood from the lower body regions. Both venae cava pass the deoxygenated blood to the right atrium and, blood from tissues is rich in CO_2 . You should choose option [A] as an answer.

15. ANSWER: [B]

Explanation: Generally, the breakdown of pyruvate to give CO_2 , water and energy takes place in mitochondria. Hence, your answer will be option [B].

16. ANSWER: [B]

Explanation: Sugars and amino acids are transported by phloem tissue. There are found alternative between central core of xylem. Here, you should go with the option [B].

17. ANSWER: [B]

Explanation: A→(iv) = when object is placed between infinity and the pole of convex mirror, image formed is virtual, erect and diminished.

B→(i) = when object is at the centre of curvature of concave mirror, image formed is real, inverted and same size as that of object.

C→(ii) = when object is between focus and centre of curvature of concave mirror, image formed is real, inverted and enlarged.

D → (iii) = when object is at some distance from concave mirror beyond centre of curvature, image formed is real, inverted and diminished.

18. ANSWER: [D]

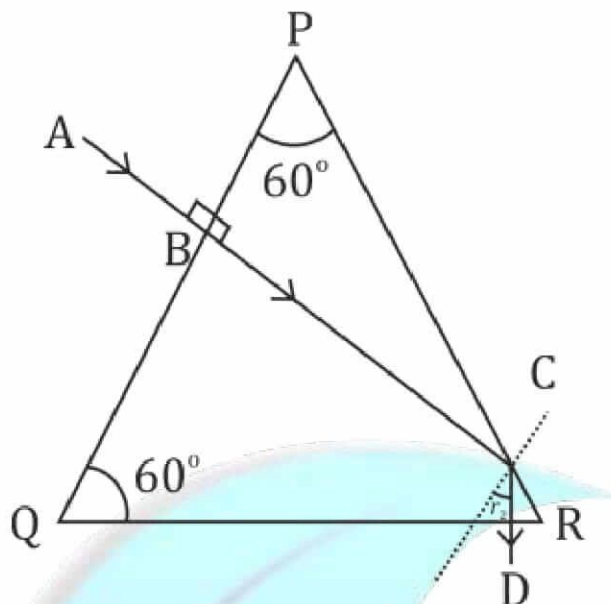
Explanation: $v = c/\mu = 3 \times 10^8 / 1.5 = 2.0 \times 10^8 \text{ m/s}$. Here, correct option will be [D].

19. ANSWER: [C]

Explanation: Virtual images are always erect and cannot be projected on the screen. These are formed by both concave and convex lens.

20. ANSWER: [A]

Explanation: The ray traces path inside prism as shown in figure:



Here, $i = 0^\circ$

$\Rightarrow r_1 = 0^\circ$ [Angle between normal and incident ray, not visible in figure]

$\Rightarrow A = 60^\circ$

Also, $\angle P = r_1 + r_2$

$\Rightarrow 60^\circ = 0^\circ + r_2$

Or, $r_2 = 60^\circ$

Here, correct option will be [A].

21. ANSWER: [A]

Explanation: Diagram given depicts early sunrise and late sunset due to atmospheric refraction.

22. ANSWER: [A]

Explanation: As we know that - as a rear-view mirror in vehicles generally convex mirror is used. Remember, it forms virtual, erect, and diminished images of the objects. Magnification is ratio of height of image to height of the object, therefore, magnification produced by a rear-view mirror fitted in vehicles is less than 1. Hence, you should go with the option [A].

23. ANSWER: [D]

Explanation: We must know that - the rays parallel to the principal axis, after refraction by convex lens, will pass through the principal focus. And the incident rays coming from the distant object will be parallel to the principal axis.

Hence, a distinct image will be obtained immediately when distance between screen and lens is equal to focal length, so option (D) is your correct choice.

24. ANSWER: [A]

Explanation: As per the convention of sign, we know that the focal length of a concave lens and a concave mirror are taken as negative. And, both the spherical mirror and the thin spherical lens are concave in nature. Therefore, you should go with the option [A] as an answer.

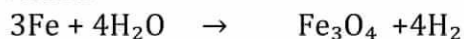
SECTION - B

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

The first attempted 20 questions would be evaluated.

25. ANSWER: [D]

Explanation: Metals like iron, aluminium, zinc do not react with hot/cold water. They react with water only when water is in the form of steam.



Hence, your answer will be option [D].

26. ANSWER: [D]

Explanation: We know that steel is an alloy of iron and carbon. Mixing of carbon gives strength to iron. Your answer will be option [D].

27. ANSWER: [D]

Explanation: Remember that - sodium and calcium are very reactive. Since, sodium (Na) and calcium (Ca) are always present in the top section in the series of the reactivity. Therefore, they obtained by the process of electrolysis of their chlorides (sodium (Na) and calcium (Ca)). You should go with the option [D].

28. ANSWER: [B]

Explanation: We must know that, Hydrochloric acid (HCl) and carbon tetrachloride (CCl₄) form a covalent bond due to sharing of a pair of electrons between two atoms. Here, HCl is a polar covalent compound and (CCl₄) is a non-polar covalent compound. On the other hand, sodium chloride (NaCl) and potassium chloride (KCl) form ionic compounds as they consist of positive and negative ions. Hence, you should go with the option [B] as an answer.

29. ANSWER: [C]

Explanation: The metals have been arranged in order of their decreasing reactivity by using displacement reaction since all metals are not equally reactive the activity series is shown below:

K	Potassium	← Most reactive
Na	Sodium	
Ca	Calcium	
Mg	Magnesium	
Al	Aluminium	
Zn	Zinc	
Fe	Iron	
Pb	Lead	
[H]	[Hydrogen]	
Cu	Copper	
Hg	Mercury	
Ag	Silver	
Au	Gold	← Least reactive

Reactivity decreases ↓

30. ANSWER: [C]

Explanation: Zinc (Zn) metal is used to protect iron surface from rusting.

31. ANSWER: [A]

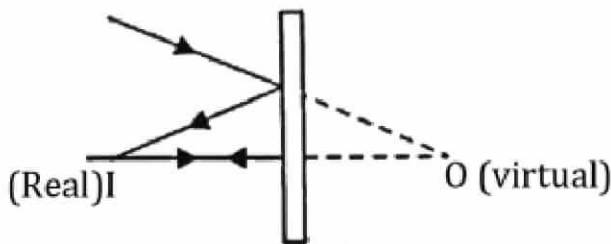
Explanation: We know that a chemical reaction occurs fast at temperatures which is higher. Remember, at high temperature, the movement of particles are greater. Hence, you should go with the option [A].

32. ANSWER: [C]

Explanation: Remember, when white light passes through a glass prism, red colour is deviated the least because red colour has maximum in the prism. Hence, your answer will be option [C].

33. ANSWER: [B]

Explanation: Plane mirror may form real image, if object is virtual.



34. ANSWER: [C]

Explanation: Autotrophs do this process, called "Photosynthesis. It is an anabolic process as it takes CO_2 and H_2O and then assembles them into glucose ($\text{C}_6\text{H}_{12}\text{O}_6$). Remember, Photosynthesis occurs in chloroplast.

35. ANSWER: [D]

Explanation: You know that Sodium hydrogen carbonate (NaHCO_3) is a basic salt. It is produced by the neutralization reaction between a strong base (NaOH) and a weak acid (H_2CO_3). You should go with the option [D].

36. ANSWER: [B]

Explanation: As we know that our stomach has a lining mucus cells. The mucus is secreted in the gastric juice by the glands present in the stomach wall of stomach from its own secretions of hydrochloric acid (HCl). HCl will cause the erosion of inner lining of stomach, but there is condition. Generally, it will happen when mucus is not secreted, leading to ulcer formation. You must go with option [B].

37. ANSWER: [C]

Explanation: 1) One of the functions of blood is transport oxygen, carbon dioxide, enzymes, hormones etc. from one part of body to another so this statement is incorrect.

2) Statement (b) is incorrect, because Human heart has four chambers-2 Atria and 2 ventricles.

3) Both oxygen-rich and oxygen-deficient blood does not get mixed in the human heart as it has four chambers. The left side chamber-left atrium and left ventricle carry only oxygenated blood. Whereas right Atrium and right ventricle have only the deoxygenated blood and they do not get mixed in the process of circulation. Therefore, this statement is incorrect.

4) Valves prevent backward flow of blood as they are located at each end of two ventricles and act as one way inlet. You should go with the option [D].

38. ANSWER: [A]

Explanation: You must know that small intestine receives juices from liver, pancreas, and walls of small intestine. Bile juice from liver emulsifies the fats and makes the medium alkaline. Pancreas and small intestine juices contain amylase, lipase, and trypsin.

The function of these enzymes is:

Fats (Lipase / breakdown)	→	Fatty acid + Glycerol
Carbohydrate (Amylase / breakdown)	→	Glucose
Proteins (Trypsin / breakdown)	→	Amino acid

You should go with the option [D].

39. ANSWER: [D]

Explanation: Remember when air passes through the nasal cavity and take it as respiration. But that air is filtered by the nostrils, and moistened by mucus, before air is going into the lungs. And gets warmer equal to the temperature of the body.

40. ANSWER: [D]

Explanation: You should remember that arteries are the many characteristics as

i) It is valve less blood vessels

ii) It serve to transport the blood away from the heart.

iii) The thick strong elastic walls of arteries withstand the high pressure of blood coming from heart. You should go with the option [D].

41. ANSWER: [C]

Explanation: Living organisms are well organised to structure, they can have tissues, tissues also have cells, and cells have smaller components in them. Leaving organisms skip repairing and maintaining their structures by self. All these structures are made up of molecules and molecules must moves around all the time of all cells. Cell membrane which is permeable and molecules can move into or out of cells by diffusion and transport.

42. ANSWER: [C]

Explanation: Steps of photosynthesis are as follows:

(1) Absorption of light energy by chlorophyll.

(2) Reduction carbohydrates of carbon dioxide to

(3) In the process of photosynthesis generally light energy converted to chemical energy and water molecules, splitting into hydrogen and oxygen.

Your answer will be option [C].

43. ANSWER: [B]

Explanation: You must know that - the concave mirror forms the image of the distant object at its focus. We conclude from figure, that the object (MW) distance while the image distance is (MS) which is equal to the focal length of the mirror. Therefore, to find out the focal length of the mirror, the student needs to measure MS.

44. ANSWER: [C]

Explanation: To form an image at infinity by convex lens is that when any object is placed at the focus of a convex lens, the convex lens converts the diverging rays of light coming from the object into a parallel beam of light.

45. ANSWER: [A]

Explanation: When a light passing by the principal focus of a convex lens, there will be refraction, but after refraction will emerge parallel to the principal axis.

46. ANSWER: [B]

Explanation: The light rays from sun incident parallel all the rays converge at the principal focus. The focal length is 15 cm and size of image and object will be same if the object is placed at $2 \times f$. Hence, in this situation object must be placed at:

$2f$ or $2 \times 15 = 30$ cm. You should go with the option [B].

47. ANSWER: [C]

Explanation: The speed of light in a medium is inversely proportional to the refractive index of the medium. And the amount of bending is also inversely proportional to the refractive index of the medium. As the refractive index of water is the least out of the given media, it is optically rarer as compared to the other media. So, light will bend the least in water.

48. ANSWER: [C]

Explanation: Graphite cannot be used as insulating material. Polyvinyl Chloride (PVC) is used as an insulating material for covering electric wires. Sulphur is a non-metal although non-conductor of electricity. So, cannot be used as insulating material. Hence, you should go with option [C].

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: [B]

Explanation: Figure One depicts (i) white emergent beam and laterally displaced. Figure Three depicts (iii) the second prism is white only. Figure two depicts (ii) seven colours bent in different angles as emergent beam of a spectrum.

Similarity between (i) and (iii) as both emergent rays are white in colour. Hence, you should go with option [C].

50. ANSWER: [A]

Explanation:

$$\sin i / \sin r = \sin 45^\circ / \sin 30^\circ \\ = (1/\sqrt{2}) / (1/2) = \sqrt{2}$$

51. ANSWER: [B]

Explanation: Speed of light is different in different media. As the medium changes, the light has to choose a path of minimum time.

Hence, the direction of the light changes. This phenomenon is known as refraction of light.

52. ANSWER: [C]

Explanation: Refractive index being a ratio of two similar quantities hence has no unit.

Case - 2:

53. ANSWER: [B]

Explanation: You must know that – transpiration process is very low, At night, when there is no sunlight, but the absorption of substances by roots remains high.

54. ANSWER: [B]

Explanation: Xylem & phloem both conduct water & minerals, food etc. But difference is that Xylem conducts water for tissue and minerals and consists of vessels, tracheids, and xylem parenchyma. Phloem on the other hand transports the dissolved products of photosynthesis. Hence, your answer will be option [B].

55. ANSWER: [D]

Explanation: Always remember that, xylem transports water and minerals to different parts of the plant in upward direction after taking from the soil. As soil the source of water & minerals. Phloem transports the soluble things, for “photosynthesis” which is done from the leaves, to different parts of the plant by using energy. Hence, you should choose the option [D].

56. ANSWER: [C]

Explanation: Transpiration pulls –

- 1) During the day in the xylem, there are the major driving force created in plant as the movement of water.
- 2) The stomata are open and helps in the absorption and upward movement of water and minerals dissolved in it from roots to the leaves.
- 3) Transpiration also regulates temperature.

Hence, you should choose the option [C].

[Note: Remember, root pressure in transport of water is more important (at night)].

Case – 3:

57. ANSWER: [D]

Explanation: We all know that light is travelling from a denser medium to a rarer medium, at a certain angle which is greater than the critical angle, the light undergoes total internal reflection. And mirage is phenomenon which generally happens in warmer condition or summer days. Where total internal reflection occurs while in hotter days light travels into denser medium to rarer medium and bends away from the normal. Due to refraction & responsible to produced mirage phenomenon.

58. ANSWER: [C]

Explanation: You must know that, on hot sunny days in deserts or road surfaces when the air just above the ground is much hotter than the air above it, Mirages are formed. Hence, your answer should be option [C].

59. ANSWER: [B]

Explanation: 1) As we know that when - light is travelling from a denser medium to a rarer medium, at a certain angle which is greater than the critical angle, the light undergoes total internal reflection.

2) Generally, Mirage is formed on a hot day when the air just above the ground is hotter than the air above it.

3) To making a mirage, hotter air plays an important role. As hotter air is optically rarer than cooler air, light traveling from a distant object travels from a denser medium to a rarer medium. After that it bends away from the normal. And mirage produced.

60. ANSWER: [A]

Explanation: We must know that - our atmospheric is responsible for refraction and occurs in a medium of gradually changing index of refractive. So, light rays undergo refraction continuously before it reaches the earth when it coming from the sun or stars on entering the earth's atmosphere.