

Solved Paper 2018

Science CLASS-X

Time : 3 Hours

Max. Marks : 80

General Instructions :

- (i) The questions paper comprises **two** Sections A, B. You are to attempt all the sections.
- (ii) All questions are **compulsory**.
- (iii) Internal choice is given in sections B, C, D and E.
- (iv) Question numbers **1 and 2** in Section A are one mark questions. They are to be answered in **one** word or in **one** sentence.
- (v) Question numbers **3 to 5** in Section B are two marks questions. These are to be answered in about **30** words each.
- (vi) Question numbers **6 to 15** in Section C are three marks question. These are to be answered in about **50** words each.
- (vii) Question numbers **16 to 21** in Section D are **five** marks questions. These are to be answered in about **70** words each.
- (viii) Question numbers **22 to 27** in Section E are based on practical skills. Each question is a **two** marks question. These are to be answered in brief.

Delhi Set I

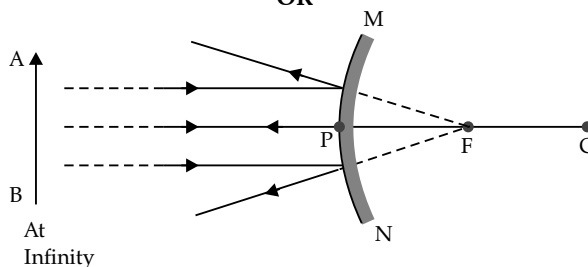
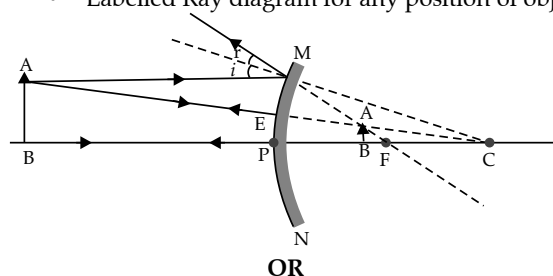
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SECTION - A

1. A Mendelian experiment consisted of breeding pea plants bearing violet flowers with pea plants bearing white flowers. What will be the result in F_1 progeny ? 1
Ans. Violet flowers
2. Write the energy conversion that takes place in hydropower plant. 1
Ans. Potential/Kinetic/Mechanical Energy into Electrical energy.
3. A compound 'X' on heating with excess conc. sulphuric acid at 443 K gives an unsaturated compound 'Y'. 'X' also reacts with sodium metal to evolve a colourless gas 'Z'. Identify 'X', 'Y' and 'Z'. Write the equation of the chemical reaction of formation of 'Y' and also write the role of sulphuric acid in the reaction. 2
Ans.
 - X-Ethanol/ (C_2H_5OH) Ethyl Alcohol
 - Y- Ethene / (C_2H_4)
 - Z- Hydrogen/ (H_2)
 - $CH_3 - CH_2OH \xrightarrow{\text{conc}H_2SO_4} CH_2 = CH_2 + H_2O$
 - Role of sulphuric acid – dehydrating agent(Any two)
4. (a) Name one gustatory receptor and one olfactory receptor present in human beings.
 (b) Write *a* and *b* in the given flow chart of neuron through which information travels and as an electrical impulse. 2

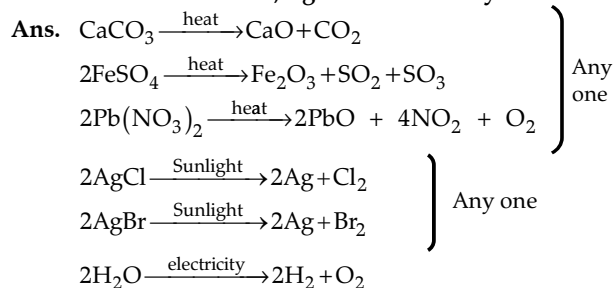
Den-drite	→	a	→	b	→	End point of Neuron
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- Ans.** (a) Gustatory receptor is present in tongue and olfactory receptor is present in nose.
- (b) (a) Cell body/ cyton
 (b) Axon
5. If the image formed by a spherical mirror for all position of the object placed in front of it is always erect and diminished, what type of mirror is it ? Draw a labelled ray diagram to support your answer. 2
- Ans.**
 - Convex Mirror
 - Labelled Ray diagram for any position of object



Note: If arrows not marked, $\frac{1}{2}$ mark to be deducted. 1+1=2

6. Decomposition reactions require energy either in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity. 3



(or any other equation for above decomposition reaction.)

Note: No marks to be deducted if equations are not balanced.

7. 2 mL of sodium hydroxide solution is added to a few pieces of granulated zinc metal taken in a test tube. When the contents are warmed, a gas evolves which is bubbled through a soap solution before testing. Write the equation of the chemical reaction involved and the test to detect the gas. Name the gas which will be evolved when the same metal reacts with dilute solution of a strong acid. 3

OR

The pH of a salt used to make tasty and crispy pakoras is 14. Identify the salt and write a chemical equation for its formation. List its two uses.

- Ans. • $\text{Zn} + 2\text{NaOH} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$
Sodium zincate
- When a burning splinter is brought near the gas, it burns with a pop sound.
 - Gas - Hydrogen / H_2
- OR
- NaHCO_3 (Sodium Hydrogen Carbonate/ Sodium Bicarbonate)
 - $\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3$

Uses:

For making baking powder

As ingredient of antacid.

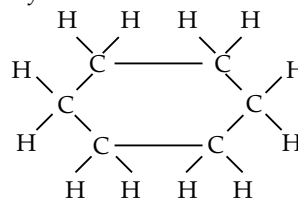
Soda-acid fire extinguishers (Any two)

Note: As no salt can have pH = 14, give full credit for any attempt of the candidates.

8. (a) Why are most carbon compounds poor conductors of electricity ?
- (b) Write the name and structure of a saturated compound in which the carbon atoms are arranged in a ring. Give the number of single bonds present in this compound. 3

- Ans. (a) Carbon compounds form Covalent bonds/ do not dissociate into ions/ do not have charged particles (ions)

- (b) Cyclohexane



Total no. of single bonds = 18

(OR any other cycloalkane with corresponding number of bonds)

9. Name the hormones secreted by the following endocrine glands and specify one function of each: (a) Thyroid (b) Pituitary (c) Pancreas. 3
- Ans. (a) Thyroxine, regulates carbohydrate protein and fat metabolism/ controls metabolism for balance of body growth.
- (b) Growth hormone, regulates growth and development of body. (or any other correct answer)
- (c) Insulin, regulates/ decreases blood sugar level.

OR

Glucagon, regulates / increases blood sugar.

10. Write one main difference between asexual and sexual mode of reproduction. Which species is likely to have comparatively better chances of survival — the one reproducing asexually or the one reproducing sexually ? Give reason to justify your answer. 3

Ans. Any one of the following difference:

- (i) In sexual reproduction two opposite sexes are involved where as in asexual reproduction only one individual is involved.
- (ii) In sexual reproduction male and female gamete formation takes place where as in asexual no gamete formation occurs.
- Sexually reproducing organisms have better chances of survival
 - Because more variations are generated.

11. State the laws of refraction of light. Explain the term 'absolute refractive index of a medium' and write an expression to relate it with the speed of light in vacuum. 3

OR

What is meant by power of a lens ? Write the SI unit. A student uses a lens of focal length 40 cm and another of - 20 cm. Write the nature and power of each lens.

Ans. Laws of Refraction of light:

1st law: The incident ray, refracted ray and normal to the interface at the point of incidence lie in the same plane.

2nd law: The sine of angle of incidence bears a constant ratio with sine of angle of refraction for a given pair of media. Or $\frac{\sin i}{\sin r} = \text{constant}$

Absolute refractive index of a medium

$$= \frac{\text{speed of light in air (c) or vacuum}}{\text{speed of light in medium (v)}}$$

(Award full marks if the same thing is given in the form of statement)

OR

Power of lens = Ability to converge / diverge light rays passing through it/ reciprocal of the focal length in metres $\frac{1}{f}$ (in metres)

SI unit of power is Dioptre

$$\text{Power of 1st lens } P_1 = \frac{100}{f_1} = \frac{100}{40 \text{ cm}} = +2.5D$$

Nature: Converging lens / Convex lens

$$\text{Power of 2nd lens } P_2 = \frac{100}{f_2} = \frac{100}{-20 \text{ cm}} = -5D$$

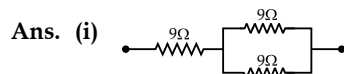
Nature: Diverging lens / Concave lens

12. Show how would you join three resistors, each of resistance 9Ω so that the equivalent resistance of the combination is (i) 13.5Ω , (ii) 6Ω ? 3

OR

(a) Write Joule's law of heating.

(b) Two lamps one rated $100 \text{ W}; 220 \text{ V}$, and the other $60 \text{ W}; 220 \text{ V}$, are connected in parallel to electric mains supply. Find the current drawn by two bulbs from the line, if the supply voltage is 220 V .

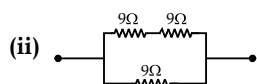


Two 9 ohm resistors in parallel connected to one 9 ohms in series

$$\frac{1}{R_p} = \frac{1}{9} + \frac{1}{9} = \frac{2}{9}$$

$$\therefore R_p = \frac{9}{2} \Omega$$

$$R = 9\Omega + \frac{9}{2}\Omega = 13.5\Omega$$



Two 9 ohm resistors in series connected to one 9 ohms in parallel

$$R_s = 9\Omega + 9\Omega = 18\Omega$$

$$\frac{1}{R} = \frac{1}{18} + \frac{1}{9} = \frac{3}{18}$$

$$\therefore R = 6\Omega$$

Note: Deduct $\frac{1}{2}$ mark if calculations are not given.

OR

(a) **Joule's law of heating:** Heat produced in a resistor is (i) directly proportional to the square of current for a given resistance, (ii) directly proportional to the resistance for a given current and (iii) directly proportional to the time for which the current flows through the resistor / $H = I^2Rt$ where, H = Heat produced, I = current, R = Resistance of the conductor and t = Time for which the current flows through the resistor.

Note : If the candidate gives only the expression $H = I^2Rt$ award $\frac{1}{2}$ mark only.

(b) Current in 1st bulb

$$I_1 = \frac{P_1}{V} = \frac{100}{220} = \frac{5}{11} \text{ A or } 0.45 \text{ A}$$

Current in 2nd bulb

$$I_2 = \frac{P_2}{V} = \frac{60}{220} = \frac{3}{11} \text{ A or } 0.27 \text{ A}$$

13. (a) List the factors on which the resistance of a conductor in the shape of a wire depends.
 (b) Why are metals good conductors of electricity whereas glass is a bad conductor of electricity? Give reason.
 (c) Why are alloys commonly used in electrical heating devices? Give reason. 3

Ans. (a) Factors on which resistance of a conductor depends:

- (i) Length of conductor [or $R \propto \ell$]
 (ii) Area of cross-section of the conductor [or $R \propto 1/A$]

(b) Metals are good conductor of electricity – as they have low resistivity/ have free electrons

Glass is a bad conductor of electricity – as it has high resistivity/have no free electrons

(c) Reason:

Alloys have high resistivity /high melting point/ alloys do not oxidize (Or burn) readily at high temperatures. (Any one)

14. Students in a school listened to the news read in the morning assembly that the mountain of garbage in Delhi, suddenly exploded and various vehicles got buried under it. Several people were also injured and there was traffic jam all around. In the brain storming session the teacher also discussed this issue and asked the students to find out a solution to the problem of garbage. Finally they arrived at two main points – one is self management of the

garbage we produce and the second is to generate less garbage at individual level.

- (a) Suggest two measures to manage the garbage we produce.
- (b) As an individual, what can we do to generate the least garbage? Give two points.
- (c) List two values the teacher instilled in his students in this episode. 3

Ans. (a) Incineration / Waste compaction / Biogas generation / Composting / Segregation and safe disposal / Vermicomposting

(Any other) (Any two)

- (b) Reuse of empty bottles, books etc.
Reduce the use of non-biodegradable substances like polythene, thermocol etc.

(Any other)

- (c) Awareness about environment, scientific attitude, Concern for community health and personal health (Any two)

15. What is dam? Why do we seek to build large dams? While building large dams, which three main problems should particularly be addressed to maintain peace among local people? Mention them. 3

Ans. (a) Dam is a barrier that is built across a river or a stream for storage of water. 1

- (b) Large dam can ensure the storage of adequate water for irrigation and also for generating electricity. 1

- (c) Social problem, economic problem and environmental problem. 1

(CBSE Marking Scheme, 2018)

Detailed Answer:

A dam is a barrier that stops or restricts the flow of water or underground streams.

A dam is built to control water through placement of a blockage of earth, rock across a stream or river. They usually store water in a reservoir, which is then used for a variety of applications such as irrigation and municipal water supplies.

Three main problems that arise because of the construction of big dams are :

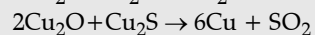
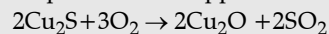
- (i) Construction of dams across rivers leads to deforestation, which results in the loss of biodiversity.
- (ii) Constructing reservoir may result in the flooding of nearby towns and villages.
- (iii) Construction of dams requires a huge amount of monetary investments.

16. (a) Write the steps involved in the extraction of pure metals in the middle of the activity series from their carbonate ores.

- (b) How is copper extracted from its sulphide ore? Explain the various steps supported by chemical equations. Draw labelled diagram for the electrolytic refining of copper. 3

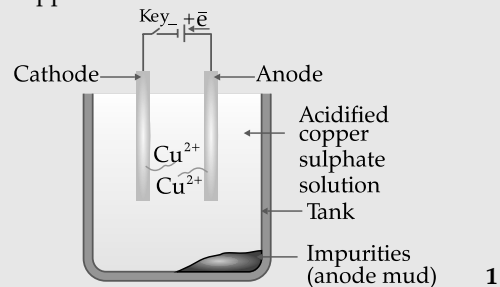
Ans. (a) (i) Calcination (ii) Reduction (iii) Purification (in the given sequence only) 1

- (b) Sulphide ore of copper is heated in air



(Note: Full marks to be awarded even when only equations are written) 1

- (c) Labelled diagram of electrolytic refining of copper



(CBSE Marking Scheme, 2018)

- *17. (a) The modern periodic table has been evolved through the early attempts of Dobereiner, Newland and Mendeleev. List one advantage and one limitation of all the three attempts.

- (b) Name the scientist who first of all showed that atomic number of an element is a more fundamental property than its atomic mass.

- (c) State Modern periodic law. 3

18. (a) Mention any two components of blood.

- (b) Trace the movement of oxygenated blood in the body.

- (c) Write the function of valves present in between atria and ventricles.

- (d) Write the structural difference between the composition of artery and veins. 5

OR

- (a) Define excretion.

- (b) Name the basic filtration unit present in the kidney.

- (c) Draw excretory system in human beings and label the following organs of excretory system which perform following functions :

- (i) form urine.

- (ii) is a long tube which collects urine from kidney.

- (iii) store urine until it is passed out.

Ans. (a) Plasma, red blood cells, white blood cells, platelets (any two)

- (b) Lungs → Left side of the heart → aorta → body organs 2

Note: Give weightage even if same thing is explained in the form of paragraph.

- (c) Prevent back flow of blood

- (d) Artery has thick elastic wall and vein is thin walled/ valves are present in the veins and not in arteries. 3

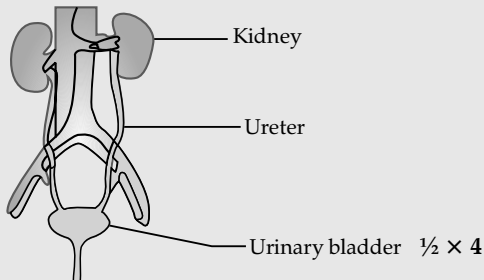
(CBSE Marking Scheme, 2018)

Detailed Answer:

- (a) Two components of Blood are — Plasma and Blood Corpuscles.
- (b) Oxygenated blood arrives at the left hand side of the heart. It enters the heart through the pulmonary vein. Blood is pumped into the left ventricle. Blood is pumped out of the heart, along the aorta, to the rest of the body.
- (c) As the heart muscle contracts and relaxes, the valves open and shut, letting blood flow into the ventricles and atria at alternate times. When the left ventricle contracts, the mitral valve closes and the aortic valve opens, so blood flows into the aorta.
- (d) Artery wall is thick and valves are absent whereas vein wall is thin and valves are present.

OR

- Ans. (a)** Process involved in removal of nitrogenous / harmful metabolic waste from the body.
- (b) Nephron.
- (c) Diagram of Human Excretory System : 3
- Labelling of the following parts**
- (i) kidney
 - (ii) Ureter
 - (iii) Urinary bladder
 - (iv) Urethra



(CBSE Marking Scheme, 2018)

19. (a) Write the function of following parts in human female reproduction system:
- (i) Ovary (ii) Oviduct
 - (iii) Uterus
- (b) Describe in brief the structure and function of placenta. 2

- Ans. (a)** (i) **Ovary** – releases egg/ female gamete/ ovum releases oestrogen/ female hormones (any one)
- (ii) **Oviduct** – Transportation of ovum/ egg from ovary to the uterus/ Site of fertilisation
- (iii) **Uterus** – Development of embryo/ foetus
- (b) **Placenta** – It is a disc embedded in uterine wall which contains villi on the embryo side of the tissue and blood space on mother side.
- Function of placenta:** Provides nourishment to embryo from mother's blood / Removal of waste from embryo to mother's blood. (Any one)

20. (a) A student is unable to see clearly the words written on the black board placed at a distance

of approximately 3 m from him. Name the defect of vision the boy is suffering from. State the possible causes of this defect and explain the method of correcting it.

- (b) Why do stars twinkle ? Explain. 2

OR

- (a) Write the function of each of the following parts of human eye :
- (i) Cornea (ii) Iris
 - (iii) Crystalline lens (iv) Ciliary muscles
- (b) Why does the sun appear reddish early in the morning ? Will this phenomenon be observed by an astronaut on the Moon ? Give reason to justify your answer. 3

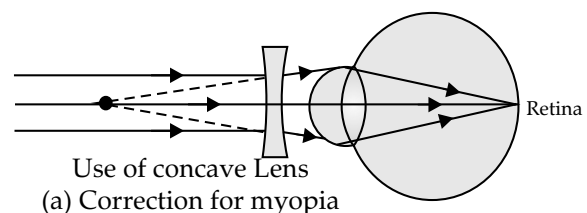
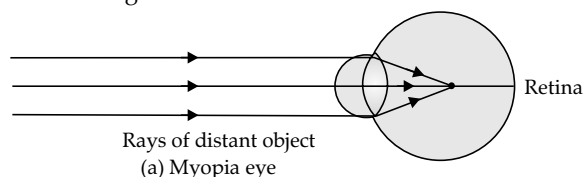
- Ans. (a)** Defect of vision – Myopia or short sightedness or near sightedness 1
- Causes of myopia : (i) Excessive curvature of eye lens / eye lens becomes more converging 1
- (ii) Elongation of eye ball
- Methods of correction : By the use of concave lens of suitable power or focal length the defect is corrected. / suitable diagrammatic representation. 1

- (b) Due to atmospheric refraction
- The density of different layers of air keeps on changing due to which the apparent image of the stars keeps on changing.
- This changing position of stars appears as twinkling of stars. 2

(CBSE Marking Scheme, 2018)

Detailed Answer:

- (a) The defect is Myopia or short-sightedness *i.e.*, Inability of an eye in viewing long distance objects. This defect is caused by an elongation of eye-ball and excessive curvature of the lens.
- The short-sightedness is corrected by using a concave lens which diverges and shifts the image to the retina.



- (b) Stars are very distant and approximately point-sized sources. Path of star light changes continuously due to gradual changing of refractive index of the layers of earth's atmosphere. Thus, the apparent position of the stars fluctuates and the amount of star light

entering the eye flickers giving the twinkling effect.

OR

Ans. (a) **Function of:**

- **Cornea:** focuses light rays / Permits the light to enter the eye.. 1
- **Iris:** Controls amount of light entering the eye. / Controls the size of pupil. 1
- **Crystalline Lens:** Converges light rays onto retina. 1
- **Ciliary Muscles:** Adjusts focal length of eye lens by contraction and relaxation so that sharp image can be obtained on the retina. / Helps in accommodation 1

(b) In early morning, sun light has to cover larger distance in the atmosphere. So, the shorter wavelengths scatter out. Only the longer wavelengths like red reach our eye.

On moon – No 1

Cause : Moon has no atmosphere
(CBSE Marking Scheme, 2018)

21. (a) State Fleming's left hand rule.
(b) Write the principle of working of an electric motor.
(c) Explain the function of the following parts of an electric motor.
- (i) Armature (ii) Brushes
(iii) Split ring 5

Ans. (a) **Fleming's left-hand rule:** Stretch the forefinger, middle finger and thumb of left hand in such a way that they are mutually perpendicular to each other. If the forefinger point in the direction of magnetic field, middle finger point in the direction of current then the thumb show the direction of force or motion on the current carrying conductor.

(b) **Principle of working of electric motor:** A coil carrying electric current placed in an external magnetic field experiences a force.

(c) (i) **Function of armature:** Enhances the power of the motor/ induces motion.

(ii) **Function of brushes:** Helps easy transfer of charge between the coil and the external circuit.

(iii) **Function of split rings:** Reverses the direction of

current after each half rotation of the coil so that the coil can keep rotating continuously.

SECTION - B **

22. A student added few pieces of aluminium metal to two test tubes A and B containing aqueous solutions of iron sulphate and copper sulphate. In the second part of her experiment, she added iron metal to another test tubes C and D containing aqueous solutions of aluminium sulphate and copper sulphate.

In which test tube or test tubes will she observe colour change ? On the basis of this experiment, state which one is the most reactive metal and why. 2

23. What is observed when a solution of sodium sulphate is added to a solution of barium chloride taken in a test tube ? Write equation for the chemical reaction involved and name the type of reaction in this case. 2

24. List the steps of preparation of temporary mount of a leaf peel to observe stomata. 2

25. Name the process by which an amoeba reproduces. Draw the various stages of its reproduction in a proper sequence. 2

OR

A student is viewing under a microscope a permanent slide showing various stages of asexual reproduction by budding in yeast. Draw diagrams of what he observes. (in proper sequence).

26. An object of height 4.0 cm is placed at a distance of 30 cm from the optical centre 'O' of a convex lens of focal length 20 cm. Draw a ray diagram to find the position and size of the image formed. Mark optical centre 'O' and principal focus 'F' on the diagram. Also find the approximate ratio of size of the image to the size of the object. 2

27. The values of current (I) flowing through a given resistor of resistance (R), for the corresponding values of potential difference (V) across the resistor are as given below:

V (volts)	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0
I (amperes)	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0

Plot a graph between current (I) and potential difference (V) and determine the resistance (R) of the resistor. 2

