

# Annual Examination, 2020-2021

## SCIENCE

Grade: 9

Date: 10.02.2021

Time: 3 Hours

Max. Marks: 80

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### General Instructions.

- (i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
- (ii) Section–A - question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
- (iii) Section–B - question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.
- (iv) Section–C - question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.
- (v) Section–D – question no. 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
- (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (vii) Wherever necessary, neat and properly labeled diagrams should be drawn.

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### SECTION - A

1. What are alpha particles? 1

(OR)

Define nucleus.

2. The formula of bleaching powder is  $\text{CaOCl}_2$ . Calculate its formula unit mass. 1

(Given atomic masses: Ca = 40u, O = 16u, Cl = 35.5u)

3. Suggest separation techniques one would need to employ to separate the following mixtures. 1

a) Mercury and water

b) Potassium chloride and Ammonium chloride.

4. Which law gives the measure of force? Write an expression for force. 1

5. The distance between two objects is decreased. Will the gravitational force between them increase or decrease? 1

6. Name the principle on which rocket works. 1

7. Differentiate between speed and velocity. 1

8. State the law of conservation of energy 1

(OR)

State the law of conservation of linear momentum.

9. If 12N force acts on 3 kg mass for a second, calculate the change in velocity in m/s 1

(OR)

On a 3 kg mass, 5 newton of force acts for 0.1 second. Calculate the impulse imparted to the mass in kg m/s

10. Write the formula to find the magnitude of gravitational force between the earth and an object on the surface of earth. 1

11. Define valency. 1

12. Who discovered the cell? 1

13. Can you name the two organelles we have studied that contain their own genetic material? 1

**For question numbers 14, 15 and 16, two statements are given- one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:**

14. **ASSERTION:** The 19<sup>th</sup> electron in potassium atom enters into N shell and not in the M shell. 1

**REASON:** Potassium forms K<sup>+</sup> ions.

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.

15. **ASSERTION:** Lysosomes are called as suicide bags of cells. 1

**REASON:** Enzymes present in lysosomes are capable of digesting the cell.

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 and R is false.

(OR)

**ASSERTION:** Cell wall is present in plant cells.

**REASON:** Animal cells lack cell wall.

- 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 and R is false

16. **ASSERTION:** Collenchyma is a thick-walled tissue. 1

**REASON:** Collenchyma is thickened due to pectin.

- 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 and R is false

**Answer Q. No 17 - 20 contain five sub-parts each. You are expected to answer any four sub - parts in these questions.**

17. Read the following and answer any four questions from 17 (i) to 17 (v)

1 X 4

Plant cells are eukaryotic cells that vary in several fundamental factors from other eukaryotic organisms. Both plant and animal cells contain nucleus along with similar organelles. One of the distinctive aspects of a plant cell is the presence of a cell wall outside the cell membrane. Just like different organs within the body, plant cell structure includes various components known as cell organelles that perform different functions to sustain itself. Cell Wall is a rigid layer which is composed of cellulose, glycoproteins, lignin, pectin and hemicellulose. Cell membrane is the semi-permeable membrane that is present within the cell wall. It is composed of a thin layer of protein and fat. The cell membrane plays an important role in regulating the entry and exit of specific substances within the cell. The nucleus is a membrane-bound structure that is present only in eukaryotic cells. The vital function of a nucleus is to store DNA or hereditary information required for cell division, metabolism and growth. Plastids are membrane-bound organelles that have their own DNA. They are necessary to store starch, to carry out the process of photosynthesis. Mitochondria are called the powerhouse of the cells as they produce ATP.

17 (i) \_\_\_\_\_ is called the energy currency of the cell

- a) Endoplasmic reticulum
- b) Oxygen
- c) ATP
- d) Mitochondria

17 (ii) Animal cell lacking nuclei would also lack in

- a) Ribosome
- b) Lysosome

- c) Endoplasmic reticulum
- d) Chromosome

17 (iii) This structure of the plant cell is non-living

- a) Nucleus
- b) cell wall
- c) cytoplasm
- d) Mitochondrion

17 (iv) The main difference between human cheek cells and onion peel cells is

- a) Presence of cell wall in onion peel cells
- b) Presence of mitochondria in onion peel cells
- c) Absence of endoplasmic reticulum in cheek cells
- d) Absence of the plasma membrane in cheek cells

17 (v) This cell organelle does not contain DNA

- a) Nucleus
- b) Mitochondria
- c) Lysosomes
- d) Chloroplast

18. Read the following and answer any four questions from 18 (i) to 18 (v)

1 X 4

Elements are classified into metals, non-metals and metalloids. Metals are lustrous, malleable, ductile, mostly solids, forms positive ions and are good conductors of heat and electricity. Non-metals are brittle, non-lustrous, non-malleable, non-ductile, exists as solids and gases, forms negative ions and are poor conductors of heat and electricity. Metals form basic oxides and non-metals form acidic oxides. Metals and non-metals vary in their reactivity. Metals and non-metals combine to form ionic compounds. A homogeneous mixture of two or more metals or metal with non-metal is called solid solution or an alloy.

18 (i) An element X with atomic number 12 reacts with Y with atomic number 17. What is the formula and nature of compound formed?

- a) XCl and covalent in nature
- b) XCl<sub>2</sub> and ionic in nature
- c) X<sub>2</sub>Cl and ionic in nature
- d) XCl<sub>2</sub> and covalent in nature

18 (ii) The symbol of liquid metal is:

- a) Hg
- b) Ag
- c) Au
- d) Zn

18 (iii) Brass is an example of a -----.

- a) Homogeneous compound
- b) Homogeneous mixture
- c) Heterogeneous mixture
- d) Heterogeneous compound

18 (iv) Which of the following is not a monoatomic element?

- a) Argon
- b) Neon
- c) Sodium
- d) Nitrogen

18 (v) An element A is tetravalent and element B is divalent. The formula of the compound formed by these two elements is:

- a)  $AB_2$
- b)  $A_2B$
- c)  $A_2B_4$
- d)  $AB$

19. Read the following and answer any four questions from 19 (i) to 19 (v)

1 x 4

An object of mass 1 kg travelling in a straight line with a velocity of 10 m/s collides with, and sticks to a stationary wooden block of mass 5 kg. Then they both move off together in the same straight line.

19 (i) The momentum before impact

- (a) 5 kg m/s      (b) 10 kg m/s      (c) 15 kg m/s      (d) 15.5 kg m/s

19 (ii) The momentum after impact

- (a) 5 kg m/s      (b) 10 kg m/s      (c) 15 kg m/s      (d) 25.5 kg m/s

19 (iii) The change in momentum

- (a) 0 kg m/s      (b) 15 kg m/s      (c) 30 kg m/s      (d) 30.5 kg m/s

19 (iv) The velocity of the combined object

- (a) 0.67 m/s      (b) 1.67 m/s      (c) 3.67 m/s      (d) 4.25 m/s

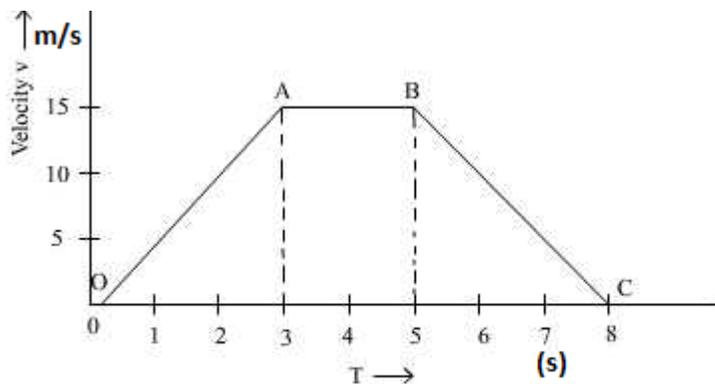
19 (v) The magnitude of external force for the momentum to be conserved

- (a) 0 N                      (b) 10 N                      (c) 20 N                      (d) 30 N

20. Read the following and answer any four questions from 20 (i) to 20 (v).

1 x 4

The graph given below shows the velocity of a body at different times.



- 20 (i) Which part of the graph shows accelerated motion?  
(a) OA                      (b) AB                      (c) BC                      (d) OC
- 20 (ii) Which part of the graph shows retarded motion?  
(a) OA                      (b) AB                      (c) BC                      (d) OC
- 20 (iii) Which part of the graph shows constant velocity?  
(a) OA                      (b) AB                      (c) BC                      (d) OC
- 20 (iv) Which part of the graph shows zero acceleration?  
(a) OA                      (b) AB                      (c) BC                      (d) OC
- 20 (v) The distance travelled by the body during the period  $t = 3 \text{ s}$  to  $t = 5 \text{ s}$  of journey  
(a) 10 m                      (b) 12 m                      (c) 22.5 m                      (d) 30 m

## SECTION - B

21. Make a comparison and write down ways in which plant cells are different from animal cells. 2

(OR)

How is a prokaryotic cell different from a eukaryotic cell?

22. Mention any 4 precautions that can you take in your school to reduce the incidence of infectious diseases? 2
23. Which has more number of atoms: 2

100g of sodium or 100g of iron? (Given atomic mass of Na = 23u and Fe = 56u)

(OR)

A 0.24g sample of compound of oxygen and boron was found by analysis to contain 0.096g of boron and 0.144g of oxygen. Calculate the percentage composition of the compound by weight.

24. Composition of the nuclei of two atomic species X and Y is given as follows: 2

Atomic species	Number of protons	Number of neutrons
X	6	6
Y	6	8

- a) What is the mass number of X and Y?  
b) What is the relation between X and Y? Explain why?

25. What happens to the force between two objects, if: 2
- (i) the mass of one object is doubled?  
(ii) both the masses are doubled?

Justify your answers.

26. A pair of bullocks exerts a force of 140 N on a plough. The field being ploughed is 15 m long. How much work is done in ploughing the length of the field? 2

## SECTION - C

27. Draw a neat and labelled diagram of a neuron. 3

(OR)

Differentiate between striated, un-striated and cardiac muscles on the basis of their structure and site/location in the body.

28. Define : Congenital Disease, Pathogen and Vector. 3

29. What are antibiotics? What is the mechanism of action of antibiotics? 3
30. Calculate: 3
- a) The number of molecules of sulphur ( $S_8$ ) in 16g of solid sulphur.  
b) The number of moles present in 9.8g of sulphuric acid.  
(Given Atomic mass: H = 1u, S = 32u, O =16u)
31. Write the chemical formulae of the following: 3
- a) Aluminium sulphate  
b) Calcium hydrogen carbonate  
c) Ammonium phosphate
32. During an experiment the students were asked to prepare 10% mass by mass solution of sugar in water. Rahul dissolved 10g of sugar in 100g of water while Sam prepared it by dissolving 10g of sugar in water to make 100g of the solution. 3
- (a) Are the two solutions of the same concentration?  
(b) Compare the mass % of the two solution.  
(c) What do you mean by saturated solution?
33. (a) An object moves on a circular path of radius  $r$ . What will be the displacement when it completes one revolution? 3
- (b) Give the name of physical quantity that corresponds to the rate of change of velocity.
- (c) Why is the motion in a circle with constant speed called accelerated motion?

#### SECTION –D

34. (i) The atom of an element has 11 protons, 11 electrons and 12 neutrons. 5
- a) Write the atomic number and name of the element.  
b) Calculate the mass number of the element.  
c) Write its electronic configuration.  
d) Predict the valency of the element.  
e) Write the formula of its ion with sulphate.
- (ii) What are the drawbacks of Rutherford's model of an atom?
- (OR)**
- (i) Give reasons for the following:
- a) Ions are more stable than atoms.  
b) An atom is electrically neutral.  
c) Inert gases show least reactivity.
- (ii) Chlorine occurs in nature in two isotopic forms with masses 35u and 37u in the ratio of 3:1. Calculate the average atomic mass of chlorine atom on the basis of this data.

35. i) State any two differences between bone and cartilage. 5  
ii) State any two functions of areolar tissue.  
iii) Name the tissues for the following:  
(a) Stores fat in animal body.  
(b) Tissue that joins bone to bone.  
(d) Covers the external surface of animal body.

**(OR)**

- i) What is stomata?  
ii) Why does epidermal tissue have no intercellular space?  
iii) Give difference between ligament and tendon.  
iv) Why is blood called connective tissue?  
v) Name the different types of simple tissues of plants.
36. (a) Define kinetic energy 5  
(b) A body of mass 2 kg is thrown up at a velocity of 10 m/s. Find the kinetic energy of the body at the time of throw.  
(c) Find the potential energy at the highest point. The value of  $g = 10 \text{ m/s}^2$ .

**(OR)**

- (a) Define power.  
(b) Two bodies of equal masses move with uniform velocities  $v$  and  $3v$  respectively. Find the ratio of their kinetic energies  
(c) An electric heater is rated 1500 W. How much energy does it use in 10 h?