

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 1**

Time : 3 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 labeled diagrams should be drawn.
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SECTION A

- Q1. Name a device that helps to maintain a potential difference across a conductor. [1]

OR

Which metal has lowest resistivity?

- Q2. What change in colour is observed when white silver chloride is left exposed to sunlight? What type of chemical reaction is this? [1]

- Q3. If the charge on an electron be $1.6 \times 10^{-19}\text{C}$, find the approximate number of electrons in 1 C. [1]

- Q4. When is potential difference between two points said to be 1 volt? [1]

- Q5. Name two specialised tissues that provide control and coordination in multicellular organisms. [1]

- Q6. Name the method by which Spirogyra reproduce under favourable conditions. Is this method sexual or asexual? [1]

OR

When a cell reproduces, what happens to its DNA?

- Q7. What can be seen when a strip of copper metal is placed in a solution of silver nitrate? [1]

- Q8. Hydrogen being a highly inflammable gas and oxygen being a supporter of combustion, yet water a compound made up of hydrogen and oxygen is used to extinguish fire. Why? [1]

Q9. What is meant by water of crystallisation in a substance? [1]

OR

What effect does an increase in concentration of $H^+(aq)$ ions in a solution have on pH of solution?

Q10. At what pH in the mouth is tooth decay faster and why? [1]

Q11. Name any one metal which reacts neither with cold water nor with hot water but reacts with heated steam to produce hydrogen gas. [1]

OR

Name one metal and one non-metal in liquid state at room temperature.

Q12. Mendel observed a contrasting trait in relation to position of flowers. Mention the trait. [1]

OR

What is heredity?

Q13. Name the sensory receptors found in the nose and on the tongue. [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.

Q14. **Assertion :** Respiration in living beings is called exothermic reaction. [1]

Reason : Respiration in living beings involves with absorption of heat energy.

Q15. **Assertion :** Copper is used to make hot water tanks and not steel. [1]

Reason : Copper is a better conductor of heat than steel and it is fairly resistant to corrosion than steel.

OR

Assertion : When zinc is added to a solution of iron (II) sulphate, no change is observed.

Reason : Zinc is less reactive than iron.

Q16. **Assertion :** During fertilization only head of spermatozoa enters egg. [1]

Reason : If several spermatozoa hit the egg at same time, all can enter the egg.

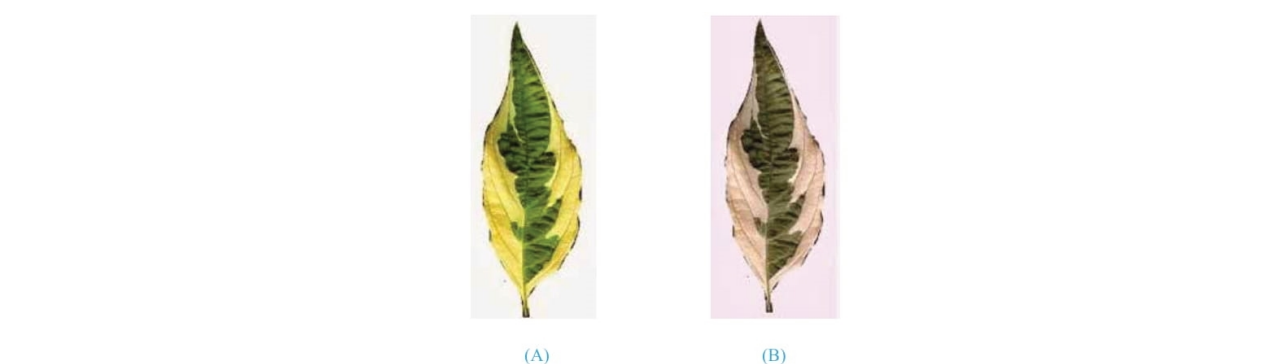
Q17. **Read the following and answer any four questions from 17.1 to 17.5.** 1 × 4

Energy is needed to maintain a state of order in our body. The source of energy and materials is the food we eat. Some organisms use simple food material obtained from inorganic sources and other organisms utilise complex substances. These complex substances have to be broken down into simpler ones before they can be used for the upkeep and growth of the body.

17.1 All non-green organisms fall under the category of

- (a) autotrophs
- (b) heterotrophs
- (c) saprobes
- (d) chemotrophs

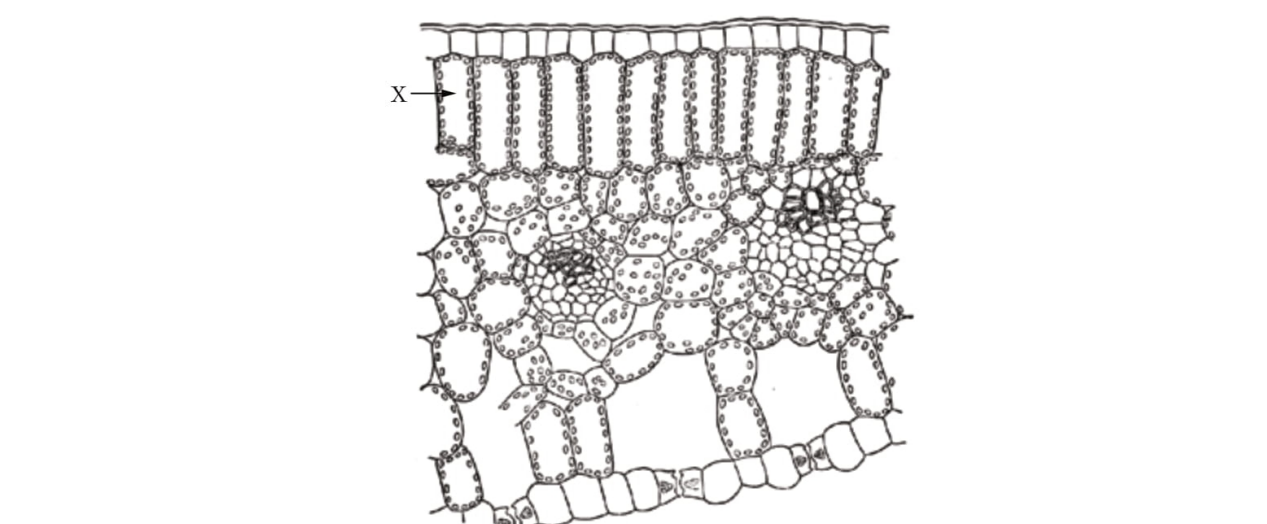
17.2 The diagram below is an experiment conducted to study a factor necessary for photosynthesis.



The test performed on the leaf and the solution used for the test are respectively
(a) starch test and potassium iodide

- (b) chlorophyll test and ethyl alcohol
(c) photosynthesis test and potassium iodide
(d) starch test and ethyl alcohol

17.3 Below given diagram represents the cross section of a leaf.



Identify “X” and choose the correct combination of plots provided in the following table.

	X	Description	Function
(a)	Chlorophyll	A green coloured pigment	Essential for photosynthesis
(b)	Chloroplast	A cell organelle	Conducts photosynthesis
(c)	Vascular bundle	Vascular tissue	Transportation in plants
(d)	Chloroplast	A green coloured pigment	Essential for photosynthesis

17.4 Which of the following statement(s) is (are) true about stomata?

I. These are the tiny pores present on the surface of the leaves.

- II. Through these, massive amounts of gaseous exchange take place.
III. Plants open these pores when carbon dioxide is not required for photosynthesis.
IV. Guard cells operate the opening and closing of these pores.
- (a) I and II only (b) I and III only
(c) I, II and III only (d) I, II and IV only

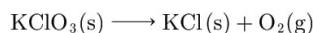
17.5 Study the table below and select the row that has the incorrect information.

	Organism	Type of heterotrophic nutrition
(a)	Amoeba	Holozoic
(b)	Mushroom	Saprophytic
(c)	Lice	Parasitic
(d)	Lion	Parasitic

Q18. Read the following and answer any four questions from 18.1 to 18.5.

1 × 4

Oxygen is prepared by catalytic decomposition of potassium chlorate (KClO_3). Decomposition of potassium chlorate gives potassium chloride (KCl) and oxygen (O_2). The following reaction takes place :



18.1 How many moles of KClO_3 are required to produce 2.4 moles of O_2 ?

- (a) 1.6 mole (b) 2.6 moles
(c) 2.1 mole (d) 1.9 moles

18.2 Which element is reduced in the given reaction.

- (a) oxygen (b) potassium
(c) chlorine (d) None the these

18.3 How many moles of KClO_3 give 3 moles of oxygen?

- (a) 2 mole (b) 1 moles
(c) 4 mole (d) 5 moles

18.4 The oxidation state of chlorine in potassium chlorate is

- (a) +2 (b) +3
(c) +4 (d) +5

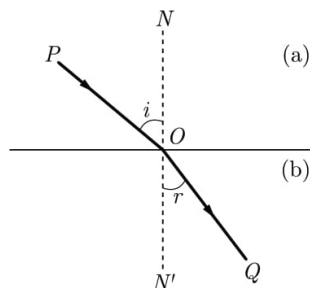
18.5 Decomposition of potassium chlorate gives

- (a) KCl (b) O_2
(c) KCl, O_2 (d) KCl_3

Q19. Read the following and answer any four questions from 19.1 to 19.5.

1 × 4

Sunita wants to observed the phenomenon of refraction of light when she performed the experiment of refraction of light. She observed that When light ray goes from one transparent medium to another transparent medium, it suffers a change in direction, into second medium. The extent of the change in direction suffered by the phenomenon of change in the path of light rays when going from one medium to another medium is known as refraction. Ray is a given pair of media can be expressed in terms of refractive index. The refractive index is related to an important physical quantity in the relative speed of light in different media.



19.1 When light goes from one medium to another than which parameter of light wave remain constant?

- (a) Frequency (b) Wavelength
(c) Velocity (d) Amplitude

19.2 Refractive indices of water, sulphuric acid, glass and carbon disulphide are 1.33, 1.43, 1.53 and 1.63 respectively. The light travels slowest in

- (a) sulphuric acid (b) glass
(c) water (d) carbon disulphide

19.3 Light enters from air to glass having refractive index 1.50. The speed of light in vacuum is $3 \times 10^8 \text{ ms}^{-1}$ the speed of light in the glass is?.

- (a) $2 \times 10^8 \text{ ms}^{-1}$ (b) $3 \times 10^9 \text{ ms}^{-1}$
(c) $4 \times 10^8 \text{ ms}^{-1}$ (d) $2.5 \times 10^8 \text{ ms}^{-1}$

19.4 The unit of refractive index?

- (a) m/s (b) m^2/s
(c) Unit less (d) m - s

19.5 A ray of light passes from a medium A to another medium B. No bending of light occurs if the ray of light his the boundary of medium B at an angle of

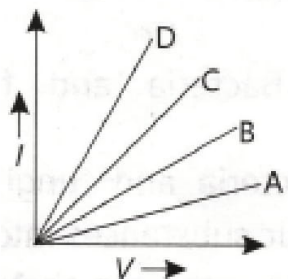
- (a) 0° (b) 45°
(c) 90° (d) 120°

Q20. Read the following and answer any four questions from 20.1 to 20.5.

1 × 4

Ohms law gives a relationship between current and potential difference. According to this Law, at constant temperature, the current flowing through a conductor is directly proportional. to the potential difference across its ends. The ratio of potential difference applied between the ends of a conductor and the current flowing through it is a constant quantity called resistance.

The following graph is obtained by a researcher while doing an experiment to study Ohm s law. The $I-V$ graph for four conductors A, B, C and D having resistance R_A, R_B, R_C and R_D respectively are shown in the graph.



20.1 If all the conductors are of same length and same material, which is the thickest ?

- (a) C (b) D
(c) A (d) B

20.2 If all the conductors are of same thickness and of same material, which is the longest ?

- (a) B (b) C
(c) A (d) D

20.3 Which one of the following relations is true for these conductors ?

- (a) $R_A > R_B > R_C > R_D$ (b) $R_A = R_B < R_C < R_D$
(c) $R_A < R_B < R_C < R_D$ (d) $R_A = R_B = R_C = R_D$

20.4 If conductors *A* and *B* are connected in series and *I*–*V* graph is plotted for the combination, its slope would be:

- (a) more than that of *A* (b) between *A* and *B*
(c) more than that of *D* (d) less than that of *A*

20.5 If conductors *C* and *D* are connected in parallel and *I*–*V* graph is plotted for the combination, its slope would be:

- (a) between *C* and *D* (b) lesser than that of *A*
(c) more than that of *D* (d) between *B* and *C*

SECTION B

Q21. A white chemical compound becomes hard on mixing proper quantity of water. It is also used to maintain joints in fixed position. Name the chemical compound and write its chemical formula. Write the chemical equation to show what happens when water is added to this compound in proper quantity. [2]

OR

Two solutions 'A' and 'B' have pH value 3.0 and 10.5 respectively. Which of these will turn

- a. Blue litmus solution to red,
b. Phenolphthalein from colourless to pink? Justify your answer in each case.

Q22. State the changes that take place in the uterus when

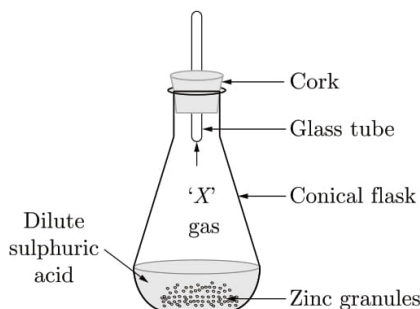
- a. Implantation of embryo has occurred
b. female gamete/egg is not fertilized [2]

Q23. Why is lithium with atomic number 3 and potassium with atomic number 19 are placed in group one? What will be atomic number of the first two elements in the second group? [2]

OR

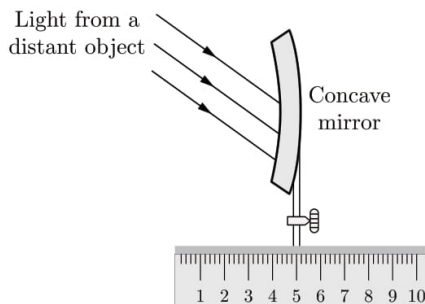
- a. Name the element with atomic number 17.
b. To which period does it belong to?
c. To which group does it belong to?
d. Write its electronic configuration.

Q24. Observe the given figure and answer the questions that follow: [2]



- a. Identify the gas 'X'.
b. How will you test for the gas which is liberated in the experiment?

Q25. In the below set-up, the focal length of the concave mirror is 4.0 cm. Where should the screen be placed on the scale to obtain a sharp image? [2]



- Q26. a. What material is used in making the filament of an electric bulb?
 b. Name the characteristics which make it suitable for this. [2]

SECTION C

- Q27. 2 g of ferrous sulphate crystals were heated in a hard glass test tube and observations recorded.
 a. What type of odour is observed on heating ferrous sulphate crystals?
 b. Name the products obtained on heating ferrous sulphate crystals.
 c. What type of reaction is taking place. [3]

OR

- a. Why metals are not found in their free state generally?
 b. If a strip of aluminium with scratched clean surface is dipped into an aqueous solution of copper sulphate for little time, surface of the strip becomes brownish. What is the reason for this? Write the balanced chemical equation for the reaction.
- Q28. How do guard cells regulate opening and closing of stomatal pores? [3]
- Q29. Write the chemical formula for washing soda. How may it be obtained from baking soda? Name an industrial use of washing soda other than washing clothes. [3]
- Q30. Out of the elements H(1), Be(4), Na(11) and Mg(12).
 a. Write the pair of elements having similar chemical properties.
 b. State the group number of each pair,
 c. Name one another element belonging to each of these groups. [3]
- Q31. What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties. [3]
- Q32. Why does the sun appear reddish early in the morning? Will this phenomenon be observed by an observer on the moon? Justify your answer with a reason. [3]
- Q33. Suggest three contraceptive methods to control the size of human population which is essential for the health and prosperity of a country. State the basic principle involved in each. [3]

SECTION D

- Q34. a. Give a chemical test to distinguish between saturated and unsaturated hydrocarbon.
 b. Name the products formed when ethane burns in air. Write the balanced chemical equation for the reaction showing the types of energies liberated.
 c. Why is reaction between methane and chlorine in the presence of sunlight considered a substitution reaction? [5]

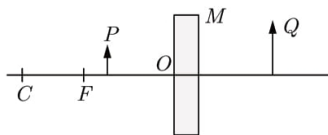
OR

Account for the following.

- a. Dry HCl gas does not change the colour of dry blue litmus paper
- b. Antacid tablets are used by a person suffering from stomach pain.
- c. Toothpaste is used for cleaning teeth.

- Q35.
- a. Draw a neat diagram of an excretory unit of a human kidney and label the following parts.
 - (i) Bowman's capsule
 - (ii) Renal artery
 - (iii) Glomerulus
 - (iv) Collecting duct
 - b. Give one advantage of having a large number of these highly coiled structures in our kidneys.
 - c. Mention any two substances which are selectively reabsorbed as the filtrate flows along the tubular part of this unit. [5]

- Q36.
- a. Define the following terms in the context of spherical mirrors:
 - (i) Pole
 - (ii) Centre of curvature
 - (iii) Principal axis
 - (iv) Principal focus
 - b. Draw ray diagrams to show the principal focus of a :
 - (i) Concave mirror
 - (ii) Convex mirror
 - c. Consider the following diagram in which M is a mirror and P is an object and Q is its magnified image formed by the mirror



State the type of the mirror M and one characteristic property of the image Q . [5]

OR

- a. Draw a ray diagram to show the formation of image by a convex lens when an object is placed in front of the lens between its optical centre and principal focus.
- b. In the above ray diagram mark the object-distance (u) and the image-distance (v) with their proper signs (+ve or -ve as per the new Cartesian sign convention) and state how these distances are related to the focal length (f) of the convex lens in the case.
- c. Find the power of a convex lens which forms a real, and inverted image of magnification -1 of an object placed at a distance of 20 cm from its optical centre.

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 2**

Time : 3 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.
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 - (vii) Wherever necessary, neat and properly labeled diagrams should be drawn.
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SECTION A

- Q1. The pH of a sample of vegetable soup was found to be 6.5. How is this soup likely to taste? [1]

OR

Why oxides of highly reactive metals cannot be reduced by carbon?

- Q2. What is an alkali? [1]

- Q3. Write two reasons responsible for the late discovery of noble gases. [1]

- Q4. Why sky appears dark to the passengers flying at high altitudes? [1]

- Q5. Explain why we see the sign Δ on the front of the some vehicles. [1]

- Q6. Name a mirror that can give an erect and enlarged image of an object. [1]

OR

Light enters from air to glass having refractive index 1.50. What is the speed of light in glass? Speed of light in air is 3×10^8 m/s.

- Q7. If field lines of a magnetic field are crossed at a point, what does it indicate? [1]

- Q8. What type of core is used to make an electromagnet? [1]

- Q9. Power of a lamp is 60 W. Find the energy in joules consumed by it in 1 s. [1]

OR

Why do we use copper and aluminium wire for transmission of electric current?

Q10. Write the role of motor areas in brain. [1]

Q11. Why is respiration considered an exothermic process? [1]

OR

What role do digestive enzymes play in the alimentary canal?

Q12. How can the chromosomes be identified? [1]

OR

A normal baby girl receives her X chromosome from whom : mother, father, both mother and father or either from mother or father?

Q13. How is spinal cord protected? [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.

Q14. **Assertion :** Magnesium ribbon should be cleaned before burning in air.
Reason : Magnesium ribbon is coated with a thin layer of dust containing moisture. [1]

Q15. **Assertion :** Food cans are coated with tin and not with zinc.
Reason : Zinc is more reactive than tin. [1]

OR

Assertion : Platinum, gold and silver are used to make jewellery.
Reason : Platinum, gold and silver are least reactive metals.

Q16. **Assertion :** A network of food chains existing together in an ecosystem is known as food web.
Reason : An animal like kite cannot be a part of a food web. [1]

Q17. **Read the following and answer any four question from (17.1) to (17.5) :** 1 × 4

Metal	Iron (II) Sulphate	Copper (II) Sulphate	Zinc Sulphate	Silver Nitrate
A	No reaction	Displacement	---	---
B	Displacement	---	No reaction	---
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

17.1 The most active metal is

- (a) A
- (b) B
- (c) C
- (d) D

17.2 The least reactive metal is

- (a) A (b) B
(c) C (d) D

17.3 The increasing order of reactivity of metal A, B, C and D is

- (a) $A < B < C < D$ (b) $D < C < B < A$
(c) $D < A < C < B$ (d) $D < C < A < B$

17.4 Container of which metal can be used to store both zinc sulphate solution and silver nitrate solution?

- (a) A (b) C
(c) B (d) D

17.5 The metal which shows the displacement with iron (II) sulphate.

- (a) A (b) C
(c) D (d) B

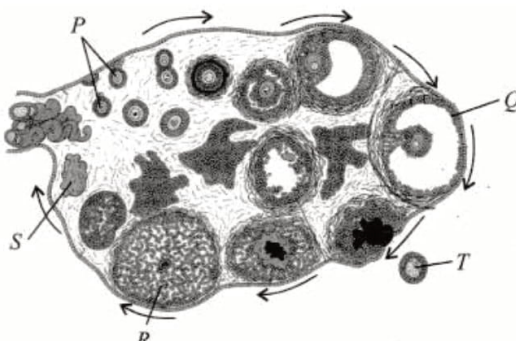
Q18. Read the following and answer any four question from (18.1) to (18.5) :

1 × 4

The ovary is a ductless reproductive gland in which the female reproductive cells are produced. Females have a pair of ovaries, held by a membrane beside the uterus on each side of the lower abdomen. The ovary is needed in reproduction since it is responsible for producing the female reproductive cells, or ova.

The ovary is a ductless reproductive gland in which the female reproductive cells are produced. Females have a pair of ovaries, held by a membrane beside the uterus on each side of the lower abdomen. The ovary is needed in reproduction since it is responsible for producing the female reproductive cells, or ova.

During ovulation, a follicle (a small cavity in the ovary) expels an egg under the stimulation of gonadotropic hormones released by the pituitary gland, the luteinizing hormone and the follicle-stimulating hormone. The rest of the follicle, or the corpus luteum, secretes the sex hormones estrogen and progesterone, which regulate menstruation and control the development of the sex organs. The sex hormones and the gonadotropic hormones interact with each other to control the menstrual cycle



18.1 Which of the following statements is correct regarding the labelled structures?

- (a) Before puberty, only structure T undergoes meiosis.
(b) The hormone produced by structure R stimulates the pituitary gland to secrete luteinizing hormone.
(c) The hormone produced by structure S is responsible for the development of female secondary sexual characters.
(d) The hormone produced by P and Q stimulates the proliferation of the endometrial lining of the uterine wall.

- 18.2** The formation of T begins in female
 (a) at birth (b) before birth
 (c) after puberty (d) none of these
- 18.3** The term used for release of T is?
 (a) Ovulation (b) Proliferation
 (c) Fragmentation (d) Fission
- 18.4** Which the hormone secreted by R is?
 (a) Progesterone (b) Triiodothyronine
 (c) Thyroxine (d) Cortisol
- 18.5** The name of part R is
 (a) Ovum (b) Oviduct
 (c) Corpus luteum (d) Medulla

Q19. Read the following and answer any four question from (19.1) to (19.5) : **1 × 4**
 Convex mirror is used as a rear view mirror in vehicles. Since the image of the object formed is small in size, the field of view is increased. Convex mirror is also used in street lights to diverge light over a large area.



- 19.1** The nature of image in driver's mirror is-
 (a) Erect and diminished (b) Virtual and undiminished
 (c) Erect and magnified (d) Virtual and magnified
- 19.2** A person standing in front of a mirror finds his image thinner but with normal height. This implies that the mirror is
 (a) convex and cylindrical with axis vertical
 (b) convex and cylindrical with axis horizontal
 (c) convex and spherical
 (d) concave and spherical
- 19.3** A convex mirror is used to form the image of an object. Then which of the following statement is wrong.
 (a) The image lies between the pole and the focus.
 (b) The image is diminished in size.
 (c) The image is erect.
 (d) The image is real.
- 19.4** The field of view of convex mirror is as compared to plane mirror.
 (a) large (b) small
 (c) equal (d) none of these

19.5 $f = \frac{R}{2}$ is valid

- (a) for convex mirrors but not for concave mirrors
- (b) for concave mirrors but not for convex mirrors
- (c) for both convex and concave mirrors
- (d) neither for convex mirrors not for concave mirrors.

Q20. The following table given below shows the resistivity of three materials X, Y and Z. Analyse the table and answer the following questions : 1 × 4

Samples	X	Y	Z
Resistivity	3×10^{-9}	11.1×10^{-6}	18×10^{-17}

20.1 The increasing order of conductivity of samples is

- (a) $Y < X < Z$
- (b) $X < Y < Z$
- (c) $Z < X < Y$
- (d) $Z < Y < X$

20.2 The best conductor is

- (a) X
- (b) Y
- (c) Z
- (d) X and Y

20.3 Which are these is best insulator?

- (a) X
- (b) Y
- (c) Z
- (d) None of these

20.4 Electrical resistivity of a given metallic wire depends upon :

- (a) Its length
- (b) Its thickness
- (c) Its shape
- (d) Nature of the material

20.5 In the following material, which has the low resistivity-

- (a) Copper
- (b) Iron
- (c) Mercury
- (d) None & these

SECTION B

Q21. What is the importance of DNA copying in reproduction? Why is variation beneficial to the species but not necessary for the individual? Explain. [2]

OR

- a. "Recent fossils are found closer to the earth's surface". Comment on the statement stating reason.
- b. List two factors which could lead to the rise of new species.

Q22. Differentiate between auricles and ventricles. [2]

Q23. A compound Z is formed by transfer of electrons from the metal X to a non-metal Y, Identify the type of bond formed in the compound. List three properties of compound formed by such type of bonds. [2]

OR

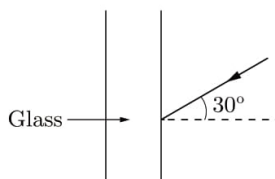
Give reason for the following:

- a. School bells are made up of metals.
- b. Electrical wires are made up of copper.

- Q24. In the following table, seven elements A, B, C, D, E, F and G (here letters are not the usual symbols of the elements) of the Modern Periodic Table with atomic numbers 3 to 18 are given: [2]

3	4	5	6	7	8	9	10
A					E		G
11	12	13	14	15	16	17	18
B	C		D			F	

- Which of these is (a) a noble gas, (b) a halogen?
 - If B combines with F , what would be the formula of the compound formed?
- Q25. Figure shows a ray of light meeting the glass of the window of a car at angle of incidence of 30° .



- Assuming that the refractive index of glass is 1.5, find the angle of refraction for this ray in the glass. (Given : $\sin(19.5^\circ) = 1/3$)
 - Complete the diagram by sketching the path of the ray through the glass and out on the other side.
- Q26. A bulb is rated at 5.0 V, 100 mA. Calculate its (a) power and (b) resistance. [2]

SECTION C

- Q27. How does control and coordination take place in plants? [3]

OR

Explain the process of break down of glucose in a cell (i) in the presence of oxygen (ii) in the absence of oxygen.

- Q28.
 - Write the chemical formula for washing soda.
 - How may it be obtained from baking soda?
 - Name an industrial use of washing soda other than washing clothes. [3]
- Q29. What are plant hormones? Give its examples. [3]
- Q30. Name the hormones secreted by the following endocrine glands and specify one function of each:
 (a) Thyroid
 (b) Pituitary
 (c) Pancreas [3]
- Q31. Write an equation each for decomposition reactions, where energy is supplied in the form of heat, light or electricity. [3]
- Q32. Out of the elements $H(1)$, $Be(4)$, $Na(11)$ and $Mg(12)$.
 - Write the pair of elements having similar chemical properties.
 - State the group number of each pair,
 - Name one another element belonging to each of these groups. [3]

- Q33. i. Name and define SI unit of resistance.
 ii. Calculate the resistance of a resistor if the current flowing through it is 200 mA, when the applied potential difference is 0.8 V. [3]

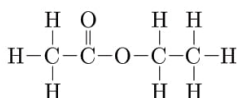
SECTION D

- Q34. A carbon compound 'P' on heating with excess conc. H_2SO_4 forms another carbon compound 'Q' which on addition of hydrogen in the presence of nickel catalyst forms a saturated carbon compound 'R'. One molecule of 'R' on combustion forms two molecules of carbon dioxide and three molecules of water. Identify P, Q and R and write chemical equations for the reactions involved. [5]

OR

Answer the following:

- i. The structural formula of an ester is :



Write the structural formulae of the corresponding alcohol and the acid.

- ii.
 (a) Mention the experimental conditions involved in obtaining ethene from ethanol.
 (b) Write the chemical equation for the above reaction.
 iii. Explain the cleansing action of soap.

- Q35. Answer the following: [5]

- i. How is zygote formed?
 ii. State the function of placenta in the mother's body.
 iii. At what interval the egg is formed in human female ovary?
 iv. Name two STDs caused by bacterial infection.
 v. Why is prenatal sex determination prohibited?

- Q36. It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm.
 i. What should be the range of distance of an object placed in front of the mirror?
 ii. Will the image be smaller or larger than the object. Draw ray diagram to show the formation of image in this case.
 iii. Where will the image of this object be formed, if it is placed 24 cm in front of the mirror? Draw ray diagram for this situation also to justify your answer.
 Show the positions of pole, principal focus and the centre of curvature in the above ray diagrams.

[5]

OR

- i. Define real image of an object.
 ii. Name the mirror that
 (a) can give real as well as virtual image of an object.
 (b) will always give virtual image of same size of an object.
 (c) will always give virtual and diminished image of an object.
 (d) is used by a doctor in examining teeth.
 iii. With the help of a ray diagram explain the use of concave mirror as solar concentrators.

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 3**

Time : 3 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 labeled diagrams should be drawn.
-

SECTION A

- Q1. Which one of these has a higher concentration of H^+ ions ? [1]
1 M HCl or 1 M CH_3COOH

OR

A few drops of sulphuric acid are added to water before electrolysis, why?

- Q2. What is an alkali? [1]
- Q3. At what pH rain water is said to be acidic ? [1]
- Q4. What are the units of power of a lens? [1]
- Q5. Which colour of white light suffers (i) least deviation and (ii) maximum deviation when a beam of white light passes through a glass prism? [1]
- Q6. State the laws of reflection. [1]

OR

How many images are formed by two parallel mirrors?

- Q7. Why are magnetic field lines closed curves? [1]
- Q8. How is the induced current in a secondary coil related to current in a primary coil? [1]

- Q9. State which has a higher resistance a 50 W or a 25 W lamp bulb and how many times? [1]

OR

Define resistivity of a material.

- Q10. Name the type of blood vessels, which carry blood from organs to the heart. [1]

- Q11. Which tropic movement is responsible for the growth of pollen tubes towards ovules? [1]

OR

Why endocrine glands release their secretions into the blood?

- Q12. How is the age of fossil determined? [1]

OR

What is evolution?

- Q13. What is acid rain? [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.

- Q14. **Assertion :** Plaster of Paris should be stored in moisture proof containers.

Reason : Plaster of Paris on coming in contact of moisture, absorbs water and reacts chemically to form hydrated calcium sulphate, which sets to form a hard mass. [1]

- Q15. **Assertion :** Iron is found in the free state in nature.

Reason : Iron a highly reactive element. [1]

OR

Assertion : Different metals have different reactivities with water and dilute acids.

Reason : Reactivity of a metal depends on its position in the reactivity series.

- Q16. **Assertion :** Consumers are present at the first trophic level.

Reason : Consumers or heterotrophs fix energy making it available for autotrophs. [1]

- Q17. **Read the following and answer any four question from (17.1) to (17.5) :** 1 × 4
Chemistry is one of the most sophisticated branches of science, would not have been the same if Russian scientist Dmitri Ivanovich Mendeleev had not come up with the periodic table on March 6, 1869. Until 1863, the world was aware of only 56 known elements. The rate of scientific progress was such that every year, a new element was being discovered. It was during this time periodic table. He published the periodic table in his book- "The Relation between the Properties and Atomic Weights of the Elements". He had found a definitive pattern following which each element could be placed according to their atomic weight. He noticed that elements that are similar in their similar chemical properties either had the atomic weight or had a regular increase. He also predicted the properties of the missing (yet to be discovered) elements and gave them Sanskrit names.

17.1 Which of the following statement about the Mendeleev's periodic table is correct ?

- (a) It has 8 vertical columns known as groups.

- (b) It has 18 horizontal rows known as periods.
 (c) It has 7 horizontal rows known as groups
 (d) It has 18 vertical columns known as periods
- 17.2** According to Mendeleev's periodic law, the elements were arranged in the periodic table in the order of :
 (a) decreasing atomic numbers (b) increasing atomic numbers
 (c) decreasing atomic masses (d) increasing atomic masses
- 17.3** In Mendeleev's periodic table, gaps were left for the elements to be discovered later on. An element which found a vacant place in the periodic table later on is :
 (a) Se (b) Ge
 (c) Si (d) Be
- 17.4** Gallium was named by Mendeleev as :
 (a) Eka-aluminium (b) Eka-silicon
 (c) Eka-germanium (d) Eka-zinc
- 17.5** Which of the following statement is correct in regard to Mendeleev's periodic table ?
 I. Position of isotopes could not be explained.
 II. It is true for elements upto calcium only.
 III. It could accommodate noble gases when they were discovered
 IV. It assigned correct position to hydrogen.
 (a) I and II only (b) I and III only
 (c) I, II and III (d) IV only

Q18. Answer question numbers 18.1-18.4 on the basis of your understanding of the following paragraph and the related studied concepts.

1 × 4

In the series combination, the resistances are joined end to end. For a series combination of resistors, $R_s = \sum R_i$ and current through each resistor is same but their potential difference between their ends are different according to their resistors. When two or more resistors are combined in such a way that their first ends are connected to one point and the second ends to another point. In a parallel combination of resistors, $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$ and potential drop across each resistor is same but current in different resistances are different.

- 18.1** If we connect n bulbs each with a rated power P in series, then the total power consumed by combination at rated current is
 (a) Pn (b) Pn^2
 (c) P/n (d) $P^2 n$
- 18.2** If we connect n bulbs each with a rated power P in parallel, then the total power consumed by combination at rated voltage is
 (a) Pn (b) Pn^2
 (c) P^2/n (d) P/n
- 18.3** The power consumed by n equal resistance in parallel is x times that of power consumed in series, if the voltage supply is same. The value of x is
 (a) n (b) n^2
 (c) n^3 (d) $n^{1/2}$
- 18.4** If resistors 4Ω , 5Ω and 6Ω are connected in series with 5 V battery, then the total power consumed by the combination is
 (a) $\frac{5}{3}\text{ W}$ (b) $\frac{5}{4}\text{ W}$

(c) $\frac{9}{4} W$

(d) $\frac{1}{2} W$

Q19. Read the following and answer any four question from (19.1) to (19.5) :

1 × 4

A concave mirror forms image of an object thrice in its size on a screen. Magnification of a mirror gives information about the size of the image relative to the object. It is defined as the ratio of size of image to the size of object. It is represented by m .

$$m = \frac{\text{Size of image}}{\text{Size of object}}$$

Sign of magnification by mirror gives the information about the nature of the image produce by it.

19.1 The nature of formed image is

- (a) Real and inverted (b) Virtual and erect
(c) Virtual, and enlarged (d) None of these

19.2 If the object x distance from the pole of mirror, then image distance from the pole is.

- (a) $-2x$ (b) $-3x$
(c) $-4x$ (d) $-x$

19.3 If the radius of curvature of mirror is R , then the relation between object distance, image distance and focal length of the mirror is.

- (a) $\frac{1}{x} + \frac{1}{2x} = \frac{2}{R}$ (b) $\frac{1}{x} + \frac{1}{3x} = \frac{2}{R}$
(c) $\frac{1}{x} + \frac{1}{3x} = \frac{2}{R^2}$ (d) $\frac{1}{(x)^2} + \frac{1}{(3x)} = \frac{2}{R}$

19.4 When an object is placed at infinity then the nature of image will be.

- (a) real, inverted, highly diminished (b) virtual, inverted, diminished
(c) virtual, inverted, infinitely large (d) real, erect and smaller

19.5 An object is placed at the centre of curvature of a concave mirror. The distance between its image and the pole is

- (a) equal of f (b) between f and $2f$
(c) equal of $2f$ (d) greater than $2f$

Q20. Different magnetic field patterns are produced by current-carrying conductors having different shapes.

1 × 4

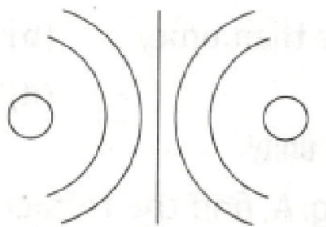
The magnetic field lines around a straight conductor (straight wire) carrying current are concentric circles whose centres lie on the wire. It has been shown by experiments that the magnitude of magnetic field produced by a straight current carrying wire at a given point is : (i) directly proportional to the current passing in the wire, and (ii) inversely proportional to the distance of that point from the wire.

The magnetic field lines are circular near the current carrying circular loop. As we move away, the concentric circles representing magnetic field lines become bigger and bigger and at the centre the magnetic field lines are straight.

20.1 The direction of magnetic field developed around a current-carrying conductor can be easily found by the use of :

- (a) Fleming's left-hand rule (b) Left-hand thumb rule
(c) Right-hand thumb rule (d) Fleming's right hand rule

20.2 The diagram given below represents magnetic field caused by a current-carrying conductor which is :



- (a) a solenoid
(b) a long straight wire
(c) a circular coil
(d) a short straight wire
- 20.3** The strength of magnetic field due to a straight conductor depends on the :
(a) nature of conductor
(b) current passing through the wire
(c) direction of current
(d) all of above
- 20.4** Which of the following correctly describes the magnetic field near a long straight wire?
(a) The field consists of straight lines perpendicular to the wire
(b) The field consists of straight lines parallel to the wire
(c) The field consists of radial lines originating from the wire
(d) The field consists of concentric circles centred on the wire
- 20.5** The strength of magnetic field inside a long current carrying straight solenoid is :
(a) same at all points
(b) minimum in the middle
(c) found to increase from one end to the other
(d) more at the ends than at the centre.

SECTION B

Q21. What are enzyme? Do they play some role in our digestive system too? [2]

OR

What is the role of large intestine?

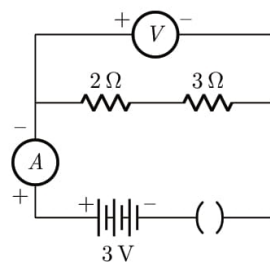
Q22. What is meant by hydro-tropism? Give an example. [2]

Q23. Which of the following listed metals can displace zinc from its salt solution? Give reason for your answer with a chemical equation: [2]
Copper, Lead, Magnesium, Silver

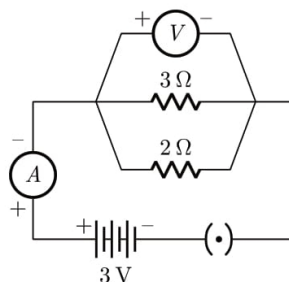
OR

The reaction of metal X with Fe_2O_3 is highly exothermic and is used to join railway tracks. Identify metal X. Write the chemical equation for the reaction.

Q24. Find the voltmeter readings for the circuits I and II shown. [2]



(I)



(II)

Q25. Give reasons for the following : [2]

- Non-metals, in general, do not displace hydrogen from dilute acids.
- Aluminium easily combines with oxygen but still it can be used for making kitchen utensils.

Q26. List in a tabular form two differences between a voltmeter and an ammeter. [2]

SECTION C

Q27. i. Name the plant used by Mendel to carry out his experiments. [3]

ii. Study the following cross and answer the questions that follow :

Parents	Green and Round seed	×	Yellow and Wrinkled seed
F ₁ Generation	All Green and Round seeds		

F₂ Generation

Green and Round (9)	Green and Wrinkled (3)
Yellow and Round (3)	Yellow and Wrinkled (1)

- List the dominant and recessive characters.
- Are the characters linked or independent?

OR

- Differentiate between sensory neurons and motor neurons.
- How is brain protected in our body?
- Name the part of the brain responsible for precision of voluntary actions and maintaining body posture and balance of the body.

Q28. The ozone layer is formed high up in the atmosphere by the action of ultraviolet radiation on

oxygen gas. The damage of the ozone layer leads to variation in rainfall, ecological disturbances and other effects in global food supply. United Nations Environment programme (UNEP) has signed an agreement to limit this damage in 1986.

- i. Where is ozone layer found in the atmosphere?
- ii. How is ozone layer formed in the atmosphere?
- iii. How can you contribute in saving the ozone layer? [3]

Q29. Write equations to show the presence of all ions in the aqueous solutions of : [3]

- i. CH_3COOH
- ii. H_3PO_4
- iii. HI

Q30. Mention the components of the transport system in highly organised plants. State the functions of these components. [3]

- Q31. (i) Name all the digestive enzymes present in our digestive system.
(ii) Explain the process of digestion of carbohydrates, fats and proteins. [3]

Q32. Why does the sun appear reddish early in the morning? Will this phenomenon be observed by an observer on the moon? Justify your answer with a reason. [3]

Q33. What is ethanol? Draw the structure of ethanol molecule. How does ethanol behave with the following:

- i. Sodium
- ii. Excess of con. sulphuric acid at 443 K ?

Write chemical equation for each reaction. [3]

SECTION D

Q34. An element X (atomic number 17) reacts with an element Y (atomic number 20) to form a divalent halide.

- i. Where in the periodic table are elements X and Y placed?
- ii. Classify X and Y as metal (s), non-metal(s) or metalloid(s).
- iii. What will be the nature of the oxide of element Y? Identify the nature of bonding in the compound formed.
- iv. Draw the electron dot structure of the divalent halide. [5]

OR

State the reason why?

- i. Carbon is not used to reduce the oxides of sodium or aluminium.
- ii. An iron strip is dipped in a blue copper sulphate solution turns the blue solution pale green.
- iii. Metals replace hydrogen from acids whereas non-metals do not.
- iv. Calcium does not occur free in nature.
- v. Zinc is used in the galvanisation of iron and not the copper.

Q35. i. Draw a diagram depicting the Human Alimentary Canal and label on it, Gall Bladder, Liver and Pancreas.

ii. State the roles of liver and pancreas.

iii. Name the organ which performs the following functions in humans :

- (a) Absorption of digested food.
- (b) Absorption of water [5]

Q36. "A convex lens can form a magnified erect as well as magnified inverted image of an object placed

in front of it.” Draw ray diagrams to justify this statement stating the position of the object with respect to the lens in each case.

An object of height 4 cm is placed at a distance of 20 cm from a convex lens of focal length 10 cm. Use lens formula to determine the position of the image formed. [5]

OR

- i. What is meant by dispersion of light?
- ii. Describe the formation of rainbow in the sky.
- iii. With the help of a labelled diagram, explain why the sun appears reddish at the sunrise and the sunset.

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 4**

Time : 3 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 labeled diagrams should be drawn.
-

SECTION A

- Q1. How will the tendency to gain electrons change as we go from left to right across a period ? Why ? [1]

OR

Out of the three elements P, Q and R having atomic numbers 11, 17 and 19 respectively, which two elements will show similar properties and why?

- Q2. A shiny brown coloured element X' on heating in air becomes black in colour. Name the element X' and the black compound formed. [1]
- Q3. Why do ionic compounds have high melting point? [1]
- Q4. The radius of curvature of a spherical mirror is 20 cm. What is its focal length? [1]
- Q5. Write down four important characteristics of image formed by a plane mirror. [1]
- Q6. What is twinkling of stars due to? [1]

OR

Name the two phenomena involved in the formation of rainbow.

- Q7. State the observation made by Oersted on the basis of his experiment with current carrying

conductors. [1]

Q8. What constitutes the field of a magnet? [1]

Q9. What happens to the resistance of a conductor when temperature is increased? [1]

OR

Out of the two, a toaster of 1 kW and an electric heater of 2 kW, which has a greater resistance?

Q10. Name mode of nutrition in the following organisms:

- a. Fungi
- b. Amoeba [1]

Q11. What will happen to a plant shoot if sunlight falls on it from one direction only? What do you call this movement? [1]

OR

How is spinal cord protected?

Q12. Mendel observed a contrasting trait in relation to position of flowers. Mention the trait. [1]

OR

Name the term used for the traits that are exhibited externally.

Q13. Mention two ways in which food gets oxidized in organisms. [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.

Q14. **Assertion :** Copper reacts with silver nitrate solution.

Reason : Copper is placed higher in the metal activity series than silver. Thus, it can displace silver from silver nitrate solution [1]

Q15. **Assertion :** A mineral is called ore, when metal is extracted from it conveniently and economically.

Reason : All ores are minerals but all minerals are not ores.

OR

Assertion : Gold is isolated from other impurities by Arndt forest cyanide process.

Reason : The cyanide which is used here dissolve all possible impurities. [1]

Q16. **Assertion :** Reflex actions are automatic and rapid responses to stimuli.

Reason : These actions are controlled by brain. [1]

Q17. **Read the following and answer any four question from (17.1) to (17.5) :** 1 × 4

S. No.	Solution	pH limit
1.	Saliva	6.5-7.5
2.	Lemon juice	2.2-2.4

3.	Tomato juice	4.0-4.4
4.	Coffee	4.5-5.5

17.1 When drops of tomato juice are dropped on litmus paper than litmus paper will turn

- (a) red (b) yellow
(c) green (d) black

17.2 The nature of saliva in given table is

- (a) acidic (b) basic
(c) Neither acidic nor basic (d) cannot be define

17.3 The effect of acid on litmus paper is

- (a) blue to red in colour (b) red to blue in colour
(c) red to green in colour (d) green to red on colour

17.4 The effect of base on litmus paper is

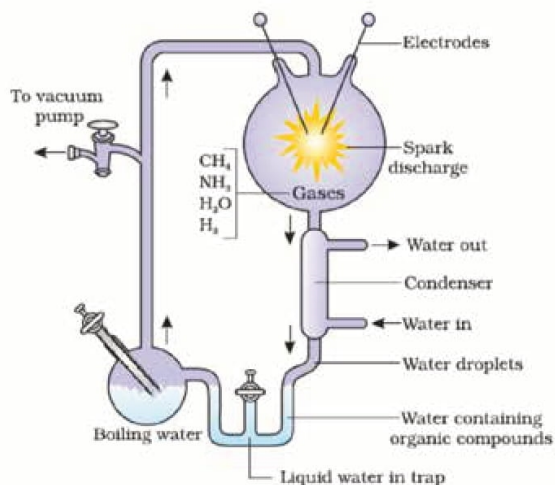
- (a) Turns red litmus to blue in colour (b) Turns blue litmus to blue in colour
(c) Turns red litmus to orange (d) None of these

17.5 The pH limit of coffee is

- (a) 4.5-5.5 (b) 6.5-7.5
(c) 1.4-2.5 (d) 2.9-3.9

Q18. Question numbers 18.1-18.4 are based on the given experiment. Study the given experimental setup and answer the questions that follow.

1 × 4



18.1 The name of experiment which is shown in the figure.

- (a) Miler and Urey's experiment (b) Hen's berg experiment
(c) Millican oil drop experiment (d) None of these

18.2 The gaseous mixture used in the experiment comprised of

- (a) methane, ammonia, hydrogen, water vapours
(b) methane, nitrogen, hydrogen, water vapours
(c) ammonia, carbondioxide, nitrogen, water vapours
(d) methane, ammonia, nitrogen, water vapours

18.3 Under this experiment, electric discharge was created in a closed flask containing mixture of

gases at

(a) 50°C

(b) 250°C

(c) 800°C

(d) 500°C

18.4 The organic compounds found in this experiment is.

(a) Amino acid

(b) HCL

(c) CCl₄

(d) SO₂

Q19. Analyse the following observation table showing variation of image-distance (v) with object-distance (u) in case of a convex lens and answer the questions that follow without doing any calculations :

1 × 4

S.No.	Object-Distance u (cm)	Image-Distance v (cm)
1.	-60	+12
2.	-30	+15
3.	-20	+20
4.	-15	+30
5.	-12	+60
6.	-9	+90

19.1 The focal length of convex lens is

(a) 5 cm

(b) 10 cm

(c) 15 cm

(d) 20 cm

19.2 For what object-distance (u) is the corresponding image-distance (v) not correct?

(a) 1st observation

(b) 2nd observation

(c) 6th observation

(d) 5th observation

19.3 A concave mirror gives real, inverted and same size image if the object is placed

(a) At focus

(b) At infinity

(c) At C i.e. centre of curvature

(d) Beyond centre of curvature

19.4 Focal length of plane mirror is :

(a) At infinity

(b) Zero

(c) Negative

(d) None of these

19.5 The relation between focal length, image distance and object distance is

(a) $\frac{1}{v} = \frac{1}{v} - \frac{1}{u}$

(b) $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$

(c) $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

(d) $\frac{1}{f} = \frac{1}{u} - \frac{1}{v}$

Q20. Question numbers 20.1-20.5 are based on the table given below. Study the table and answer the following questions. The table given below shows the resistivity of conductors and alloys.

1 × 4

Electrical Resistivity of Some Substances at 20°C

	Material	Resistivity (Ω -m)
--	----------	----------------------------

Conductors	Silver	1.60×10^{-8}
	Copper	1.62×10^{-8}
	Aluminium	2.63×10^{-8}
	Tungsten	5.20×10^{-8}
	Nickel	6.84×10^{-8}
	Iron	10.0×10^{-8}
	Chromium	12.9×10^{-8}
	Mercury	94.0×10^{-8}
	Manganese	1.84×10^{-8}
Alloys	Constantan (Cu + Ni)	49×10^{-6}
	Manganin (Cu+Mn+Ni)	44×10^{-6}
	Nichrome (Ni+Cr+Mn+Fe)	100×10^{-6}
Insulators	Glass	$10^{10} - 10^{14}$
	Hard rubber	$10^{13} - 10^{16}$
	Ebonite	$10^{15} - 10^{17}$
	Diamond	$10^{12} - 10^{13}$
	Dry paper	10^{12}

- 20.1** In the given material which one is the better conductor-
- (a) Nickel (b) Copper
(c) Iron (d) Mercury
- 20.2** From the above table, the most popular material used in the heater is
- (a) Copper (b) Nichrome
(c) Ebonite (d) Nickel
- 20.3** The resistance of a copper wire of length 2 m and area of cross-section $1.7 \times 10^{-6} \text{ m}^2$ is
- (a) $1.9 \times 10^{-2} \Omega$ (b) $2 \times 10^{-2} \Omega$
(c) $1.6 \times 10^{-2} \Omega$ (d) $1.5 \times 10^{-2} \Omega$
- 20.4** Nichrome is the mixture of-
- (a) Cu + Ni (b) Cu + Mn + Ni
(c) Ni + Cr + Mn + Fe (d) Ni + Cr
- 20.5** In the following insulator which one has the large resistivity-
- (a) Glass (b) Diamond
(c) Dry paper (d) Ebonite

SECTION B

Q21. List two ways in which plants can get rid of the wastes.

[2]

OR

What is the role of acid and mucus in stomach?

- Q22. How does feedback mechanism regulate the hormone secretion? [2]
- Q23. Why is lithium with atomic number 3 and potassium with atomic number 19 are placed in group one? What will be atomic number of the first two elements in the second group? [2]

OR

Calcium is an element with atomic number 20.

- Will it be a metal/non-metal?
 - What will be its valency?
 - What would be the formula of its chloride?
 - Will it be smaller/larger than K?
- Q24. A gas is liberated immediately with a brisk effervescence, when you add acetic acid to sodium hydrogen carbonate powder in a test tube. Name the gas and describe the test that confirms the identity of the gas. [2]
- Q25. 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]
- Q26. Give reason for the following:
- Tungsten used almost exclusively for filament of electric lamp.
 - Why do we use copper and aluminium wires for transmission of electric current? [2]

SECTION C

- Q27. Give two uses each of the products obtained by the electrolysis of sodium chloride. [3]

OR

Name the type of chemical reaction presented by the following equations:

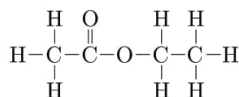
- $\text{CaCO}_3(\text{s}) \xrightarrow{\text{heat}} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
 - $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{Ca}(\text{OH})_2(\text{aq})$
 - $\text{Zn}(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \longrightarrow \text{ZnSO}_4(\text{aq}) + \text{H}_2(\text{g})$
- Q28. An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields an organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formula. What happens when 'A' and 'B' react in the presence of an acid catalyst? Write the chemical equation for the reaction. [3]
- Q29. How do auxins promote the growth of a tendril around a support? [3]
- Q30. What are biodegradable substances? Describe two ways in which non-biodegradable substances affect our environment. [3]
- Q31. (a) Name metals among the first five elements of the Modern Periodic Table.
(b) Write their symbols.
(c) Write the formula of their oxides.
- Q32. List and describe in brief any three ways devised to avoid pregnancy. [3]
- Q33. A 5.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30 cm. By calculation determine (i) the position

and (ii) the size of the image formed.

[3]

SECTION D

- Q34. i. The structural formula of an ester is :



Write the structural formulae of the corresponding alcohol and the acid.

ii.

(a) Mention the experimental conditions involved in obtaining ethene from ethanol.

(b) Write the chemical equation for the above reaction.

iii. Explain the cleansing action of soap.

[5]

OR

Atoms of seven elements A, B, C, D, E, F and G have a different number of electronic shells but have the same number of electrons in their outermost shells. The elements A and C combine with chlorine to form an acid and common salt respectively. The oxide of element A is a liquid at room temperature and is a neutral substance, while the oxides of the remaining six elements are basic in nature. Based on the above information answer the following questions.

i. What could the element A be ?

ii. Will elements A to G belong to the same period or same group of the periodic table ?

iii. Write the formula of the compound formed by the reaction of element A with oxygen.

iv. Show the formation of the compound by a combination of element C with chlorine with the help of an electronic structure.

v. Which one of the given elements is likely to have the smallest atomic radius ?

[5]

- Q35. i. What are chromosomes ? Where are they seated ?

ii. What is a sex chromosome ?

iii. Explain the mechanism of sex determination in human beings.

[5]

- Q36. i. Two identical resistors each of resistance $10\ \Omega$ are connected in :

(a) Series

(b) Parallel

in turn to a battery of 6 V. Calculate the ratio of power consumed by the combination of resistor in the two cases

ii. List two factors on which the resistance of a conductor depends.

iii. Write a difference between an ammeter and voltmeter.

[5]

OR

i. State the commercial unit of electric energy and find its relation with its SI unit.

ii. The current through a resistor is made three times its initial value. Calculate how it will affect the heat produced in the resistor.

iii. Find the amount of heat generated in a conductor if another conductor of double resistance is connected in the circuit keeping all other factors unchanged.

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 5**

Time : 3 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 labeled diagrams should be drawn.
-

SECTION A

- Q1. An element M is in group 13 of the periodic table. What is the formula of its oxide? [1]

OR

The atomic numbers of three elements X, Y and Z are given below:

Elements	Atomic Numbers
X	3
Y	9
Z	11

State giving reason which two elements will show similar chemical properties?

- Q2. Which element exhibits the property of catenation to maximum extent and why ? [1]
- Q3. Identify 'x' in the following reaction: [1]
- $$2\text{AgCl(s)} \xrightarrow{x} 2\text{Ag(s)} + \text{Cl}_2\text{(g)}$$
- Q4. Define the term dispersion of white light. [1]
- Q5. Which phenomenon is responsible for increasing the apparent length of the day by 4 minutes? [1]
- Q6. A girl was playing with a thin beam of light from her laser torch by directing it from different directions on a convex lens held vertically. She was surprised to see that in a particular direction the beam of light continues to move along the same direction after passing through the lens. State

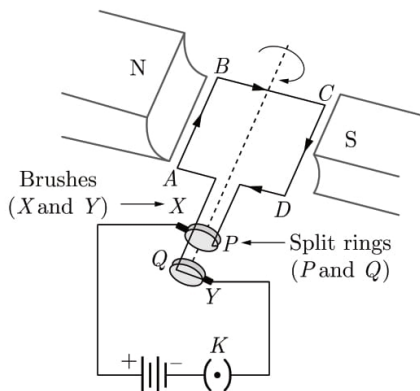
the reason for the observation.

[1]

OR

What is the nature and radius of curvature of the mirror having focal length -15 cm ?

- Q7. In the device shown in figure, there is a rectangular coil $ABCD$ of insulated copper wire. The ends of the coil are connected to the two halves of a split ring. [1]



What is the role of split ring in the given device?

- Q8. Draw the magnetic field lines around a bar magnet. [1]

- Q9. What happens to resistance of a conductor when its area of cross-section is increased? [1]

OR

Heating element of electrical heating devices is made up of an alloy rather than a pure metal. Give two reasons.

- Q10. Which enzyme present in saliva breaks down starch? [1]

- Q11. Name the tissue which transports soluble products of photosynthesis in a plant. [1]

OR

What will happen to a plant if its xylem is removed?

- Q12. Which class of chemicals is linked to the decrease in the amount of ozone in the upper atmosphere of the earth? [1]

OR

The first trophic level in a food chain is always a green plant. Why?

- Q13. Write the full form of DNA. [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.

Q14. **Assertion :** Covalent compounds have generally low melting and boiling points. [1]
Reason : Covalent compounds are soluble in water.

Q15. **Assertion :** The enzymes released by micro-organisms help in breaking down biodegradable wastes.
Reason : Biodegradable wastes are generally inorganic wastes. [1]

Q16. **Assertion :** The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta.
Reason : Placenta transfers glucose and oxygen from the mother to the embryo. [1]

OR

Assertion : Fertilisation cannot take place in flowers if pollination does not occur.

Reason : Fertilisation requires both male and female gametes in a flower.

Q17. **Read the following and answer any four question 17.1 to 17.5.** 1 × 4

Sexually Transmitted Diseases (STDs) or Sexually Transmitted Infections (STIs) are caused by bacteria, viruses or parasites that are transmitted through unprotected sex and skin to skin genital contact. Bacterial infections include gonorrhoea, syphilis and Lymphogranuloma Venerum (LGV) whereas viral infections include warts, genital herpes and HIV-AIDS. STIs are an important public health problem in India. ICMR estimates the occurrence of about 30-35 million new infections in the country every year, almost half of them among adolescents and young people. Birth control methods such as oral contraceptives or IUDs do not prevent STD transmission, however, correct and consistent use of male condom is highly effective in reducing STD transmission.

17.1 Which of the following is not a sexually transmitted disease?

- (a) gonorrhoea
- (b) hepatitis
- (c) syphilis
- (d) AIDS

17.2 The sexually transmitted disease which is caused by bacteria is:

- (a) diarrhoea
- (b) AIDS
- (c) gonorrhoea
- (d) genital herpes

17.3 Which of the following method of contraception protects a person from acquiring a STD?

- (a) oral pills
- (b) copper-T
- (c) surgery
- (d) condom

17.4 Study the table below and select the row that has the incorrect Information.

	Disease	Cause
(a)	LGV	Bacteria
(b)	Genital Herpes	Virus
(c)	Syphilis	Virus
(d)	Gonorrhoea	Bacteria

17.5 STIs are most common in which age group?

- (a) people 60 and older
- (b) people aged 40 to 50
- (c) adolescents and young people upto age 25.
- (d) none of these

Q18. **Read the following and answer any four questions from 18.1 to 18.5.** 1 × 4

In the year 1817, a German chemist, arranged certain elements with similar properties (both physical and chemical) in groups of three. The basis of the arrangement was the atomic masses of

the elements. In a particular group, the elements (e.g., A, B, C) with atomic masses 7, 23 and 39 respectively were arranged in order of increasing atomic masses and the atomic mass of the middle element (B) was almost the mean or the average of the atomic masses of the first and third elements i.e., A and C .

18.1 Which of the following scientist had proposed such a classification of elements?

- | | |
|-------------------|-----------------------|
| (a) Henry Mosely | (b) Dmitri Mendeleev |
| (c) John Newlands | (d) Johann Dobereiner |

18.2 What could be the elements A, B and C ?

- | | |
|-----------------------------------|-----------------------------------|
| (a) Calcium, Strontium and Barium | (b) Lithium, Sodium and Potassium |
| (c) Lithium, Sodium and Calcium | (d) Nitrogen, Calcium and Iodine |

18.3 The three imaginary elements X, Y and Z represent elements according to the given law. If the atomic mass of element X is 14 and that of Y is 46, then the atomic mass of element Z will be:

- | | |
|--------|--------|
| (a) 78 | (b) 32 |
| (c) 18 | (d) 60 |

18.4 What is the limitation of law discussed in the given paragraph?

- | |
|---|
| (a) This law could not explain the position of isotopes |
| (b) This law proved to be true for elements only up to calcium. |
| (c) This law could define a total of 9 elements only |
| (d) This law could not define the position of hydrogen |

18.5 Out of A, B and C which element(s) catches fire in air?

- | | |
|-----------------|-----------------|
| (a) A and B | (b) B Only |
| (c) C only | (d) B and C |

Q19. Read the following and answer any four questions from 19.1 to 19.5.

1 × 4

A student of class X wanted to understand the phenomenon of refraction of light through a glass slab. For this, he fix a sheet of white paper on a drawing board using drawing pins and place a rectangular glass slab over the sheet in the middle. Now, he draw the outline of slab with a pencil. Using two pins, such that line joining the pins is inclined to edge of slab he look for images through the opposite edge such that images of pins also lie on a straight line and obtained the following ray diagrams as shown below:

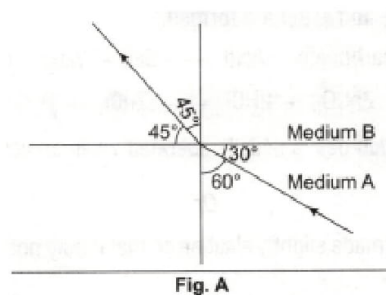
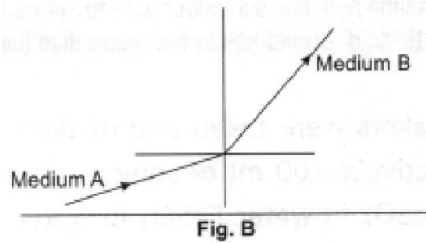


Fig. A



19.1 What is the focal length of a glass slab?

- (a) Zero
- (b) One
- (c) Vary from zero to one
- (d) Infinite

19.2 In fig. *B*, the refractive index of medium *B* relative to *A* will be:

- (a) greater than unity
- (b) equal to unity
- (c) zero
- (d) less than unity

19.3 Refer to fig. *A*, find the refractive index of medium *B* relative to medium *A* is:

- (a) $\frac{2}{\sqrt{6}}$
- (b) $\frac{\sqrt{2}}{\sqrt{3}}$
- (c) $\frac{\sqrt{3}}{\sqrt{2}}$
- (d) $\frac{\sqrt{6}}{2}$

19.4 In one case, the student observes that no refraction of light occurs when ray of light passes from medium *A* to medium *B*. In this case, the angle made by the ray of light at boundary of medium *B* is:

- (a) 0°
- (b) 90°
- (c) 45°
- (d) 60°

19.5 You are given alcohol, mustard oil, glycerine and kerosene. In which of these media a ray of light incident obliquely at same angle would bend the most?

- (a) mustard oil
- (b) glycerine
- (c) kerosene
- (d) alcohol

Q20. Read the following and answer any four questions from 20.1 to 20.5.

1 × 4

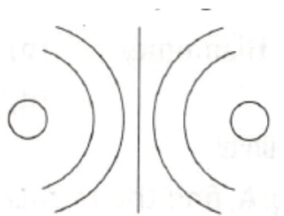
The magnetic field lines around a straight conductor (straight wire) carrying current are concentric circles whose centres lie on the wire. It has been shown by experiments that the magnitude of magnetic field produced by a straight current carrying wire at a given point is: (i) directly proportional to the current passing in the wire, and (ii) inversely proportional to the distance of that point from the wire.

The magnetic field lines are circular near the current carrying circular loop. As we move away, the concentric circles representing magnetic field lines become bigger and bigger and at the centre the magnetic field lines are straight.

20.1 The direction of magnetic field developed around a current-carrying conductor can be easily found by the use of:

- (a) Fleming's left-hand rule
- (b) Left-hand thumb rule
- (c) Right-hand thumb rule
- (d) Fleming's right hand rule

20.2 The diagram given below represents magnetic field caused by a current-carrying conductor which is:



- (a) a solenoid
(b) a long straight wire
(c) a circular coil
(d) a short straight wire

20.3 The strength of magnetic field due to a straight conductor depends on the:
(a) nature of conductor
(b) current passing through the wire
(c) direction of current
(d) all of above

20.4 Which of the following correctly describes the magnetic field near a long straight wire?
(a) The field consists of straight Lines perpendicular to the wire
(b) The field consists of straight lines parallel to the wire
(c) The field consists of radial Lines originating from the wire
(d) The field consists of concentric circles centred on the wire

20.5 The strength of magnetic field inside a long current carrying straight solenoid is:
(a) same at all points
(b) minimum in the middle
(c) found to increase from one end to the other
(d) more at the ends than at the centre.

SECTION B

- Q21. (i) What is meant by heredity?
(ii) How many types of genes are there? Name them. [2]

OR

Why did Mendel choose garden pea for his experiments?

- Q22. List two distinguishing features between sexual and asexual types of reproduction in tabular form. [2]
- Q23. (i) What happens when an acid reacts with a metal carbonate? Give chemical equation involved.
(ii) Which gas is usually liberated when an acid reacts with a metal. [2]

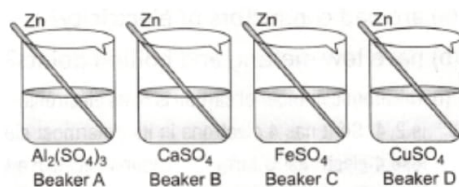
OR

A milkman adds a very small amount of baking soda to fresh milk.

- (i) Why does he shift the pH of the fresh milk from 6 to slightly alkaline?
(ii) Why does this milk take a long time to set as curd?

- Q24. Four beakers were taken and marked *A, B, C* and *D* respectively 200 ml of solution of $\text{Al}_2(\text{SO}_4)_3$ in water, CaSO_4 in water, FeSO_4 in water and CuSO_4 in water was filled in the beakers *A, B, C* and *D* respectively. Clean piece of metal zinc was placed in each solution and kept undisturbed for two

hours.



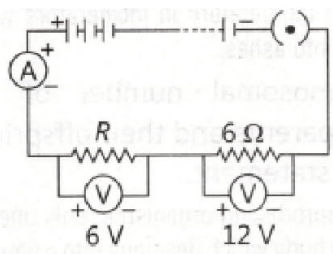
- (a) What colour change would you observe in beaker *D*?
 (b) Arrange the metals Zn, Al, Ca, Fe and Cu in the order of decreasing reactivity. [2]

Q25. A student performs an experiment in the lab to study image formation by different types of lenses. When a fork is seen through lenses *A* and *B* one by one, it appears as shown in the above figures.



- (a) What is the nature of lens *A*? Give reason for your answer.
 (b) What is the nature of lens *B*? Give reason for your answer. [2]

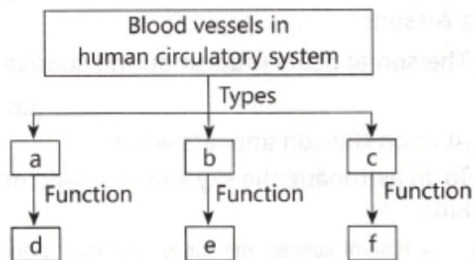
Q26. A circuit is shown in the diagram given below.



- (i) Find the value of *R*.
 (ii) Find the potential difference across to terminals of the battery. [2]

SECTION C

Q27. Complete the following flow chart as per the given [3]



OR

What are the components of the transport system in human beings? What are the functions of these components?

- Q28. State in brief two ways in which non-biodegradable substances would affect the environment. List two methods of safe disposal of the non-biodegradable waste. [3]
- Q29. 'The chromosomal number of the asexually producing parents and their offspring is the same.' Justify this statement. [3]
- Q30. (i) Study the following reaction between lead sulphide and hydrogen peroxide:

$$\text{PbS(s)} + 4\text{H}_2\text{O}_2(\text{aq}) \longrightarrow \text{PbSO}_4(\text{s}) + 4\text{H}_2\text{O(l)}$$
 (a) Which substance is oxidised?
 (b) Which substance is reduced?
 (ii) What happens when lead nitrate is heated? Write the equation involved. [3]
- Q31. State the reason why carbon can neither form C^{4+} cation nor C^{4-} anions, but forms covalent bonds. Also state reasons to explain why covalent compounds:
 (a) are bad conductors of electricity?
 (b) have low melting and boiling points? [3]
- Q32. The following table shows the position of five elements p, q, r, s and t in the modern periodic table: [3]

1						18
p	2	13	14	15	16	17
		q				r
s					t	

Answer the following:

- (a) Select the letter which represents:
 (i) an alkali metal.
 (ii) a halogen.
 (b) What type of bond is formed between p and t ?
 (c) What type of bond is formed between s and t ?
- Q33. Give reasons:
 (i) The sun appears reddish during sunrise.
 (ii) At noon the sun appears white.
 (iii) To an astronaut, the sky appears dark instead of blue. [3]

SECTION D

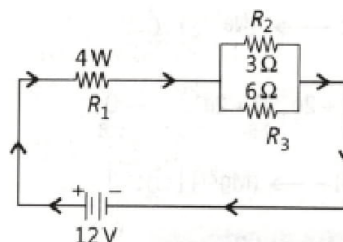
- Q34. (i) Define reactivity series of metals. Arrange the metals lead, calcium, gold and magnesium in order of their increasing reactivity.
 (ii) Why are ionic compounds usually hard?
 (iii) Write chemical equations that show aluminium oxide reacts with acid as well as base. [5]

OR

- (i) A copper coin is kept immersed in a solution of silver nitrate for sometime. What will happen to the coin and the colour of the solution?
 (ii) Write the equation involved.
 (iii) Show the formation of Na_2O and MgO by transfer of electrons. Name the ions present in these compounds.
- Q35. (i) Give two differences between the two modes of pollination in flowering plants.
 (ii) Explain with the help of a labelled diagram the process by which Hydra reproduces asexually.

[5]

- Q36. (i) The circuit diagram given below shows the combination of three resistors R_1 , R_2 and R_3 :
[5]



Find:

- (a) Total resistance of the circuit.
 - (b) Total current flowing in the circuit.
 - (c) The potential difference across R_1 .
- (ii) What is meant by electric power? Write the formula for electric power in terms of potential difference and resistance.

OR

- (i)Electrical resistivities of some substance at 20°C are given below :

Silver	$1.60 \times 10^{-8} \Omega\text{-m}$
Copper	$1.62 \times 10^{-8} \Omega\text{-m}$
Tungsten	$5.2 \times 10^{-8} \Omega\text{-m}$
Iron	$10.0 \times 10^{-8} \Omega\text{-m}$
Mercury	$94.0 \times 10^{-8} \Omega\text{-m}$
Nichrome	$100 \times 10^{-6} \Omega\text{-m}$

Answer the following questions in relation to them:

- (a) Among silver and copper which one is better conductor? Why?
 - (b) Which material would you advise to use in electrical heating device? Why?
- (ii) Justify the following statements:
- (a) Two magnetic field lines never intersect each other.
 - (b) Magnetic field lines are closed curves.

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 6**

Time : 3 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 labeled diagrams should be drawn.
-

SECTION-A

- Q1. Name a non-metal which is lustrous and a metal which is non-lustrous. [1]

OR

Why does calcium float in water?

- Q2. What type of bond is present in F_2 molecule? [1]

- Q3. The elements A, B, C, D and E have atomic numbers 9, 11, 17, 12 and 13 respectively. Which pair of elements belongs to the same group of the periodic table? [1]

- Q4. What is the reason behind twinkling of stars? [1]

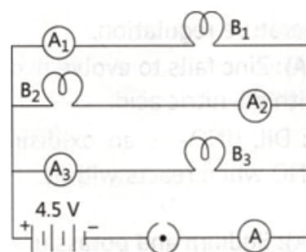
- Q5. The refractive index of diamond is 2.42. What is the meaning of this statement? [1]

- Q6. Where should an object be placed in front of a convex lens to get a real image of the size of the object? [1]

OR

Define 1 dioptre of power of a lens.

- Q7. B_1, B_2 and B_3 are three identical bulbs connected as shown in figure. When all the three bulbs glow, a current of 3 A is recorded by the ammeter A .



What happens to the glow of the other two bulbs when the bulb B_1 gets fused? [1]

Q8. An electron does not suffer any deflection while passing through a region of uniform magnetic field. What is the direction of magnetic field? [1]

Q9. What is meant by saying that the potential difference between the two points is 1 V? [1]

OR

Write SI unit of resistivity.

Q10. What is the role of the acid in our stomach? [1]

Q11. Why do the walls of trachea not collapse when there is less air in it? [1]

OR

What is the range of normal blood pressure (systolic/diastolic)?

Q12. Name any two man-made ecosystems. [1]

OR

Select two non-biodegradable substances from the following wastes generated in a kitchen: Spoiled food, paper bags, milk bags, vegetable peels, tin cans, used tea leaves.

Q13. Name the part of Bryophyllum where the buds are produced for vegetative propagation. [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.

Q14. **Assertion :** It is necessary to separate oxygenated and deoxygenated blood in mammals and birds.
Reason : Mammals and birds are warm blooded animals and they depend on environment for their body temperature regulation. [1]

Q15. **Assertion :** Zinc fails to evolve hydrogen gas on reacting with dil. nitric acid.
Reason : Dil. HNO_3 is an oxidising agent and zinc gives NO when reacts with it. [1]

OR

Assertion : Sodium and potassium are stored in kerosene oil.

Reason : Sodium and potassium belongs to group IA, so they are alkali metals.

Q16. **Assertion :** Biological magnification is the process in which harmful chemicals enter a food chain and get accumulated progressively at each trophic level.

Reason : Biological magnification affect organisms belonging to different trophic levels particularly the tertiary consumers. [1]

Q17. Read the following and answer any four question 17.1 to 17.5.

 1×4

Naren was participating in a marathon. He was running at position two, right from the beginning. Just when he was nearing the finishing line, he started running even faster so as to stand first. And when he was about to win the marathon, he got a severe muscle cramp in his leg. This cramp prevented Naren from running any further and shattered his dream of winning the marathon.

17.1 The process which provides most of the energy to Naren for running the marathon is:

- (a) anaerobic Respiration (b) aerobic Respiration
(c) breathing (d) fermentation

17.2 The process which provides a little extra energy to Naren for running very fast towards the end of race is:

- (a) anaerobic respiration (b) aerobic respiration
(c) breathing (d) fermentation

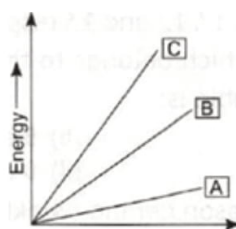
17.3 The substance which gets accumulated in the leg muscles of Naren that causes muscle cramp is:

- (a) pyruvate
(b) ethanol
(c) carbon dioxide
(d) lactic acid

17.4 Which of the following is correct for the process of anaerobic respiration?

	Carbon dioxide always produced	A lot of energy is released
(a)	Yes	No
(b)	No	Yes
(c)	No	No
(d)	Yes	Yes

17.5 Based on the data represented in the graph below, among *A*, *B* and *C* the products of respiration in *C* is likely to be:



- (a) Alcohol + CO₂ + 38 ATP (b) Lactic Acid + CO₂ + 2 ATP
(c) Alcohol + CO₂ + 2 ATP (d) CO₂ + H₂O + 38 ATP

Q18. Read the following and answer any four question 18.1 to 18.5.

 1×4

Chemistry is one of the most sophisticated branches of science, would not have been the same if Russian scientist Dmitri Ivanovich Mendeleev had not come up with the periodic table on March 6, 1869. Until 1863, the world was aware of only 56 known elements. The rate of scientific progress was such that every year, a new element was being discovered. It was during this time that Mendeleev came up with the idea of the periodic table. He published the periodic table in his book- "The Relation between the Properties and Atomic Weights of the Elements". He had

found a definitive pattern following which each element could be placed according to their atomic weight. He noticed that elements that are similar in their chemical properties either had the atomic weight or had a regular increase. He also predicted the properties of the missing (yet to be discovered) elements and gave them Sanskrit names.

18.1 Which of the following statement about the Mendeleev's periodic table is correct?

- (a) It has 8 vertical columns known as groups.
- (b) It has 18 horizontal rows known as periods.
- (c) It has 7 horizontal rows known as groups.
- (d) It has 18 vertical columns known as periods.

18.2 According to Mendeleev's periodic law, the elements were arranged in the periodic table in the order of:

- (a) decreasing atomic numbers
- (b) increasing atomic numbers
- (c) decreasing atomic masses
- (d) increasing atomic masses

18.3 In Mendeleev's periodic table, gaps were left for the elements to be discovered later on. An element which found a vacant place in the periodic table later on is:

- (a) Se
- (b) Ge
- (c) Si
- (d) Be

18.4 Gallium was named by Mendeleev as:

- (a) Eka-aluminium
- (b) Eka-silicon
- (c) Eka-germanium
- (d) Eka-zinc

18.5 Which of the following statement is correct in regard to Mendeleev's periodic table?

- I. Position of isotopes could not be explained.
- II. It is true for elements upto calcium only.
- III. It could accommodate noble gases when they were discovered.
- IV. It assigned correct position to hydrogen.

- (a) I and II only
- (b) I and III only
- (c) I, II and III
- (d) IV only

Q19. Read the following and answer any four question 19.1 to 19.5.

1 × 4

The triangular glass prism is a transparent object made of glass having two triangular ends and three rectangular sides. The opposite faces of a triangular glass prism are not parallel to one another. When a ray of light passes through a prism, it bends towards the base of prism as shown in figure below. But when white light consisting of seven colours falls on a glass prism, each colour in it is refracted by a different angle, with the result that seven colours are spread out to form a spectrum. The red colour is deviated the least and the violet colour is deviated the maximum.

19.1 Angle of deviation in a prism is the angle between:

- (a) incident and reflected ray
- (b) reflected and emergent ray
- (c) incident and emergent ray
- (d) incident and refracted ray

19.2 Which of the following phenomena of light are involved in the formation of a rainbow?

- (a) Reflection, refraction and dispersion
- (b) Refraction, dispersion and total internal reflection
- (c) Refraction, dispersion and internal reflection
- (d) Dispersion, scattering and total internal reflection

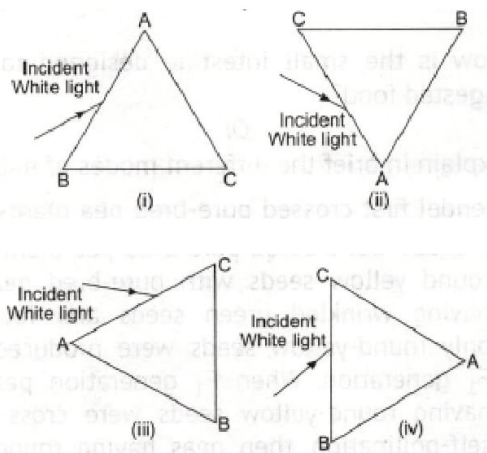
19.3 Which of the following coloured light has the least speed in glass prism?

- (a) violet
- (b) yellow
- (c) red
- (d) green

19.4 The colour of light which undergoes least bending on passing through the glass prism is:

- (a) green (b) violet
(c) red (d) blue

19.5 Based on the different orientations of a prism ABC given below, in which of the following cases, after dispersion, the third colour from the top corresponds to the colour of the sky?



- (a) (i) (b) (ii)
(c) (iii) (d) (iv)

Q20. Read the following and answer any four question 20.1 to 20.5.

1×4

The solenoid is a long coil containing a large number of close turns of insulated copper wire. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The magnetic field lines inside the solenoid are in the form of parallel straight lines. This indicates that the strength of magnetic field is the same at all the points inside the solenoid. One end of the current-carrying solenoid acts like a north-pole (N-pole) and the other end as a south pole (S-pole). So, if a current-carrying solenoid is suspended freely, it will come to rest pointing in the north and south directions (just like a freely suspended bar magnet).

The strength of magnetic field produced by a current carrying solenoid depends on:

The number of turns in the solenoid. Larger the number of turns in the solenoid, greater will be the magnetism produced.

The strength of current in the solenoid. Larger the current passed through solenoid, stronger will be the magnetic field produced.

The nature of "core material" used in making solenoid. The use of soft iron rod as core in a solenoid produces the strongest magnetism.

20.1 The strength of magnetic field due to a solenoid depends on the:

- (a) number of turns in the solenoid (b) strength of current in the solenoid
(c) nature of core material (d) all of the above

20.2 For a current in a long straight solenoid N and S-poles are created at the two ends. Among the following statements, the incorrect statements is:

- (a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid
(b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil
(c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet

(d) The N-and S-poles exchange position when the direction of current through the solenoid is reversed

20.3 If the direction of current in the coil at one end of an electromagnet is clockwise. This end of the electromagnet will be:

- (a) west pole (b) north pole
(c) south pole (d) east pole

20.4 A soft iron bar is inserted inside a current-carrying solenoid. The magnetic field inside the solenoid:

- (a) will decrease (b) will become zero
(c) will remain the same (d) will increase

20.5 The magnetic field lines in the middle of the current-carrying solenoid are:

- (a) parallel to the axis of the tube
(b) perpendicular to the axis of the tube
(c) spirals
(d) circles

SECTION-B

Q21. How is the small intestine designed to absorb digested food? [2]

OR

Explain in brief the different modes of nutrition.

Q22. Mendel first crossed pure-bred pea plants having round yellow seeds with pure-bred pea plants having wrinkled green seeds and found that only round-yellow seeds were produced in the F_1 generation. When F_1 generation pea plants having round-yellow seeds were cross-bred by self-pollination, then peas having round yellow seeds, round green seeds, wrinkled-yellow seeds and wrinkled-green seeds were produced. Mendel collected a total of 2224 seeds. What will be the number of (i) round yellow seeds and (ii) wrinkled-green seeds? [2]

Q23. Complete the following table : [2]

	Plaster of Paris	Bleaching Powder
Chemical equation for its formation	(i)	(ii)
Use	(iii)	(iv)

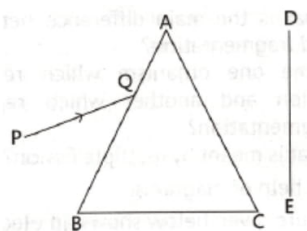
OR

Which among the following changes are exothermic or endothermic in nature?

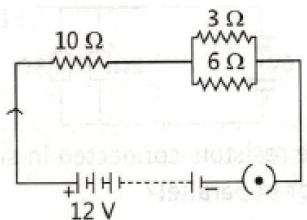
- (i) Decomposition of ferrous sulphate.
(ii) Dilution of sulphuric acid.
(iii) Dissolution of sodium hydroxide in water.
(iv) Dissolution of ammonium chloride in water.

Q24. What happens when nitric acid is added to egg shell? [2]

Q25. A narrow beam PQ of white light is passing through a glass prism ABC as shown in the diagram. Trace it on your answer sheet and show the path of the emergent beam as observed on the screen DE . Write the name and cause of the phenomenon observed. [2]



- Q26. Consider the circuit shown in the diagram. Find the current in $3\ \Omega$ resistor. [2]



SECTION-C

- Q27. Explain the following methods of contraception giving one example of each:
 (i) Barrier method.
 (ii) Hormonal imbalance method.
 (iii) Surgical method. [3]

OR

What is placenta? Describe its structure. State its functions in case of pregnant human female.

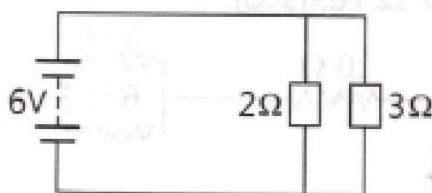
- Q28. Calculate the amount of energy available to lion in the following food chain if plants have 20,000 J of energy available from the sun. [3]
 Plants \longrightarrow Deer \longrightarrow Lion
- Q29. Explain the mechanism of breathing in humans. [3]
- Q30. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity. [3]
- Q31. For making cake, baking powder is taken. If at home your mother uses baking soda instead of baking powder in cake:
 (i) How will it affect the taste of the cake and why?
 (ii) How can baking soda be converted into baking powder?
 (iii) What is the role of tartaric acid added to baking soda? [3]
- Q32. Give reason for the following: [3]
 (i) Element carbon forms compounds mainly by covalent bonding.
 (ii) Diamond has a high melting point.
 (iii) Graphite is a good conductor of electricity.
- Q33. When and where do we see a rainbow? How is a rainbow formed? Draw a labelled diagram to illustrate the formation of a rainbow. [3]

SECTION-D

- Q34. (i) The way metals like sodium, magnesium and iron react with air and water is an indication of their relative positions in the 'reactivity series'. Is this statement true? Justify your answer with examples.
- (ii) What will you observe when:
- (a) Some zinc pieces are put in copper sulphate solution.
 - (b) Some silver pieces are put into green coloured ferrous sulphate solution.
- (iii) Which of the following metals will melt at body temperature?
Gallium, Magnesium and Caesium. [5]

OR

- (i) Write electron dot diagram for chlorine (At. no. 17) and calcium (At. no. 20). Show the formation of calcium chloride by transfer of electrons.
- (ii) Identify the nature of above compound and explain three physical properties of such compound.
- Q35. (i) What is the main difference between fission and fragmentation?
- (ii) Name one organism which reproduces by fission and another which reproduces by fragmentation?
- (iii) What is meant by multiple fission? Show it with the help of diagrams. [5]
- Q36. The figure given below shows an electric circuit in which current flows from a 6 V battery through two resistors. [5]



- (i) Are the resistors connected in series with each other or in parallel?
- (ii) For each resistor state the potential difference across it.
- (iii) The current flowing from the battery is shared between the two resistors. Which resistor will have bigger share of the current?
- (iv) Calculate the effective resistance of the two resistors.
- (v) Calculate the current that flows from the battery.

OR

Obtain an expression for the heat produced in a conductor when a voltage V is applied across it. Heating effect of electric current is desirable as well as undesirable. Explain this statement.

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 7**

Time : 3 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 labeled diagrams should be drawn.
-

SECTION A

- Q1. An element 'X' is in group 2 of the periodic table. What will be the formula of its chloride? [1]

OR

How would the tendency to lose electrons change as we go from left to right across a period of the periodic table?

- Q2. What is a homologous series of carbon compounds? [1]

- Q3. Name a sexually transmitted disease which damages the immune system of human body. [1]

- Q4. What is the magnification of the images formed by plane mirrors and why? [1]

- Q5. Why are danger signal lights red in colour? [1]

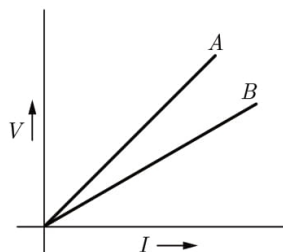
- Q6. Define 1 dioptre of power of a lens. [1]

OR

A mirror has magnification 0.4. What type of the mirror is it and what type of the image is formed?

- Q7. $V - I$ graph for two wires A and B are shown in the figure. If both wires are of same length and

same thickness, which of the two is made of a material of high resistivity? [1]



Q8. When a magnetic needle is brought near a current carrying conductor, it deflects. Why? [1]

Q9. Name the physical quantity whose unit is JC^{-1} . [1]

OR

A wire of resistance $2\ \Omega$ has been connected to a source of 50 V as its two ends. What is the current flowing through the wire?

Q10. In a bisexual flower, inspite of the young stamens being removed artificially, the flower produces fruit. Provide a suitable explanation for the above situation. [1]

Q11. What will happen to a plant if its xylem is removed? [1]

OR

What is translocation in a plant?

Q12. We do not clean ponds or lakes, but an aquarium needs to be cleaned. Why? [1]

OR

What happens when high energy ultraviolet radiation act on the oxygen at the higher level of the atmosphere?

Q13. Define excretion. [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.

Q14. **Assertion :** Diamond is a conductor of electricity and heat. [1]
Reason : Diamond is soluble in all known solvents.

Q15. **Assertion :** The enzymes released by micro-organisms help in breaking down biodegradable wastes. [1]
Reason : Biodegradable wastes are generally inorganic wastes.

OR

Assertion : Bacteria and fungi are called decomposers.

Reason : Bacteria and fungi break down the complex organic substances into simple inorganic substances that enter into the soil and are again used up by the plants.

- Q16. **Assertion :** Herbivores have longer small intestine than carnivores.
Reason : Carnivores can digest cellulose due to the presence of enzyme, cellulase. [1]

- Q17. **Read the following and answer any four question 17.1 to 17.5.** 1×4

In human beings, air is taken into the body through the nostrils. From here, the air passes through the throat and into the lungs. Rings of cartilage are present in the throat.

17.1 Which of the following prevent collapsing of trachea?

- (a) Diaphragm (b) Alveoli
- (c) Rings of cartilage (d) Ribs

17.2 Which is the correct sequence of air passage during inhalation?

- (a) Nostrils → larynx → pharynx → trachea → lungs
- (b) Nasal passage → trachea → pharynx → larynx → alveoli
- (c) Larynx → nostrils → pharynx → lungs
- (d) Nostrils → pharynx → larynx → trachea → alveoli

17.3 During respiration exchange of gases take place in:

- (a) trachea and larynx (b) alveoli of lungs
- (c) alveoli and throat (d) throat and larynx

17.4 Which of the following statement(s) is are true about respiration?

- I. During inhalation, ribs move inward and diaphragm is raised.
- II. In the alveoli, exchange of gases takes place i.e., oxygen from alveolar air diffuses into blood and carbon dioxide from blood into alveolar air.
- III. Haemoglobin has greater affinity for carbon dioxide than oxygen.
- IV. Alveoli increase surface area for exchange of gases.

- (a) I and IV (b) II and III
- (c) I and III (d) II and IV

17.5 When air is blown from mouth into a test-tube containing limewater, the limewater turned milky due to the presence of:

- (a) oxygen (b) carbon dioxide
- (c) nitrogen (d) water vapour

- Q18. **Read the following and answer any four questions from 18.1 to 18.5.** 1×4

An indicator is a special chemical that changes its colour to indicate the presence of a chemical substance. It is used to confirm the presence of an acid, a base or a neutral solution. Litmus paper is the most commonly used indicator. It is a purple dye which is extracted from a plant 'lichen'. Litmus paper comes in two colours-blue and red.

There are many other natural materials like turmeric, red cabbage leaves, coloured petals of some flowers such as petunia, which indicate the presence of acid or base in a solution. These are called acid-base indicators. These indicators tell us whether a substance is acidic or basic through colour changes.

18.1 The indicator which turn red in acid solution are:

- (a) turmeric and litmus
- (b) phenolphthalein and methyl orange
- (c) litmus and methyl orange
- (d) phenolphthalein and Litmus

18.2 Which of the following is an olfactory indicator?

- (a) Litmus (b) Petunia leaves
- (c) Turmeric (d) Vanilla essence

19.3 The indicator which produces a pink colour in an alkaline solution is:

- (a) phenolphthalein
- (b) turmeric
- (c) litmus
- (d) methyl orange

19.4 Litmus is extracted from a plant called:

- (a) Hydrangea
- (b) Lichen
- (c) Geranium
- (d) Petunia

19.5 Which of the following statements is correct about an aqueous solution of an acid and of a base?

- I. Higher the pH, stronger the acid
- II. Higher the pH, weaker the acid
- III. Lower the pH, stronger the base
- IV. Lower the pH, weaker the base

- (a) I and III
- (b) II and III
- (c) I and IV
- (d) II and IV

Q19. Read the following and answer any four questions from 19.1 to 19.5.

1 × 4

Ravi wanted to fix the rear-view mirror of his scooter. He knows that rear-view mirror is an essential safety device in the vehicle and allows him to see objects at the backside of his vehicle.



He bought two mirrors M_1 and M_2 , out of which M_1 is curved inwards and M_2 is curved outwards.

19.1 Based on the given situation, which mirror should Ravi need to fix as his rear-view mirror?

- (a) M_1
- (b) M_2
- (c) Both M_1 and M_2
- (d) None of these

19.2 If R is the radius of curvature of a spherical mirror and f is its focal length, then:

- (a) $R = f$
- (b) $R = 2f$
- (c) $R = 3f$
- (d) $R = \frac{f}{2}$

19.3 What is the formula for magnification obtained with a mirror?

- (a) $\left(\frac{-\text{Image distance}}{\text{Object distance}} \right)$
- (b) $2 \times \text{Focal length}$
- (c) $\left(\frac{\text{Height of object}}{\text{Height of image}} \right)$
- (d) None of these

19.4 Ravi did some preliminary experiment with mirror M_1 and found that magnification of the real image of an object placed at 10 cm in front of it is 3, at what distance is the image located?

- (a) 30 cm
- (b) $\frac{-10}{3}$ cm
- (c) $\frac{10}{3}$ cm
- (d) -30 cm

19.5 If the magnification of a mirror has a plus sign, then the nature of image formed by it is:

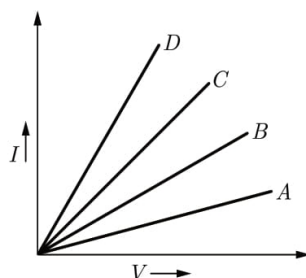
- (a) real and inverted
- (b) virtual and inverted
- (c) virtual and erect
- (d) real and erect

Q20. Read the following and answer any four questions from 20.1 to 20.5.

1 × 4

Ohm's law gives a relationship between current and potential difference. According to this Law, at constant temperature, the current flowing through a conductor is directly proportional to the potential difference across its ends. The ratio of potential difference applied between the ends of a conductor and the current flowing through it is a constant quantity called resistance.

The following graph is obtained by a researcher while doing an experiment to study Ohm's law. The I - V graph for four conductors A , B , C and D having resistance R_A , R_B , R_C and R_D respectively are shown in the graph.



20.1 If all the conductors are of same length and same material, which is the thickest ?

- (a) C (b) D
(c) A (d) B

20.2 If all the conductors are of same thickness and of same material, which is the longest ?

- (a) B (b) C
(c) A (d) D

20.3 Which one of the following relations is true for these conductors ?

- (a) $R_A > R_B > R_C > R_D$ (b) $R_A = R_B < R_C < R_D$
(c) $R_A < R_B < R_C < R_D$ (d) $R_A = R_B = R_C = R_D$

20.4 If conductors A and B are connected in series and I - V graph is plotted for the combination, its slope would be:

- (a) more than that of A (b) between A and B
(c) more than that of D (d) less than that of A

20.5 If conductors C and D are connected in parallel and I - V graph is plotted for the combination, its slope would be:

- (a) between C and D (b) lesser than that of A
(c) more than that of D (d) between B and C

SECTION-B

Q21. Write any two differences between the two ways of oxidation of glucose in organisms.

[2]

OR

- (i) State two functions of stomata.
(ii) How do guard cells regulate the opening and closing of stomatal pore?

Q22. (i) Trace the movement of oxygenated blood in the body.

- (ii) Write one structural difference between the composition of artery and vein.

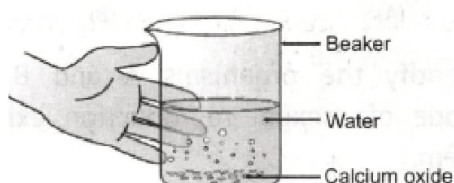
[2]

- Q23. What is the difference between displacement and double displacement reactions? Write equations for these reactions. [2]

OR

What happens when hydrogen gas is passed over the heated copper oxide? Write the chemical equation involved in this reaction.

- Q24. In order to illustrate a combination reaction, a teacher take about 2 g to 3 g of calcium oxide in a glass beaker and pour water over it very slowly.



Based on the given information:

- (i) Write the chemical reaction involved in this process.
(ii) One of the student observed that water started boiling even when the solution was not being heated. Give reason for his observation. [2]
- Q25. A student observes a dish antenna which is used to receive television signals from a satellite. What is the nature of the curved dish? Where should the antenna be positioned to receive the strongest possible signals? [2]

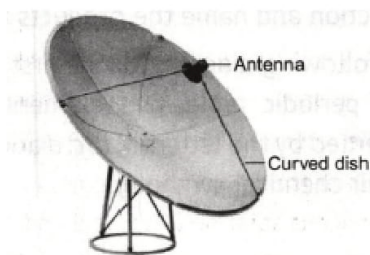


Figure : A dish Antenna

- Q26. What is meant by periodicity of properties of elements? Why are the properties of elements placed in the same group of the periodic table similar? [2]

SECTION-C

- Q27. In a monohybrid cross between tall pea plants (TT) and short pea plants (tt) a scientist obtained only tall pea plants (Tt) in the F_1 generation. However, on selfing the F_1 generation pea plants, he obtained both tall and short plants in F_2 generation. On the basis of above observation with other angiosperms also, can the scientist arrive at a law? If yes, explain the law, if not, give justification for your answer. [3]

OR

Explain Mendel's experiment with peas on inheritance of characters, considering only one visible contrasting character.

- Q28. Give reason to justify the following: [3]
 (i) The existence of decomposers is essential in a biosphere.
 (ii) Flow of energy in a food chain is unidirectional.

- Q29. What are the different ways in which glucose is oxidised to provide energy in various organisms? [3]

- Q30. 2 g ferrous sulphate crystals are heated in a dry boiling tube. [3]
 (i) List any two observations.
 (ii) Name the type of chemical reaction taking place.
 (iii) Write balanced chemical equation for the reaction and name the products formed.

- Q31. In the following diagram for the first three periods of the periodic table, five elements have been represented by the letters *a*, *b*, *c*, *d* and *e* (which are not their chemical symbols): [3]

1							18
	2	13	14	15	16	17	
			<i>a</i>			<i>b</i>	
	<i>c</i>				<i>d</i>		<i>e</i>

- (i) Select the letter which represents a halogen.
 (ii) Select the letter which represents a noble gas.
 (iii) What type of bond is formed between *a* and *b*?
- Q32. Explain the nature of the covalent bond using the bond formation in CH_3Cl . [3]
- Q33. A convex lens of focal length 25 cm and a concave lens of focal length 10 cm are placed in close contact with one another. [3]
 (i) What is the power of this combination?
 (ii) What is the focal length of this combination?
 (iii) Is this combination converging or diverging?

SECTION-D

- Q34. (i) The electronic configurations of some elements are given below:

Element	Electronic configuration		
	<i>K</i>	<i>L</i>	<i>M</i>
<i>A</i>	2	8	7
<i>B</i>	2	8	1
<i>C</i>	2	8	8
<i>D</i>	2	8	2
<i>E</i>	1		

Which of these are metals?

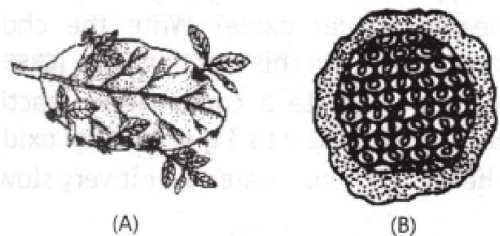
- (ii) *P*, *Q* and *R* are 3 elements which undergo chemical reactions according to the following equations:
 A. $\text{P}_2\text{O}_3 + 2\text{Q} \longrightarrow \text{Q}_2\text{O}_3 + 2\text{P}$.
 B. $3\text{RSO}_4 + 2\text{Q} \longrightarrow \text{Q}_2(\text{SO}_4)_3 + 3\text{R}$.
 C. $3\text{RO} + 2\text{P} \longrightarrow \text{P}_2\text{O}_3 + 3\text{R}$.
 Answer the following question :
 (a) Which element is most reactive?
 (b) Which element is least reactive?
 (c) State the type of reaction listed above. [5]

OR

Write equations for the reactions, if any, between:

- (i) iron and steam.
- (ii) calcium and potassium with water.
- (iii) zinc and silver nitrate solution.
- (iv) magnesium and iron(II) chloride solution.

Q35.

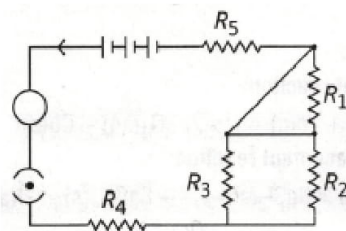


- (i) Identify the organisms *A* and *B* and the mode of asexual reproduction exhibited by them.
- (ii) How will an organism be benefited if it reproduces through spores?
- (iii) Mention the two asexual methods by which Hydra can reproduce. Explain briefly any one such method. [5]

- Q36. With the help of a diagram of experimental set-up describe an activity to show that the force acting on a current carrying conductor placed in a magnetic field increase with increase in field strength.

OR

Deduce the expression for the equivalent resistance of the parallel combination of three resistors R_1 , R_2 and R_3 .



Consider the following electric circuit:

- (i) Which two resistors are connected in series?
- (ii) Which two resistors are connected in parallel?
- (iii) If every resistor of the circuit is of 2Ω , what current will flow in the circuit? [5]

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 8**

Time : 3 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 labeled diagrams should be drawn.
-

SECTION-A

Q1. Define rancidity. [1]

OR

Why is hydrogen peroxide kept in coloured bottles?

Q2. What is universal indicator? [1]

Q3. Define catenation. [1]

Q4. What will happen if platelets were absent in the blood? [1]

Q5. What will happen to a plant if its xylem is removed? [1]

OR

Which is the largest gland in the human body?

Q6. Define photolysis. [1]

Q7. Define absolute refractive index. [1]

OR

Define the term principal axis of a spherical mirror.

- Q8. What is meant by power of a lens? [1]
- Q9. Why does the sky appear dark to astronauts? [1]
- Q10. Define one volt. [1]

OR

Define the term electrical resistivity of a material.

- Q11. What does the closeness of field lines in a magnetic field signify? [1]
- Q12. What happens if a current carrying conductor is placed in the magnetic field? [1]
- Q13. Why are crop fields known as artificial ecosystems? [1]

OR

List two biotic components of a biosphere.

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.
- Q14. **Assertion :** When HCl is added to zinc granules, a chemical reaction occurs.
Reason : Evolution of a gas and change in colour indicate that the chemical reaction is taking place. [1]
- Q15. **Assertion :** The sex of a child is determined by the mother.
Reason : Humans have two types of sex chromosomes XX and XY. [1]
- Q16. **Assertion :** Decomposers act as cleaning agents of the environment.
Reason : The decomposers recycle waste material in the hydrosphere. [1]

OR

Assertion : Green plants of the ecosystem are the producers.

Reason : Producers trap the radiant energy of the Sun and change it into chemical energy.

- Q17. **Read the following and answer any four questions from 17.1 to 17.5.** 1 × 4
 Dmitri Ivanovich Mendeleev, a Russian chemist developed a Periodic Table on the basis of atomic mass and also on the similarity of chemical properties. He started with 63 elements, studied their chemical reactivity and arranged them in the order of increasing atomic masses. But there were a few instances where Mendeleev had to place an element with a slightly greater atomic mass before an element with a slightly lower atomic mass. He also left some gaps in his periodic table. He could not assign a correct position to hydrogen in his table.
 Due to limitations, his periodic table was modified and was adopted as the basis of Modern Periodic Table.

17.1 The two elements selected by Mendeleev as the basis for the chemical reactivity are

- (a) hydrogen and nitrogen (b) oxygen and hydrogen
 (c) hydrogen and carbon (d) oxygen and nitrogen

17.2 The placement of which of the following pair of elements was not according to Mendeleev's Periodic Law in the table?

- (a) Co and Ni (b) Li and Be
(c) N and O (d) Fe and Co

17.3 Mendeleev could not assign a fix position to hydrogen because

- (a) hydrogen does not react with any other element
(b) hydrogen has completely filled shell
(c) hydrogen resemble alkali metals as well as halogens in properties
(d) hydrogen is highly reactive element

17.4 The formula of oxide of Eka-aluminium is

- (a) Al_2O_3 (b) GeO_2
(c) Sc_2O_3 (d) Ga_2O_3

17.5 How many groups and periods are there in Mendeleev's Periodic Table?

- (a) 18 Groups and 7 Periods (b) 8 Groups and 6 Periods
(c) 18 Groups and 6 Periods (d) 8 Groups and 7 Periods

Q18. Read the following and answer any four questions from 18.1 to 18.5.

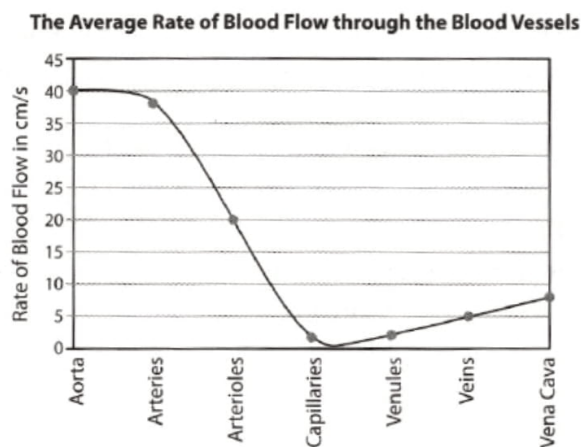
1 × 4

Blood transport food, oxygen and waste materials in our bodies. It consists of plasma as a Fluid medium. A pumping organ(heart) is required to push the blood around the body. The blood now through the chambers of heart in a specific manner and direction. While Flowing throughout the body, blood exert a pressure against the wall of a vessel.

18.1 Oxygenated blood from lungs enters left atrium through

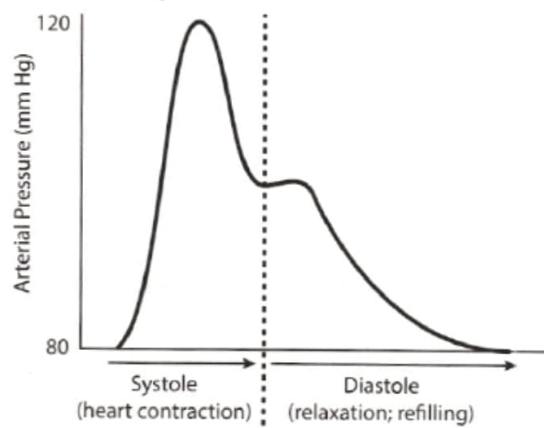
- (a) vena cava
(b) pulmonary artery
(c) pulmonary vein
(d) aorta

18.2 The given graph indicates the average rate of blood flow in the different blood vessels.



The rate of blood flow in the capillaries is very low because capillaries are

- (a) very narrow and have high resistance
(b) much wide and have low resistance
(c) very narrow and have low resistance
(d) much wide and have high resistance



Choose the correct combination of plots provided in the following table.

	Blood pressure category	Systolic (mmHg)	Diastolic (mmHg)
(a)	Normal	120	80
(b)	Normal	80	120
(c)	Hypertension	120	80
(d)	Hypertension	70	60

18.4 Which of the following statement(s) is (are) true about human heart?

- I. It is a hollow muscular organ.
 - II. It is four chambered having three auricle and one ventricle.
 - III. It has different chambers to prevent the oxygen-rich blood from mixing with the blood containing carbon dioxide.
 - IV. Arteries always carry blood away from the heart.
- (a) I and II (b) II and III
(c) I, II and III (d) I, III and IV

18.5 Study the table below and select the row that has the correct information.

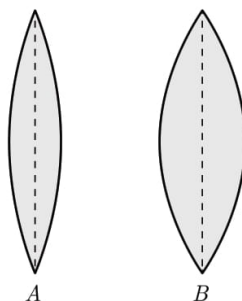
	Bodily fluid	Contents
(a)	Blood	Plasma + RBCs + WBCs + Platelets
(b)	Plasma	Blood – RBCs
(c)	Lymph	Plasma + RBCs
(d)	Serum	Plasma + RBCs + WBCs

Q19. Read the following and answer any four questions from 19.1 to 19.5.

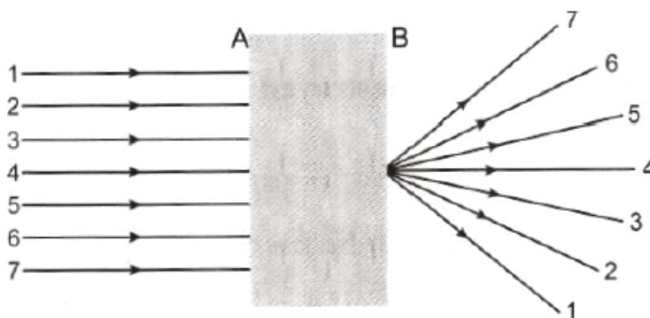
 1×4

Lenses are objects made of transparent materials such as glass or clear plastic that have curved surfaces. Diverging lenses are thicker at their edges than at their centres and make light rays passing through them spread out. Converging lenses are thicker in the middle than at the edges and make light rays passing through them focus at a point. These are used in spectacles to help people with poor vision see better. The converging lenses magnify by bending the rays of light that pass through them to meet at a point called the focus. The thicker the converging lens is at its centre, the more it magnifies and closer the focus is to the lens.

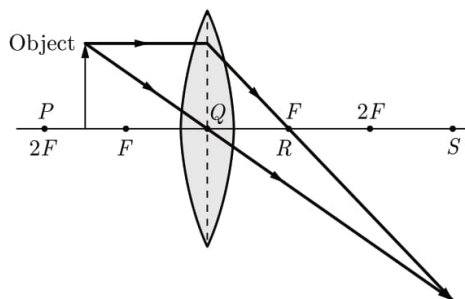
- 19.1** Ravi uses two lenses A and B of same size and same material as shown. P_1 and P_2 are the powers of A and B . An object is kept at the same distance from the lenses between F and $2F$ of each lens on the principal axis in turn. Let I_1 and I_2 be the image formed by two lenses respectively. Which one of the following statements is correct for the images formed?



- (a) Distance of image I_2 will be less than distance of image I_1 from the lens.
 (b) Distance of image I_2 will be greater than distance of image I_1 from the lens.
 (c) Size of image I_1 will be equal to size of image I_2 .
 (d) Size of image I_1 will be lesser than size of image I_2 .
- 19.2** For the above two lenses
- (a) $P_1 = P_2$ (b) $P_1 < P_2$
 (c) $P_1 > P_2$ (d) P_1 is positive and P_2 is negative
- 19.3** A beam of light is incident on the box through the holes on side A and emerges out of the holes on the other face of the box as shown in the figure.



- Which of the following could be inside the box?
- (a) Concave lens (b) Convex lens
 (c) Prism (d) Rectangular glass plate
- 19.4** The image represents the rays of light travelling through a convex lens.



Where is the image most likely to form?

- (a) Position *P*
- (b) Position *Q*
- (c) Position *R*
- (d) Position *S*

19.5 Rakhi conducts an experiment to produce an image of an object on a screen which is placed at 20 cm from the lens.

She uses a convex lens of focal length 15 cm for the experiment.

Where should she place the object in order to produce the sharpest image?

- (a) 20 cm in front of the lens
- (b) 8 cm in front of the lens
- (c) 15 cm in front of the lens
- (d) 60 cm in front of the lens

Q20. Read the following and answer any four questions from 20.1 to 20.5.

1 × 4

In 19th century, Hans Christian Oersted, one of the leading scientist played a crucial role in understanding electromagnetism. In 1820, he accidentally discovered that a compass needle got deflected when an electric current passed through a metallic wire. An electromagnet is a temporary magnet of soft iron which retains magnetism only when the current passes around it.

Electromagnets are used in electric bell, telephone, electric motor, etc.

Oersted showed that electricity and magnetism were related phenomena. His research later created technologies such as the radio, television and fibre optics.

20.1 Which of the following is not a part of an electromagnet?

- (a) Iron
- (b) Toothpick
- (c) Power source
- (d) Wire

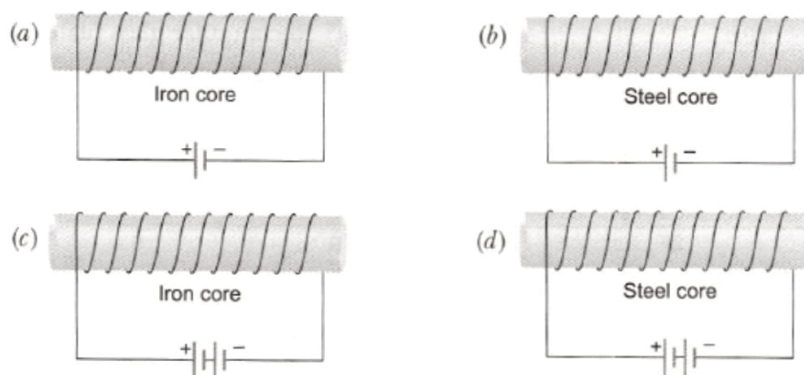
20.2 Magnetism of a magnet can be destroyed by

- (a) heating
- (b) inductive action of another magnet
- (c) hammering
- (d) all the above method

20.3 Strength of an electromagnet can be increased by

- (a) increasing the cross-sectional area
- (b) increasing the number of turns
- (c) increasing the current supply
- (d) all the above methods

20.4 Which of the following is the strongest electromagnet?



20.5 Which coil produces the strongest electromagnet for a given flow of current?

- (a) A 5 cm coil with 200 turns
- (b) A 10 cm coil with 200 turns
- (c) A 20 cm coil with 200 turns
- (d) A 10 cm coil with 100 turns

SECTION-B

- Q21. Name a metal for each case:
(i) It does not react with cold as well as hot water but reacts with steam.
(ii) It does not react with any physical state of water. [2]
- Q22. (i) Write the number of covalent bonds in the molecule of propane, C_3H_8 .
(ii) Which element exhibits the property of catenation to maximum extent and why? [2]

OR

Catenation is the ability of an atom to form bonds with other atoms of the same element. It is exhibited by both carbon and silicon. Compare the ability of catenation of the two elements. Give reasons.

- Q23. What processes would you consider essential for maintaining life? [2]
- Q24. What is the role of the acid in our stomach? [2]

OR

Name the parts of the body responsible for excretion in

- (i) Amoeba
(ii) Earthworm
- Q25. State the cause of dispersion when white light enters a glass prism. Explain with a diagram. [2]
- Q26. An electric oven of 2 kW power rating is operated in a domestic electrical circuit of 220 V that has a current rating of 5 A. What result do you expect? Explain. [2]

SECTION-C

- Q27. (i) Write two observations when lead nitrate is heated in a test tube.
(ii) Name the type of reaction.
(iii) Write a balanced chemical equation to represent the above reaction. [3]
- Q28. Samples of four metals A, B, C and D were taken and added to the following solution one by one. The results obtained have been tabulated as follows:

Metal	Iron(II) sulphate	Copper(II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement	–	–
B	Displacement	–	No reaction	–
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Use the table above to answer the following questions about metals A, B, C and D.

- (i) Which is the most reactive metal?
(ii) What would you observe, if B is added to a solution of copper(II) sulphate?
(iii) Arrange the metals A, B, C and D in the order of decreasing reactivity. [3]
- Q29. Elements have been arranged in the following sequence on the basis of their increasing atomic masses.
F, Na, Mg, Al, Si, P, S, Cl, Ar, K
(i) Pick two sets of elements which have similar properties.
(ii) The given sequence represents which law of classification of elements? [3]

Q30. A variegated leaf with green and yellow patches is used for an experiment to prove that chlorophyll is required for photosynthesis. Before the experiment the green portions (A) and the pale yellow portions (B) are observed. What will be the colour of 'N'. just before and after the starch test? Also write the equation of photosynthesis and mark, as well as validate from which molecule the by-product is obtained. [3]

Q31. In a pea plant, the trait of flowers bearing purple colour (PP) is dominant over white colour (pp). Explain the inheritance pattern of F_1 and F_2 generations with the help of a cross following the rules of inheritance of traits. State the visible characters of F_1 and F_2 progenies. [3]

OR

What is variation? How is variation created in a population? How does the creation of variation in a species promote survival?

Q32. 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]

Q33. Why should there be equitable distribution of resources? List three forces that would be working against an equitable distribution of our resources. [3]

SECTION-D

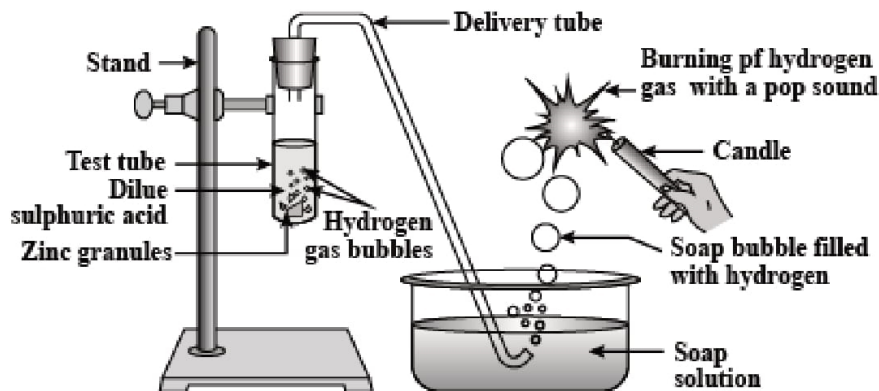
Q34. Equal length of magnesium ribbon are taken in two test tubes 'A'. and 'B'. H_2SO_4 is added to test tube 'A' and H_2CO_3 in the test tube 'B' in equal amounts:

- Identify the test tube showing vigorous reaction.
- Give reason to support your answer.
- Name the gas liberated in both the tubes. How will you prove its liberation?
- Write chemical equations for both reactions.
- Out of the acids taken above, which one will have
 - lower pH value?
 - lower H^+ ion concentration respectively?

[5]

OR

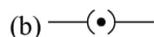
- In the following schematic diagram for the preparation of hydrogen gas as shown in figure, what would happen if following changes are made?
 - In place of zinc granules, same amount of zinc dust is taken in the test tube.
 - Instead of dilute sulphuric acid, dilute hydrochloric acid is taken.
 - Sodium hydroxide is taken in place of dilute sulphuric acid and the tube is heated.



- How do metal carbonates and metal hydrogencarbonates react with acids?

- Q35. (i) Describe the various steps involved in the process of binary fission with the help of a diagram. (ii) Why do multicellular organisms use complex way of reproduction? [5]

- Q36. (i) Name an instrument that measures electric current in a circuit. Define the unit of electric current. (ii) What do the following symbols represent in a circuit diagram?

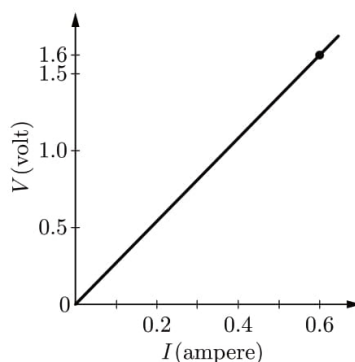


- (iii) An electric circuit consisting of a 0.5 m long nichrome wire XY , an ammeter, a voltmeter, four cells of 1.5 V each and a plug key was set up.

(a) Draw the electric circuit diagram to study the relation between the potential difference maintained between the points ' X ' and ' Y ' and the electric current flowing through XY .

(b) Following graph was plotted between V and I values using above circuit:

What would be the values of $\frac{V}{I}$ ratios when the potential difference is 0.8 V, 1.2 V and 1.6 V respectively? What conclusion do you draw from these values?



OR

- (i) What are magnetic field lines? How is the direction of magnetic field at a point in a magnetic field determined using field lines?
 (ii) Two circular coils ' X ' and ' Y ' are placed close to each other. If the current in the coil ' X ' is changed, will some current be induced in the coil ' Y '? Give reason.
 (iii) State 'Fleming's right hand rule'.

**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 9**

Time : 3 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 labeled diagrams should be drawn.
-

SECTION-A

Q1. Give an example of a redox reaction. [1]

OR

What type of reaction is represented by the digestion of food in our body?

Q2. Write the name given to bases that are highly soluble in water. Give an example. [1]

Q3. What is meant by homologous series of carbon compounds? [1]

Q4. In which form
(i) oxygen is carried to the tissues?
(ii) CO₂ moves out of the blood? [1]

Q5. Name two organisms in which food material is broken down outside the body and absorbed. [1]

OR

Name the various cells through which water moves upward to reach the leaves.

Q6. What prevents backflow of blood inside the heart during contraction? [1]

Q7. Why is convex mirror used as a rear view mirror in vehicles? State any one reason. [1]

OR

A small electric lamp is placed at the focus of a convex lens. What is the nature of beam of light produced by the lens?

- Q8. Which property of concave mirror is utilised for using them as shaving mirrors? [1]
- Q9. How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light? [1]
- Q10. Why is resistance less when resistors are joined in parallel? [1]

OR

Define resistance. Give its SI unit.

- Q11. How is the strength of the magnetic field at a point near a wire related to the strength of the electric current flowing in the wire? [1]
- Q12. Name the alloy which is mainly used for making permanent magnets. [1]
- Q13. What is a biodegradable substance? [1]

OR

What is the function of ozone in the upper atmosphere?

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.
- Q14. **Assertion :** In a reaction of copper with oxygen, copper serves as a reducing agent.
Reason : The substance which gains oxygen in a chemical reaction acts as a reducing agent. [1]
- Q15. **Assertion :** Mendel selected the pea plant for his experiments.
Reason : Pea plant is cross-pollinating and has unisexual flowers. [1]
- Q16. **Assertion :** Supersonic jets cause thinning of ozone layer.
Reason : Depletion of ozone layer causes greenhouse effect. [1]

OR

Assertion : Biotic components of ecosystem continuously require energy to carry on life processes.
Reason : Abiotic components are the non-living factors of the ecosystem.

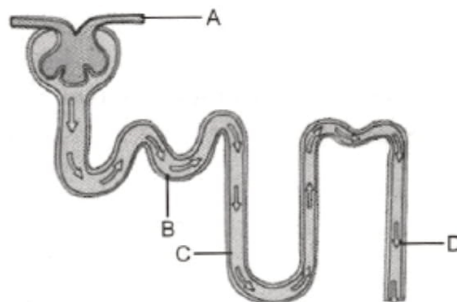
- Q17. **Read the following and answer any four questions from 17.1 to 17.5.** 1 × 4
 In 1817, Dobereiner showed that when the three elements in a triad were written in the order of increasing atomic masses; the atomic mass of the middle element was roughly the average of the atomic masses of the other two elements. But this classification into triads was not found to be useful.
 In 1866, Newlands arranged the then known elements in the order of increasing atomic masses and proposed a law known as 'Newlands' Law of Octaves'. It states that "when elements are arranged in order of increasing atomic masses, then every eighth element has properties similar to that of the first". In order to fit elements into his table, he adjusted two elements in the same slot, but also put some unlike elements under the same note. Then Mendeleev, a Russian chemist was the most important contributor to the early development of a Periodic Table of elements in which the elements were arranged on the basis of atomic mass and also on the similarity of chemical properties.

- 17.1** The three triads identified by Dobereiner are
 (a) N, P, As; He, Ne, Ar; Ca, Sr, Ba
 (b) Li, Na, K; N, P, As; Cl, Br, I
 (c) N, P, As; Ca, Sr, Ba; Cl, Br, I
 (d) Be, Mg, Ca; N, P, As; Cl, Br, I
- 17.2** Which of the following statements is incorrect about the table proposed by Newlands?
 (a) It was applicable only upto calcium.
 (b) It worked well with heavier elements only.
 (c) It became irrelevant for noble gases.
 (d) It was not applicable for only 56 elements existed at that time .
- 17.3** The two pairs of elements placed in one slot by Newlands are
 (a) Co, Ni and Ce, La (b) Be, Mg and Co, Ni
 (c) F, Cl and Ce, La (d) Zn, Sr and Be, Mg
- 17.4** The drawbacks of Mendeleev's Periodic Table were removed when the elements are arranged in the order of
 (a) decreasing atomic masses (b) increasing atomic masses
 (c) decreasing atomic number (d) increasing atomic number
- 17.5** Who introduced the terms 'Groups' and 'Periods' in the Periodic Table first?
 (a) Dobereiner (b) Newlands
 (c) Mendeleev (d) Henry

Q18. Read the following and answer any four questions from 18.1 to 18.5. 1 × 4
 Nitrogenous materials formed due to metabolic activities are need to be removed. The biological process involved in the removal of these harmful metabolic wastes from the body is called excretion. Different organisms use varied strategies to do this. Many unicellular organisms remove these wastes by simple diffusion from the body surface into the surrounding water while complex multi-cellular organisms use specialised organs to perform the same function.

- 18.1** The excretory system of human beings include
 (a) a pair of kidneys, a pair of ureters, a urinary bladder and a urethra
 (b) a pair of kidneys, a pair of urinary bladders, a ureter, and a urethra
 (c) a pair of kidneys, a pair of ureters, a pair of urinary bladders and a urethra
 (d) a kidney, a ureter, a urinary bladder and a urethra

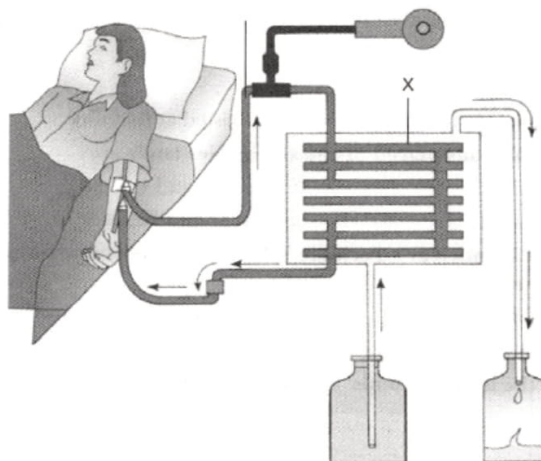
18.2 The given figure represents the structure of a nephron.



Which section of the nephron is responsible for concentrating the solute in the filtrate?

- (a) A (b) B
 (c) C (d) D

18.3



Study the picture given above and choose the correct combination of plots provided in the following table.

	X	Process used	Function
(a)	Dialyser	Diffusion	To remove the excess wastes and fluid from the blood
(b)	Blood thinner	Clotting	To remove the clots from the blood
(c)	Dialysate	Osmosis	To add fluid to the blood
(d)	Dialysing pump	Filtration	To draw blood from the body and send it to dialyser

18.4 Which of the following statement(s) is (are) true about excretion in human beings?

- I. Kidneys are the primary excretory organs.
- II. The bladder is muscular, so it is under nervous control.
- III. Each kidney has large numbers of filtration units called nephrons.
- IV. Urine is stored in the urethra until the urge of passing it out.

- (a) I and II only
- (b) I and III only
- (c) I, II and III only
- (d) I and IV only

18.5 Study the table below and select the row that has the incorrect information.

	Excretory organ	Substances excreted
(a)	Kidneys	Nitrogenous wastes
(b)	Lungs	Urea
(c)	Skin	Sweat
(d)	Oil glands	Sebum

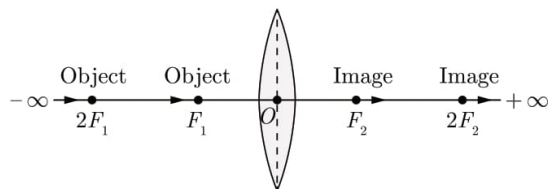
Q19. Read the following and answer any four questions from 19.1 to 19.5.

1 × 4

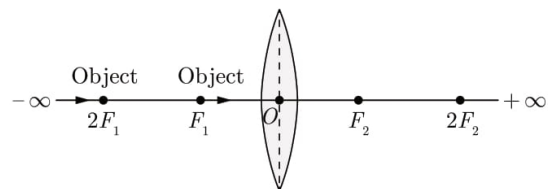
The image formed by a convex lens depends on the position of the object in front of the lens. When the object is placed anywhere between focus and infinity, the image formed by convex lens is real and inverted. The image is not obtained on the screen when the object is placed between focus and the lens.

The distance between the optical centre O of the convex lens and the focus point F_1 or F_2 is its focal length.

When the object shifts from $-\infty$ to F_1 , the image moves from F_2 to $+\infty$.



When the object shifts from F_1 to O , the image moves from $-\infty$ to O .



A student did an experiment with a convex lens. He put an object at different distances from the lens. In each case he measured the distance of the image from the lens. The results were recorded in the following table.

Object distance (in cm)	25	30	40	60	120
Image distance (in cm)	100	24	60	30	40

Unfortunately his results are written in the wrong order.

19.1 The focal length of this lens is

- (a) 20 cm
- (b) 25 cm
- (c) 30 cm
- (d) 35 cm

19.2 The image distances in the correct order (in cm) is

- (a) 24, 30, 40, 60, 100
- (b) 100, 24, 60, 40, 30
- (c) 100, 60, 30, 40, 24
- (d) 100, 60, 40, 30, 24

19.3 Which of this object distances gives the biggest image?

- (a) 30 cm
- (b) 25 cm
- (c) 40 cm
- (d) 60 cm

19.4 The minimum distance between an object and its real image formed by a convex lens is

- (a) $2f$
- (b) $3f$
- (c) $4f$
- (d) zero

19.5 A virtual image is formed by convex lens when object is placed

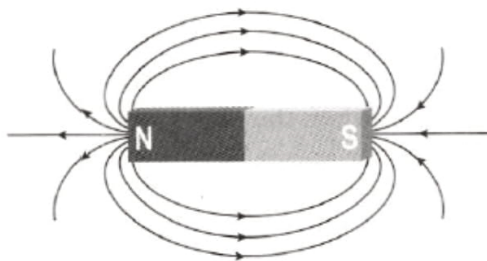
- (a) at infinity
- (b) between C and F
- (c) at F
- (d) between F and O

Q20. Read the following and answer any four questions from 20.1 to 20.5. 1 × 4

When magnet is brought into the field of another magnet, the field interacts with each pole of the magnet and each of these poles experience magnetic force.

The space surrounding a magnet where a magnetic force is experienced is called magnetic field.

A magnetic field line is a continuous curve in a magnetic field such that the tangent at any point on it gives the direction of magnetic field at that point.



- 20.1** Magnetic field is produced by the flow of current in a straight wire. The phenomenon was discovered by
 (a) Faraday (b) Fleming
 (c) Oersted (d) Maxwell
- 20.2** At the centre of bar magnet, the magnetism is
 (a) same as the pole (b) zero
 (c) maximum (d) minimum
- 20.3** Magnetic field lines can be used to determine
 (a) only the direction of magnetic field
 (b) only the relative strength of the magnetic field
 (c) both the direction and relative strength of the magnetic field
 (d) the shape of the magnetic field
- 20.4** A bar magnet has strongest magnetism
 (a) inside of the magnet
 (b) at the centre of the magnet
 (c) near the poles of the magnet
 (d) at one quarter distance from the poles of the magnet
- 20.5** SI unit of magnetic field is
 (a) webre (b) tesla
 (c) newton (d) henry

SECTION-B

- Q21. Why are food cans tin-plated instead of zinc plated though zinc is cheaper than tin? [2]
- Q22. What is a covalent bond? What type of bond exists in
 (i) CCl_4
 (ii) CaCl_2 ? [2]

OR

Carbon, Group (14) element in the Periodic Table, is known to form compounds with many elements.

Write an example of a compound formed with

- (i) Chlorine (Group 17 of Periodic Table)
 (ii) Oxygen (Group 16 of Periodic Table)
- Q23. What is the role of saliva in the digestion of food? [2]
- Q24. “All plants give out oxygen during day and carbon dioxide during night”. Do you agree with this statement? Give reason. [2]

OR

What is translocation? Why is it essential for plants?

- Q25. Is the position of a star as seen by us is its true position? Justify your answer. [2]
- Q26. Two lamps, one rated 100 W; 220 V, and the other 60 W; 220 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. [2]

SECTION-C

- Q27. 2 g of ferrous sulphate crystals are heated in a dry boiling tube.
(i) List any two observations.
(ii) Name the type of chemical reaction taking place.
(iii) Write balanced chemical equation for the reaction and name the products formed. [3]
- Q28. (i) Write the electron dot structures of sodium, oxygen and magnesium.
(ii) Show the formation of Na_2O and MgO by the transfer of electrons.
(iii) What are the ions present in these compounds? [3]
- Q29. Two elements X and Y have atomic numbers 12 and 16 respectively. To which period of the Modern Periodic Table do these two elements belong? What type of bond will be formed between them and why? Also give the chemical formula of the compound formed. [3]
- Q30. Write three types of blood vessels. Give one important feature of each. [3]
- Q31. Give the pair of contrasting traits of the following characters in pea plant and mention which is dominant and recessive.
(i) yellow seed
(ii) round seed [3]

OR

What is DNA copying? State its importance.

- Q32. It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm.
(i) What should be the range of the object distance in the above case?
(ii) Will the image be smaller or larger than the object? Draw a ray diagram to show the formation of image in this case.
(iii) Where will the image of this object be, if it is placed 24 cm in front of the mirror? [3]
- Q33. Calculate the amount of energy available to tiger in the following food chain if plants have 30,000 J of energy available from the Sun:
Plant \longrightarrow Deer \longrightarrow Tiger [3]

SECTION-D

- Q34. (i) Why does an aqueous solution of an acid conduct electricity?
(ii) How does the concentration of hydronium ions (H_3O^+) change when a solution of an acid is diluted?
(iii) Which has higher pH value, a concentrated or dilute solution of hydrochloric acid?
(iv) What do you observe on adding dilute hydrochloric acid to
(a) sodium carbonate placed in test tube,
(b) zinc metal in a test tube? [5]

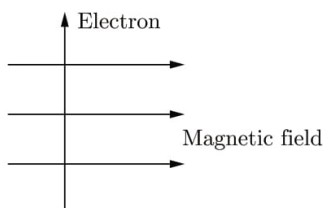
OR

A sulphate salt of Group 2 element of the Periodic Table is a white, soft 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. Identify the sulphate salt and state why does it show such a behaviour. Give the reaction involved.

- Q35. (i) Draw the diagram of female reproductive system and mark the part(s):
(a) where block is created surgically to prevent fertilization
(b) where CuT is inserted
(c) inside which condom can be placed
(ii) Why do more and more people prefer to use condoms? What is the principle behind the use of condoms? [5]
- Q36. (i) Consider a conductor of resistance ' R ', length ' L ', thickness ' d ' and resistivity ' ρ '.
Now this conductor is cut into four equal parts. What will be the new resistivity of each of these parts? Why?
(ii) Find the resistance if all of these parts are connected in
(a) parallel
(b) series
(iii) Out of the combinations of resistors mentioned above in the previous part, for a given voltage which combination will consume more power and why? [5]

OR

- (i) Explain an activity to show that a current-carrying conductor experiences a force when placed in a magnetic field. How do you think the displacement of rod AB will be affected if (a) current in rod AB is increased; (b) a stronger horse-shoe magnet is used; and (c) length of the rod AB is increased?
(ii) State the rule which gives the direction of force acting on the conductor.
(iii) An electron moves perpendicular to a magnetic field as shown in the figure.
What would be the direction of force experienced by the electron? Electron



**BIDWAN CLASSES
BERHAMPUR
SCIENCE SET - 10**

Time : 3 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 labeled diagrams should be drawn.
-

SECTION-A

Q1. What is a chemical equation? [1]

OR

Balance the following chemical equation:

Q2. What is a neutralisation reaction? [1]

Q3. Define allotropy. [1]

Q4. In which forms do most plants absorb nitrogen? [1]

Q5. What is ascent of sap? [1]

OR

Which is the major nitrogenous waste product in human beings? How is it removed from the body?

Q6. Why does lack of oxygen in muscles often lead to cramps among cricketers? [1]

Q7. Write two different uses of concave mirrors. [1]

OR

Define the term magnification.

Q8. Draw a labelled ray diagram to show the path of the reflected ray corresponding to an incident ray of light parallel to the principal axis of a convex mirror. Mark the angle of incidence and angle of reflection on it. [1]

Q9. Why do we see a rainbow in the sky only after rainfall? [1]

Q10. Mention the condition under which a current can flow in a conductor. [1]

OR

What are the special features of a heating wire?

Q11. On what effect of an electric current does an electromagnet work? [1]

Q12. State Faraday's law of electromagnetic induction. [1]

Q13. Which of the following are always at the second trophic level of food chains?
Carnivores, Autotrophs, Herbivores [1]

OR

What will be the amount of energy available to the organisms of the 2nd trophic level of a food chain, if the energy available at the first trophic level is 10,000 joules?

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.

Q14. **Assertion :** Calcium carbonate when heated gives calcium oxide and water.
Reason : On heating calcium carbonate, decomposition reaction takes place. [1]

Q15. **Assertion :** Mutation is sudden change in the genetic material.
Reason : Variation is useful for the survival of species over time. [1]

Q16. **Assertion :** Man is a herbivore.
Reason : Omnivores eat both plant parts and meat of animals. [1]

OR

Assertion : The food in the ecosystem is preserved in a linear fashion.

Reason : Plants use the solar energy in reducing carbon dioxide to carbon.

Q17. **Read the following and answer any four questions from 17.1 to 17.5.** 1 × 4

In Modern Periodic Table, metals are towards the left hand side, non-metals are towards the right hand side and there is a zig-zag line between them which contains metalloids.

Metals are electropositive, i.e., they have a tendency to lose electrons. As the effective nuclear charge acting on the valence shell electrons increases across a period, the tendency to lose electron will decrease so metallic character decreases. Down the group, the effective nuclear charge experienced by valence electrons is decreasing because the outermost electrons are farther away from the nucleus. Therefore, they can be lost easily and thus metallic character increases down the group.

Non-metals on the other hand, are electronegative. They tend to form bonds by gaining electrons. Non-metallic character increases along the period and decreases down the group.

17.1 Which of the following element is not a metalloid?

- (a) Ge
- (b) As
- (c) Ar
- (d) Te

17.2 The order of metallic character of some elements is $N < P < As < Sb < Bi$. The most electronegative among these elements is

- (a) N
- (b) P
- (c) Sb
- (d) Bi

17.3 Which of the following statements is correct?

- (a) Electronegativity increases down the group.
- (b) Metallic character decreases down the group.
- (c) Effective nuclear charge decreases down the group.
- (d) The force of attraction between the nucleus and the outermost electrons increases down the group.

17.4 Which of the following property increases along the period?

- (a) Atomic size
- (b) Metallic character
- (c) Electropositivity
- (d) Non-metallic character

17.5 Which of the following is the most non-metallic element?

- (a) P
- (b) Cl
- (c) Se
- (d) Br

Q18. Read the following and answer any four questions from 18.1 to 18.5.

1 × 4

Energy is needed to maintain a state of order in our body. The source of energy and materials is the food we eat. Some organisms use simple food material obtained from inorganic sources and other organisms utilise complex substances. These complex substances have to be broken down into simpler ones before they can be used for the upkeep and growth of the body.

18.1 All non-green organisms fall under the category of

- (a) autotrophs
- (b) heterotrophs
- (c) saprobes
- (d) chemotrophs

18.2 The diagram below is an experiment conducted to study a factor necessary for photosynthesis.

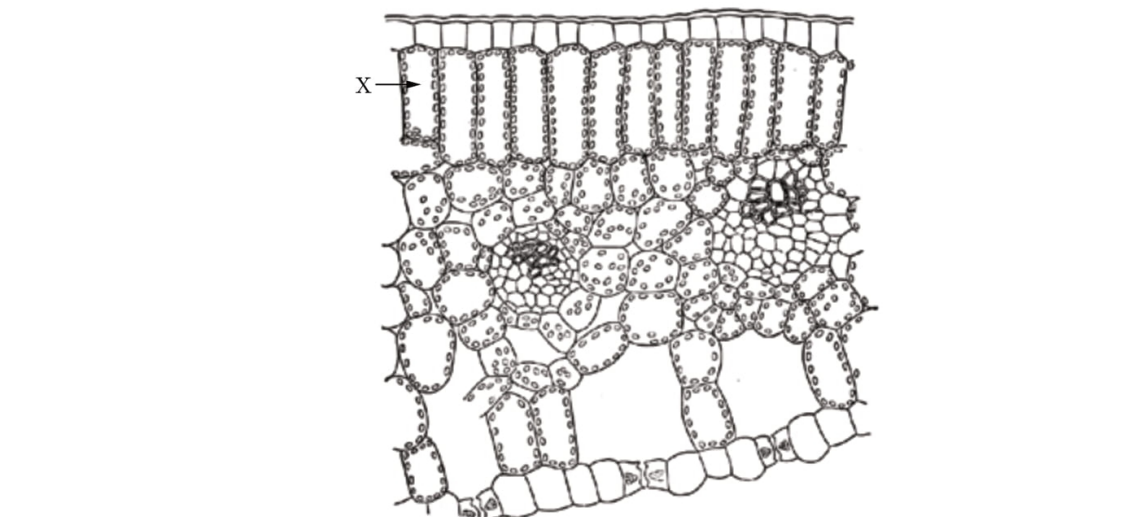


(A)

(B)

The test performed on the leaf and the solution used for the test are respectively

- (a) starch test and potassium iodide
- (b) chlorophyll test and ethyl alcohol
- (c) photosynthesis test and potassium iodide
- (d) starch test and ethyl alcohol



Identify “X” and choose the correct combination of plots provided in the following table.

	X	Description	Function
(a)	Chlorophyll	A green coloured pigment	Essential for photosynthesis
(b)	Chloroplast	A cell organelle	Conducts photosynthesis
(c)	Vascular bundle	Vascular tissue	Transportation in plants
(d)	Chloroplast	A green coloured pigment	Essential for photosynthesis

18.4 Which of the following statement(s) is (are) true about stomata?

- I. These are the tiny pores present on the surface of the leaves.
 - II. Through these, massive amounts of gaseous exchange take place.
 - III. Plants open these pores when carbon dioxide is not required for photosynthesis.
 - IV. Guard cells operate the opening and closing of these pores.
- (a) I and II only (b) I and III only
(c) I, II and III only (d) I, II and IV only

18.5 Study the table below and select the row that has the incorrect information.

	Organism	Type of heterotrophic nutrition
(a)	Amoeba	Holozoic
(b)	Mushroom	Saprophytic
(c)	Lice	Parasitic
(d)	Lion	Parasitic

Q19. Read the following and answer any four questions from 19.1 to 19.5.

 1×4

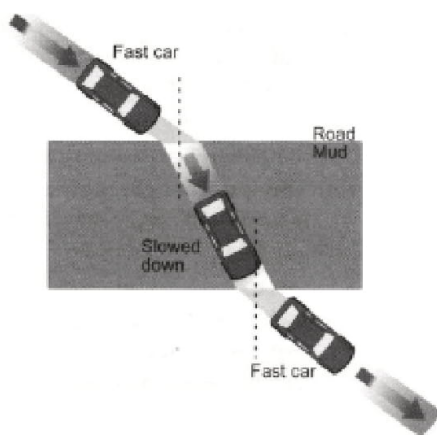
A ray of light travelling from a rarer medium to a denser medium slows down and bends towards the normal. When it travels from denser medium to a rarer medium, it speeds up and bends away from the normal.

Consider an analogy to assist in our understanding of these two important principles. Suppose that a fast car is travelling across the road towards a thick mud at an angle, the mud slows down one side of the car, and the path of the car bends.

The more it is slowed, the more it bends. Upon exiting the thick mud on the opposite side, the car speeds up and achieves its original speed. In effect, this analogy would be representative of light wave crossing two boundaries.

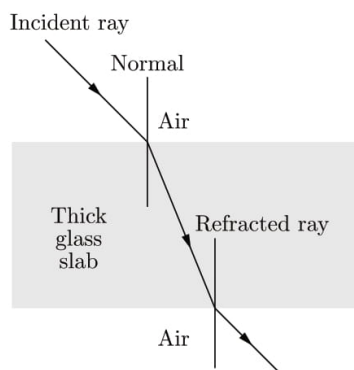
At the first boundary (the road to thick mud boundary), the light ray (or the car) would be slowing down; and at the second boundary (the mud to road boundary), the light ray (or the car) would be speeding up. We can apply our two important principles listed above and predict the direction of bending and the path of the car as it travels through the thick mud. As indicated in the diagram, upon entering the mud, the car slows down and the path of the car bends towards the normal (perpendicular line drawn to the surface). Upon exiting the mud, the car speeds up and the path of the car bends away from the normal. The path of the car is closer to the normal in the slower medium and farther from the normal in the faster medium.

This analogy can be extended to the path of a light ray as it passes from air into and out of a rectangular block of glass.



19.1 A student studies that when a ray of light travels from air into the glass slab, it bends towards the normal. But as refracted ray emerges out of the glass slab to the vacuum, it bends away from the normal, as shown.

Which option explains the law of refraction of light through the glass slab?



- (a) Light always bends towards the normal slab in a glass slab.
- (b) Ray of light travelling in the air is always considered as the incident ray, and the one in the glass is the refracted ray.
- (c) The incident ray, the refracted ray and the normal to the interface always lie on the same plane.
- (d) Ray of light always travels in a straight path irrespective of change in medium.

- 19.2** A student studies that speed of light in air is 300000 km/s whereas that of speed in a glass slab is about 197000 km/s. What causes the difference in speed of light in these two media?
- Difference in density
 - Difference in amount of light
 - Difference in direction of wind flow
 - Difference in temperature
- 19.3** The speed of light in air is 3×10^8 m/s, whereas that of the speed of light in water is 2.26×10^8 m/s. What is the refractive index of water with respect to air?
- 2.64
 - 1
 - 1.32
 - 0.75
- 19.4** Rahul conducts an experiment using an object of height 10 cm and a concave lens with focal length 20 cm. The object is placed at a distance of 25 cm from the lens. Can the image be formed on a screen?
- Yes, as the image formed will be real.
 - No, as the image formed will be inverted.
 - No, as the image formed will be virtual.
 - Yes, as the image formed will be erect.
- 19.5** A ray of light continues moving along the same path while passing through air-glass interface. The angle of incidence for the ray is
- zero
 - 90°
 - less than 90°
 - greater than 90°

Q20. Read the following and answer any four questions from 20.1 to 20.5.

1 × 4

It is now well known that “magnetic field is caused by electric current.”

Whenever there is a change in magnetic flux linked with a coil (or circuit) an emf is induced in the coil. This phenomenon is called electromagnetic induction.

The emf produced in the coil is called the induced emf. If the coil is closed, the current thus produced is called as induced current.

The direction of induced current is determining by Fleming’s right hand rule.

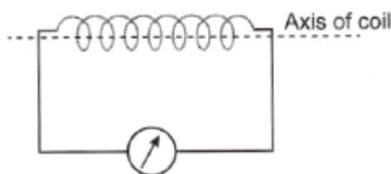
These induced current are used in a moving coil microphone, tape-recorders, video-recorders, hard-discs in computers, etc.

- 20.1** The direction of magnetic field around straight conductor carrying current can be determined by
- Fleming’s right hand rule
 - Fleming’s left hand rule
 - Right hand thumb rule
 - Lenz’s law
- 20.2** Induced current flows through coil
- only for the period during which magnetic field changes through it.
 - less than the period during which magnetic field changes through it
 - more than the period during which magnetic field changes through it
 - none of these
- 20.3** The direction of induced current is determined by
- Fleming’s right hand rule
 - Fleming’s left hand rule
 - Right hand thumb rule
 - Lenz’s law

20.4 A technique of taking image of different body organs which is based on magnetic effect of current is

- (a) MRI (b) X-ray
(c) sonography (d) none of these

20.5 A student connects a coil of wire with a sensitive galvanometer as shown in figure. He will observe the deflection in the galvanometer if bar magnet is



- (a) placed near one of the faces of the coil and parallel to the axis of the coil
(b) placed near one of the faces of the coil and perpendicular to the axis of the coil
(c) moved towards or away from the coil and parallel to the axis of the coil
(d) placed inside the coil

SECTION-B

Q21. Name two physical properties each of sodium and carbon in which their behaviour is not as expected from their classification as metal and non-metal respectively. [2]

Q22. Draw the electron dot structure of the gas molecule which is liberated when zinc metal is treated with aqueous NaOH solution. [2]

OR

What is heteroatom? Give an example.

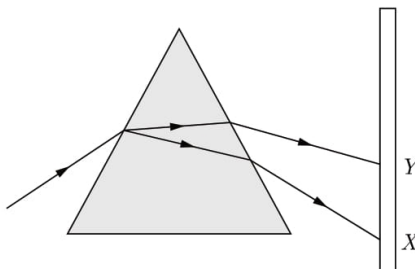
Q23. How does water affect the rate of photosynthesis in plants? [2]

Q24. List two different functions performed by pancreas in our body. [2]

OR

What is peptic ulcer? How is peptic ulcer caused?

Q25. 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 the screen. [2]



- (i) Name the phenomenon.
(ii) State the colours seen at X and Y.

[2]

- Q26. Two wires made of copper and nichrome have equal lengths and equal resistance. Which is thicker? (The resistivity of nichrome is greater than resistivity of copper.) [2]

SECTION-C

- Q27. 2 g of silver chloride is taken in a china dish and the china dish is placed in sunlight for sometime. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction. [3]
- Q28. Distinguish between ionic and covalent compounds under the following properties:
(i) Strength of forces between constituent elements
(ii) Solubility of compounds in water
(iii) Electrical conduction in substances [3]
- Q29. An element 'X' has mass number 35 and number of neutrons 18. Write atomic number and electronic configuration of 'X'. Also write group number, period number and valency of 'X'. [3]
- Q30. Explain the processes of aerobic respiration in mitochondria of a cell and anaerobic respiration in yeast and muscle with the help of word equations. [3]
- Q31. Name the plant Mendel used for his experiment. What type of progeny was obtained by Mendel in F_1 and F_2 generations when he crossed the tall and short plants? Write the ratio he obtained in F_2 generation plants. [3]

OR

List two differences in tabular form between dominant trait and recessive trait. What percentage/proportion of the plants in the F_2 generation/progeny were round, in Mendel's cross between round and wrinkled pea plants?

- Q32. (i) List four characteristics of the images formed by plane mirrors.
(ii) How can you distinguish between a plane mirror, a concave mirror and a convex mirror without touching them? [3]
- Q33. Why are forests considered "biodiversity hot spots"? Suggest four approaches towards the conservation of forests. [3]

SECTION-D

- Q34. For making cake, baking powder is taken. If at home your mother uses baking soda instead of baking powder in cake.
(i) How will it affect the taste of the cake and why?
(ii) How can baking soda be converted into baking powder?
(iii) What is the role of tartaric acid added to baking soda? [5]

OR

Compounds such as alcohols and glucose also contain hydrogen but are not categorised as acids. Describe an activity to prove it.

- Q35. Define pollination. Explain the different types of pollination. List two agents of pollination. How does suitable pollination lead to fertilization? [5]
- Q36. A current of 1 ampere flows in a series circuit having an electric lamp and a conductor of $5\ \Omega$ when connected to a 10 V battery. Calculate the resistance of the electric lamp.

Now if a resistance of $10\ \Omega$ is connected in parallel with this series combination, what change (if any) in current flowing through $5\ \Omega$ conductor and potential difference across the lamp will take place? Give reason. [5]

OR

- (i) With the help of a labelled diagram, explain the distribution of magnetic field due to a current through a circular loop. Why is it that if a current carrying coil has n turns, the field produced at any point is n times as large as that produced by a single turn?
- (ii) Draw a pattern of magnetic field formed around a current carrying solenoid. What happens to the magnetic field when the current through the solenoid is reversed?