

FIRST PREBOARD EXAMINATION (2020-21)

CLASS: X

Subject: SCIENCE (086)

Date: 10 .01.2021

Time Allowed: 03 Hours

Maximum Marks: 80

General instructions:

- (i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. **All** questions are **compulsory**.
- (ii) Section-A - question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
- (iii) Section-B - question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.
- (iv) Section-C - question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.
- (v) Section-D - question no. 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
- (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (vii) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION A

- 1 List any two observations when Lead nitrate is heated in a dry test tube? 1

OR

A shiny brown coloured element 'X' on heating in air becomes black in colour. Name the element 'X' and the black coloured compound formed.

- 2 Give reasons why strong acid and concentrated acid does not mean the same thing. 1

- 3 Which of the following is an unsaturated hydrocarbon? 1

- a) C_5H_{12}
- b) C_7H_{14}
- c) C_7H_{16}
- d) C_6H_{14}

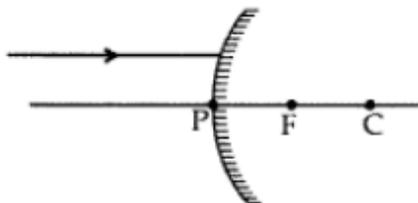
- 4 The sky appears dark instead of blue to an astronaut. State its reason. 1

- 5 Name the lens that forms a virtual, erect, and diminished image of an object. 1

- 6 Two thin lenses of power +3.5 D and -2.5 D are placed in contact. Find the power and focal length of the lens combination. 1

OR

A ray of light is incident on a convex mirror as shown. Redraw the diagram and complete the path of this ray after reflection from the mirror. Mark the angle of incidence and angle of reflection.



7 Two circular coils A and B are placed close to each other. If the current in the coil A is changed, will some current be induced in the coil B? Give reason. 1

8 No two magnetic field lines intersect each other. Give reason. 1

9 An ammeter is always connected in series with the circuit elements. What happens when it is connected in parallel with a circuit element? 1

OR

How much work is done in moving a charge of 4 C across two points having a potential difference 10 V?

10 How is lymph formed? 1

11 What is the relevance of residual volume of air in the lungs? 1

OR

Represent the pathway to show the breakdown of glucose in yeast cells.

12 What is the role of the respiratory pigment in animals? 1

OR

Where are the organs containing nephrons located in human body?

13 How do guard cells regulate the opening and closing of stomata? 1

For question numbers **14, 15 and 16**, two statements are given- one labelled **Assertion (A)** and the other labelled **Reason (R)**. Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

(a) Both A and R are true, and R is correct explanation of the assertion.

(b) Both A and R are true, but R is not the correct explanation of the assertion.

- (c) A is true, but R is false.
- (d) A is false, but R is true.

14 **Assertion:** Combustion reactions are also called exothermic oxidation reactions. 1

Reason: During combustion reaction oxygen is removed with large amount of heat.

15 **Assertion:** Consumers utilise the entire energy produced by Producers. 1

Reason: In living organisms chemical energy is stored in the form of food.

OR

Assertion: Greatest number of individuals are generally present at the lowest trophic level of an ecosystem.

Reason: Organisms in the lowest trophic levels of an ecosystem show maximum extent of biological magnification.

16 **Assertion:** Mendel chose garden pea as the material for his experiments. 1

Reason: Garden pea has well defined characters and is bisexual.

Answer Q. No 17 - 20 contain five sub-parts each. You are expected to answer any four subparts in these questions.

17 Read the following and answer any **four** questions from 17 (i) to 17 (v). 1×4

Human blood pressure can be measured using Sphygmomanometer. High blood pressure also called as hypertension. It is caused by the arteriole constriction.

Table A Normal Blood Pressure (BP)		
<u>Systolic Pressure (mm Hg)</u>	<u>Diastolic Pressure(mm Hg)</u>	<u>Pressure Range</u>
130	85	High Normal BP
120	80	Normal BP
110	75	Low Normal BP

Table B Approx. Ideal BP According to Age Chart		
<u>Age</u>	<u>Female</u>	<u>Male</u>
10	111/73	112/73
13	117/75	117/76
14	120/75	119/77
15	120/76	120/78
19-24	120/79	120/80
25-29	120/80	121/82
30-35	122/81	123/82
40-45	124/84	125/83
50-55	129/85	128/85
60+	134/84	135/88

- 17 (i) Arteriole constriction results in
- Lesser resistance to the flow of blood.
 - Greater resistance to the flow of blood.
- 17 (ii) As a person proceeds in life from teenage to old age, what trend is seen with respect to the blood pressure range?
- Fluctuates
 - Remains the same
 - Increases
 - Decreases
- 17 (iii) Choose the incorrect statement related to blood pressure.
- Blood pressure is the force exerted by blood against the wall of a blood vessel.
 - The pressure of blood inside the artery during ventricular contraction is diastolic pressure.

- c) The normal systolic pressure is 120 mm of Hg.
- d) The normal diastolic pressure is 80 mm of Hg.

- 17 (iv) The correct statement is
- a) Blood pressure in the veins is greater than that in the arteries.
 - b) Blood pressure in the arteries and veins will be equal.
 - c) Blood pressure in the arteries is greater than that in the veins.
 - d) All the 3 statements given above are correct.

- 17 (v) High blood pressure can lead to
- a) Stroke
 - b) Heart attack
 - c) Internal bleeding
 - d) all of these

18 Read the following and answer any **four** questions from 18 (i) to 18(v). 1×4

In 1913, Henry Moseley showed that the atomic number of an element is a more fundamental property than its atomic mass. Accordingly, Mendeleev’s Periodic Law was modified and atomic number was adopted as the basis of Modern Periodic Table and the Modern Periodic Law can be stated as follows: ‘Properties of elements are a periodic function of their atomic number.’

Periodic Table of the Elements

1 H Hydrogen																	2 He Helium
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon
11 Na Sodium	12 Mg Magnesium											13 Al Aluminum	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon
55 Cs Cesium	56 Ba Barium	57-71 Lanthanides	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon
87 Fr Francium	88 Ra Radium	89-103 Actinides	104 Rf Rutherfordium	105 Db Dubnium	106 Sg Seaborgium	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitnerium	110 Ds Darmstadtium	111 Rg Roentgenium	112 Cn Copernicium	113 Nh Nihonium	114 Fl Flerovium	115 Mc Moscovium	116 Lv Livermorium	117 Ts Tennessine	118 Og Oganesson
57 La Lanthanum	58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium			
89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium			

- 18 (i) Mendeleev's periodic table was based on :
- Atomicity
 - Atomic mass
 - Atomic number
 - Atomic size
- 18 (ii) Group 2 elements are also called as:
- Alkali metals
 - Alkaline earth metals
 - Noble gases
 - Halogens
- 18 (iii) The valency of halogens is
- 1
 - 2
 - 1
 - 2
- 18 (iv) The valency of halogens is
- 1
 - 2
 - 1
 - 2
- 18 (v) Element X forms a chloride with the formula XCl_2 , which is a solid with a high melting point. X would most likely be in the same group of the Periodic Table as:
- Na
 - Mg
 - Al
 - Si
- 19 Read the following and answer any **four** questions from 19 (i) to 19 (v) 1×4
Rajesh wanted to participate in school science fair. After registering his name for science fair he planned to build a box type solar cooker. A box type solar cooker consists of box covered by a thick transparent sheet

of glass. When the box with glass cover is placed in the sunlight, the glass cover allows the infra-red rays present in sunlight to pass into the box. Most of these infra-red rays are then absorbed by black surface of the box and the box becomes hot. A spherical surface reflector attached increases the efficiency of solar cooker by reflecting more and more sunlight towards the cooker.



- 19 (i) What type of reflecting surface is used in the figure shown above?
- a) Concave mirror
 - b) Convex mirror
 - c) Plane mirror
 - d) Flat mirror
- 19 (ii) What is the formula for magnification obtained by a spherical mirror?
- a) Inverse of the radius of curvature.
 - b) Double the focal length.
 - c) Ratio of height of image to height of object.
 - d) Inverse of the object distance.
- 19 (iii) While using the above device Rajesh obtained the best result when the cooker was placed at 50 cm from the centre of mirror. The focal length of the mirror is likely to be___.
- a) 25 cm
 - b) 50 cm

- c) 100 cm
- d) 10 cm

19 (iv) If the magnification produced by such a type of mirror is +4 then the object is placed _____.

- a) at the focus
- b) between the focus and the Centre of curvature
- c) between the focus and the pole
- d) beyond the Centre of curvature

19 (v) Rajesh after doing this activity, he found that the above mirror can also be used as shaving mirror as the image of an object can be obtained as

- a) virtual, erect and enlarged
- b) real, inverted and enlarged
- c) virtual and diminished
- d) virtual and same size

20 Read the following and answer any 4 questions from 20 (i) to 20 (v) 1×4

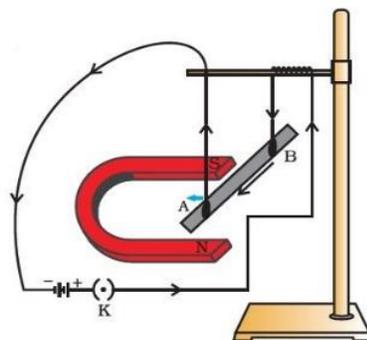
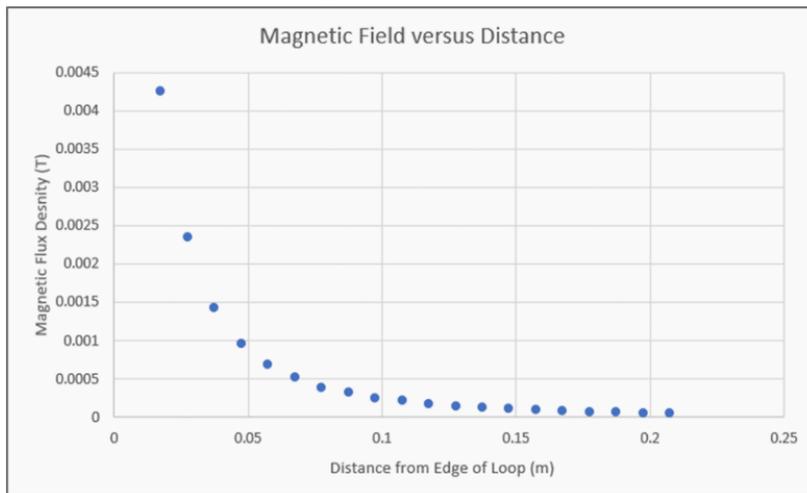


Figure shows a current-carrying aluminium rod AB placed in a magnetic field experiences force. The direction of the force on the conductor depends upon the direction of current and the direction of the magnetic field. Experiments have shown that the displacement of

the rod is largest (or the magnitude of the force is the highest) when the direction of current is at right angles to the direction of the magnetic field.

The following graph is obtained by a researcher while doing an experiment to see the variation of the magnetic field strength with the distance from a current carrying conductor.

The unit of magnetic field as given in the graph attached is in Tesla (T) and the distance is given in meter.



- 20 (i) The direction of force on a current carrying conductor in a magnetic field can be found using
- Fleming's left-hand rule.
 - Fleming's right-hand rule.
 - Right hand thumb rule.
 - Left hand thumb rule.
- 20 (ii) The displacement of the conductor in magnetic field can be increased by
- decreasing the magnetic field
 - increasing the magnetic field
 - decreasing the current in the conductor
 - None of the above.

- 20 (iii) From the graph deduce which of the following statements is correct.
- a) For a distance of 0.05 m the magnetic field is 0.001 T approximately.
 - b) As the distance increases, the magnetic field increases non-linearly.
 - c) For a distance of 0.05 m the magnetic field is 0.0015 T.
 - d) There is not enough information to find the magnetic field corresponding to 0.05 m distance.
- 20 (iv) The force on the rod is maximum when the direction of current and the direction of magnetic field are at
- a) 0°
 - b) 90°
 - c) 180°
 - d) 60°
- 20 (v) If a positively charged particle (alpha-particle) projected towards west is deflected towards north by a magnetic field, the direction of magnetic field is
- a) towards south
 - b) towards east
 - c) downward
 - d) upward

SECTION B

- 21 Small intestine plays an important part of in the process of nutrition in human beings. Explain. 2

OR

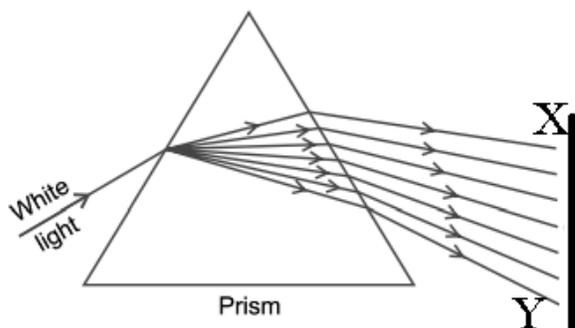
What makes transpiration a helpful process in plants?

- 22 Is it necessary that the steps of photosynthesis take place one after the other? Justify this statement taking a suitable example. 2
- 23 Draw the structure of first and second members of alkene homologous series. 2

OR

The molecular formula of a hydrocarbon is C_2H_6 . Draw the electron dot structure of the same compound and find out the number of covalent bonds present in it.

- 24 What would you observe when zinc is added to a solution of iron (II) sulphate? Write the chemical reaction that takes place. 2
- 25 In the figure given below a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism it produces a spectrum XY on a screen. 2



- (i) State the colour seen at X and Y.
- (ii) Why do different colours of white light bend through different angles with respect to the incident beam of light?
- 26 (i) Why is tungsten used almost exclusively for filament of electric lamps? 2
- (ii) Define S.I unit of electrical power.

SECTION C

- 27 A plant with yellow flowers (Y Y) is cross bred with a plant with white flowers (y y). 3
- (i) What will be the colour of the flowers of the plants in the F1 generation?
- (ii) What percentage of the flowers of F2 generation would be white colour, if the F1 generation plants are self-pollinated?
- (iii) Find the ratio of the genotypes Yy and YY in the F2 generation.

OR

According to the mechanism of sex-determination in human beings, explain that, it is a matter of chance that a couple can have a male or a female child.

- 28 (i) Explain how oxygenated blood is pumped from the heart to different part of the body? 3
- (ii) Is double circulation of blood found in fishes? Explain.
- 29 Draw a neat diagram to represent energy flow in an ecosystem. 3
Energy flow in an ecosystem is unidirectional. Why?
- 30 Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity. 3
- 31 Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table: 3

Group →	1	2	3 - 12	13	14	15	16	17	18
Period ↓									
2	A					B			C
3				D	E				F

- (i) Name the element which is a non-metal with valency three.
- (ii) Write the chemical formula of oxide of an element E.
- (iii) Which is the smallest element in the above table.

- 32 Write balanced equation for the reaction of: 3
- (i) Aluminium when heated in air. Write the name of the product.
 - (ii) Iron with steam. Name the products obtained.
 - (iii) Calcium with water. Why does calcium start floating in water?
- 33 (i) The refractive indices of glass and water with respect to air are $\frac{3}{2}$ 3
and $\frac{4}{3}$ respectively. If speed of light in glass is 2×10^8 m/s, find the speed of light in water.
- (ii) Draw a ray diagram to show the principle focus of a convex mirror.

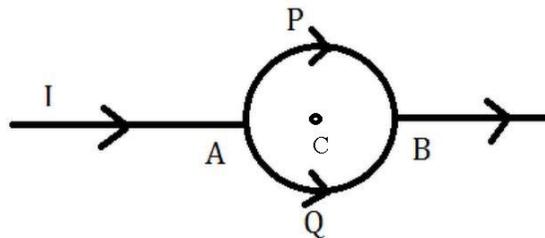
SECTION D

- 34 A sulphate salt of group 2 element of the Periodic Table is white, soft 5
substance, which can be moulded into different shapes by making its dough. When this compound is left in open for some time, it becomes a solid mass and cannot be used for moulding purposes. Write the chemical name and chemical formula of the sulphate salt and why does it show such a behavior? Give the reaction involved. Write any two uses of the above salt.

OR

A metal carbonate 'X' on reacting with an acid gives a gas which when passed through a solution 'Y' gives the carbonate back. On the other hand, a gas 'G' that is obtained at anode during electrolysis of brine is passed on dry 'Y', it gives a compound 'Z' used for disinfecting drinking water. Identify X, Y, G and Z. Also write the reaction involved between G and Y.

- 35 (i) Draw a neat labelled diagram to show the germination of pollen on the stigma. 5
(ii) Testes are important parts of the male reproductive system in human beings. Explain.
(iii) How do oral contraceptive pills serve the purpose of contraception?
- 36 (i) State the rule used to find the direction of the magnetic field produced around a current carrying conductor. 5
(ii) Explain with circuit diagram an activity to find the magnetic field formed due to a current carrying straight conductor.
(iii) Consider the circuit shown where APB and AQB are semicircles. What will be the magnetic field at the centre C of the circular loop? Give reason.



- (iv) A coil of insulated wire is connected to a galvanometer. What would be seen if a bar magnet with its north pole towards one face of the coil is
- moved quickly towards it?
 - placed near its one face?

OR

- (i) Draw a schematic diagram of an electric circuit consisting of a battery of five 2V cells, a 20 Ω resistor, a 30 Ω resistor, a plug key, all

connected in series. Calculate the value of current flowing through the circuit & the power consumed by $30\ \Omega$ resistor.

(ii) An electric lamp is marked 100W, 220 V. It is used for 5 hours daily.

Calculate

(a) its resistance while glowing

(b) energy consumed in kWh per day.

(iii) What is the function of an electric fuse? Name any one material used for making fuse.