General Instructions:
i)   This question paper consists of 39 questions in 5 sections.
ii)   All questions are compulsory. However, an internal choice is provided in some questions.
        A student is expected to attempt only one of these questions.
iii)   Section A consists of 20 objective type questions carrying 1 mark each.
iv)   Section B consists of 6 Very Short questions carrying 2 marks each. Answers to
        these questions should be in the range of 30 to 50 words.
v)   Section C consists of 7 Short Answer type questions carrying 3 marks each. Answers
        to these questions should be in the range of 50 to 80 words.
vi)   Section D consists of 3 Long Answer type questions carrying 5 marks each. Answer
        to these questions should be in the range of 80 to 120 words.
vii)   Section E consists of 3 source-based/case-based units of assessment of 4 marks each
        with sub-parts.

SECTION – A
**Select and write the most appropriate option out of the four options given
for each of the questions 1 - 20.**

1. Sodium hydrogen carbonate when added to acetic acid evolves a gas. Which of the following
    statements are true about the gas evolved?
    (i)   It turns limewater milky.
    (ii)   It extinguishes a burning splinter.
    (iii)   It dissolves in a solution of sodium hydroxide.
    (iv)   It has a pungent odour.

    a)   (i) and (ii)   b)   (i), (ii) and (iii)
    c)   (ii), (iii) and (iv)   d)   (i) and (iv)   1

2. Silver article turns black when kept in the open for a few days is due to the formation of
    a) H_2S b)   AgS   c) $AgSO_4$ d) Ag_2S 1

3. The respiration process during which glucose undergoes slow combustion by combining
    with oxygen in the cells of our body to produce energy, is a kind of:
    a)   Exothermic process   b)   Endothermic process
    c)   Reversible process   d)   Physical process   1

4. Which of the following statements about the reaction given below are correct?
                        $H_2S + Cl_2 \rightarrow 2HCl + S$
    (i) H_2S is oxidized to S   (ii) H_2S is reduced to S
    (iii) Cl_2 acts as an oxidizing agent   (iv) H_2S acts as an oxidizing agent.

    a)   (ii),(iii) and (iv)   b)   (i), (ii) and (iii)
    c)   (i) and (iii) only   d)   (iii) and (iv) only   1

5. An aqueous solution 'A' turns phenolphthalein solution pink. On addition of an aqueous
    solution 'B' to 'A', the pink colour disappears. Which of the following statement is true for
    solution 'A' and 'B'?
    a)   A is strongly basic and B is a weak base.
    b)   A is strongly acidic and B is a weak acid.
    c)   A has pH greater than 7 and B has pH less than 7.
    d)   A has pH less than 7 and B has pH greater than 7.   1

6. Salt 'A' commonly used in food products, is a reactant to produce salt 'B', used in the kitchen
    for making tasty, crispy pakoras. Salt 'B' on heating converts into another salt 'C, which is
    used in the manufacturing of glass. Salts 'A', 'B' and 'C' respectively are:
    a) $NaHCO_3$, NaCl, Na_2CO_3 b) Na_2CO_3, $NaHCO_3$, NaCl
    c) Na_2CO_3, NaCl, $NaHCO_3$ d)   NaCl, $NaHCO_3$, Na_2CO_3 1

7.   Which among the following statements is incorrect for magnesium metal?
      a)   It burns in oxygen with a dazzling white flame.
      b)   It reacts with cold water to form magnesium oxide and evolves hydrogen gas.
      c)   It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas.
      d)   It reacts with steam to form magnesium hydroxide and evolves hydrogen gas.   1

8.   Gastric juice is secreted by gastric glands and contains hydrochloric acid, mucus, and pepsin.
      Which activity will be affected in the absence of hydrochloric acid?
      a)   Digestion of proteins   b)   Digestion of carbohydrates
      c)   Digestion of lipids   d)   Digestion of starch   1

9.   Which of the following statements is TRUE about the uptake of water in plants?
      a)   It occurs all the time due to diffusion.
      b)   Water enters the roots due to osmosis.
      c)   At night when transpiration is low, roots do not take up water.
      d)   The movement of water from roots to leaves is bidirectional.   1

10.   Which of the following statement(s) is (are) true about nastic movements?
      (i)   These are slow movements.
      (ii)   These occur either towards or away from the stimulus.
      (iii) These involve the use of electrochemical signals by the plants.
      (iv)   In such movements, the plant cells change their shape by altering their water content.

      a)   (i) and (ii) only   b)   (i) and (iii) only
      c)   (iii) and (iv) only   d)   (ii) and (iv) only   1

11.   Which of the following method/s are useful to prevent fertilisation even when ovulation occurs?
      P)   surgical blocking of the fallopian tube   Q)   copper-T
      R)   oral pills   S)   condom

      a)   only P   b)   only Q and R
      c)   only P, Q and S   d)   only Q, R and S   1

12.   A cross between pure tall and pure short pea plants gives hybrid tall pea plants in the first
      generation. What would be the expected ratio of tall and short pea plants in the offspring of
      the second generation if these F1 plants were self-fertilized?
      a)   3:1   b)   9:3:3:1   c)   1:2:1   d)   1:1   1

13.   The minimum distance between object and its real image for concave mirror is:
      a)   0   b)   F   c)   2 F   d)   None of these   1

14.   Two bulbs of 100 W and 40 W are connected in series, if current through 100 W is 1 A,
      then the current through 40 W will be:
      a)   0.4 A   b)   0.8 A   c)   1 A   d)   2 A   1

15.   The action of which among the following is crucial to the formation of ozone?
      a)   humans   b)   sunlight
      c)   carbon dioxide   d)   chlorofluorocarbons   1

16.   If all the organisms of one trophic level in a food chain die, what would be its impact
      on the population of organisms in other trophic levels? It will :
      a)   remain the same in the next trophic level.
      b)   increase in the next trophic level.
      c)   increase in the lower trophic level.
      d)   remain the same in the lower trophic level.   1

Question Nos. 17 to 20 consist of two statements – Assertion (A) and Reason (R).
Answer these questions selecting the appropriate option given below:

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

17.   Assertion (A): If the first member of a homologous series is methanol, its third member will be propanal.
    Reason (R):   All the members of a homologous series show similar chemical properties.   1

18.   Assertion (A): Variations always provide a survival advantage to an organism.
    Reasons (R):   Variations can be caused due to incorrect DNA copying.   1

19.   Assertion (A): The resistivity of a substance does not depend on nature and temperature.
    Reason (R):   The resistivity of a substance is characteristic property of a material.   1

20.   Assertion (A): Omnivores receive 10% of their energy from the trophic level below them.
    Reason (R):   An omnivore is always in the trophic level just above herbivores.   1

Section – B
(Question Nos. 21 to 26 are very short answer questions)

21.   a)   Show the formation of $MgCl_2$ by the transfer of electrons. (At. No of Mg – 12, Cl – 17)
    b)   Zinc oxide is considered an amphoteric oxide. Give reason.   2

22.   What changes are observed in the uterus subsequent to implantation of young embryo?   2

23.   A plant X was enclosed in a glass jar with some lizards. A similar plant Y was enclosed in another glass jar but without lizards. Both the jars are kept under the same light conditions for a few hours. Which plant is likely to photosynthesize more and why?
                (OR)
    Proteinuria is a condition in which significant amounts of protein can be detected in urine. Which process in the nephron is likely to be affected causing proteinuria? Justify.   2

24.   Explain in what ways fuse wire is different from earth wire in terms of their composition and use.   2

25.   State Snell's law of refraction. On entering a medium from air speed of light becomes half of its value in air. Find refractive index of that medium with respect to air.
                (OR)
    A security mirror used in a big showroom has radius of curvature 5m. If customer is standing at a distance of 20m from cash counter, then find position, nature and size of image formed in security mirror.   2

26.   How are cloth bags advantageous over plastic bags? (any 2 points)   2

Section-C
(Question Nos. 27 to 33 are short answer questions)

27.   2g 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 the balanced chemical equation for the reaction.   3

28.
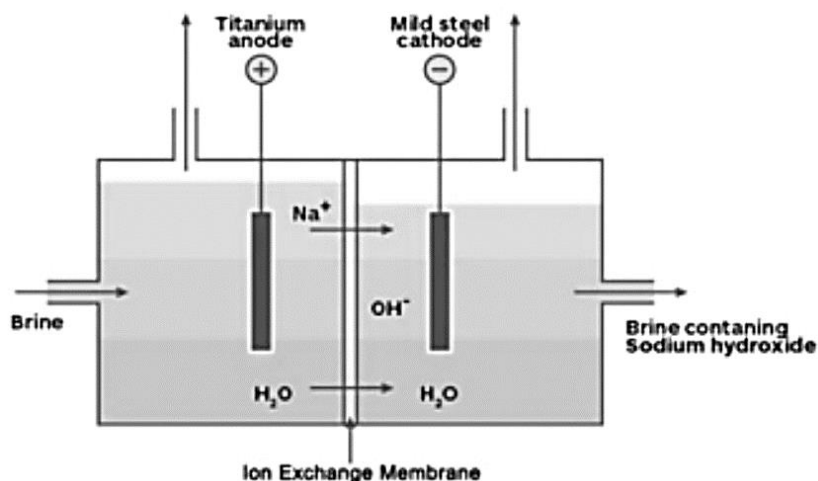
a)   Identify the gases evolved at the anode and cathode in the above experimental set up.
b)   Name the process that occurs. Why is it called so?
c)   Illustrate the reaction of the process with the help of a chemical equation.

(OR)

Give reasons for the following:
i)   On strong heating, blue coloured copper sulphate crystals turn white.
ii)   Distilled water not conduct electricity, whereas rainwater does.
iii)   Plaster of Paris should be stored in a moisture-proof container.   3

29.   "The sex of a new born child is a matter of chance and none of the parents may be
      responsible for it." Justify this statement with the help of flowchart showing sex determination
      in human beings.   3

30.   Given below are some disorders noticed in some patients. It could be due to malfunctioning
      of which part of brain?
      i)   Loss of sensation of feeling full.
      ii)   Lowered ability to salivate.
      iii)   Difficulty in maintaining the posture and balance in body.   3

31.   What is a solenoid? Draw a pattern of magnetic field lines of a current carrying solenoid.
      State the rule used for direction of its magnetic field.   3

32.   Give reasons:
      i)   Person suffering from hypermetropia prefers to remove his spectacles while
             looking at a distant object.
      ii)   Colour of Sky is blue.
      iii)   It takes some time to see object in a dim room when we enter the room from bright
             sunlight outside.   3

33.   What will happen to a beam of white light when it gets refracted through glass prism.
      Explain with the help of a diagram. What is likely to happen if second identical prism is placed
      in an inverted position with respect to first prism? Justify your answer.   3

Section – D
(Question Nos. 34 to 36 are long answer questions)

34.   a)   Draw two structural isomer of butane.
      b)   Covalent compounds are bad conductors of electricity. Give reason.
      c)   When a compound 'X' with molecular formula C_2H_6O is heated with excess conc.H_2SO_4,
             it forms C_2H_4. 'X' when oxidized forms a compound 'Y' with molecular formula $C_2H_4O_2$.
             i)   Identify 'X' and 'Y'.
             ii)   Write the chemical equation involved in the conversion of 'X' and 'Y'.
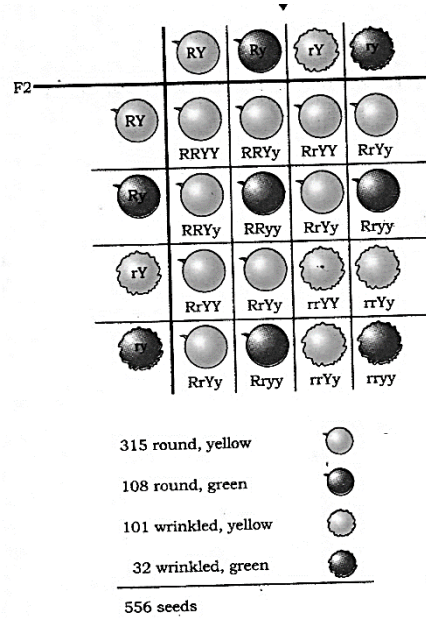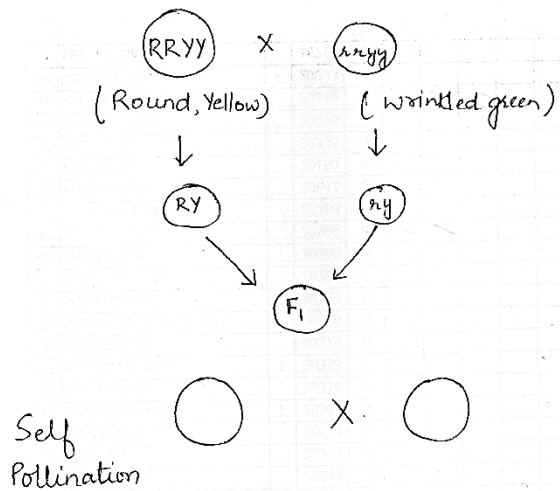   iii)   Write the role of conc.H_2SO_4 in the reaction.

(OR)
a) Define the terms: (i) Isomerism (ii) Catenation.
b) Why are soaps not suitable for washing clothes with hard water?
c) Write chemical equation for the following reactions:
   i) Esterification reaction ii) Hydrogenation reaction
   iii) Substitution reaction   5

35. a) Draw a labelled diagram of germination of pollen on stigma.
    b) Identify TWO pairs of reproductive organs in males and females that are functionally similar to each other. Justify.
                                        (OR)
    a) How does blood sugar level get regulated in the human body?
    b) i) Which hormone is secreted into the blood when you are under stress? Name the gland that secretes this hormone.
       ii) How does it help the body to cope up in an emergency situation.?   5

36. a) State Joule's Law of heating. A 5Ω resistor is connected across 6V. Calculate energy that dissipates as heat in 10 seconds.
    b) Define Electric Power. Derive an expression for power in terms of R and V. What is the power of device of resistance 400Ω operating at 200V? What would be the power if operating voltage reduces to 100V?
                                        (OR)
    a) Why electric appliances are connected in parallel in a domestic circuit?
    b) How will you connect 2Ω, 4Ω and 6Ω to get an equivalent resistance of 3Ω?
    c) An electric iron rated as 2KW: 220V. Calculate the capacity of fuse that should be used for it.
    d) Which will consume more energy? 250 W TV used for 5h or 1.5 KW toaster for 20mins.
    e) Calculate the amount of work done to carry 4 C of charge from one point to another on a conductor at 120 Volt.   5

SECTION – E
(Question Nos. 37 to 39 are case-based/data -based questions with 2 to 3 short sub-parts.
Internal choice is provided in one of these sub-parts)

37. On the basis of reactivity metals are grouped into three categories:
    (i) Metals of low reactivity (ii) Metals of medium reactivity
    (iii) Metals of high reactivity
    Therefore metals are extracted in pure form from their ores on the basis of their chemical properties. Metals of high reactivity are extracted from their ores by electrolysis of the molten ore.
    Metals of low reactivity are extracted from their sulphide ores, which are converted into their oxides. The oxides of these metals are reduced to metals by simple heating.

    a) Name the process of reduction used for a metal that gives vigorous reaction with air and water both.
    b) Why should the metal sulphides and carbonates be converted to metal oxides in the process of extraction of metals from them?
    c) Describe briefly the method to obtain mercury from Cinnabar. Write the chemical equation for the reactions involved in the process.
                                        (OR)
    c) Differentiate between roasting and calcination giving chemical equation for each.   4

38.

F2	RY	Rv	rY	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	RRyy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy

315 round, yellow
108 round, green
101 wrinkled, yellow
32 wrinkled, green
556 seeds

a) What is the expected ratio of round yellow, round green, wrinkled yellow, wrinkled green in the above shown cross?

b) Calculate the percentage of round green pea plants in the shown cross.

c) What was the inference drawn by Mendel from the above cross?

(OR)

c) Mention the dominant and recessive parent of the shown cross. Also state the F1 progeny of the cross.   4

39. The characteristics of the image formed by convex lens depends on the position of object with respect to lens. When an object is placed between Focus and Infinity, the image formed is real and inverted and when object is placed between Focus and Lens, image is virtual, erect and magnified. When object is placed at 2F, image of same size is formed at 2F on screen. When object is moved from focus towards infinity, image moves from infinity to focus and its size decreases.

a) What would be the nature, size and position of image if m = -1?

b) If focal length of convex lens is 20 cm, then what would be the position of object to get erect image.

a) How does power of lens and size of image changes when object is moved away from its focus?

(OR)

c) Draw a ray diagram to show converging action of lens and hence define Principal focus.   4

-x-x-x-x-x-x-x-