

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

प्रश्न-पत्र कोड

Q.P. Code

31/2/2

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

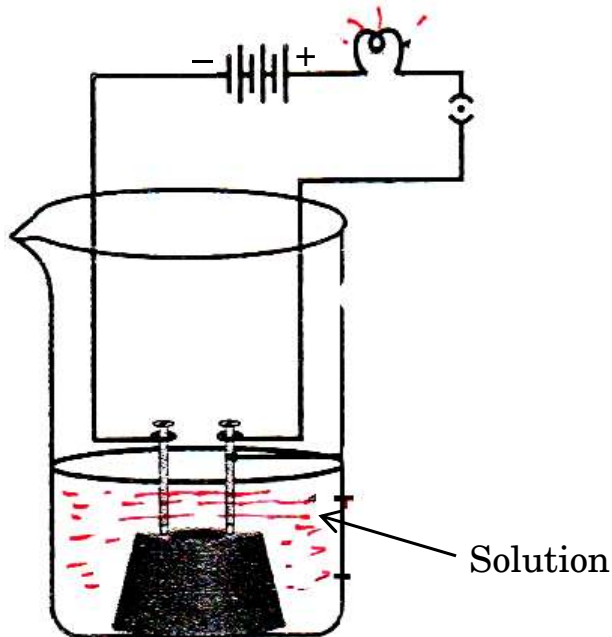
*This section has **20** multiple choice questions (Q.No. 1 – 20). **All** questions are compulsory.*

20×1=20

1. During electrolysis of water, if the volumes of oxygen and hydrogen evolved at the electrodes are V_O and V_H respectively, then V_O/V_H is
 - (a) 4
 - (b) 2
 - (c) $\frac{1}{2}$
 - (d) $\frac{1}{4}$
2. Among the following, the metal with lowest density is :
 - (a) Lithium
 - (b) Lead
 - (c) Magnesium
 - (d) Aluminium



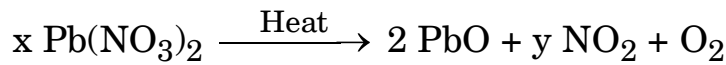
3. In the given experimental set-up, if the experiment is carried out separately with each of the following solutions the cases in which the bulb will glow is/are :



- (i) Dilute hydrochloric acid
 - (ii) Dilute sulphuric acid
 - (iii) Glucose solution
 - (iv) Alcohol
- (a) (i) only
- (b) (ii) only
- (c) (i) and (ii)
- (d) (ii), (iii) and (iv)
4. Which of the following gives the correct increasing order of acidic strength ?
- (a) Sodium chloride < Acetic acid < Hydrochloric acid
 - (b) Sodium chloride < Hydrochloric acid < Acetic acid
 - (c) Acetic acid < Sodium chloride < Hydrochloric acid
 - (d) Hydrochloric acid < Sodium chloride < Acetic acid



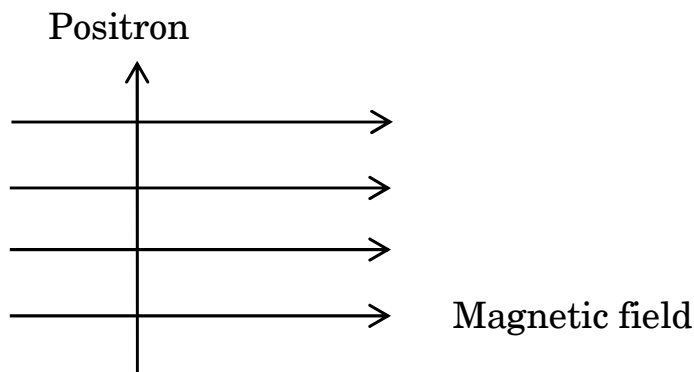
5. In order to balance the following chemical equation, the values of the coefficients x and y respectively are :



- (a) 2, 4 (b) 2, 2
(c) 2, 3 (d) 4, 2
6. When ethanol reacts with sodium two products are formed. These products are :

- (a) Sodium ethanoate and oxygen
(b) Sodium ethanoate and hydrogen
(c) Sodium ethoxide and oxygen
(d) Sodium ethoxide and hydrogen

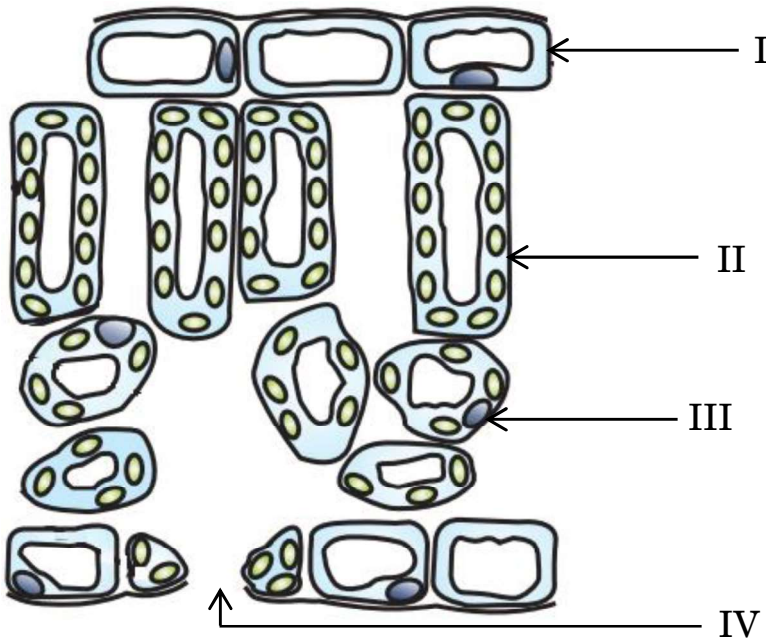
7. A positron enters a uniform magnetic field at right angles to it as shown. The direction of force experienced by the positron will be :



- (a) to the right
(b) to the left
(c) into the page
(d) out of the page
8. 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



9. 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%
10. 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.
11. The total number of electrons shared in the formation of an ethyne molecule is :
- (a) 6 (b) 3
(c) 10 (d) 4
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. 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
14. 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
15. Plants which bear unisexual flowers are :
- (a) Mustard and Papaya
 - (b) Hibiscus and Watermelon
 - (c) Mustard and Hibiscus
 - (d) Watermelon and Papaya
16. 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) + , +

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) :* Sodium, calcium and magnesium are obtained by the electrolysis of their molten oxides.

Reason (R) : These metals have more affinity for oxygen than carbon.

18. *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.

19. *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.

20. *Assertion (A) :* A person suffering from myopia cannot see the distant objects clearly.

Reason (R) : A converging lens is used for the correction of myopic eye as it can form real as well as virtual images of the objects placed in front of it.

SECTION B

21. (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



- 22.** What will happen if :
- (a) Xylem tissue in a plant is removed ?
 - (b) We are injured and start bleeding ? 2
- 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.** Consider a circular loop of thick copper wire lying horizontally on a table. Let the current pass through the loop anticlockwise. Draw the magnetic field lines to show the direction and the pattern of the magnetic field inside and outside the loop. 2
- 26.** (a) What is meant by trophic level ?
- (b) On an average, what percentage of energy is transferred to the second trophic level from the first trophic level ? Which categories of consumers do the organisms of the second trophic level belong to ? 2



SECTION C

- 27.** Write down the balanced chemical 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 a shining deposit of silver is produced. 3
- 28.** 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
- 29.** (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
- 30.** Explain the directional movement due to growth in response to touch in a pea plant. 3



31. With the help of suitable chemical equations, list the two main differences between roasting and calcination. How is metal reduced from the product obtained after roasting/calcination of the ore ? Write the chemical equation for the reaction involved. 3
32. What is a solenoid ? Draw a diagram to show the pattern of magnetic field around a current carrying solenoid. Name the region of uniform magnetic field. 3
33. (a) (i) What is the first step in the breakdown of glucose during aerobic and anaerobic respiration ? Where does it take place ?
- (ii) ATP is called the energy currency of the cell. Why ?
- (iii) What is meant by “residual volume of air” in a breathing cycle ? 3

OR

- (b) Write in sequence the steps for experimental verification of the fact that “sunlight is essential for photosynthesis”. 3

SECTION D

34. (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

35. (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



- 36.** (a) Name the type of mirror that should be used to obtain the following types of images :
- (i) A magnified and virtual image of an object
 - (ii) A diminished and virtual image of an object
- (b) Draw labelled ray diagrams to justify your answers in each case mentioned above.
- (c) Which of these mirrors can also be used to obtain a magnified and real image of an object ? State the position of the object in this case.

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.

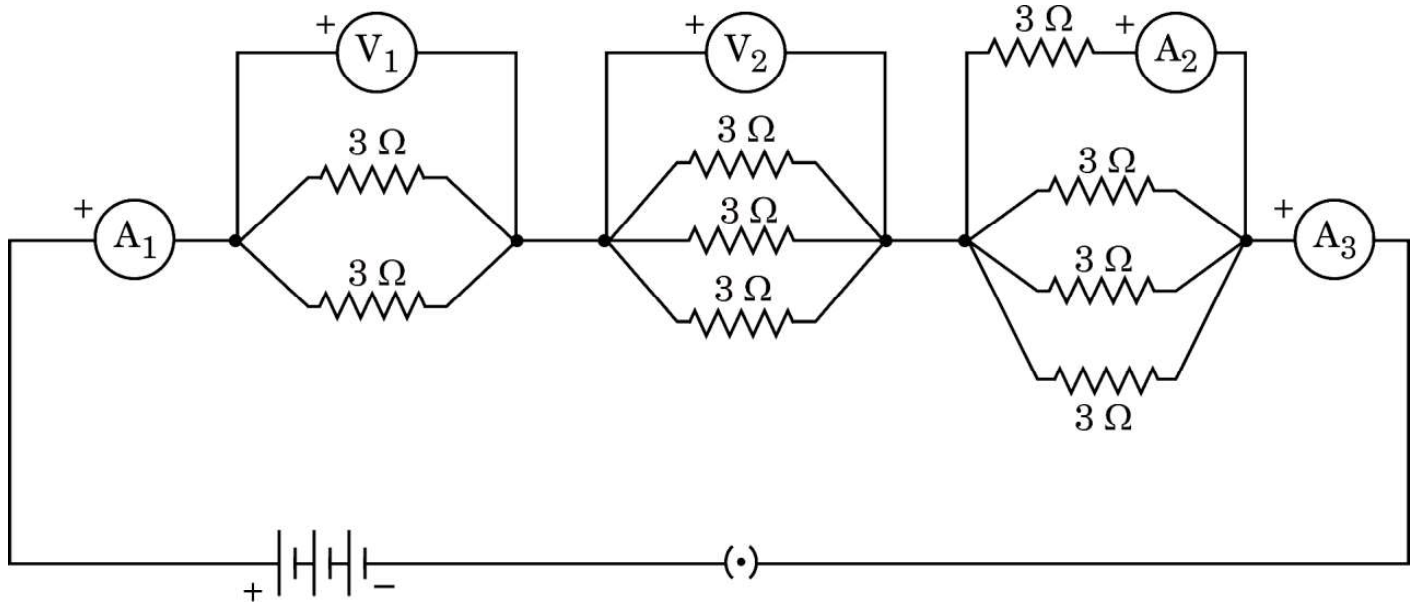
- (a) Name the type of fission that occurs in Leishmania and Plasmodium. 1
- (b) Write one advantage of sexual mode of reproduction over asexual reproduction. 1
- (c) Give reasons why :
- (i) Colonies of yeast fail to multiply in water but multiply in sugar solution.
- (ii) Rhizopus individuals do not 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