CBSE Sample Paper -01 (solved)
SUMMATIVE ASSESSMENT –II
SCIENCE (Theory)
Class – IX

Time allowed: 3 hours Maximum Marks: 90

General Instructions:

a) All questions are compulsory.
b) The question paper comprises of two sections, A and B. You are to attempt both the sections.
c) Questions 1 to 3 in section A are one mark questions. These are to be answered in one word or in one sentence.
d) Questions 4 to 6 in section A are two marks questions. These are to be answered in about 30 words each.
e) Questions 7 to 18 in section A are three marks questions. These are to be answered in about 50 words each.
f) Questions 19 to 24 in section A are five marks questions. These are to be answered in about 70 words each.
g) Questions 25 to 27 in section B are two marks questions based on practical skills. These are to be answered in about 30 words each.
h) Questions 28 to 36 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to select one most appropriate response out of the four provided to you

Section A

1. Name the two elemental forms of carbon.
2. State the phylum to which centipede and prawn belong.
3. Identify the energy possessed by a running athlete.
4. Calculate the mass of 3.011×10^{23} number of N atoms [given atomic mass of nitrogen= 14u]
5. What are gymnosperms? Give two characteristics.
6. A ball of mass 2kg is dropped from a height. What is the work done by its weight in two seconds after the ball is dropped?
7. A. Explain Bohr and Bury rules for distribution of electrons into different shells.

   B. Draw the electronic structure of element X with atomic number 17 and element Y with atomic number 16?
8. Which of the following are isotopes and which are isobars?

   Argon, Protium, Calcium, Deuterium. Explain why isotopes have similar chemical properties but they differ in physical properties?

9. State the appropriate terms for the following:
   a. Plants which bear seeds with two cotyledons.
   b. Animals which do not have coelom.
   c. Edible fungi
10. Why is there need for systematic naming of living organisms? Write four conversations that are followed while writing scientific names of the species.
11. Differentiate between a plant and an animal.
12. Why are local names not sufficient to recognize the organisms? What are the advantages of keeping names?
13. Mention the commercial unit of energy. Express it in terms of joules. Calculate the energy in joule consumed by a device of 60W in 1 hour.
14. Explain the working of SONAR.
15. **One day it was raining heavily. Sagar was very fond of making paper boats so decided to make them and started playing with it in the water pool at road side. He then got his toys and dolls and made them boat riders. The boat sank in water but he did not lose his courage. He made another boat and used lighter toys as passengers and this time boat did not sink in water.**

a. Which force is exerted by water on objects immersed in it?

b. Why did the boat sink when loaded with doll?

c. What qualities are shown by Sagar?

16. State the relationship between frequency and time period of a wave. The wavelength of vibrations produced on the surface of water is 2 cm. If the wave velocity is 16m/s, find its frequency and time period.
17. Explain how defects in a metal block can be detected using ultrasound.
18. State any two daily life phenomenon which are based on Archimedes' principle. Discuss the role of Archimedes' principle in industry and defence.
19. a. what is an octet? How do elements reach an octet?
    b. Make a schematic atomic structure of Magnesium or phosphorus. (Given: number of protons of Magnesium=12, Phosphorus=15)
20. a. Write any four features that all chordates possess.
    b. Explain the three basic features for grouping all organisms into five major kingdoms.

21. What is meant by buoyancy? Why does an object float or sink when placed on the surface of a liquid?

22. a. The stone is dropped from a tower of 500 m height into a pond of water at a base of the tower. When is the splash heard at the top? (given g= $10ms^{-2}$ and speed of sound =340 ms^{-1})

23. OTBA

24. OTBA

Section B

25. In a reaction, 5.3 g of sodium carbonate reacted with 6 g of ethanoic acid. The products were 2.2 g of carbon dioxide, 0.9 g water and some sodium ethanoate. What is the expected weight of sodium ethanoate?

26. Draw well labeled diagram of earthworm.

27. A metal cube weighs 80 g. The water level in the measuring cylinder, before and after immersing metal cube is shown below. What will be the density of cube?

28. Which of the following is correct according to law of conservation of mass?
    A. Volume of reactants = volume of products
    B. number of reactants = number of products
    C. mass of reactants = mass of products
    D. total number of atoms on reactants side = total number of atoms on products side

29. When we react lead nitrate and sodium chloride to get lead chloride and sodium nitrate so as to prove law of conservation of mass, which of the following statement is correct?
    a. Mass of lead nitrate = mass of sodium chloride
    b. Mass of lead nitrate + mass of sodium chloride = Mass of lead chloride + mass of sodium nitrate
    c. Mass of lead chloride + mass of sodium chloride = Mass of lead nitrate + mass of sodium nitrate
    d. Mass of sodium chloride + mass of sodium nitrate = Mass of lead chloride + mass of lead nitrate

30. Which of the following are monocots?
    a. Orchid, sugarcane, peas
    b. Orchid, peas, bamboo
    c. Peas, bamboo, sugarcane
    d. Orchid, bamboo, sugarcane

31. Which acts as an anti-coagulant in female mosquitoes?
    a. Saliva
    b. Gastric juice
    c. Bile juice
    d. Acetic acid
32. What do mosquitoes mostly use the for senses?
    a. Antennae
    b. Eggs
    c. Nose
    d. Mouth
33. Black dot-like structures seen in the underside of fern leaflets are:
    a. Seeds
    b. Sori
    c. Sporophylls
    d. Spores
34. The pressure exerted by the book due to thickness and front page on the ground are P_1 and P_2 respectively. Then,
    a. $P_1=P_2$
    b. $P_2=2P_1$
    c. $P_1=2P_2$
    d. $P_1 > P_2$
35. Weight of an object in air is 300N. Its weight in water will be
    a. 300 N
    b. >300 N
    c. <300 N
    d. Zero
36. The object immersed in a fluid floats in it with its top surface at fluid surface. Which of the following will be true?
    a. The upthrust is greater than weight of the object
    b. The upthrust is less than weight of the object
    c. The upthrust is equal than weight of the object
    d. None of the above

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Solution

1. Graphite and diamond
2. Phylum arthropoda
3. Kinetic energy
4. 1 mole of N atoms= 14g

   1 mole of N atoms= 6.022×10^{23} atoms

   6.022×10^{23} atoms of N atoms = 14 g

   Mass of 3.011×10^{23} atoms of N = $14/6.022 \times 10^{23}$ atoms x 3.011×10^{23}

   = 7g
5. Gymnosperms are naked seeded plants. Two characteristics of gymnosperms are
   1. The plants are usually perennial, evergreen and woody.
   2. The flowers are represented by unisexual cones, both being present on same plants.
6. m = 2kg, g= 9.8 m/s^2 , u= 0, t= 2s

   v = u + gt = 0 + 9.8 x 2

   v = 19.6 m/s

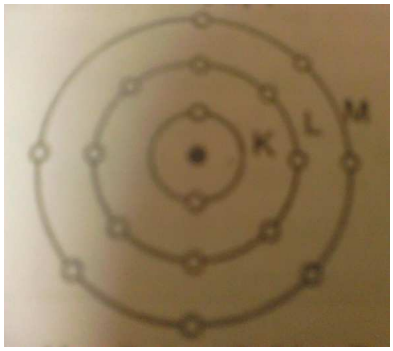
   $W = ½ mv^2 = ½ \times 2 \times (19.6)^2 = 384.16$ J
7. a. Bohr and Bury Scheme for distribution of electrons in different Energy levels:
   1. The maximum number of electrons in an energy level is equal to $2n^2$ where 'n' is the energy level.

      1^{st} energy level can have $2n^2 = 2 \times 1^2 = 2$ electrons

      2^{nd} energy level can have $= 2 \times 2^2 = 8$ electrons

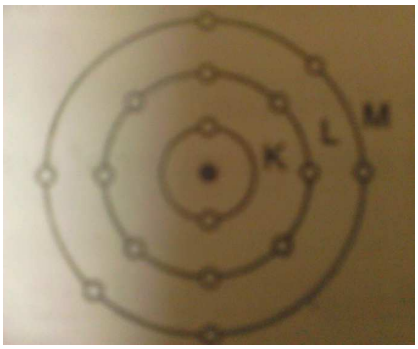
      3^{rd} energy level can have $2 \times 3^2 = 18$ electrons
   2. The last energy level (outermost energy level) cannot have more than 18 electrons.
   3. The last but one shell (penultimate shell) cannot have more than 8 electrons.
   4. **A.** The last but one shell (anti-penultimate shell) cannot have more than 18 electrons.

      B. X(17) = 2, 8, 7 Y(16) = 2,8,6



X(17) = 2, 8, 7

K= 2, L= 8, M=7



Y(16) = 2,8,6

K=2, L= 8, M=6

8. $_{1}{}^{1}H$ (Protium) and $_{1}{}^{2}H$ (Deuterium) are isotopes $_{18}{}^{40}Ar$ and $_{20}{}^{40}Ca$ are isobars.

Isotopes have similarity in chemical properties as these have same atomic number i.e same number of valence electrons but differ in physical properties due to difference in mass number.

9. a. Plants which bear seeds with two cotyledons are called dicotyledons.

b. Platyhelminthes do not have coelom.

c. Edible fungi is mushroom.

10. There is a need for systematic naming of living organisms because of the following reasons:

In a community local name serves the purpose of recognizing an organism but people in different region call the same organism with different name.

For eg. A dog is called Kutta in Hindi, Kukur in Bangla, naai in tamil and Kutra in Marathi, and it is difficult to know different language hence, system of scientific naming was introduced by Carolus Linnaeus called as the Binomial system of nomenaclature.

The four conventions that are followed while writing scientific name of the species are as follows:-

(a) The name of genus begins with a Capital Letter.

(b) The name of species begins with small letter.

(c) When printed, the scientific name is given in italics.

(d) When written in hand, the genus name and the species name have to be underlined separately.

11.

Characteristics	Plants	Animals
a. Movability	Stationary	Move freely
b. Food habits	Prepare their own food.	Cannot prepare their food
c. Growth	Grow throughout their lives.	Grow up to a certain age.
d. Cell Structure	Plant cell is surrounded by Cell wall and contains chloroplast.	Animal cell neither have cell wall nor have chloroplast.

12. Names are essential to distinguish one organism from the other. The local names serve their purpose in a community of a particular region. The names used in a region may not be understood in other regions and therefore, cause confusion. So, the local names are not sufficient to recognize the organism. On the other hand, Scientific names are followed an understood all over the world. Each scientific name is specific and therefore, there is no chance of any confusion. Moreover, scientific name immediately provide information about the generic origin of the species.

13. Kilowatt hour (kWh)

1kWh = 3.6×10^6 J

Given P = 60 W

t = 1h = 3600 s

W = Pt

= 60 x 3600

= 108000

= 1.08×10^5 J

14. SONAR (Sound navigation and ranging) works on the principle of reflection of sound. Sound waves are sent into the water by SONAR device. These strike the underwater objects such as rocks, ice bergs and even submarines and get reflected back. The reflected waves are detected by detector and time taken by them to return back is measured. This helps to measure depth of objects in the sea.

15. a. buoyant force

b. Its weight became more than upthrust exerted by water.

c. Sagar was courageous and experimental.

16. Frequency = 1/ time period

17. $\lambda = 2$ cm$= 0.02$ m

$\upsilon = \nu\lambda$

or $\nu = \upsilon/\lambda = 16/ 0.02 = 800$ Hz

$T = 1/ \nu = 1/ 800 = 0.00125$ s

18. a. when clothes are immersed in a bucket of water the water level rises.

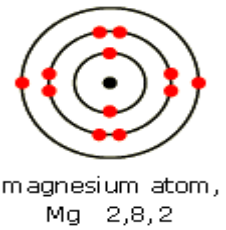
b. An empty mug floats on water. But when water filled in the mug, it sinks.

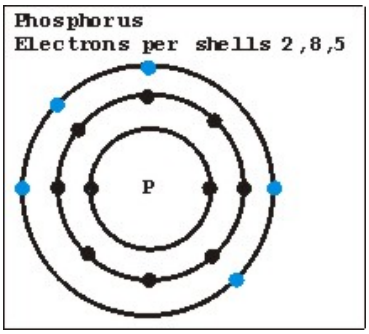
Archimedes' principle is used in industry for ship designing and making lactometers to test purity of milk etc.

In country's defence, it plays an important role as it is used in making submarines.

19. a. when an atom has 8 electrons in outermost shell, it has octet. An element can attain octet by losing, gaining or sharing electrons.

b.





20. a. The four main characteristics of chordates are as follows:

i) Presence of notochord at any stage of life.

ii) Presence of dorsal hollow nerve cord.

iii) Presence of gill slits at any stage of life.

iv) Presence of tail behind the anal opening.

b.The groups are formed on the basis of their cell structure, mode and source of nutrition and body organization.

Whittaker based his scheme of classification on the following three levels of organization:

i) Prokaryotic versus Eukaryotic cell structure.

ii) Three different modes of nutrition- Photosynthesis(plants), Absorption from the environment(fungi) and Ingestion(animals).

iii) Unicellular versus Multicellular organization.

21. Upthrust or buoyant force: The force exerted by the fluid displaced, equaling the weight of fluid displaced is called upthrust, i.e

U= volume immersed x density of fluid x g

Volume of the fluid displaced is equal to the volume of the immersed portion of the body.

Due to the presence of upthrust, there is an apparent loss in the body weight. When upthrust is more than the weight of body, the body floats. When upthrust is less than the weight of the body, the body sinks.

Apparent weight = weight – upthrust = $Vr_bg - V_ir_lg$

Where r_b , r_l are density of body and liquid and V, V_i are volume of the body and volume immersed.

Density of a liquid is the mass per unit volume. It is measured in kg m^{-3}

When pressed, more immersion will lead to more upthrust for a moment.

22. A. Time taken by stone to reach water surface

$t_1 = \sqrt{2h/g} = \sqrt{2 \times 500/10} = \sqrt{100} = 10s$

Time taken by the sound to reach the object

$t_2 = h/v = 500/340 = 1.47$ s

Time at which splash is heard at the top

$= t_1 + t_2 = 10 + 1.47 = 11.47$ s

23. OTBA

24. OTBA

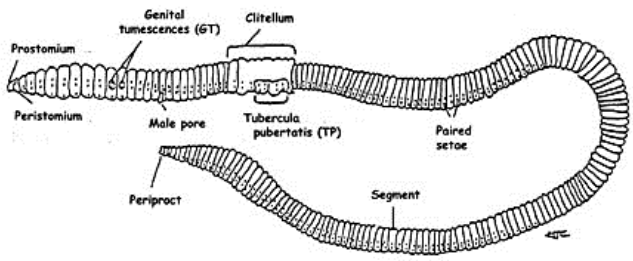
25. Mass of sodium carbonate + mass of ethanoic acid = mass of sodium ethanoate + mass of water + mass of carbon dioxide

5.3 g + 6.0 g = x + 0.9 + 2.2 g

x = 11.3 – 3.1

= 8.2 g

26. Diagram of earthworm



27. $V = 20\ cm^3$; $\rho = M/V = 80\ g/20cm^3 = 4\ g/cm^3$

28. C

29. B

30. D

31. A

32. C

33. B

34. D

35. C

36. A