Set-1

Series RST-DS2

Q.P. Code **RSPL/1**

Roll No. | | | | | | | | |

Candidates must write the Q.P. code on the title page of the answer-book.

- Please check that this question paper contains **15** printed pages.
- Please check that this question paper contains **39** questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- **Please write down the Serial Number of the question in the answer-book before attempting it.**
- **15** minute time has been allotted to read this question paper. During this time, the students will read the question paper only and will not write any answer on the answer-book.

SCIENCE

Time allowed : 3 hours *Maximum Marks : 80*

***General Instructions*:**

Read the following instructions very carefully and strictly follow them:

(i) This question paper comprises **39** questions. **All** questions are compulsory.

(ii) This question paper is divided into five sections – **A**, **B**, **C**, **D** and **E**.

(iii) **Section A** – Question Nos. **1** to **20** are multiple choice questions. Each question carries 1 mark.

(iv) **Section B** – Question Nos. **21** to **26** are very short answer type questions. Each question carries **2** marks. Answer to these questions should be in the range of 30 to 50 words.

(v) **Section C** – Question Nos. **27** to **33** are short answer type questions. Each question carries **3** marks. Answer to these questions should in the range of 50 to 80 words.

(vi) **Section D** – Question Nos. **34** to **36** are long answer type questions. Each question carries **5** marks. Answer to these questions should be in the range of 80 to 120 words.

(vii) **Section E** – Question Nos. **37** to **39** are of 3 source-based/case-based units of assessment carrying **4** marks each with sub-parts.

(viii) There is no overall choice. However, an internal choice has been provided in some sections. Only one of the alternatives has to be attempted in such questions.

SECTION–A

Question 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

1. A sample of soil is mixed with water and allowed to settle. The clear supernatant solution turns the pH paper yellowish-orange. Which of the following would change the colour of this pH paper to greenish-blue?

   (a) Lemon juice (b) Vinegar

   (c) Common salt (d) An antacid

2. Iron on prolonged reaction with steam produces

   (a) FeO (b) Fe_2O_3

   (c) Fe_3O_4 (d) Fe_2O_3 and Fe_3O_4

3. Which among the following statement(s) is (are) true?

   Silver chloride turns grey on exposure to sunlight for a long duration due to

   (i) the formation of silver by decomposition of silver chloride

   (ii) sublimation of silver chloride

   (iii) decomposition of chlorine gas from silver chloride

   (iv) oxidation of silver chloride

   (a) (i) only

   (b) (i) and (iii)

   (c) (ii) and (iii)

   (d) (iv) only

4. When Sodium bicarbonate reacts with dilute hydrochloric acid the gas evolved is:

(a) Hydrogen; it gives pop sound with burning match stick

(b) Hydrogen; it turns lime water milky.

(c) Carbon dioxide; it turns lime water milky.

(d) Carbon dioxide; it blows off a burning match stick with a pop sound.

5. A metal ribbon 'X' burns in oxygen with a dazzling white flame forming a white ash 'Y'. The correct description of X, Y and the type of reaction is:

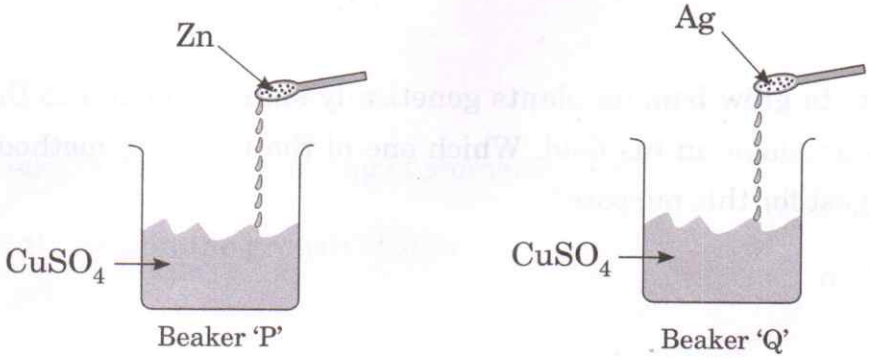
(a) X = Ca; Y = CaO; Type of reaction = Decomposition

(b) X = Mg; Y = MgO; Type of reaction = Combination

(c) X = Al; Y = Al_2O_3; Type of reaction = Thermal decomposition

(d) X = Zn; Y = ZnO; Type of reaction = Endothermic

6. A student adds an equal amount of $CuSO_4$(aq) in two beakers as shown in the given figure. He add zinc in beaker 'P' and Ag in beaker 'Q'. The student observes that the colour of solution in beaker 'P' changes while no change is observed in beaker 'Q'. Which option is correct?



(a) Ag < Zn < Cu

(b) Zn < Cu < Ag

(c) Ag < Cu < Zn

(d) Cu < Ag < Zn

7. Which of the following statements about graphite and diamond is true?

(a) They have the same crystal structure

(b) They have the same degree of hardness

(c) They have the same electrical conductivity

(d) They can undergo the same chemical reactions

8. During respiration exchange of gases occurs in:

(a) alveoli

(b) bronchi

(c) larynx

(d) trachea

9. A cross between pea plant with white flowers (vv) and pea plant with violet flowers (VV) resulted in F_2 progeny in which ratio of violet (VV) and white (vv) flowers will be:

(a) 1 : 1

(b) 2 : 1

(c) 3 : 1

(d) 1 : 3

10. A farmer wants to grow banana plants genetically similar enough to the plants already available in his field. Which one of the following methods would you suggest for this purpose?

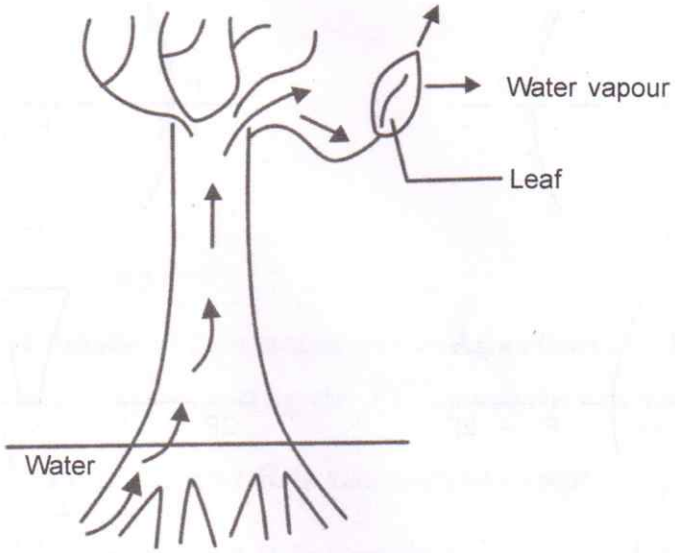
(a) Regeneration

(b) Budding

(c) Vegetative propagation

(d) Sexual reproduction

11. Observe the following diagram and identify the process and its significance from the following options:



(a) Evaporation: maintains water contents in leaf cells.

(b) Transpiration: creates a suction force which pulls water inside the plant.

(c) Excretion: helps in excreting out waste water from the plant.

(d) Translocation: helps in transporting materials from one cell to another.

12. In plants the role of cytokinin is:

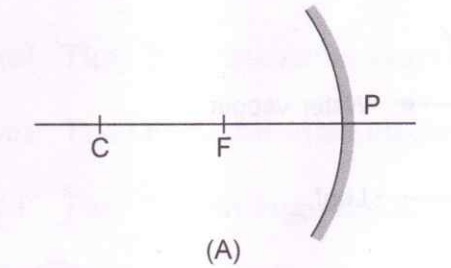
(a) Promote cell division.

(b) Wilting of leaves.

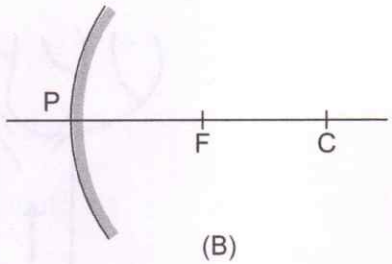
(c) Promote the opening of stomatal pore.

(d) Help in the growth of stem.

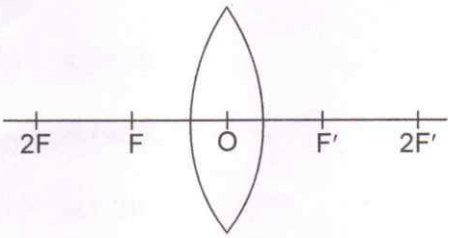
13. Which of the following can make a parallel beam of light when light from a point source is incident on it?



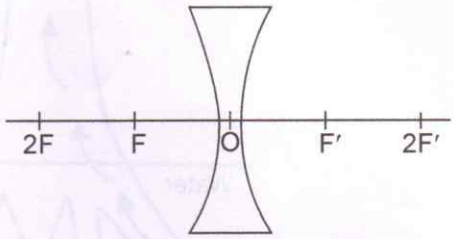
(A)



(B)



(C)



(D)

(a) Both (A) and (B)
(b) Both (B) and (C)
(c) Both (A) and (C)
(d) Both (A) and (D)

14. Sun appears to be white and sky appears to be black in space because

(a) there is no atmosphere to refract the sunlight in space.

(b) sunlight is of a single wavelength in space.

(c) there is no atmosphere to scatter sunlight in space.

(d) the particles present in space do not scatter light effectively.

15. Excessive exposure of humans to UV-rays results in

(i) damage to immune system
(ii) damage to lungs
(iii) skin cancer
(iv) peptic ulcer

Select the correct option.

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

16. If DDT is accidentally sprayed in a lake, its highest concentration will be found in

(a) fishes

(b) zooplanktons

(c) fish eating birds

(d) phytoplanktons

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions by 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):** Lead reacts with H_2SO_4 to form lead sulphate and further reaction stops.

Reason (R): Lead sulphate is insoluble in water and forms a coating over lead metal preventing further reaction.

18. **Assertion (A):** Variation is high in sexually reproducing organisms compared to asexually reproducing organisms.

Reason (R): Inaccuracies during DNA copying give rise to variations.

19. **Assertion (A):** The maximum distance upto which eyes can see objects clearly without strain is called far point of the eye.

Reason (R): The value of far point of a normal adult eye is infinity.

20. **Assertion:** Biodegradable substances result in the formation of compost and natural replenishment.

Reason: It is due to breakdown of complex inorganic substances into simple organic substances.

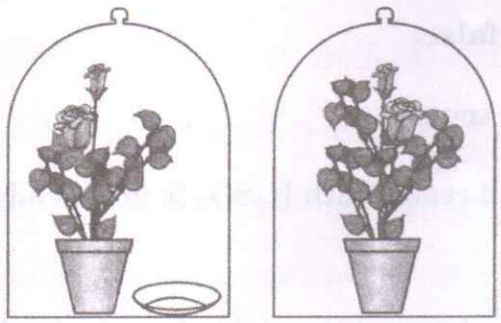
SECTION – B

Question No. 21 to 26 are Very Short Answer Questions.

21. Trupti mixes an aqueous solution of sodium sulphate (Na_2SO_4) and an aqueous solution of copper chloride ($CuCl_2$).

Will this lead to a double displacement reaction? Justify your answer.

22. The following figures show the experimental set up which has been done by Amita.



(i) (ii)

(a) What does the set up done by Amita show?

(b) What has been kept in the watch glass in set up (i) and why?

(c) In which of set up (i) or (ii) the leaf shows the absence of starch and why?

23. ***Attempt either option A or B***

A. Why is the inner wall of alimentary canal not digested although the digestive enzyme can digest all the materials that make cells?

OR

B. What governs the opening and closing of stomata?

24. A doctor has prescribed a corrective lens of power +1.5 D to a patient. Find the focal length of the lens. Is the prescribed lens diverging or converging?

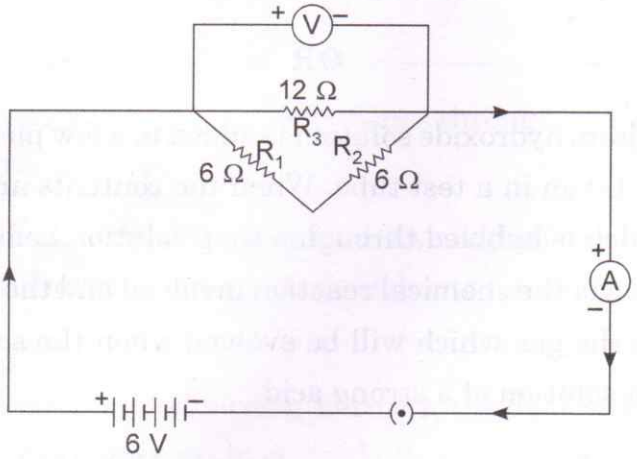
25. ***Attempt either option A or B***

A. (a) A wire of resistance 20 ohm is bent in the form a closed circle. What is the equivalent resistance between two diametrically opposite ends?

(b) Calculate the electric energy consumed by a 1000 W music system in 30 minutes.

OR

B. In the given circuit, calculate



(a) the effective resistance

(b) the current recorded by ammeter

26. (a) What will be the amount of energy available to the organism of the 2nd trophic level of a food chain, if the energy available at the first trophic level is 10,000 Joules?

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

SECTION – C

Question No. 27 to 33 are Short Answer Questions.

27. An element 'M' with electronic configuration 2, 8, 3 combines separately with Cl^-, SO_4^{2-} anions. Write the chemical formulae of the compounds formed. Predict with the suitable reason the nature of the bond formed by element 'M' in general. How will the electrical conductivity of the compounds formed vary with respect to 'M'?

28. ***Attempt either option A or B***

A. How is washing soda prepared from sodium carbonate? Give its chemical equation. State the type of this salt.

Name the type of hardness of water which can be removed by it.

OR

B. 2 mL of sodium hydroxide solution is added to a few pieces of granulated zinc metal taken in a test tube. When the contents are warmed, a gas evolves which is bubbled through a soap solution before testing. Write the equation of the chemical reaction involved and the test to detect the gas. Name the gas which will be evolved when the same metal reacts with dilute solution of a strong acid.

29. Draw a diagram of human excretory system and label kidney, ureter, aorta, vena cava, urethra and urinary bladder on it.

30. When a cross between two pea plants with a pair of contrasting characters was made

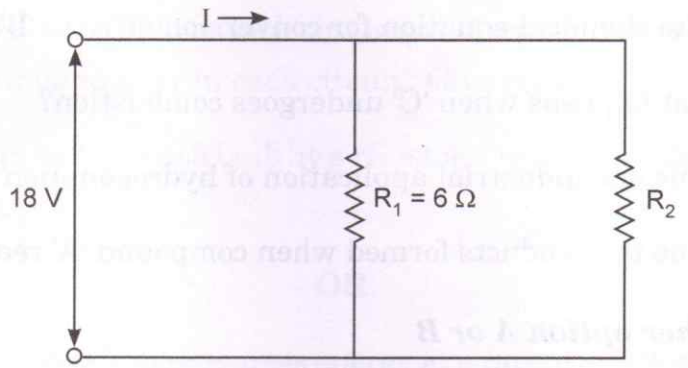
RRYY × rryy

Round yellow Wrinkled green

1120 plants with 4 types of combinations were obtained in F_2 progeny. Write the number of plants having new combinations. What conclusion do you draw from this experiment?

31. Draw a diagram and apply Cartesian sign conventions for calculating the focal length and nature of a spherical mirror which forms a 1/3 times magnified virtual image of an object placed 18 cm in front of it.

32. The Physics teacher gave 3 Ω and 4 Ω resistors respectively to Reema and Neeta to be put in the given circuit so as to obtain equivalent current of 9 A. Show by calculations which of the two students would be able to get the required result.



33. (a) Draw the pattern of magnetic field lines through and around a current carrying circular loop.

(b) Explain with the help of the pattern drawn in the figure in above question (a), the distribution of magnetic field due to a current carrying circular loop.

(c) If there is a circular coil having 'n' turns, the field produced is 'n' times as large as that produced by a single turn. Why?

SECTION - D

Question No. 34 to 36 are Long Answer Questions.

34. ***Attempt either option A or B***

A. A carbon compound 'X' turns blue litmus to red and has a molecular formula $C_2H_4O_2$. Identify 'X' and draw its structure. Write chemical equation for the reaction and name of the product formed in each case when 'X' reacts with

(a) ethanol in the presence of conc. H_2SO_4.

(b) sodium carbonate.

OR

B. A saturated organic compound 'A' belongs to the homologous series of alcohols. On heating with conc. H_2SO_4 at 443 K, it forms an unsaturated compound 'B' with molecular mass 28 u. The compound 'B' on addition of one mole of H_2 in presence of nickel change to saturated hydrocarbon 'C'.

(a) Identify 'A', 'B' and 'C'.

(b) Write chemical equation for conversion of 'A' to 'B'.

(c) What happens when 'C' undergoes combustion?

(d) Name one industrial application of hydrogenation reaction.

(e) Name the products formed when compound 'A' reacts with sodium.

35. ***Attempt either option A or B***

A. (a) Identify the asexual method of reproduction in each of the following organisms:

(i) Rose

(ii) Yeast

(iii) Planaria.

(b) What is fragmentation? Name a multicellular organism which reproduces by this method.

(c) What could be the TWO most likely reasons for unicellular organisms to reproduce only through asexual reproduction?

OR

B. (a) Write the function of placenta in human females.

(b) List four ways of preventing pregnancy. State two advantages of using such preventive methods.

36. ***Attempt either option A or B***

A. 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.

OR

B. (a) An electric iron consumes energy at a rate of 880 W when heating is at the maximum rate and 330 W when heating is at the minimum rate. If the source voltage is 220 V, calculate the current and resistance in each case.

(b) What is heating effect of electric current?

(c) Find an expression for the amount of heat produced when a current passes through a resistor for some time.

SECTION – E

Question No. 37 to 39 are case-based/data-based questions.

37. The statue of Liberty is one of the seven wonders. It is present on Liberty island in New York harbour in United States. It is the gift from the people of France to the people of the United States. It is totally made up of metal. Over a period of time, the metal's colour has changed and the statue gives greenish look.

(a) What is an alloy? How is an alloy made? How are the properties of alloy different from those of constituent metals?

Attempt either subpart (b) or (c)

(b) What is corrosion? Name any two metals which do not corrode easily.

OR

(c) Copper reacts with moist gas 'A' in the air and slowly loses its shiny surface. It turns green. Identify 'A' and the substance of green coating formed on the surface of copper.

38. More women have some kind of thyroid problem than men. Women are at greater risk for developing abnormal thyroid stimulating hormone levels during menstruation and after going through menopause. The given table shows the levels of thyroid stimulating hormones (TSH) in women of different age groups.

Age Range	Normal (mU/L)	Low (mU/L)
18 – 29 years	0.4 – 2.34	< 0.4
30 – 49 years	0.4 – 4.0	< 0.4
50 – 79 years	0.46 – 4.68	< 0.46

(a) What name is given to the endocrine gland which secretes TSH? Where is this gland situated in the human body?

(b) What is the function of hormone thyroxine?

Attempt either subpart (c) or (d)

(c) (i) Name the mineral that is responsible for the synthesis of thyroxine hormone.

(ii) Which disease is caused due to the deficiency of this hormone?

(iii) Write the most common symptom of this disease.

(iv) Why is it important for us to take iodised salt in our diet?

OR

(d) Which hormones are released in boys and girls at the time of puberty? Write any two common changes that take place in boys and girls at this time.

39. The human eye is one of the most significant sense organs as it enables us to see the beautiful colourful world around us. The human eye is like a camera. Light enters the eye through the cornea and lens systems forms an image on retina. If cornea, pupil, eye lens, aqueous humour, vitreous humour, retina or optic nerve is damaged, it will result in visual impairment.

(a) Why does it take some time to see the objects in a dim light when we enter the room from bright sunlight outside?

Attempt either subpart (b) or (c)

(b) What is presbyopia? How it can be corrected?

OR

(c) When a person is said to have developed cataract? How is the vision of such a person restored?

(d) A person is advised to wear spectacles with concave lenses. What type of defect of vision is he suffering from?