

**Series Z1XYW/2****SET~3**

प्रश्न-पत्र कोड

Q.P. Code

31/2/3

रोल नं.

Roll No.

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परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।

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

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **27** हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में **39** प्रश्न हैं ।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।
- Please check that this question paper contains **27** printed pages.
- 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 check that this question paper contains **39** questions.
- **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. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान

SCIENCE

निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

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** – Questions No. **1** to **20** are multiple choice questions. Each question carries **1** mark.
- (iv) **Section B** – Questions No. **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** – Questions No. **27** to **33** are short answer type questions. Each question carries **3** marks. Answer to these questions should be in the range of 50 to 80 words.
- (vi) **Section D** – Questions No. **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** – Questions No. **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

This section has **20** multiple choice questions (Q.No. 1 – 20). **All** questions are compulsory. $20 \times 1 = 20$

1. The number of electrons in the outermost shell of the atom of a non-metal can be :

- (a) 1, 2 or 3
- (b) 3, 4 or 5
- (c) 5, 6 or 7
- (d) 5, 6 or 8

2. Select the correct option(s) in the following table :

Option	Natural Sources	Acid present
(i)	Tamarind	Tartaric acid
(ii)	Tomato	Acetic acid
(iii)	Ant sting	Oxalic acid
(iv)	Nettle sting	Methanoic acid

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

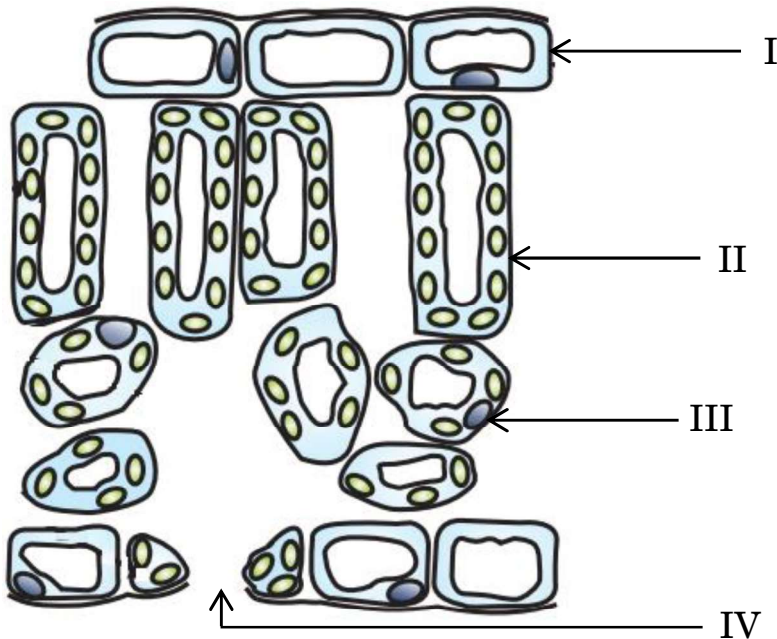


3. Among the following, the metal with lowest density is :
(a) Lithium (b) Lead
(c) Magnesium (d) Aluminium
4. Which of the following is an example of endothermic process ?
(a) Formation of slaked lime
(b) Decomposition of vegetable matter into compost
(c) Dissolution of ammonium chloride in water
(d) Digestion of food in our body
5. In order to balance the following chemical equation, the values of the coefficients x and y respectively are :
$$x \text{ Pb(NO}_3)_2 \xrightarrow{\text{Heat}} 2 \text{ PbO} + y \text{ NO}_2 + \text{O}_2$$

(a) 2, 4 (b) 2, 2
(c) 2, 3 (d) 4, 2
6. When zinc reacts with sodium hydroxide, the product formed is :
(a) Sodium oxide (b) Sodium zincate
(c) Zinc hydroxide (d) Zinc oxide
7. Select the correct option from the following :
- | | Salt | Parent acid | Parent base | Nature of salt |
|-----|------------------|--------------------------|---------------|----------------|
| (a) | Sodium acetate | CH_3COOH | NaOH | Neutral |
| (b) | Sodium carbonate | H_2CO_3 | NaOH | Basic |
| (c) | Sodium chloride | HCl | NaOH | Acidic |
| (d) | Sodium nitrate | HNO_3 | NaOH | Acidic |
8. For verifying Ohm's law, we design an electric circuit diagram in which we show the arrangement of different circuit components. We find that with respect to the resistor, the :
(a) ammeter is connected in parallel and the voltmeter in series.
(b) ammeter is connected in series and the voltmeter in parallel.
(c) ammeter and voltmeter are both connected in series.
(d) ammeter and voltmeter are both connected in parallel.



9. An object is placed in front of a convex mirror at infinity. According to the New Cartesian Sign Convention, the sign of the focal length and the sign of the image distance in this case are respectively :
- (a) + , - (b) - , +
(c) - , - (d) + , +
10. When an 'X' bearing sperm fertilises the egg, the resulting zygote has the following combination of chromosomes :
- (a) 44 + XX (b) 44 + XY
(c) 22 + XX (d) 22 + XY
11. Sphincter muscles are present at the exit of :
- (a) Stomach and small intestine
(b) Stomach and anus
(c) Small intestine and large intestine
(d) Oesophagus and stomach
12. In the following diagram, identify the cells through which massive amounts of gaseous exchange takes place for photosynthesis :



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



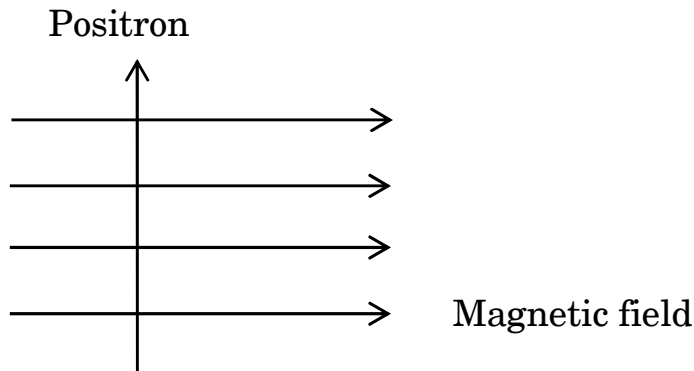
13. During vigorous exercise, the occurrence of cramps in the outer muscles of an athlete is due to the conversion of pyruvate to :

- | | |
|-----------------|-------------|
| (a) Glucose | (b) Ethanol |
| (c) Lactic acid | (d) Lactose |

14. Plants which bear unisexual flowers are :

- (a) Mustard and Papaya
- (b) Hibiscus and Watermelon
- (c) Mustard and Hibiscus
- (d) Watermelon and Papaya

15. A positron enters a uniform magnetic field at right angles to it as shown. The direction of force experienced by the positron will be :



- (a) to the right
- (b) to the left
- (c) into the page
- (d) out of the page

16. In a resistive circuit if the current is increased to two times, the percentage change in the amount of heat dissipated in the circuit would be :

- | | |
|----------|----------|
| (a) 400% | (b) 300% |
| (c) 200% | (d) 100% |



For Questions number 17 to 20, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

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

17. *Assertion (A) :* Magnetic field lines do not intersect each other.

Reason (R) : Magnetic field lines are imaginary lines, the tangent to which at any point gives the direction of the field at that point.

18. *Assertion (A) :* Sodium oxide is an amphoteric oxide.

Reason (R) : Metal oxides which react with both acids as well as bases are known as amphoteric oxides.

19. *Assertion (A) :* The angle through which a ray of light bends on passing through a prism is called the angle of deviation.

Reason (R) : The peculiar shape of a prism makes the emergent ray bend at an angle to the direction of the incident ray.

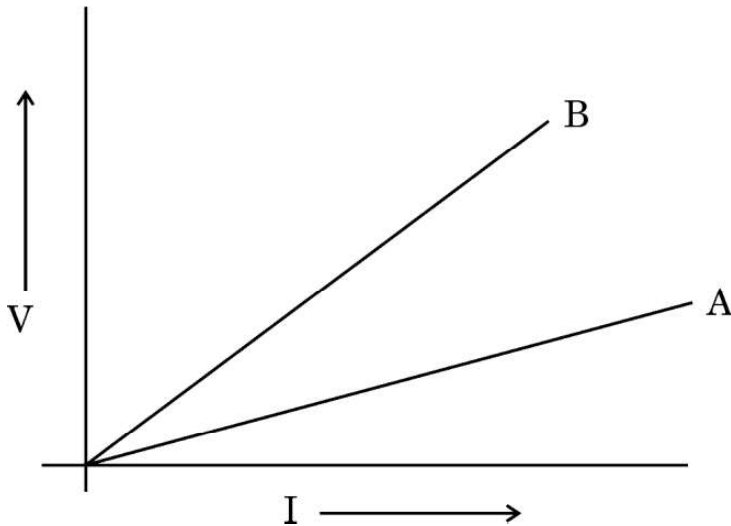
20. *Assertion (A) :* When a bacterium divides into two, and the resultant two bacteria divide again, the four bacteria produced would be almost similar.

Reason (R) : DNA copying involves small inaccuracies in the reproduction process.



SECTION B

21. V – I graph for two conducting wires A and B are as shown. If both wires are of the same length and same diameter, which of the two is made of a material of high resistivity ? Give reasons to justify your answer. 2



22. State the role of the following in the process of digestion : 2

- (a) Bile juice and bile salts
- (b) Pancreatic enzymes

23. (a) What is observed when aqueous solutions of potassium iodide and lead nitrate are mixed together ? Name the type of reaction and write the chemical equation for the reaction that occurs. 2

OR

- (b) When copper powder is heated in a watch glass, a black substance is formed.

- (i) Why is this black substance formed ? Name it.
- (ii) How can this black substance be reversed to its original form ? 2



- 24.** Mendel crossed a pure tall pea plant (TT) with a pure short pea plant (tt) and obtained all tall plants in F_1 generation.
- (a) What is the gene combination present in the plants of F_1 generation ?
- (b) Give reason why only tall plants are observed in F_1 progeny.
- (c) What will be the ratio of the plants obtained in the F_2 generation when F_1 plants are self-pollinated ? 2
- 25.** (a) When and where does a rainbow appear in the sky ? Draw a labelled ray diagram to show its formation. 2
- OR**
- (b) What is scattering of light ? Why does the clear sky appear blue ? 2
- 26.** “Ozone, although a deadly poison, performs an essential function for the earth and its inhabitants.” Explain. 2

SECTION C

- 27.** (a) Define oxidation.
- (b) Identify the oxidising agent in the following reactions and balance the chemical equations :
- (i) $\text{Pb}_3\text{O}_4 + \text{HCl} \longrightarrow \text{PbCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$
- (ii) $\text{MnO}_2 + \text{Al} \longrightarrow \text{Mn} + \text{Al}_2\text{O}_3$ 3



- 28.** (a) Copper reacts with a moist gas 'A' in the air and slowly loses its shiny brown surface. It turns green. Identify 'A' and the substance of the green coating formed on the surface of copper.
- (b) How is copper obtained from its sulphide ore ? Write the chemical equations for the reaction involved in its extraction. 3

- 29.** (a) (i) What is meant by excretion ?
- (ii) Name the organ that connects the kidneys with the urinary bladder. State its function.
- (iii) List two factors on which the amount of water reabsorbed depends. 3

OR

- (b) (i) In the human respiratory system, name the following :
- (I) Part where air is filtered by fine hairs and mucus lining
- (II) Part which separates chest cavity from abdominal cavity
- (III) Balloon like structures where exchange of gases takes place
- (IV) The two large air passages that lead from trachea to the lungs
- (ii) List any two characteristics of lungs which make it an efficient respiratory surface. 3
- 30.** (a) A student has focussed the image of an object of height 3 cm on a white screen using a concave mirror of focal length 12 cm. If the distance of the object from the mirror is 18 cm, find the values of the following :
- (i) Distance of the image from the mirror
- (ii) Height of the image 3

OR



- (b) Define power of a lens. The focal length of a lens is -10 cm. Write the nature of the lens and find its power. If an object is placed at a distance of 20 cm from the optical centre of this lens, according to the New Cartesian Sign Convention, what will be the sign of magnification in this case ? 3

31. Explain how some harmful chemicals enter our bodies through the food chain. Why is the concentration of these harmful chemicals found to be maximum in human beings ? 3

32. (a) List two factors on which the magnitude of magnetic field produced by a current carrying straight conductor depends.
(b) State the rule which determines the direction of magnetic field in the above case.
(c) Draw the pattern of magnetic field lines produced in this case. 3

33. Name the hormone released and the gland which secretes it in human beings during scary situations. How does the body respond to enable it to deal with the situation ? 3

SECTION D

34. (a) (i) List three points of difference between nervous and hormonal mechanisms for control and coordination in animals.
(ii) How are auxins related with the bending of plant shoot towards unidirectional light ? Explain. 5

OR



- (b) (i) Name the disorder which a person is likely to suffer from due to the following :

- (I) Over-secretion of growth hormone
- (II) Deficiency of oestrogen in females
- (III) Less secretion of thyroxine

Also name the gland that secretes each of the hormones mentioned above.

- (ii) How is the timing and amount of hormone released regulated ? Explain with the help of an example.

5

- 35.** (a) An acid 'X' and an alcohol 'Y' react with each other in the presence of an acid catalyst to form a sweet smelling substance 'Z'. Identify 'X', 'Y' and 'Z'. Write the chemical equation for the reaction involved and name it. The substance 'Z' on treatment with sodium hydroxide produces back the alcohol 'Y' and sodium ethanoate. Write the chemical equation for the reaction involved and name it, giving justification for the name.

5

OR

- (b) (i) Name the simplest saturated hydrocarbon. Draw its electron dot structure. Which type of bonds exist in this compound ?
- (ii) Name any two mixtures of the carbon compound used as a fuel in daily life, of which the above mentioned compound is an important component.
- (iii) In which homologous series of carbon compounds can this compound be placed ? Write the general formula of the series.
- (iv) Which type of flame is produced on burning it ?

5



- 36.** (a) Draw a ray diagram for showing the convergence of a parallel beam of light by a concave mirror and mark the positions of pole and the centre of curvature in it.
- (b) An object 4 cm in size is placed at 25 cm in front of a concave mirror of focal length 15 cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image ? Find the nature and size of the image.
- (c) List any two uses of a concave mirror. 5

SECTION E

The following questions are source-based/case-based questions. Read the case carefully and answer the questions that follow.

- 37.** The teacher while conducting practicals in the laboratory divided the students into three groups and gave them various solutions to find out their pH and classify them into acidic, basic and neutral solutions.
- Group A – Lemon juice, vinegar, colourless aerated drink
- Group B – Tomato juice, coffee, ginger juice
- Group C – Sodium hydroxide, sodium chloride, lime water
- (a) For the solutions provided, which group is/are likely to have pH value (i) less than 7, and (ii) greater than 7 ? 1
- (b) List two ways of determining pH of a solution 1
- (c) Explain, why the sour substances such as lemon juice are effective in cleaning the tarnished copper vessels. 2

OR



- (c) “pH has great importance in our daily life.” Justify this statement by giving two examples. 2

38. All the reproductive methods of living organisms are broadly categorized into two types : 1. Asexual reproduction, and 2. Sexual reproduction.

Asexual reproduction involves the participation of a single parent without the formation of gametes, fertilisation and transfer of genetic material. This method is a common means of rapidly increasing offsprings under favourable conditions.

- (a) Name the type of fission that occurs in Leishmania and Plasmodium. 1

- (b) Write one advantage of sexual mode of reproduction over asexual reproduction. 1

- (c) Give reasons why :

- (i) Colonies of yeast fail to multiply in water but multiply in sugar solution.

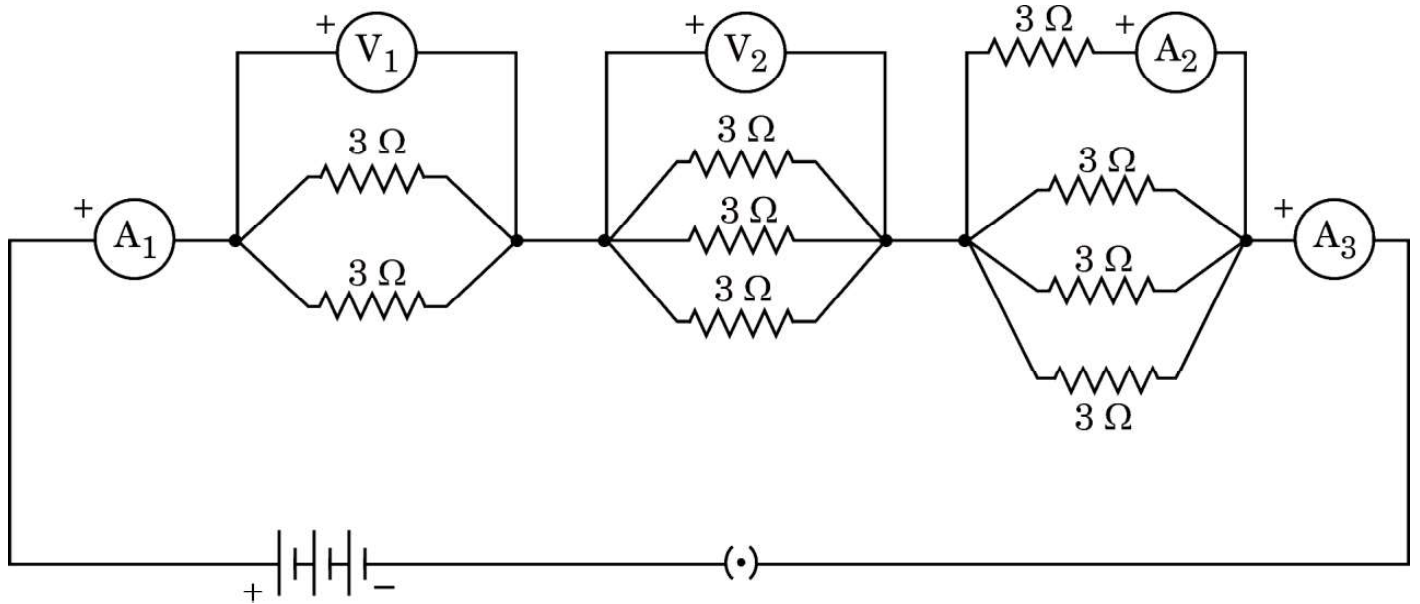
- (ii) Rhizopus individuals do not grow on a dry slice of bread. 2

OR

- (c) Name the filamentous structures a student could identify when he collected water from a pond that appeared dark green. How do these organisms multiply ? Explain. 2



39. Consider the following electrical circuit diagram in which nine identical resistors of $3\ \Omega$ each are connected as shown. If the reading of the ammeter A_1 is 1 ampere, answer the following questions :



- (a) What is the relationship between the readings of A_1 and A_3 ? Give reasons for your answer. 1
- (b) What is the relationship between the readings of A_2 and A_3 ? 1
- (c) Determine the reading of the voltmeter V_1 . 2

OR

- (c) Find the total resistance of the circuit. 2