**SINDHI HIGH SCHOOL, BENGALURU**

**I PREBOARD EXAMINATION, 2023-24**

**SUBJECT: SCIENCE (086)**

**CLASS: X – SET 2**

**MARKING SCHEME**

**DATE: 13/12/2023 MAX MARKS: 80**

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| **Qn. NO** | **VALUE POINT** | **Marks** |
| 1. | (d) (i) and (ii) | **1** |
| 2. | (b) 1, 6, 3, 2 | **1** |
| 3. | (c) combining with water when water is added | **1** |
| 4. | (d) 4, 3, 2, 1 | **1** |
| 5. | (c) sodium chloride | **1** |
| 6. | (b) Formic acid and zinc carbonate | **1** |
| 7. | (c) c | **1** |
| 8. | a) by splitting of a molecule of oxygen in to two atoms in the presence of high-energy UV radiations | **1** |
| 9. | (c) Round and yellow | **1** |
| 10. | (d) The thinking processes of the brain is not fast enough. | **1** |
| 11. | (b) DNA copying ensures organisms pass on the characteristic features to the offsprings | **1** |
| 12. | (b) diffusion is a slow process and all the cells of the body are not in direct contact with environment. | **1** |
| 13. | (b) ohm-metre | **1** |
| 14. | (c) Each turn contributes to magnetic field. | **1** |
| 15. | (d) i ,ii, iv | **1** |
| 16. | (d) Arteries carry blood away from the heart to various organs of the body under high pressure | **1** |
| 17. | (c) A is true but R is false. | **1** |
| 18. | (c) A is true but R is false. | **1** |
| 19. | (b) Both A and R are true and R is not the correct explanation of A. | **1** |
| 20. | (a) Both A and R are true and R is the correct explanation of A. | **1** |
| 21. | Ionic bond and example Al2O3 (1)  1) Ionic compounds are solid. Ionic bond has greater force of attraction because of which ions attract each other strongly. This makes ionic compounds solid.  2) Ionic compounds are brittle.  3) Ionic compounds have high melting and boiling points.  4) Ionic compounds generally dissolve in water.  (Any two properties of ionic compounds) (½ + ½) | **(2)** |
| 22. | Yes . (½)  Mucous forms a lining in the stomach before the release of gastric juice and protects the lining from action of hydrochloric acid. (1)  In the absence of mucous the lining may get burnt due to the acid (½) | **(2)** |
| 23. | i) If the septum of the human heart is not formed completely then there are possibilities of mixing of oxygenated and deoxygenated blood. (1)  ii) The efficiency of transport system is reduced resulting in supply of mixed blood to all the cells of the body. (1)  **OR**  i) Root pressure helps in movement of water absorbed by roots towards the stem and it is more efficient during night time. (1)  ii) Suction pressure created due to transpiration and helps in upward movement of water in plants it is more efficient during day time. (1) | **(2)** |
| 24. | Ability of eye to vary focal length of eye lens depending on position of object is power of accommodation. (1)  i) when object is nearer to the eye , the lens becomes thick and power increases and that object can be seen clearly. (½)  ii) when object is farther from the eye, the lens becomes thin. Focal length increases and object can be seen clearly. (½)  **OR**  The light composed of seven spectral colours is white light (½)  The colour below Red is orange color while that above violet is Indigo. (½)  The speed of orange light is less than Red light while that of Indigo light is greater than that of Violet light. (1) | **(2)** |
| 25. | (a) (i) it is used as an electro magnet  (ii)used to make permanent magnets (½) X 4  (b) i) magnetic field lines are parallel to each other inside.  ii) they are closely spaced at the ends. | **(2)** |
| 26. | * In few reptiles the temperature at which fertilize eggs are kept determines weather the animals developing in the eggs will be male or female * In snails the individuals can change sex, indicating that sex is not genetically determined. * In humans individual is largely genetically determined (any two) | **(2)** |
| 27. | When copper is heated a black residue is formed in the dish due to the formation of copper(II) oxide. The following reaction is:  2Cu + O2 -----🡪2CuO  (1½)  ii) Again when CuO is treated with hydrochloric acid, the colour of the solution turns bluish green due to the formation of soluble cupric chloride,  CuO + 2HCl----🡪CuCl2 +H2O (1½) | **(3)** |
| 28. | (a) Sodium reacts vigorously with cold water and forms a clear solution of sodium hydroxide (alkali) and hydrogen gas is released. The reaction is so exothermic that hydrogen gas catches fire and the sparks can be seen.  2Na(s) + 2H2O(l) → 2NaOH(aq) + H2(g) (1½)  (b) Aluminium does not react with water at room temperature or even hot water, but it reacts with steam and forms a thin black layer (coating) of aluminium oxide on its surface which prevents its further reaction with steam and reaction stops there.  2Al+3H2O→Al2O3+3H2 (1½)  **OR**  In the electrolytic purification of copper, impure copper is made into an anode and a thin line of pure copper is made into a cathode, a copper salt solution is used as an electrolyte. (1)  The following reactions occur at anode and cathode: (1)  **Diagram with labelling (1)** | **(3)** |
| 29. | diagram (1)  Labelling => a) Site of pollination = Stigma  b) Female gamete = Egg  c) ovules  d) Region which forms the fruit = Ovary (½ X4) | **(3)** |
| 30. | To prove Characters get segregated during gamete formation . (1½)        Monohybrid phenotypic ratio = 3 tall : 1 short (½)  Monohybrid genotypic ratio= TT:Tt :tt===1:2:1 (½)  **Inference :** the cross between parental generation yields only tall plants . the short character stays hidden which is again shown in the F2 Generation when the F1 plants are selfed. This experiment proves that the characters get segregated during gamete formation. (½) | **(3)** |
| 31. | a) i) All measurements in the direction of incident light and parallel the principal axis are positive. (½)  ii) All measurements perpendicular to the principal axis and above it are positive. (½)  (Any other valid sign conventions)  (b) Uses of concave mirror:  (i) It is used as a reflector in head lights of automobiles. (½)  (ii) It is used in search lights. (½)  (c) Uses of convex lens  (i) It is used in a microscope. (½)  (ii) It is used by watch maker. (½) | **(3)** |
| 32. | a) The statement means that the velocity of light is 1/1.7 times the velocity of light in vacuum. (1)  b) (i) ng a = ; C = ng a X Vg = X 2X 108 = 3X 108m/s (1)  ii) Vw = 3X 108 X = 2.25 X 108m/s (1) | **(3)** |
| 33. | a) i) Right hand thumb rule states that when a straight current crrying conductor is held in the right hand such that the THUMB points the direction of current then the other fingers which encircle around the conductor indicate direction of magnetic field. (1)  ii) They are circular in shape (½)  They are farther from each other at points farther from the metal rod. (½)  b) The strength of the magnetic field can be enhanced by increasing the current value. (1) | **(3)** |
| 34. | (a) Compound A C3H8 is saturated hydrocarbon (alkane) and compound B C3H6 is unsaturated hydrocarbon with a double bond (alkenes). As we know that addition reactions are a characteristic property of unsaturated hydrocarbons thus the compound B is most likely to show addition reaction. (2)  (b) Addition of H2 to unsaturated hydrocarbon in presence of Nickel catalyst when they are heated. it gives saturated hydrocarbon. Hydrogenation of oil: Vegetable oil like ground nut oil which is liquid at room temperature undergoes addition reaction and gives vegetable ghee or dalda. (1)  (c) Nitrogen atom has five valence electrons. It achieves the nearest noble gas electronic configuration by sharing three electrons with another nitrogen atom. Therefore, between 2 nitrogen atoms, three electron pairs are shared to form a molecule with a triple bond.    (2) **OR**  (a) (i) 2,3 dimethyl butane  (ii) 1,1 dibromo ethane (1X2=2)  (b) (i) ketone (ii) aldehyde (½ X 2=1)  (c)  (½ +1½) | **(5)** |
| 35. | (a) Nerve cell releases neurotransmitters at the near the nerve endings into the synapse. These neurotransmitters stimulate the proteins present in the muscle cells rearrange themselves. This changes the shape of muscle cell reorganisation changes shape of muscle cell resulting in contraction. When protein come back to original position muscles relax. (2)  (b) The nerve cell consists of receiving end and transmitting end . The dendrites are the receiving end which receives chemical signals from adjacent nerve endings. These chemical signals are converted into electrical impulses and transmitted along the axon of the nerve cell . these nerve impulses are converted to chemical signals at the nerve endings and released into the synapse. These neurotransmitters are taken up by the adjacent dendritic tip (2)  (c) the sensory receptors present in  tongue= gustatory nerve, and  in nose = olfactory nerve (1)  **OR**  (a) The chemical coordination is better than nervous coordination because – (1+1+1)   1. Chemical coordination is brought about by hormones, It reaches each and every cell of the body. Nerve impulse reach specific organs or tissues 2. Chemical coordination has a feedback mechanism due to which the transmission of messages can be regulated according to the need of the body . Nerves donot have this mechanism 3. The hormones can be released continuously by the glands as they do not require time to reset their mechanism before the next message is transmitted as in case of neurons .   b) Plants also respond to stimuli by tropic and nastic movements (1+ 1) (any one example)  plants respond by growing towards or away from the stimuli present in the external environment like sunlight, water or chemical .  Example :growth of roots towards water – hydrotropism  growth of shoot towards sunlight – phototropism  growth of root towards gravity – geo tropism | **(5)** |
| 36. | Ohm’s law states that when physical conditions remain same and temperature is kept constant current flowing in a conductor is directly proportional to the applied potential difference. (1)  The circuit is arranged as shown in the circuit diagram. (1)  Current values(I) noted for different values of potential difference (V).  Resistance(R) is computed for each pair of I and V values.  We find that the ratio of remains the same (2)  A graph is plotted as shown and the slope of the V-I graph gives the unknown Resistance value. Thus, the law is verified. (1)  **OR**  The resistance offered by a cubical conductor of length 1 m and area of cross section 1m2 is Resistivity. (1)  Factors: Temperature and material of the conductor. (½ + ½)  The length area of cross section and Resistance of the conductor are l, a and R respectively.  So, R =  When the lengh is doubled then let area of cross section be a’.  Resistance changes and becomes R’ = 4 R  Ratio of resistances is R : R’ is 1 : 4 (3) | **(5)** |
| 37. | (a) 4Fe+3O2+x.H2O→2Fe2O3.xH2O (1)  (b) galvanization, oiling, greasing, painting, chrome plating, alloying (any 2) (1)  (c) It can be defined as a homogeneous mixture of two or more metals or a metal and a nonmetal. Brass is composed of Copper (60%) and Zinc (40%). Any one use (1+½+ ½)  OR  Amalgam is an alloy of mercury with one or more metals. Sodium along with liquid mercury is known as sodium amalgam. Amalgam of mercury with tin, silver and zinc is widely used in dental filling. (1+½+ ½) | **(4)** |
| 38. | 1. Biomagnification is the cumulative accumulation of harmful non-biodegradable waste in the food chains. (1)  2. Biomagnification leads to altered metabolism , infertility, turns tissues toxic and even death of organisms especially in higher tropic levels. (any two) (1)  3. Improper disposal of waste from mining industry, chemical factories, usage of insecticides and pesticides in agriculture and microplastics, released directly into water (any 2) (1)  4. Segregation of waste, proper disposal of non- biodegradable waste, increasing usage of biodegradable materials, adopting 3R.s (any 2) (1)  **OR**  Proper disposal of waste results in segregation of waste. Biodegradable waste is sent to compostry while non-biodegradable waste can be recycled, which prevents excessive mining, contamination and leaching of minerals in land fields etc. (1) | **(4)** |
| 39. | i) variation in velocity of light. (1)  ii) The bending of light is more when the optical dendity is more. (1)  iii) Diamond; Because its Refractive index is maximum. (1+1)  **OR**  iv) The ray of light travels without refraction. Because the angle of incidence is ZERO. (1+1) | **(4)** |