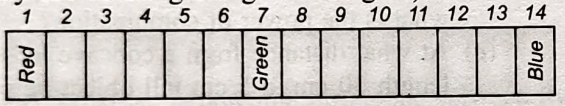
[Time Allowed: 3 Hours] [Maximum Marks: 80]

General Instructions: Same as Practice Paper 1.

SECTION–A

Select and write one most appropriate option out of the four options given for each of the questions 1–20. There is no negative mark for incorrect response.

1. Equal volumes of hydrochloric acid and potassium hydroxide solutions of same concentration are mixed and the pH of the resulting solution is checked with a pH paper. What would be the colour obtained? (You may use colour guide given in figure).



(*a*) Red (*b*) Yellowish orange
(*c*) Green (*d*) Blue

2. Sodium and chlorine react to form sodium chloride. Which of the following is correct?
(*a*) Sodium is oxidising agent, Cl_2 is reducing agent.
(*b*) Sodium is reducing agent, Cl_2 is oxidising agent.
(*c*) Both Na and Cl_2 are oxidising agents.
(*d*) Both Na and Cl_2 are reducing agents.

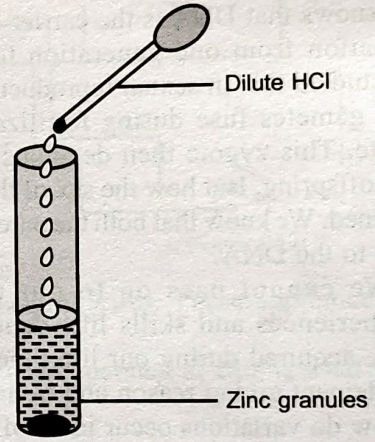
3. $MnO_2 + xHCl \longrightarrow MnCl_2 + yH_2O + zCl_2$,
In order to balance the chemical equation x, y, z respectively are
(*a*) 6, 2, 2 (*b*) 4, 1, 2
(*c*) 4, 2, 1 (*d*) 2, 2, 1

4. Match the chemical substances given in Column (A) with their appropriate application given in Column (B).

Column (A)	Column (B)
A. Bleaching powder	(*i*) Preparation of glass
B. Baking soda	(*ii*) Production of H_2 and Cl_2
C. Washing soda	(*iii*) Disinfectant
D. Sodium chloride	(*iv*) As an antacid

(*a*) A—(*ii*), B—(*i*), C—(*iv*), D—(*iii*)
(*b*) A—(*iii*), B—(*ii*), C—(*iv*), D—(*i*)
(*c*) A—(*iii*), B—(*iv*), C—(*i*), D—(*ii*)
(*d*) A—(*ii*), B—(*iv*), C—(*i*), D—(*iii*)

5. A student added dilute HCl to Zn granules taken in a test tube. The correct observation would be

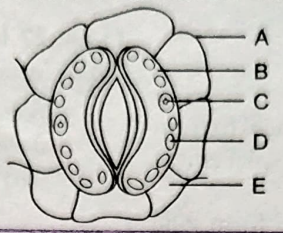


(*a*) Zn granules turned green
(*b*) formation of a precipitate
(*c*) evolution of gas
(*d*) no change

6. What happens when a solution of an acid is mixed with a solution of a base in a test tube?
(*i*) The temperature of the solution increases
(*ii*) The temperature of the solution decreases
(*iii*) The temperature of the solution remains the same
(*iv*) Salt formation takes place.
(*a*) (*i*) only
(*b*) (*i*) and (*iii*)
(*c*) (*ii*) and (*iii*)
(*d*) (*i*) and (*iv*)

7. The percentage of carbon dioxide in the atmosphere is
(*a*) 0.01% (*b*) 0.02%
(*c*) 0.03% (*d*) 0.3%

8. Four students made the diagram of stomata and tabulated the labellings as follows:



Student	A	B	C	D	E
(P)	Epidermal cell	Guard cell	Nucleus	Cell wall	Chloroplast
(Q)	Guard cell	Epidermal cell	Nucleus	Chloroplast	Cell wall
(R)	Cell wall	Guard cell	Nucleus	Chloroplast	Epidermal cell
(S)	Epidermal cell	Guard cell	Nucleus	Chloroplast	Cell wall

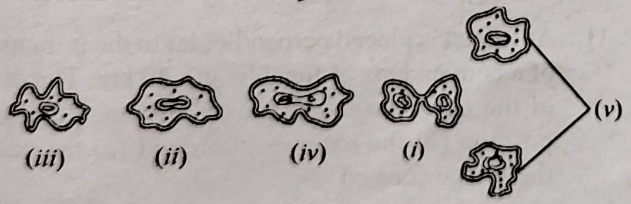
The student who made the correct labelling is
(*a*) P
(*b*) Q
(*c*) R
(*d*) S

9. The xylem in plants are responsible for
(*a*) transport of water
(*b*) transport of food
(*c*) transport of amino acids
(*d*) transport of oxygen

10. What do you find when you observe a sugarcane field?
(*i*) Very little variations in various sugarcane plants.
(*ii*) A lot of variations in various sugarcane plants.
(*iii*) No variations in various sugarcane plants.
(*iv*) Sugarcane plants almost look alike.
(*a*) (*i*) and (*iv*) (*b*) (*ii*) and (*iv*)
(*c*) (*iii*) and (*iv*) (*d*) Only (*ii*)

11. Which of the following is a plant hormone?
(*a*) Insulin (*b*) Thyroxine
(*c*) Oestrogen (*d*) Cytokinin

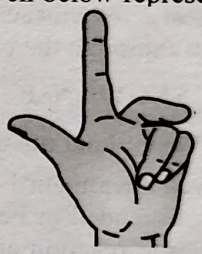
12. Given below are the stages of binary fission in *Amoeba*. Which one of the following would you select as the correct sequence?



(*a*) (*ii*), (*iii*), (*iv*), (*i*), (*v*)
(*b*) (*iii*), (*iv*), (*i*), (*ii*), (*v*)
(*c*) (*iii*), (*ii*), (*iv*), (*i*), (*v*)
(*d*) (*iii*), (*iv*), (*ii*), (*i*), (*v*)

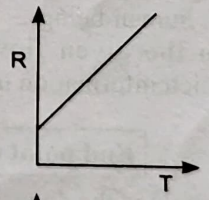
13. A wire of length *l*, made of material with resistivity ρ is cut into two equal parts. The resistivity of the two parts are equal to
(*a*) ρ (*b*) $\frac{\rho}{2}$
(*c*) 2ρ (*d*) 4ρ

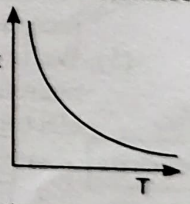
14. The figure given below represents:

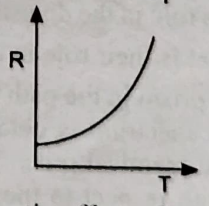


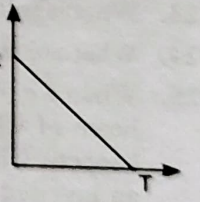
(*a*) Flemming's right-hand thumb rule
(*b*) Maxwell's left hand thumb rule
(*c*) Maxwell's corkscrew rule
(*d*) Flemming's left-hand rule

15. The temperature of a conductor is increased. The graph best showing the variation of its resistance is

(*a*)


(*b*)


(*c*)


(*d*)


16. Magnetic effect of current was discovered by
(*a*) Oersted (*b*) Faraday
(*c*) Bohr (*d*) Ampere

Q. no 17 to 20 are Assertion – Reasoning based questions. These 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):** Zinc reacts with sulphuric acid to form zinc sulphate and hydrogen gas and it is displacement reaction.
Reason (R): Zinc reacts with oxygen to form zinc oxide.

18. **Assertion (A):** All proteins in our food are digested in small intestine only.
Reason (R): The protein digesting enzymes are released into small intestine and stomach.

19. **Assertion (A):** In human beings, males produce similar gametes.
Reason (R): Males have a pair of sex chromosomes XY and 22 pairs of autosomes.

20. **Assertion (A):** Steel core is used as an electromagnet.
Reason (R): Steel gets permanently magnetised when the current flows through the coil wound around.

SECTION–B

Q. no. 21 to 26 are Very Short answer questions.

21. What is observed after about 1 hour of adding strips of Cu and Al suspended in $FeSO_4$ solution in two beakers. Name the reaction and change observed. Also write the chemical equation.

Or

What happens when NaCl solution reacts with $AgNO_3$ solution? Name the two types of reaction to which does it belong.

22. (*a*) Name one gustatory receptor and one olfactory receptor present in human beings.
(*b*) Write a and b in the given flow chart of neuron through which information travels as an electrical impulse.

Dendrite → **a** → **b** → **End point of Neuron**

23. What is saliva? State its role in the digestion of food.

24. What are stomata? What is their role in respiration?

25. When we place a glass prism in the path of a narrow beam of white light, a spectrum is obtained. What happens when a second identical prism is placed in an inverted position with respect to the first prism. Draw a labelled ray diagram to illustrate it.

Or

Draw a ray diagram to show the refraction of light through a glass prism. Mark on it (*a*) the incident ray, (*b*) the emergent ray and (*c*) the angle of deviation.

26. Mention the basis of classifying substances as biodegradable and non-biodegradable. Give two examples of each.

SECTION–C

Q.no. 27 to 33 are Short answer questions.

27. Write down the balanced equations for the following reactions and identify the type of reaction in each case:
(*a*) Nitrogen gas is treated with hydrogen gas to form ammonia gas.
(*b*) Lead nitrate is heated strongly to form lead monoxide, nitrogen dioxide and oxygen.
(*c*) A copper wire is dipped in silver nitrate solution and shiny silver is produced.

28. Arrange the following as per the instructions given in brackets:
(*a*) Al, K, Mg, Ca (decreasing order of reactivity).
(*b*) N, Be, O, C (increasing order of non-metallic character).
(*c*) P, Si, F, Be (decreasing order of valence electrons).

29. Draw a diagram of the front view of human heart and label any six parts including at least two, that are concerned with arterial blood supply to the heart muscles.

Or

Draw the structure of a nephron and label the following parts:
Glomerulus, Bowman's capsule, Renal artery.

30. (*a*) In which of the following two cases the focal length of the eye lens will be more–
(*i*) When ciliary muscles of a normal eye is most relaxed.
(*ii*) When ciliary muscles of a normal eye is in most contracted state.
Explain with reason.
(*b*) Which part of the eye has delicate membrane and containing large number of light sensitive cells?

31. An 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. Find: (*a*) the position (*b*) the magnification and (*c*) the nature of the image formed.

32. State the rule to determine the direction of a
(*a*) magnetic field produced around a straight conductor carrying current,
(*b*) force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it.

33. "Damage to the ozone layer is a cause for concern." Justify this statement. Suggest any two steps to limit this damage.

SECTION–D

Q.no. 34 to 36 are Long answer questions.

34. (*a*) How does carbon acquire stable electronic configuration? Name simplest hydrocarbon.
(*b*) Draw electron dot structures of
(*i*) Ethane (*ii*) Ethene (*iii*) Ethanoic acid

Or

(*a*) State two properties of covalent compounds.
(*b*) Why does micelle formation take place when soap is added to water? Why are micelles not formed when soap is added to ethanol?

35. Answer the following:
(*a*) Name any four asexual methods of reproduction.
(*b*) Explain the method of reproduction with diagram by which *Leishmania* reproduces.
(*c*) Give one difference between fission and fragmentation.

Or

(*a*) Name an organism that reproduces by spores. List two advantages of reproduction by sporulation.
(*b*) Give one function of each part of embryo:
(*i*) plumule
(*ii*) radicle
(*iii*) cotyledons

36. A student fixes a sheet of white paper on a drawing board. He place a bar magnet at the centre of it. He sprinkles some iron filings uniformly around the bar magnet. Then he taps the board gently and observes that the iron filings arrange themselves in a particular pattern.
(*a*) Why do the iron filings arrange in a pattern?
(*b*) What is indicated by the crowding of iron filings at the end of the magnet?
(*c*) What do the lines along which the iron filings align represent?
(*d*) Draw a neat diagram to show the magnetic field lines around a bar magnet.
(*e*) Write any two properties of magnetic field lines.

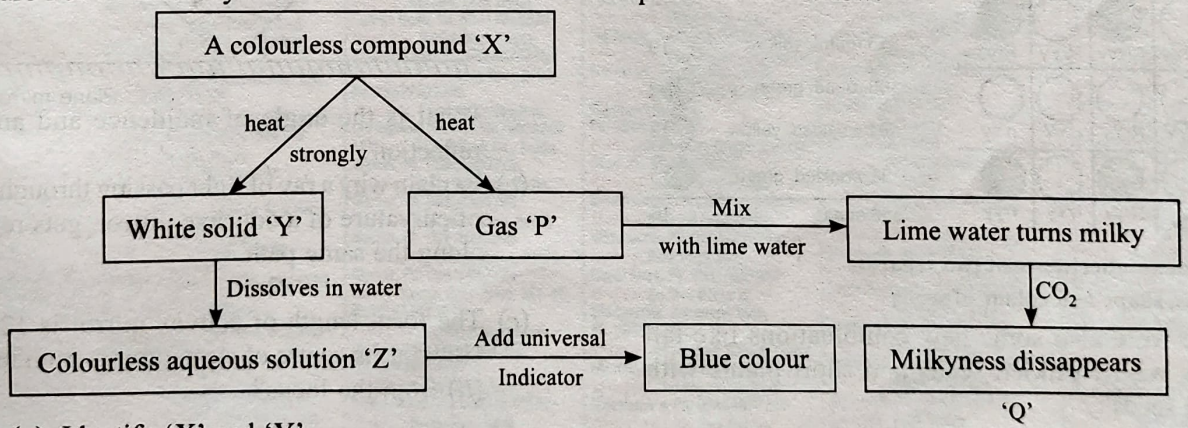
Or

Three bulbs each having power *P* are connected in series in an electric circuit. In another circuit, another set of three bulbs of same power are connected in parallel to the same source.
(*a*) Will the bulbs in both the circuits glow with the same brightness? Justify your answer.
(*b*) Now let one bulb in each circuit get fused. Will the rest of the bulbs continue to glow in each circuit? Give reason.
(*c*) Representing each bulb by a resistor, draw circuit diagram for each case.

SECTION–E

Q.no. 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. Lime is an alkaline substance. The figure shows some of the properties of a calcium compound 'X'. The letters are not chemical symbols of substances. Answer the questions that follow:

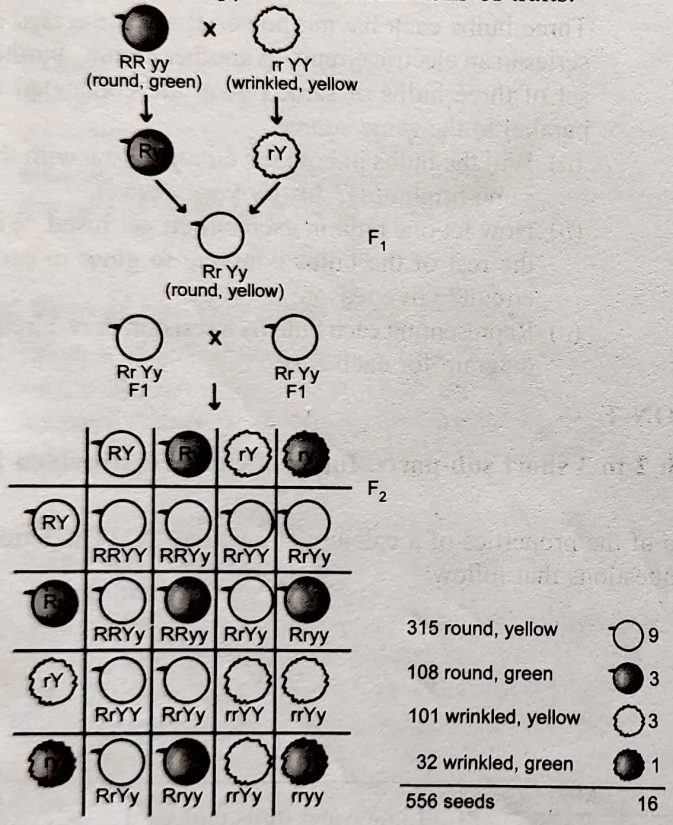


(*a*) Identify 'X' and 'Y'.
(*b*) Write the chemical reaction and identify 'P'.
(*c*) Identify 'Z' and write reaction of 'Y' to get 'Z'.

Or

(*c*) (*i*) Name an acid which can liberate 'P' from 'X'.
(*ii*) Write reaction of lime water with 'P' to form 'Q'.

38. Mendel used a number of visible contrasting characters of garden pea like round/wrinkled seeds, tall/short plants, white/violet flowers, etc. He made crosses between pea plants with different characters; there were no halfway or intermediate characters. Only one of the parental traits appeared in the F_1 generation. When the F_1 plants were self-pollinated, the F_2 progeny consists of plants with both the traits. When a cross is made between a tall plant with round seeds, with a short plant with wrinkled seeds, the F_1 progeny plants were all tall with round plants. When the F_1 plants are self-pollinated, the F_2 progeny consisted of some tall plants with round seeds and some short plants with wrinkled seeds; these two are the parental types of combinations of traits.



Independent inheritance of two separate traits, shape and colour of seeds

There were also some new combinations like tall plants with wrinkled seeds and short plants with round seeds.

(*a*) Which genetic material is responsible for the inheritance of traits?

(*b*) In what ratio, both traits were obtained in F_2 progeny?

(*c*) What type of trait appeared and what type trait remained hidden in F_1 generation?

Or

(*c*) What type of traits you observed in F_2 progeny, when F_1 plants were self pollinated?

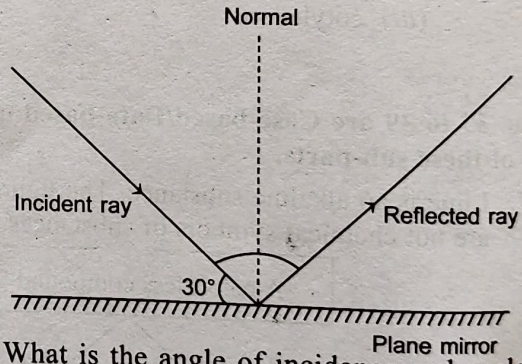
39. Shyam participated in a group discussion in his interschool competition on the practical application of light and was very happy to won the award for his school. On that very evening, his father celebrated the day with a family. At a particular moment, Shyam observed in a curved plate, the image of a person's mobile sitting on his back side. Person's mobile fell off which the person didn't know about it. Shyam went to the person and informed him about this. The person was thankful to Shyam.

(*a*) Name the type of mirror.

(*i*) Which always formes a virtual and diminished image?

(*ii*) Which has larger field of view?

(*b*) The angle between an incident ray and the mirror is 30° as shown below:



What is the angle of incidence and angle of reflection?

(*c*) Explain why a ray of light passing through centre of curvature of a concave mirror, gets reflected along the same path.

Or

(*c*) The focal length of convex mirror is 12.5 cm. How far its centre of curvature (*i*) from the pole (*ii*) from the focus?