Sample Question Paper - 2
Class- IX Session- 2021-22
TERM 2
Subject- Science

Time Allowed: 2 hour **Maximum Marks: 40**

General Instructions :

(i) *All questions are compulsory.*

(ii) *The question paper has **three sections** and **15 questions.** All questions are compulsory.*

(iii) *Section–A has 7 questions of 2 marks each; Section–B has 6 questions of 3 marks each; and Section–C has 2 case based questions of 4 marks each.*

(iv) *Internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.*

Section - A

(2 Marks each)

1. Sum of the total number of protons and neutrons present in the nucleus of an atom is the mass number of an atom while, total number of protons present in the nucleus of an atom is its atomic number. The table below shows the mass number and the atomic number of certain elements named C, D and E. Study the given data and answer the following questions:

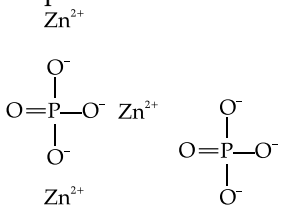
Elements	Mass No.	Atomic No.
C	14	7
D	40	18
E	40	20

(a) Which element is a noble gas?

(b) Which two elements are isobars? **2**

2. Zinc ion and phosphate ion together constitute compound "A". AI **2**

(a) Write the chemical formula for compound "A".



Compound A

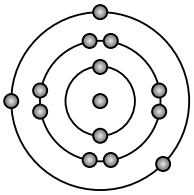
(b) Calculate the ratio by mass of atoms present in a molecule of carbon dioxide. [Given : C = 12, O=16]

2

3. An atom of an element has three electrons in its 3rd orbit, which is the outermost shell. Write:

(a) **(i)** the electronic configuration **(ii)** atomic number

(b) **(i)** number of protons **(ii)** valency



2

4. During a health survey in a locality, it was found that some children fall ill more frequently than others living in the same locality. **2**

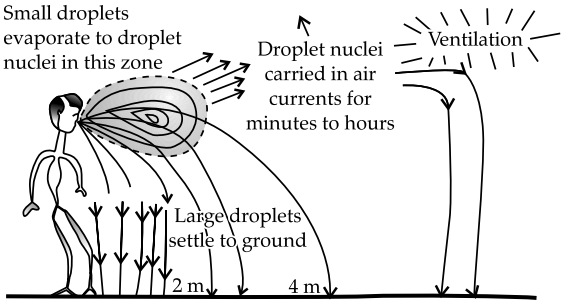
(a) Is this a sign of good immune system? Explain.

(b) Is this a sign of good personal hygiene? Justify your statement.

5. A person suffering from disease 'X' cannot fight even minor infections as it damages the immune system. It is mainly transmitted through sexual contacts with infected person. Identify the disease and state its causative agent. **2**

OR

Study the picture and answer the following questions: **2**



(a) Identify the mode of transmission of the disease in the above picture.

(b) Which of the following diseases could be spread by this mode of transmission: Common cold/ cholera?

6. Students of class IX visited a thermal power station as a part of their project. They came to know about how the conversion of energy takes place. Teacher has asked them to find the answers for conversion of energy in following cases: **2**

(a) When coal is burnt.

(b) In a thermal power plant.

OR

The physical quantity 'X' is defined as rate of doing work.

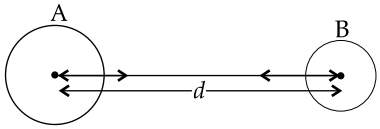
(a) Identify the quantity. State its SI unit.

(b) An electric bulb is rated 15 watts. What does it mean?.

7. Force is the push or pull upon an object which results due to its interaction with another object. This force is directly proportional to the mass of the object on which it acts. Depending on these facts, teacher has asked Rajat to explain what will happen to the force between two objects A and B if: **2**

(a) The mass of one object is doubled?

(b) The distance between the objects is tripled? Help Rajat to find the answers.



OR

The given table shows value of 'g' at equator and at poles. It is seen that it differs at the equator and on poles.

Position on the Earth	Value of 'g'
At equator	9.78 m/s^2
At poles	9.83 m/s^2

Name the positions on the Earth where the value of 'g' is (i) maximum (ii) minimum. State the reason for this difference. AI **2**

Section - B

(3 Marks each)

8. As a part of practical examination paper, Nisha has to classify the following elements on the basis of their valencies. But she could not recollect what is valency and what is cation. Help her to answer the below questions. **3**

(a) Define valency.

(b) Define cation.

(c) Classify the following cations on the basis of their valencies : NH_4^+, Al^{+++}

9. Write the chemical formulae of the following : **3**

(a) **(i)** Aluminium nitrate **(ii)** Magnesium hydrogen carbonate.

(b) Give the names of the elements present in the following compounds:

(i) Quick lime

(ii) Hydrogen bromide

OR

During an experiment performed in a laboratory, 14 g of sodium bicarbonate was allowed to react with 10 gm of acetic acid. After the reaction was completed, it was found that only 16.67 g of the solution was left because a gas escaped from the container. **3**

(a) What was the mass of the gas that escaped into the atmosphere?

(b) Name and state the law applied to find the answer.

10. Given that the percentage abundance of the isotope $_{10}Ne^{20}$ is 90% and that of isotope $_{10}Ne^{22}$ is 10%. Calculate the average atomic mass of Neon. **3**

11. **(a)** From the symbol $_{16}S^{32}$ state:

(i) Atomic number of sulphur

(ii) Mass number of sulphur

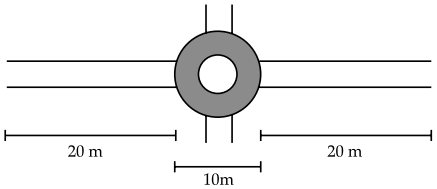
(iii) Electronic configuration of sulphur

(b) Which of the two elements given below would be chemically more reactive, 'X' of atomic number 18 or element 'Z' of atomic number 16 and why? **3**

12. Find the momentum of a body of mass 100 g having kinetic energy 500 J. AI **3**

OR

A boy is pulling a cart by supplying a constant force of 8 N on a straight path of 20 m. On a round about of 10 m diameter he forgets the path and takes $1\frac{1}{2}$ turns and then continues on the straight path for another 20 m. Find the net work done by the boy on the cart.



AI **3**

13. Weight is the force by which an object is attracted towards the earth. A man's weight when taken at the poles is 600 N. **3**

(a) Will his weight remain the same when measured at the equator?

(b) Will there be an increase or decrease in his weight? Explain.

Section - C

(4 Marks each)

14. Read the passage and answer the following questions.

We know that food is necessary for the growth and development of the body. It provides the necessary components such as proteins, carbohydrates and fats which are required for proper functioning of the body.

Justify the following statements:

(a) "Availability of proper and sufficient food would prevent from infectious diseases". **1**

(b) Balanced diet is necessary for maintaining healthy body. **1**

(c) Health of an organism depends upon the surrounding environmental conditions. AI **2**

OR

Our surrounding areas should be free of stagnant water. **2**

15. Since, Work is done when a force acting on a body produces displacement in it. Work done = Force × Displacement in the direction of force. If four men lift a 250 kg box to a height of 1 m and hold it without raising or lowering it.

(a) How much work do they do in just holding it? **1**

(b) Why do they get tired while holding it? **1**

(c) How much work is done by the men in lifting the box? **2**

OR

Define the work done by a constant force. Write its SI unit and define this unit. **2**

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Solution

Section - A

(2 Marks each)

1. **(a)** The atomic number of element D is 18. So, it's electronic configuration will be 2, 8, 8. The outermost shell is complete, so, it is a noble gas. **1**

(b) The elements having different atomic numbers but same mass numbers are called isobars. Element D and E both have same mass number *i.e.*, 40 but different atomic number. **1**

Commonly Made Error

- Students often confuse in isotopes and isobars and write wrong explanation.

Answering Tip

- Elements of same mass number are isobars whereas elements of same atomic number are isotopes.

2. **(a)** Symbol : Zn PO_4

Charge: $+2$ -3

Chemical formula: $Zn_3(PO_4)_2$ **1**

(b) Atoms of carbon = 1

Mass or carbon = 12 u

Atoms of oxygen = 2

Mass of oxygen = $2 \times 16 = 32$ u

Thus, the ratio by mass of constituting elements in carbon dioxide is mass of carbon to the mass of oxygen atoms:

12 : 32

3 : 8 **1**

3. **(a)** **(i)** Electronic configuration: 2, 8, 3

(ii) Atomic number: 13

(b) **(i)** Number of protons: 13

(ii) Valency: 3 **½×4**

[CBSE Marking Scheme, 2011]

Commonly Made Error

- Students often overlook the sub parts of question.

Answering Tip

- Avoid being in a hurry and read the question carefully.

4. **(a)** No, it is not a sign of good immune system. Only some children fall ill means they have less resistance to diseases which is due to poor immune system. **1**

(b) No, personal hygiene is important to develop resistance against diseases. If the children are falling ill frequently, it means that they might be neglecting health and hygiene. **1**

5. **Name of the disease:** Acquired immuno-deficiency syndrome (AIDS). **1**

Causative agent: Human immuno-deficiency virus (HIV). **1**

OR

(a) Mode of transmission - Air **1**

(b) Through air - Common cold or cough may occur as these are communicable diseases which spread through air. **1**

6. **(a)** Chemical energy is converted to heat energy. **1**

(b) Chemical energy of fuel is converted to electrical energy. **1**

OR

(a) Power is the rate of doing work. Hence the quantity "X" is power. Its SI unit is Watt. **1**

(b) If the power of an electric bulb is 15 W, it consumes 15 joules per second. **1**

7. Force due to gravitational pull, $F = Gm_1m_2/d^2$, As force is directly proportional to masses

and inversely proportional to the square of distance between them, then

(a) If $m_1 = 2m$, then F becomes twice.

(b) If $d = 3d_1$, then F becomes one-ninth. **2**

OR

On earth, value of g is maximum at poles and minimum at the equator. **1**

At poles, radius of earth is less so the value of g is more than on equator, at equator radius of earth is more so, value of g is less. It is because, $g \propto 1/(R^2)$ **1**

Section - B

(3 Marks each)

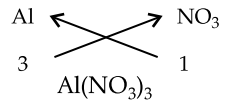
8. **(a)** The combining power (or capacity) of an element to displace or combine with number of hydrogen atoms is known as its valency. **1**

(b) Cation- Ion with positive electric charge. **1**

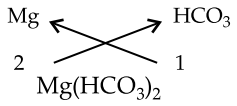
(c) $NH_4^+ \rightarrow$ Monovalent

$Al^{+++} \rightarrow$ Trivalent ½+½

9. **(a)** **(i)**



(ii)



1+1

(b) **(i)** Calcium and oxygen (CaO) ½

(ii) Hydrogen and bromide (HBr) ½

Commonly Made Error

- Most of the students write incorrect chemical formulas as they are not clear about the valency of the various elements.

Answering Tip

- Students should learn the valency of all the important elements with the help of a chart.

OR

(a) Mass of the gas that escaped into the atmosphere = 24 – 16.67 = 7.33 gm **1**

(b) The law applied was the law of conservation of mass. The law states that matter can either be created nor destroyed or mass of reactants is always equal to that of product. **2**

10. Average atomic mass is given by:

$$20 \times \frac{90}{100} + 22 \times \frac{10}{100}$$

$(18 + 2.2)u = 20.2u$ **3**

11. **(a)** **(i)** 16 **(ii)** 32 **(iii)** $_{16}S = 2, 8, 6$ ½+½+½

(b) Z is more reactive than X.
This is because, electronic configuration of Z = 2, 8, 6 which may gain 2 electrons and thus is more reactive whereas X = 2, 8, 8 has complete octet and is inert. **1½**

[CBSE Marking Scheme, 2015]

12. Using the formula for K.E. we get,

$$\text{K.E.} = \frac{1}{2}mv^2$$

$m = 100\ g = 0.1\ kg$

$\text{K.E.} = 500\ J$

$$v^2 = \frac{2 \times 500}{0.1} = 10000$$

$v = 100$ m/s

Momentum = Mass × Velocity

= 0.1 × 100 = 10 kg m/s **3**

[CBSE Marking Scheme, 2015]

OR

Work done, F = 8N

$W = F \times s$

$W_1 = 8 \times 20 = 160\ J$

$D = 10$ m

So, radius $r = \frac{D}{2} = 5$ m

Circumference of a circle $= 2\pi r$

$= 2 \times 22/7 \times 5$ m

= 31.43 m

Distance in 1/2 circle $= \pi r$ **1**

$= 22/7 \times 5 = 15.71$ m

Total distance covered in 1½ circle

= 31.43 + 15.71 = 47.14 m

Therefore, work done will be,

$W_2 = F \times s = 8 \times 47.14 = 377.12\ J$

Again travelling for 20 m, work done will be,

$W_3 = 20 \times 8 = 160\ J$ **1**

Total work done = 160 + 377.12 + 160

= 697.12 J **1**

13. **(a)** No, his weight will not remain same as that at the poles. **1**

(b) There will be a decrease in his weight at the equator. As the radius of the earth increases from the poles to the equator, the value of 'g' becomes greater at poles decreasing towards equator. Also, the force of gravity decreases from poles to the equator. **2**

Section - C

(4 Marks each)

14. **(a)** Availability of proper and sufficient food is one of the measure to prevent the occurrence of the infectious diseases. As the infectious diseases also spread through the food we eat; thus, if we obtain healthy and nutritious food, free of germs causing diseases, it would definitely prevent us from catching the infection. **1**

(b) Yes, balanced diet provides raw materials and energy in appropriate amount in the form of protein, carbohydrates, fats, minerals, etc., which, in turn, are essential for the proper growth and functioning of the healthy body. **1**

(c) Yes, health is a state of being well enough to function well physically, mentally and socially, and these conditions depend upon the surrounding environmental conditions. e.g., if there is an unhygienic condition in the surrounding area, it is likely we might get infected or diseased. **2**

OR

Yes, this is so because many water-borne diseases and insect vectors flourish in stagnant water which causes diseases in human beings. **2**

Commonly Made Error

- Mostly students fail to justify the given statement because they write irrelevant and repeated points. Also, many of them write the answer in essay form rather than points.

Answering Tip

- Students should understand what is being asked in the question. They should always write the answer point wise and each point must reflect a separate idea. They should also remember, not to repeat the same point in different words.

15. **(a)** Work done will be zero because the box does not move. So, the displacement is zero that's why work done is zero. **1**

(b) In holding the box, men are applying a force which is opposite and equal to the gravitational force acting on the box. While applying the force, muscular effort is involved. So, they feel tired. **1**

(c) Given, Mass, $m = 250$ kg,
Height, $h = 1$ m
Acceleration due to gravity, $g = 10$ m/s
Work done by the man in lifting the box
=Potential energy of box **2**
$W = mgh$
On putting the values,
$W = 250 \times 1 \times 10 = 2500$ J

OR

Work is said to be done when a force acts on an object and the object covers some distance. Its SI unit is Joule. Joule is equal to the work done by a force of one newton acting through one meter. **2**

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