

SET-3**Series QQARR/1**

प्रश्न-पत्र कोड
Q.P. Code

31/1/3

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 **11** 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 **15** 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 **11** 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 **15** 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 : 2 घण्टे

Time allowed : 2 hours

अधिकतम अंक : 40

Maximum Marks : 40

31/1/3

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P.T.O.

General Instructions :

Read the following instructions very carefully and strictly follow them :

- (i) *This question paper comprises **15** questions. **All** questions are compulsory.*
- (ii) *This question paper is divided into **three** sections – **A**, **B** and **C**.*
- (iii) ***Section A** – Questions No. **1** to **7** are short answer type questions. Each question carries **2** marks.*
- (iv) ***Section B** – Questions No. **8** to **13** are also short answer type questions. Each question carries **3** marks.*
- (v) ***Section C** – Questions No. **14** and **15** are case-based questions. Each question carries **4** marks.*
- (vi) *Internal choices have been provided in some questions. Only one of the alternatives has to be attempted.*

SECTION A

1. Two elements, A and B belong to the 3rd period of Modern Periodic Table. Element A belongs to Group 1 whereas Element B belongs to Group 16. Compare the following characteristics of A and B, giving justification for each : 2
 - (a) Atomic size
 - (b) Metallic character
2. The atomic number of a non-metal 'X' is 8. 1+1
 - (a) Write the period number and the group number of 'X'.
 - (b) Draw the electron dot structure of its molecule.
3. Which one of the two multicellular organisms — Spirogyra and Planaria reproduces by regeneration and why ? Give an example of any other organism which can also reproduce by the same process. 2
4.
 - (a) What happens when in a human female the egg released by the ovary is not fertilised ?
 - (b) Name one bacterial and one viral infection caused due to unsafe sex. 1+1



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5. (a) (i) Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field which is perpendicular to it.
- (ii) An alpha particle while passing through a magnetic field gets projected towards north. In which direction will an electron project when it passes through the same magnetic field ? 2

OR

- (b) (i) What is a solenoid ?
- (ii) Draw the pattern of magnetic field lines of the magnetic field produced by a solenoid through which a steady current flows. 2
6. (a) What is ozone ? How is it formed in the upper layers of the Earth's atmosphere ? How does ozone affect our ecosystem ? 2

OR

- (b) (i) List two human-made ecosystems. 1
- (ii) "We do not clean a pond in the same manner as we do in an aquarium." Give reason to justify this statement. 1
7. (a) What is variation ? List two main reasons that may lead to variation in a population. 2

OR

- (b) (i) In a cross between violet flowered plants and white flowered plants, state the characteristics of the plants obtained in the F_1 progeny.
- (ii) If the plants of F_1 progeny are self-pollinated, then what would be observed in the plants of F_2 progeny ?
- (iii) If 100 plants are produced in F_2 progeny, then how many plants will show the recessive trait ? 2



SECTION B

8. (a) Draw two different possible structures of a saturated hydrocarbon having four carbon atoms in its molecule. What are these two structures of the hydrocarbon having same molecular formula called ? Write the molecular formula and the common name of this compound. Also write the molecular formula of its alkyne. 3
- OR**
- (b) (i) Write the molecular formula of benzene and draw its structure.
(ii) Write the number of single and double covalent bonds present in a molecule of benzene.
(iii) Which compounds are called alkynes ? 3
9. (a) List two advantages of adopting the atomic number of an element as the basis of classification of elements in the Modern Periodic Table.
(b) Write the electronic configurations of the elements X (atomic number 13) and Y (atomic number 20). 3
10. For a heater, rated 4 kW and 220 V, calculate the following : 3
(a) The current
(b) Energy consumed in 2 hours
(c) If 1 kWh is priced at ₹ 4.50, then the cost of energy consumed
11. A red-eyed individual is crossed with a white-eyed individual to produce F_1 progeny with red eyes. When F_1 individuals are intercrossed, F_2 progeny is formed with both red as well as white-eyed individuals.
(a) How is the dominant trait identified ?
(b) What are recessive traits ?
(c) If 12 individuals are produced in F_2 generation, then how many white-eyed individuals would be obtained ? Calculate the ratio of red-eyed individuals to white-eyed individuals. $1 + \frac{1}{2} + \frac{1}{2} + 1$
12. (a) Name the group of organisms which form in the first trophic level of all food chains. Why are they called so ?
(b) Why are the human beings most adversely affected by bio-magnification ?
(c) State one ill-effect of the absence of decomposers from a natural ecosystem. 3



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13. (a) (i) Define Electric Power and write its SI unit. $\frac{1}{2} + \frac{1}{2}$
- (ii) Two bulbs rated 100 W; 220 V and 60 W; 220 V are connected in parallel to an electric mains of 220 V. Find the current drawn by the bulbs from the mains. 2

OR

- (b) (i) State Joule's law of heating. Express it mathematically when an appliance of resistance R is connected to a source of voltage V and the current I flows through the appliance for a time t.
- (ii) A $5\ \Omega$ resistor is connected across a battery of 6 volts. Calculate the energy that dissipates as heat in 10 s. 3

SECTION C

*This section has 2 case-based questions (14 and 15). Each case is followed by 3 sub-questions (a), (b) and (c). Parts (a) and (b) are **compulsory**. However, an internal choice has been provided in Part (c).*

14. A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt-sprinkler. On tapping the board gently, she observes that the iron filings have arranged themselves in a particular pattern.
- (a) Draw a diagram to show this pattern of iron filings. 1
- (b) What makes iron filings arrange in a definite pattern ? 1
- (c) (i) How is the direction of magnetic field at a point determined using the field lines ? Why do two magnetic field lines not cross each other ? 2

OR

- (ii) How are the magnetic field lines of a bar magnet drawn using a small compass needle ? Draw one magnetic field line each on both sides of the magnet. 2



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15. The mechanism by which the sex of an individual is determined is called sex-determination. In human beings, sex of a newborn is genetically determined, whereas in some others it is not. There are 46 (23 pairs) chromosomes in human beings. Out of these, 44 (22 pairs) control the body characters and 2 (one pair) are known as sex chromosomes. The sex chromosomes are of two types — X chromosome and Y chromosome. At the time of fertilisation, depending upon which type of male gamete fuses with the female gamete, the sex of the newborn child is decided.
- (a) What is the statistical probability of getting either a male or a female child ? Justify your answer. $\frac{1}{2} + \frac{1}{2}$
- (b) Out of male or female, which of them has a perfect pair of sex chromosomes ? In case of a perfect pair, will the gametes produced be of the same kind or of a different kind ? 1
- (c) (i) Name two animals whose sex is not genetically determined. Explain the process of their sex determination. 1+1

OR

- (ii) With the help of a flowchart only, show how sex is genetically determined in human beings. 1+1



