Summative Assessment - II
Class IX (SCIENCE-03)

Time: 3½ hours **M.M.: 90**

Test instructions:General Instructions:
i) The question paper comprises of two sections, A (Question No. 1 to 24)and B (Question No. 25 to 42), you are to attempt both the sections.
ii) All questions are compulsory.
iii) There is no overall choice. However, internal choice has been provided in all the five questions of five marks category. Only one option in such questions is to be attempted.
iv) All questions of section A and all questions of section B are to be attempted separately.
v) Question numbers1 to 3 in section A are one mark question. These are to be answered in one word or one sentence.
vi) Questions numbers 4 to 7 are two marks questions, to be answered in about 30 words.
vii) Question numbers 8 to 19 are three marks questions, to be answered in about 50 words.
viii) Question numbers 20 to 24 are five marks questions, to be answered in about 70 marks.
ix) Question numbers 25 to 42 in section B are multiple choice questions are based on practical skills. Each question is a one mark question. You are to choose one most appropriate response out of the four provided to you.

Questions:

1] When an object moves on a circular path, what is the work done? [Marks:1]

2] What do the following abbreviations stands for?
(a) 2O
(b) O_2 [Marks:1]

3] What is the percentage of nitrogen and oxygen in the air? [Marks:1]

4] Give any two important applications of Archimedes' principle. [Marks:2]

5] (a) Identify any two features possessed by Chordates.
(b) In which class would you place an organism which has:
(i) A scaly exoskeleton and a bony endoskeleton.
(ii) A scaly exoskeleton and lay eggs outside water. [Marks:2]

6] (a) What is the advantage of classifying organisms?
(b) Why some organisms are considered diploblastic? [Marks:2]

7] What are the two types of natural resources? Define and give an example of each. [Marks:2]

8] (a) A stone of mass 2 kg is falling from rest from the top of a steep hill. What will be its kinetic energy after 5 s?
(b) Write an expression for the work done when a force is acting on an object in the direction of its displacement. [Marks:3]

9] (a) Why is sound wave called a longitudinal wave?
(b) A bat can hear sound at frequencies upto 120 kHz. Determine the wavelength of sound in air at this frequency. Take the speed of sound in air as 344 m/s. [Marks:3]

10] (a) Give any two characteristics of wave motion.
(b) Write any two examples of electromagnetic waves. [Marks:3]

11] In which of the following cases will the work done by a force be maximum; when the angle between the direction of force and displacement is (i) zero or (ii) 90^o? [Marks:3]

12] Why sound waves are called mechanical waves? Why is a loud sound heard at resonance? [Marks:3]

13] (a) Hydrogen and oxygen combine in the ratio of 1:8 by mass to form water. What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas? [Marks:3]
(b)Write the molecular formula of a diatomic gas and a triatomic gas.

14] (a) How many grams of chlorine are contained in one mole of chlorine? (Gram atomic mass of Chlorine = 35.5 g) [Marks:3]
(b) How many molecules are there in 1 g of chlorine?

15] (a) Electron in an atom moves from K to L- shell. Will the energy be absorbed or evolved? [Marks:3]
(b) Give one achievement and one limitation of Thomson's model.

16] (a) State any two conditions essential for good health.
(b) How are antibiotics effective in the treatment of some diseases? [Marks:3]

17] (a) How cholera is spread through water?
(b) Name the primary and secondary host of the pathogen that causes malaria. [Marks:3]

18] (a) What do you mean by immunization?
(b) List two disadvantages of treatment of a disease. [Marks:3]

19] (a) What are fungi? Why are they referred to as saprophytes?
(b) What is the function of cnidoblasts cells in Hydra? [Marks:3]

20] (a) Explain the work done by the person in the following conditions.
(i) When he is standing at a place holding a suitcase in his hand.
(ii) When he is moving holding the suitcase in his hands.
(b) A certain household has consumed 250 units of energy during a month. How much energy is this in Joules? [Marks:5]

Or

(a) Describe the law of conservation of energy by giving two examples.
(b) Calculate the work done in lifting 200 kg of water through vertical height of 6 m (assuming g = 10 m/s^2)

21] (a) What is buoyancy ? What is the condition for floatation?
(b) What are the factors on which buoyant force depends? [Marks:5]

Or

Explain with examples to illustrate that sound wave is produced by vibrating objects.

22] (a) In Rutherford's experiment, how was it shown that an atom has a lot of empty space within it?

(b) Why is the nucleus of an atom positively charged?

(c) Calculate the valency of chlorine, sulphur and magnesium?

Atomic number of chlorine = 17, sulphur = 16, magneisum = 12

Or

(a) Oxygen has three isotopes of atomic masses 16, 17 and 18 respectively. Explain the following: [Marks:5]

(i) They have same chemical properties.

(ii) They are all electrically neutral.

(b) Name the isotopes of hydrogen.

(c) Give one point of similarity and one point of difference between isotopes $^{14}_{6}C$ and $^{12}_{6}C$?

23] (a) Define water cycle.

(b) Draw water cycle in nature giving neat and labeled diagram.

(c) (i) What is nitrogen fixation?

(ii) What is the effect of oxygen on nitrogen?

Or [Marks:5]

(a) Write the importance of carbon cycle in nature. List any two points.

(b) What are the factors on which the cycling of an element or substance depends?

(c) Nitrogen cycle is called a perfect cycle in nature. Explain.

24] (a) Define the following terms:

(i) Lichens

(ii) Cryptogamae

(iii) Phanerogams

(b) Why whales are not grouped in the fishes?

(c) What is bilateral symmetry?

Or [Marks:5]

(a) Give reasons for the following:

(i) Bryophytes are called amphibians of plant kingdom.

(ii) From Phylum Platyhelminthes onwards, animals are categorized as 'triploblastic'.

(iii) The presence of 'coelom' in an animal's body is considered as advantageous.

(b) What are oviparous animals?

(c) Name the phylum in which pharyngeal gill slits are present.

25] In which of the following gases is the sound speeds maximum? [Marks:1]

A. Air

B. Carbon-dioxide
C. Helium
D. Hydrogen

26] In a spring balance the space between 0 and 25 g marks is divided into 10 equal parts. The least count of spring balance is: [Marks:1]

A. 25 g wt
B. 0 g wt
C. 15 g wt
D. 2.5 g wt

27] The common spring balance is used in science laboratories measures the weight of body suspended from its lower hook in: [Marks:1]

A. Kg wt
B. dynes
C. newtons
D. g wt

28] Volume of a glass topper is 12.5 cm^3 and its density is 2.4 g cm^{-3} . To weigh it we shall prefer a spring balance of range: [Marks:1]

A. 25 g
B. 250 g
C. 1000 g
D. 100 g

29] In a graduated measuring cylinder there are four additional marks between 0 ml and 5 ml marks. Using this measuring cylinder we can find volume to an accuracy of: [Marks:1]

A. 4 ml
B. 1/4 ml
C. 1/5 ml
D. 1 ml

30] Thrust exerted by an iron cuboid when placed on sand is equal to [Marks:1]

A. mass of cuboid
B. weight per unit surface area
C. mass per unit surface area
D. weight of cuboid

31] S.I unit of pressure is [Marks:1]

A. N m

B. N m^2

C. N/m

D. N/m^2

32] The linear distance between two consecutive centers of compressions in a sound wave is known as [Marks:1]

A. Amplitude

B. Frequency

C. Wave velocity

D. Wave length

33] In the experiment for the verification of law of conservation of mass, along with Barium chloride ,which of the following reagent can be used. [Marks:1]

A. Sodium carbonate

B. Sodium chloride

C. Copper sulphate

D. Sodium sulphate

34] What is the chemical formula of the precipitate formed in the experiment? [Marks:1]

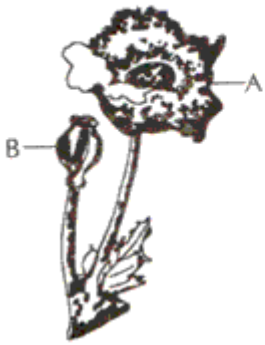
A. Na_2SO_4

B. $BaCO_3$

C. $BaCl_2$

D. $BaSO_4$

35] A student carefully observes the parts labeled A and B in the given diagram and classifies the plant correctly as:



[Marks:1]

A. A bryophyte

B. A pteridophyte

C. A gymnosperm

D. An angiosperm

36] Earthworm has an unsegmented band called [Marks:1]

A. Cephalothorax
B. Thorax
C. Metathorax
D. Clitellum

37] Which of the following belongs to thallophyta? [Marks:1]

A. Pinus
B. Fern
C. All of them
D. Spirogyra

38] Cell wall of Agaricus is made up of: [Marks:1]

A. Cellulose
B. Protein and fat
C. Lignin
D. Chitin

39] Body of the bony fish does not show gills as they are covered by [Marks:1]

A. Scales
B. Fins
C. Skin
D. Operculum

40] The number of wings in cockroach is [Marks:1]

A. Two
B. Six
C. None
D. Four

41] Forelimbs in birds are: [Marks:1]

A. Absent
B. Rudimentary
C. Only hind limbs are present
D. Modified into wings

42] Which animal belongs to phylum Arthropoda?

A

B

C

D

[Marks:1]

A. A
B. B
C. C
D. D

ANSWER SHEET OF CLASS IX CBSE SCIENCE -03

1] Work done is zero, because displacement is perpendicular to the direction of force always.

2] (a) Two atoms of oxygen.
(b) One molecule of oxygen.

3] (i) Nitrogen 78%
(ii) Oxygen 21%

4] (i) It helps in designing motorboats, ships and submarines.
(ii) Working of lactometer and hydrometer is based on Archimedes' principles

5] (a) (i) Presence of notochord or dorsal nerve chord.
(ii) They are triploblastic and are coelomate.
(b) (i) Class Pisces.
(ii) Class Reptilia.

6] (a) There is very large number of organisms and it is very difficult to study them individually, so classification enables us to deal with enormous diversity of life in an arranged manner.
(b) The body of some animals is made up of two layers of cells, one makes up the cells on the outside of the body and the other makes the inner linning of the body, so these animals are considered diploblastic.

7] The two types of natural resources are:
(a) Exhaustible resources - The resources which take millions of years to be formed and are depleted at a faster rate due to consumption by human beings are called exhaustible resources.
Examples - coal, petroleum. (Any one)
(b) Inexhaustible resources - The resources which are recycled easily and can be replenished in a very short duration of time are called inexhaustible resources. These are present in unlimited quantity in nature.
Examples - water, air (Any one)

8] (a) Here mass of stone m = 2 kg, intial velocity of stone u = 0 and time = 5 s

$\therefore$ Velocity of stone after 5 s, $v = u + gt$

$= 0 + 9.8 \times 5 = 49$ m s-1

$\therefore$ Kinetic energy of stone $Ek = \frac{1}{2} mv2$

$= \frac{1}{2} \times 2 \times (49)2 = 2401$ J

(b) If force acting is F and displacement in the direction of force is s, than

Work done = force x displacement

$W = F \times s$

9] (a) Sound wave is called a longitudinal wave because it propagates in air through compressions and rarefactions.

(b) Given, $\nu = 120$ kHz $= 120000$ Hz

$v = \nu \lambda$

$344 = 120000 \times \lambda$

$\lambda = 344/120000 = 0.000287$ m

0.287 cm.

10] (a) Characteristics of wave motion.
(i) Wave motion is a periodic disturbance which is produced by a vibrating object.
(ii) In wave motion, due to disturbance the particles of the medium vibrates along with its mean position, but do not leave their position.
(b) Radio waves and light waves.

11] The work done is given by the formula

$W = F s \cos \theta$

Case (i) when $\theta = 0°$

$W = F s (\cos 0°)$

$W = F s (1) = F s$

Case (ii) when $\theta = 90°$

$W = F s (\cos 90°)$

$W = F s (0) = 0$

Therefore, in first case when the angle between direction of force and displacement is zero the work done will be maximum.

12] Sound waves are called mechanical waves because a material medium is required for propagation of sound.
During resonance, the amplitude of the vibrating particles increases because a compression falls over a compression and a rarefaction falls over a rarefaction. As intensity of sound is directly proportional to the square of amplitude, maximum sound is heard.

13] (a) 1g of hydrogen reacts with oxygen = 8 g
: 3 g of hydrogen reacts with oxygen = 8 x 3 = 24 g
Hence, mass of oxygen required is 24 g.
(b) Diatomic gas: O_2
Triatomic gas: O_3

14] (a) Gram molecular mass of chlorine = 2 x 35.5 = 71 g
One mole of chlorine will weigh mass = Gram molecular mass = 71g
(b) Gram molecular mass of chlorine will contain = 6.022×10^{23} molecules
71 g of chlorine will contain = 6.022×10^{23} molecules
1 g of chlorine will contain = $\frac{6.022 \times 10^{23}}{71}$ molecules
$= 8.48 \times 10^{21}$ molecules of chlorine

15] (a) The energy is absorbed.
(b) Achievement of Thomson's model:
It explained the electrical neutrality of the atom.
Limitation of Thomson's model:
It failed to explain how the positive and negative charges were arranged in an atom so close to each other.

16] (a) (i) Better social environment.
(ii) Better public cleanliness.
(b) Antibiotics block the biochemical pathways of bacteria due to which they are not able to make their cell walls and they die. This helps in curing bacterial diseases.

17] (a) The water borne diseases occur if the excreta from someone suffering from an infectious gut disease, such as cholera, get mixed with the drinking water used by people living near by. The cholera causing microbes will enter new hosts through the water they drink and cause disease in them. Such diseases are much likely to spread in the absence of safe supplies of drinking water.
(b) (i) Primary host is Human being.
(ii) Secondary host is Mosquito.

18] (a) Immunization is a process of inoculation of substance into a healthy person in order to develop immunity against the disease.
(b) Disadvantages of principle of treatment.
• A person gets bedridden due to which his or her work gets affected.
• Person becomes source of infection for others also.

19] (a) (i) Fungi are hetrotrophic eukaryotic organisms.
They use decaying organic material as food and are therefore, called saprophytes.
(b) Cnidoblasts are the special stinging cells present on the tentacles of Hydra which helps in capturing its prey.

20] (a) (i) When the person is standing at a place holding the suitcase, so there is no change in the position of man or suitcase.
So, displacement (s) = 0
W = F x s = F x 0 = 0

(ii) When the person is moving holding the suitcase in his hand, he applies force in upward direction and displacement of suitcase is in forward direction that is perpendicular to the direction of force applied.

So, $\theta = 90°$
$\therefore W = F \times s \cos\theta$
$= F \times s. \cos 90° = 0$
Hence work done on the suitcase is Zero.

(b) Energy consumed = 250 units = 250 kWh
1 kWh = 3.6×10^6 J
$\therefore$ 250 kWh = $250 \times 3.6 \times 10^6$
$= 9 \times 10^8$ J.

Or

(a) According to law of conservation of energy:
"Energy remains conserve during its transformation from one form to other" or in other words "during transformation of energy, energy is neither created nor destroyed"

Examples- When we lift a stone to a vertical height h from earth surface, stone gains a potential energy equal to mgh, but we lose some amount of energy.

When a person kicks a ball, it gets some velocity or kinetic energy, the amount of energy gained by ball is equal to amount of energy lost by man.

(b) Given, mass of water (m) = 200 kg
Height (h) = 6 m
$\therefore$ weight of water (mg) = 200 x 10 N
$\therefore$ work done = mg x h
= 200 x 10 x 6 J
= 12000 J

21] (a) The tendency of a liquid or gas to push an object immersed in it upward with some force(called upthrust or buoyant force) is called buoyancy.
An object floats on the surface of a liquid if the weight of the object is equal to buoyant force acting on it.
Weight of object = Weight of liquid displaced by the immersed part of the object.
(b) The buoyant force depends upon the following two factors:
1. The volume of object immersed in fluid.
2. The density of fluid in which the object is immersed.

Or

Sound wave is a kind of energy which is produced due to vibrations. When the vibration stops, the sound also stops.
This can be illustrated by the following examples:
1. The sound in a sitar or guitar is produced by the vibrations of the stretched strings.
2. The sound of a drum is produced by the vibrations of their skin or membranes when struck.
3. The sound of a flute is produced by the vibration of the air enclosed in the flute tube.
4. the sound in the radio or television is produced by the vibration of the thin cone of the speaker.
5. When a bird flaps its wings, it produces vibrations in air and we hear sound.
6. A stretched rubber band when plucked vibrates and produces sound.

7. The underwater sound waves produced in submarines are produced by the vibrations in their propellers.
8. the sound of our voice is produced by the vibrations of two vocal chords in our throat, caused by air coming from the lungs.
(Any five)

22] (a) When the α - particles are allowed to strike a very thin gold foil, it is found that most of these particles pass through the foil without any deflection. This shows that there is a lot of empty space within the atom.

(b) The nucleus of an atom contains protons and neutrons. Protons are positively charged and neutrons are neutral. Thus, because of the presence of positively charged protons, the nucleus of an atom is positively charged.

(c) Atomic number of chlorine is 17.

Electronic configuration is 2, 8, 7

So, it has 7 electrons in its outer most shell and it requires one electron to complete its octet.

So its valency is 1.

Atomic number of sulphur is 16.

Electronic configuration of is 2, 8, 6

So, it requires 2 electrons to complete its octet.

Hence, its valency is 2.

Atomic number of magnesium = 12

Electronic configuration of magnesium is 2, 8, 2
It has to give two electrons to complete its octet.

Hence, its valency is 2.

Or

Or,

(a) (i) Mass numbers of isotopes of oxygen are different, i.e. 16, 17 and 18 but they have same atomic number 8.

Thus, the number of electrons is same.
Therefore, they have same the electronic configuration 2, 6 and same number of valence electrons.

So, their chemical properties are same.

(ii) They are electrically neutral because number of negatively charged electrons is same to the number of positively charged protons.

(b) There are three isotopes of hydrogen-

(i) Protium (ii) Deuterium (iii) Tritium

(c)One point of similarity between isotopes $^{14}_{6}C$ and $^{12}_{6}C$:

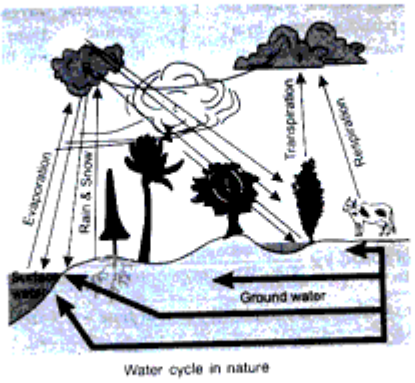
They have the same number of protons.

One point of difference between isotopes $^{14}_{6}C$ and $^{12}_{6}C$:

They have different number of neutrons.

23] (a) Water cycle is the movement of water from water bodies to atmosphere, precipitation and flow of water back to water bodies.

(b)



Water cycle in nature

(c) (i) Nitrogen fixation is the process of conversion of atmospheric nitrogen into nitrates.

(ii) Nitrogen fixation cannot take place in the presence of oxygen.

Or

(a) Importance of carbon cycle in nature:

(i) It provides carbon in the form of carbon dioxide which is used to synthesize food item, so carbon material to animals is provided by this cycle.

(ii) It maintains the level of carbon dioxide in nature or atmosphere that maintains the suitable temperature on earth surface.

(b) Cycling of an element or substance depends on the following factors:

(i) The source.
(ii) The form of availability.
(iii) The form in which an element is released back to the nutrient pool.
(Any two)

(c) Nitrogen cycle is considered as the perfect cycle in nature because overall amount of nitrogen in atmosphere and water bodies is maintained.
Use of chemical fertilisers also maintains its concentration in the biosphere. Nothing is lost, hence nitrogen cycle is considered as a perfect cycle.

24] (a) (i) Lichens: Some fungal species live in permanent mutually dependent relationships with blue-green algae. Such relationships are called symbiotic and the symbiotic life forms are called lichens.

(ii) Cryptogamae: The reproductive organs of the thallophytes, the bryophytes and the pteridophytes are very inconspicuous and are therefore, called 'cryptogamae'. It means the plants with 'hidden reproductive organs'.
(iii) Phanerogams: The plants with well differentiated reproductive tissues that ultimately make seeds are called 'phanerogams'.
(b) Whales can swim in water like the fishes but are not fish as they respire with lungs and have four chambered heart and mammary glands, so they are mammals.
(c) When the body of an organism can be cut into two similar halves which are mirror image of each other, only by one plane then the organism is said to have bilateral symmetry.
Or
(a) (i) Just like amphibians, bryophytes require water for fertilization as their gametes require aqueous medium for movement.
(ii) There are three layers of cells from which differentiated tissues can be made. This allows inside and outside body linings as well as some organs to be made. There is thus some degree of tissue formation.
(iii) Coelom is a true internal body cavity in which well-developed organs can be accommodated.
(b) The animals which lay eggs are known as oviparous animals.
(c) Chordata.

25] Hydrogen

26] 2.5 g wt

27] g wt

28] 100 g

29] 1 ml

30] weight of cuboid

31] N/m^2

32] Wave length

33] Sodium sulphate

34] $BaSO_4$

35] An angiosperm

36] Clitellum

37] Spirogyra

38] Chitin

39] Operculum

40] Four

41] Modified into wings