ARYAN INSTITUTE

Class: 10th
Subject: Science

General Instruction: Read the following instructions carefully

I. The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All question 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 in the range of 30 to 50 words.
IV. Section C – question no. 27 to 33 are short answer type question, carrying 3 marks each. Answers to these question should in the range of 50 to 80 words.
V. Section D – question no. 34 to 36 are long answer type question, carrying 5 marks each. Answers to these question should 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

1. What is the role of lymph in transportation?
2. Why is the progeny always tall when a tall pea plant is crossed with a short pea plant?
3. Name the structural and functional unit of kidney.

   OR

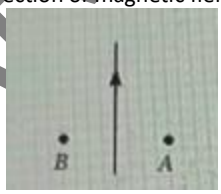
   State two functions of chewing of food.
4. Why is vegetative propagation needed for growing some plants?

   OR

   How do variations favour survival of a species?
5. How is concentration of hydronium ions (H_3O^+) affected when a solution of acid is diluted?

   OR

   A substance changes the colour of phenolphthalein to pink. What kind of substance is it?
6. Name a plant which can reproduce by fragmentation.
7. A current is flowing in upward direction on the plane of paper. Find the direction of magnetic field at A and B



8. Draw the symbol for an ammeter.
9. How is the spinal cord protected in the human body?
10. Name any two ways in which you can trace the magnetic field pattern of a bar magnet.

    OR

    How magnetic field lines are directed outside and inside the magnet?
11. Define one ampere.
12. The image formed by a convex lens is always real. Is it true?

    OR

    What is the cause of refraction?
13. Define ascent of sap.

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

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

14. **Assertion:** Myopia is due to the increased converging power of the eye lens.
    Reason: Myopia can be corrected by using spectacles made from concave lenses.
15. **Assertion:** Respiration is an exothermic process.
    Reason: Glucose combines with oxygen in the cells of our body and provides energy.

    OR

    Assertion: Following reaction of iron is a redox reaction $4Fe+3O_2 \longrightarrow 4Fe^{3+}+6O^2$.
    Reason: The metallic iron is oxidised to Fe^{3+} and O_2 is reduced to oxide ion.
16. **Assertion**: Herbivores are called first order consumers.
    Reason: Lion is a top carnivore.

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

17. **Read the following and answer any four questions from 17(i) to 17(v).**
    Following series of reactions take place with the formation of B, C, D. EF and G.
    (A) $\xrightarrow{Heat}$ (B) + CO_2
    (B) +H_2O $\longrightarrow$ (C)
    (C) +NH3Cl $\longrightarrow$ (D) (a gas which is soluble in water)
    (D) + H_0O $\longrightarrow$ (E) solution
    (E) +CO_2 $\longrightarrow$ (F)
    (F) +NaCl $\longrightarrow$ (G) + (H)
    (G) $\xrightarrow{Heat}$ $Na_2CO_3 + CO_2 + H_2O$
    (i) On heating (A), the product (B) formed is an
    (a) oxide (b) carbonate
    (c) sulphide (d) none of these
    (ii) The name of compound G is
    (a) sodium carbonate (b) sodium hydrogen carbonate
    (c) sodium chloride (d) sodium hydroxide.
    (iii) Identify the compound (C).
    (a) $Ca(OH)_2$ (b) NaOH
    (c) Cao (d) $CaCO_3$
    Name the solution (E).
    (a) NaOH (b) NaCl
    (C) NH_4OH (d) NH_4Cl
    (v) An aqueous solution of sodium carbonate is
    (a) neutral (b) acid
    (c) alkaline (d) none of these.
18. **Read the following and answer any four questions from 18(i) to 18(v).**
    The arrangement of metals in a vertical column in the decreasing order of their reactivities is called the reactivity series or activity series of metals. The most reactive metal is at the top position of the reactivity series. The least reactive metal is at the bottom of the reactivity series.

    Activity series of metals

Metal	Symbol
Potassium	K
Sodium	Na
magnesium	Mg
Aluminium	Al
Zinc	Zn
Iron	Fe
Tin	Sn
Lead	Pb
Hydrogen	H
Copper	Cu
Mercury	Hg
Silver	Ag
gold	Au

Reactivity decreases ↓

Hydrogen, though a non-metal, has been included in the activity series of metals only for comparison. Apart from it, the hydrogen atom also has tendency to lose its valence electron and form cation like the behaviour shown by metals.

(1) Food cans are coated with tin and not with zinc because
(a) zinc is less reactive than tin
(b) zinc is more reactive that tin
(c) tin decomposes the stored food
(d) none of these.

(ii) The reaction on which activity series of metals is based is
(a) displacement reaction (b) combination reaction
(c) combustion reaction (d) decomposition reaction.

(iii) An element 'X' after reacting with acids liberate hydrogen gas and can displace lead and tin from their salt solution. The metal 'X' is
(a) copper (b) gold (c)nickel (d) silver.

(iv) The most reactive metal is
(a) potassium (b) barium
(c) sodium (d) calcium.

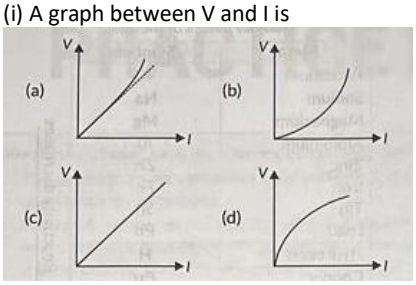
(v) Which of the following element can displace magnesium?
(a) Sodium (b) Gold (c) Mercury (d) Lead

19. Read the following and answer any four questions from 19(i) to 19(v).

The value of current *I* flowing in given resistor for the corresponding values of potential difference V across the resistor are given.

***I* (amperes)**	***V* (volts)**
0.5	1.6
1.0	3.4
2.0	6.7
3.0	10.2
4.0	13.2

(i) A graph between V and I is



(ii) The resistance of the given resistor is
(a) 5.25 Ω (b) 5 Ω
(c) 3.2 Ω (d) 2.75 Ω

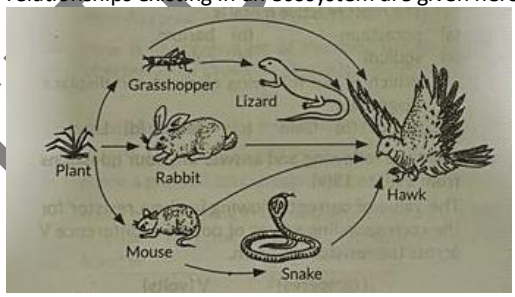
(iii) What will be the nature of graph between potential difference and current for a conductor?
(a) Straight line (b) Parabola
(c) Hyperbola (d) Ellipse

(iv) Which physical quantity can be obtained from this graph?
(a) Resistivity (b) Resistance
(c) Conductivity (d) Conductance

(v) If length of silver wire is 10 m and 2 x 10^{-3} m^2 is its area of cross-section, the resistance of the wire's material will be (Resistivity of silver, $\rho = 1.6 \times 10^{-6}$ Ω m)
(a) 2.8 x 10-8 Ω
(b) 3.6 x 10-2 Ω
(c) 8.0 x 10-3 Ω
(d) 1.6 x 10-6 Ω

20. Read the following and answer any four questions from 20(i) to 20(v).

Several interconnected food chains of nutritional relationships existing in an ecosystem are given here.



How many food chain are shown in the given figure?
(a) 6 (b) 7 (c) 5 (d) 4

(ii) Food webs are
(a) never Straight
(b) always straight
(c) interlinking of food chains
(d) both (a) and (c)

(iii) If a grasshopper is eaten by a lizard, then the energy transfer will be from
(a) producer to decomposer
(b) producer to primary consumer
(c) primary consumer to secondary consumer
(d) secondary consumer to primary consumer.

(iv) In the given figure how many food chains are with four trophic levels?
(a) 2 (b) 3 (c) 5 (d) 4

(v) Food web helps in
(a) providing alternative pathways of food availability
(b) checking the overpopulation
(c) ecosystem stability (d) all of these.

Section – B

21. Define alternating current and direct current. Explain why alternating current is preferred over direct current for transmission over long distances.
22. Draw a ray diagram to show the refraction of light through a triangular glass prism and mark angle of deviation on it.

OR

What are the conditions for the formation of a rainbow?

23. Complex organisms cannot give rise to new individuals through regeneration. Justify the statement.
24. What do you understand by male and female gamete?

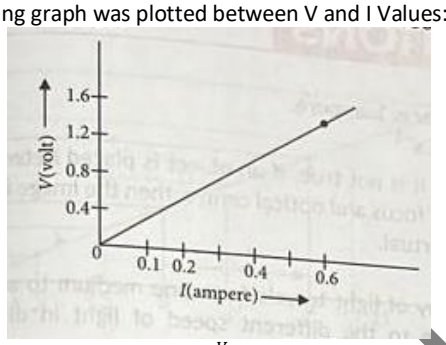
OR

Define zygote.

25. What is methane? Draw its electron dot structure. Name the type of bonds formed in this compound.
26. Name the type of reaction for the following:
    (i) Vegetable matter changing into compost.
    (ii) Burning of natural gas.

Section – C

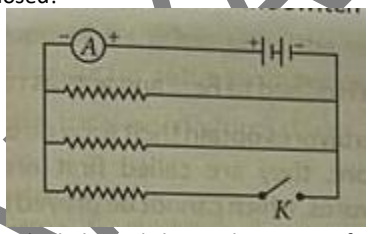
27. Explain giving reason why the sky appears blue to an observer from the surface of the Earth. What should the appearance of the sky be during the day for an astronaut staying in the international space station orbiting the Earth? State reason to justify your answer.
28. An electric circuit consisting of a 0.5 m long nichrome wire XY, and an ammeter, a voltmeter, four cells of 1.5 V each and a plug key was set up.
    (i) Draw a diagram of this electric circuit to study the relation between the potential difference maintained between the points 'X' and 'Y" and the electric current flowing through XY.
    Following graph was plotted between V and I Values:



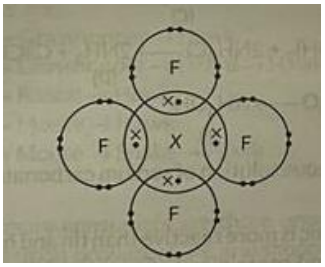
What would be the values of $\frac{V}{I}$ ratios when the potential difference is 0.8V.

OR

In the diagram shown below, the cells and the ammeter both have negligible resistance. The resistors are identical. With the switch K is open, the ammeter reads 0.6 A. What will be the ammeter reading in the ammeter when the switch is closed?



29. Write down the balanced chemical equations for the following chemical changes:
    (i) Combination of iron and sulphur
    (ii) Thermal decomposition of calcium carbonate
    (iii) Burning of magnesium ribbon
30. The diagram below shows the electron arrangement in a compound formed between element X and fluorine.



    (i) What is the formula of this compound?
    (ii) Is this an ionic or covalent compound? Give your reason.
31. Briefly describe multiple fission.
32. Define the following terms:
    (a) Inheritance (b) Heredity
    (c) Trait (d) Variations
33. What is propagation? State two advantages and two disadvantages of this method.

Section – D

34. Describe the system of vessels which comprise human circulatory system.

    OR

    (a) Draw a diagram depicting human alimentary canal and label on it: gall bladder, liver and pancreas.
    (b) State the role of liver and pancreas.
    (c) Name the organ which performs the following function in human.
    (i) Absorption of digested food
    (ii) Absorption of water
35. (i) Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity.
    (ii) Take 3 g of barium hydroxide in a test tube, now add about 2 g of ammonium chloride and mix the contents with the help of a glass rod. Now touch the test tube from outside.
    (a) What do you feel on touching the test tube?
    (b) State the inference about the type of reaction occurred.
    (c) Write the balanced chemical equation of the reaction involved.
36. (i) Under what condition with a glass lens placed in a transparent liquid become invisible.
    (ii) Describe and illustrate with a diagram, how wer should arrange two converging lenses so that a parallel beam of light entering one lens emerges as a parallel beam after passing through the second lens.
    (iii) An object is placed at a distance of 3 cm from a concave lens of focal length 12 cm. Find the (a) position and (b) nature of the image formed.

    OR

    A student focussed the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle, screen and the lens as under. Position of candle 12.0 cm, Position of convex lens 50.0 cm, Position of the screen-88.0 cm
    (1) What is the focal length of the convex lens?
    (ii) Where will the image be formed if he shifts the candle towards the lens at a position of 31.0 cm?
    (iii) What will be the nature of the image formed if he further shifts the candle towards the lens?
    (iv) Draw a ray diagram to show the formation of the image in case (iii) as said above.