

CLASS X (2019-20)
SCIENCE (CODE 086)
SAMPLE PAPER-16

Time : 3 Hours

Maximum Marks : 80

General Instructions :

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

SECTION A

Q1. Define pollination. [1]

Q2. Why does hard water produce scum with soaps? [1]

Q3. **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

Wherever we look, we find plastics-be it a food packet, a toy, storage packing, any furniture or an electronic item. According to UN estimates, every year the world uses 500 billion plastic bags and half of this plastic is single-use plastic such as plastic bags, straws, cups, plates and bottles. Plastic is currently the biggest environmental concern. Plastic waste takes a lot of time to decompose naturally. It is harmful for animals who might eat it and can cause severe air pollution on burning. In oceans, pollution is mainly caused due to plastic wastes. Each year, at least eight million tonnes of plastic wastes are released into the oceans which means a full garbage truck every minute. This is damaging the marine life and also threatening human health.

3.1 Why has there been huge hue and cry against the use of single-use plastics? [1]

3.2 The pH of ocean water as measured using pH paper is found to be 5. What does this pH tell us about the ocean water? [1]

3.3 Based on the data shown in the graph that follows, which industrial sector produces the most plastic waste? Suggest the alternative that can be used in place of plastic in this sector? [1]

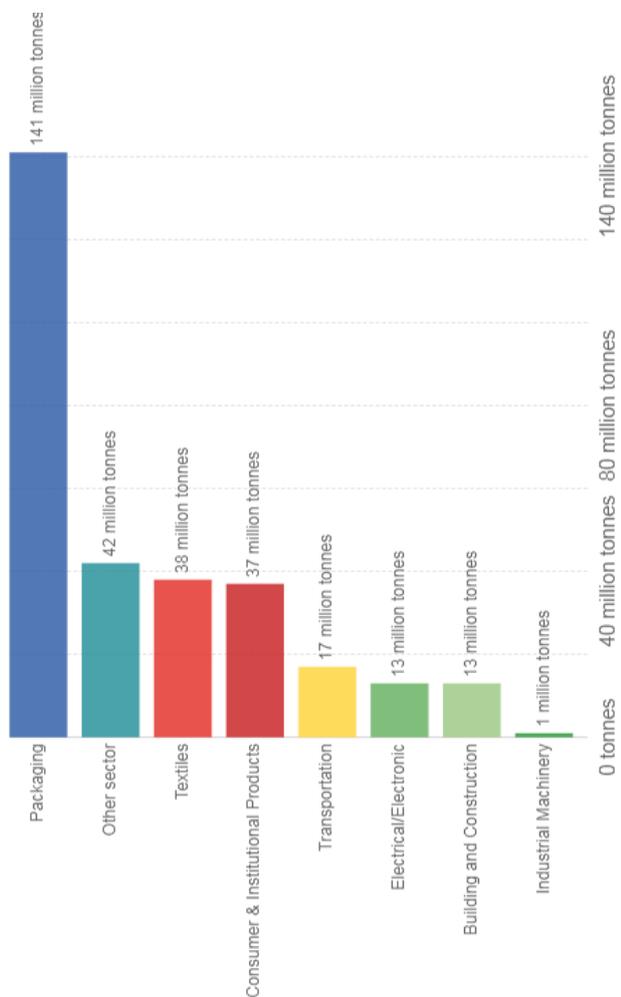


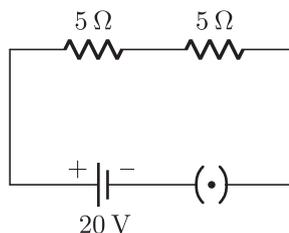
Fig: Plastic waste generation by industrial sector, 2015. Global plastic waste generation by industrial sector, measured in tonnes per year

3.4 Expand the five R’s that help in reducing plastic wastes. [1]

Q4. Question numbers 4.1-4.4 are based on the given table, circuit diagram and the related studied concepts. Analyse the table and circuit diagram to answer the questions that follow.

Table: Resistivities of some substances (at 20 °C)

Substance	Resistivity
Copper	$1.69 \times 10^{-8} \Omega\text{m}$
Mercury	$94.0 \times 10^{-8} \Omega\text{m}$
Iron	$6.84 \times 10^{-8} \Omega\text{m}$
Nichrome	$110 \times 10^{-8} \Omega\text{m}$
Paper (Dry)	$10^{12} \Omega\text{m}$
Nickel	$6.84 \times 10^{-8} \Omega\text{m}$



- 4.1 The resistivity of which substance given in the table is best suited for making wires for the transmission of electricity in the given circuit? [1]
- 4.2 Which type of circuit is represented in the above circuit diagram? [1]
 (a) Series circuit (b) Parallel circuit
 (c) Simple circuit (d) Both (i) and (ii)
- 4.3 Which of the following substances is attracted by a magnet? [1]
 (a) Nickel (b) Mercury
 (c) Copper (d) Paper
- 4.4 How much current is flowing through the electrical circuit given above? [1]
- Q5. Identify the wrong sequence of the elements in a group. [1]
 (a) Ca, Sr, Ba (b) N, P, As
 (c) Cu, Au, Ag (d) Cl, Br, I
- Q6. Which of the following is the most appropriate reaction for aerobic respiration? [1]
 (a) Glucose $\xrightarrow{\text{mitochondria}}$ Pyruvate $\xrightarrow{\text{cytoplasm}}$ $\text{CO}_2 + \text{H}_2\text{O} + \text{Energy}$
 (b) Glucose $\xrightarrow{\text{cytoplasm}}$ Pyruvate $\xrightarrow{\text{mitochondria}}$ $\text{CO}_2 + \text{H}_2\text{O} + \text{Energy}$
 (c) Glucose $\xrightarrow{\text{cytoplasm}}$ Pyruvate + Energy $\xrightarrow{\text{mitochondria}}$ $\text{CO}_2 + \text{H}_2\text{O}$
 (d) Glucose $\xrightarrow{\text{cytoplasm}}$ Pyruvate + Energy $\xrightarrow{\text{mitochondria}}$ $\text{CO}_2 + \text{H}_2\text{O} + \text{Energy}$

OR

- Which of the following is the correct sequence of anaerobic reaction in yeast? [1]
 (a) Glucose $\xrightarrow{\text{cytoplasm}}$ Pyruvate $\xrightarrow{\text{mitochondria}}$ Ethanol + CO_2
 (b) Glucose $\xrightarrow{\text{cytoplasm}}$ Pyruvate $\xrightarrow{\text{cytoplasm}}$ Lactic acid
 (c) Glucose $\xrightarrow{\text{cytoplasm}}$ Pyruvate $\xrightarrow{\text{mitochondria}}$ Lactic acid
 (d) Glucose $\xrightarrow{\text{cytoplasm}}$ Pyruvate $\xrightarrow{\text{cytoplasm}}$ Ethanol + CO_2
- Q7. On gradually adding dil. FeSO_4 to acidified KMnO_4 solution, the light purple colour of the solution fades and finally disappears. [1]
 The correct explanation for the above observation is
 (a) FeSO_4 is an oxidising agent, it oxidises KMnO_4
 (b) The colour disappears due to dilution
 (c) KMnO_4 is an unstable compound
 (d) KMnO_4 is an oxidising agent, it oxidises FeSO_4
- Q8. Pick the right combination of terms which has no fossil fuel. [1]
 (a) Wind, ocean and coal (b) Kerosene, wind and tide
 (c) Wind, wood, Sun (d) Petroleum, wood, Sun
- Q9. Consider the following statements: [1]
 A. Pyruvate can be converted into ethanol and carbon dioxide by yeast.
 B. Fermentation takes place in aerobic bacteria.
 C. Fermentation takes place in mitochondria.
 D. Fermentation is a form of anaerobic respiration.
 The correct statements are
 (a) A and B only (b) A and D only
 (c) A, B and C (d) A, C and D

- Q10. The chemical reaction in which photo-decomposition occurs is [1]
- (a) $2\text{H}_2\text{O}(l) \longrightarrow 2\text{H}_2(g) + \text{O}_2(g)$
(b) $2\text{HCl}(aq) \longrightarrow \text{HCl}(g) + \text{Cl}(g)$
(c) $\text{CaCO}_3(s) \longrightarrow \text{CaO}(s) + \text{CO}_2(g)$
(d) $2\text{AgCl}(s) \longrightarrow 2\text{Ag}(s) + \text{Cl}_2(g)$

OR

Which of the following is a physical change?

- (a) Formation of curd from milk
(b) Ripening of fruits
(c) Getting salt from sea water
(d) Burning of wood
- Q11. A convex lens forms a virtual image when an object is placed at a distance of 18 cm from it. The focal length must be [1]
- (a) less than 18 cm. (b) greater than 18 cm.
(c) greater than 36 cm. (d) less than 36 cm.

OR

Refractive index of diamond with respect to glass is 1.6. If the absolute refractive index of glass is 1.5, then the absolute refractive index of diamond is

- (a) 1.4 (b) 2.4
(c) 3.4 (d) 4.4
- Q12. Electrical impulse travels in a neuron from [1]
- (a) Dendrite → axon → axonal end → cell body
(b) Cell body → dendrite → axon → axonal end
(c) Dendrite → Cell body → axon → axonal end
(d) Axonal end → axon → cell body → dendrite
- For question numbers 13 and 14, two statements are given—one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.**
- (a) Both A and R are true and R is correct explanation of the assertion.
(b) Both A and R are true but R is not the correct explanation of the assertion.
(c) A is true but R is false.
(d) A is false but R is true.

- Q13. **Assertion :** The bouncing back of light in the same medium on striking the surface of an object is called the reflection of light.
Reason : The light propagates along a straight-line path. [1]

- Q14. **Assertion :** Silicon is a metalloid (or semi-metal).
Reason : Silicon looks like a metal and it is ductile and good conductor of heat and electricity.[1]

SECTION B

- Q15. What is an electromagnet? How can you make an electromagnet in your school laboratory? [3]

OR

State the factors on which the strength of an electromagnet depends. Differentiate between an electromagnet and a permanent magnet. [3]

- Q16. Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter, a resistor of $4\ \Omega$ in series with a combination of two resistors $8\ \Omega$ each) in parallel and a voltmeter across the parallel combination. Each of them dissipate maximum energy and can withstand a maximum power of 16W without melting. Find the maximum current that can flow through the three resistors. [3]
- Q17. In the context of electrolysis of water, answer the following questions:
(a) Name the gas collected at the anode and the cathode.
(b) Why is the volume of gas collected at one electrode double than the other?
(c) What would happen if dil H_2SO_4 is not added to water? [3]
- Q18. Differentiate between the arrangement of elements in the Mendeleev's Periodic Table and the Modern Periodic Table. [3]
- Q19. Explain the, ways in which glucose is broken down in the absence of oxygen. [3]

OR

- List three differences between arteries and veins. [3]
- Q20. How do Mendel's experiments show that traits may be dominant or recessive? [3]
- Q21. Rohit focused the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle, the screen and the lens as under:
Position of candle- $26.0\ \text{cm}$
Position of convex lens- $50.0\ \text{cm}$
Position of screen- $74.0\ \text{cm}$
(a) What is the focal length of the convex lens?
(b) Where will the image be formed if he shifts the candle towards the lens at a position of $38\ \text{cm}$?
(c) Draw a ray diagram to show the formation of the image in case (b) as said above? [3]
- Q22. "pH has a great importance in our daily life". Explain by giving three examples. [3]

OR

- A compound which is prepared from gypsum has the property of hardening when mixed with the proper quantity of water. Identify the compound and write its chemical formula. Write the chemical equation for its preparation. Mention one use of the compound. [3]
- Q23. Why are fossils considered to be important in the study of evolution? Explain two ways by which the age of fossils can be estimated. [3]
- Q24. Write two different ways of harnessing energy from the ocean. [3]

SECTION C

- Q25. (a) With the help of a labelled circuit diagram, describe an activity to illustrate the pattern of the magnetic field lines around a current carrying straight conducting wire.
(b) Name the rule that is used to find the direction of magnetic field associated with a straight current carrying conductor.
(c) Is there a similar magnetic field produced around a thin beam of moving (i) alpha particles and, (ii) neutrons? Justify your answer. [5]
- Q26. You are given six carbon atoms and fourteen hydrogen atoms. In how many ways can one join them to form different molecules of C_6H_{14} . [5]

OR

Draw the structural formulae of all the possible isomers of the compound with the molecular formula C_3H_6O and also give their electron dot structures. [5]

- Q27. (a) (i) Draw a neat diagram of the human brain and label medulla and cerebellum.
(ii) Write the functions of the parts mentioned above.
(b) “Both overproduction and underproduction of growth hormone leads to disorders in the body.”
Justify this statement. [5]
- Q28. A girl needs a lens of power $-4.5D$ for the correction of her vision.
(a) What kind of defect in vision is she suffering from?
(b) What are the causes of this defect?
(c) Draw ray diagrams showing the (i) defected eye and (ii) correction for this defect.
(d) What is the focal length and nature of the corrective lens? [5]

OR

Explain the refraction of light through a triangular glass prism using a labelled ray diagram. Define the angle of deviation. [5]

- Q29. (a) What is the reactivity series? How does the reactivity series of metals help in predicting the relative activities of various metals?
(b) Suggest different chemical processes used for obtaining a metal from its oxides for metals in the middle of the reactivity series and metals towards the top of the reactivity series. Support your answer with one example each. [5]
- Q30. Describe sexually transmitted diseases and mention the ways to prevent them. [5]

OR

Explain how fertilisation takes place in flowering plants. 5

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