CBSE Sample Paper - 02
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 33 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.

h) Questions 34 to 36 in section B are based on practical skills. Each question is a two marks question.

Section A

1. Define atomicity.
2. What is an ion?
3. Define average power.
4. In the hierarchy of classification, which grouping will have the smallest number of organisms with a maximum of characteristics in common and which will have the largest number of organisms?
5. Which wave property determines(a) loudness, (b) pitch?
6. If there is no atmosphere around the Earth, what will happen to its temperature?
7. Establish the relation for a wave that velocity = $frequency \times wavelength$.
8. State the difference between Power and energy?
9. What is SONAR? Write its working?

10. Why is atomic number is more important than atomic weight in predicting the chemical properties of elements?
11. Define valency by taking examples of silicon and oxygen.
12. What is classification? What is the need of classification? What is the basis of classification?
13. Explain giving reasons why:
    (a) Balanced diet is necessary for maintaining health body.
    (b) Health of an organism depends upon the surrounding environmental conditions.
14. An object of mass 40 kg is raised to a height of 5 m above the ground. What is its potential energy? If the object is allowed to fall, find its kinetic energy when it is half way down.
15. A person has a hearing range from 20 Hz to 20 kHz. What are the typical wavelengths of sound waves in air corresponding to these two frequencies? Take the speed of sound in air as 344 ms^{-1}.
16. In the force - displacement graph, calculate the work done during
    (a) the interval 0<x<2 m
    (b) the interval 2<x<6 m
17. Government officials often go from one house to another every year and request people to take their infants to the Pulse Polio booths to administer polio drops to them. However, in a particular colony there were six infants but only four were taken to the booth.
    Answer the following questions based on the above information:
    (i) Why does the Government take active part in administrating polio drops to all infants?
    (ii) What values are being ignored by people who do not take their infants to the pulse Polio booth?
    (iii) Government officials go from house-to-house for promoting polio drops vaccination. Besides doing their office duty, which values are promoted through their actions?
18. Write in detail what happens when water gets polluted.
19. List any three reasons why you would think that you are sick and ought to see a doctor. If only one of these symptoms were present, would you still go to the doctor? Why or why not?
20. Thallophyta, Bryophyta and Pteridophyta are called as 'Cryptogams'. Gymnosperms and Angiosperms are called as 'Phanerogams'. Discuss why. Draw one example of a gymnosperm.
21. A light and a heavy object have the same momentum, find out the ratio of their kinetic energies. Which one has a larger kinetic energy?
22. State the Postulates of Dalton Theory?

23. Represent graphically any two separate diagrams in each case:
    (i) Two sound waves having the same amplitude but different frequencies.
    (ii) Two sound waves having the same frequency but different amplitudes.
    (iii) Two sound waves having different amplitudes and also different wavelengths.
24. How has industrialisation led to an increase in air pollution? What steps should be taken to check air pollution?

Section B

25. What is the molecular formula for Calcium Hydroxide?
    (a) $Ca(OH)_2$ (b) Ca OH
    (c) Ca_2 OH (d) $Ca H_2$
26. Isotopes of an element have
    (a) the same physical properties (b) different chemical properties
    (c) different number of neutrons (d) different atomic numbers.
27. Prokaryotic organism is found in kingdom.
    (a) protista (b) fungi
    (c) monera (d) plantae
28. 'Penicillin', a life saving antibiotic, was discovered by
    (a) Alexander Fleming (b) Edward Jenner
    (c) H.G. Khorana (d) William Harvey
29. Which of the following quantities have same units?
    (a) Power and energy (b) Power and work
    (c) work and energy (d) None of the above
30. Helium $\left(\begin{matrix}4\\2\end{matrix}\text{He}\right)$ has:
    (a) 2 P^+ and 2 $n°$ (b) 2 P^+ and 4 $n°$
    (c) 4 P^+ and 2 $n°$ (d) none of these
31. Atomicity of chlorine and Argon is
    (a) Diatomic and Monoatomic (b) Monoatomic and Diatomic
    (c) Monoatomic and Monoatomic (d) Diatomic and Diatomic
32. Atomicity of fluorine is:
    (a) 1 (b) 2

(c) 3 (d) 4

33. The branch of Biology dealing with classification is known as:

(a) Physiology (b) taxonomy

(c) Paleontology (d) mycology

34. If you go to hospital to meet your friend suffering from malaria, what are the chances of malaria spreading to you and your friends?

35. The potential energy of a freely falling object decreases progressively. Does this violate the law of conservation of energy? Why?

36. When we put our ear to a railway track, we can hear the sound of an approaching train even when the train is far off but its sound cannot be heard through air. Why?

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Class – IX SCIENCE

Solutions

1. It is the number of atoms present in one molecule of a substance.
2. The negatively and positively charged particles are called ions.
3. Average power is defined as the ratio of total energy delivered in total time.
4. Smallest number of organisms with a maximum of characteristics in common will be Species while grouping with largest number of organisms with common characteristics will be the Kingdom.
5. (a) The amplitude of the wave determines loudness of sound.
   (b) The frequency of the wave determines pitch of sound.
6. The atmosphere around the Earth prevents the heat radiation to escape into the outer space. Thus, in the absence of the atmosphere, the temperature of Earth will decrease up to freezing point during night increase during day because atmosphere is no longer there to absorb radiations.
7. Since, velocity = $\frac{\text{Distance Travelled}}{\text{Time Taken}}$

   For a wave, for one vibration, the distance b/w two consecutive crest or trough is called its wavelength(λ).

   Time required to complete one vibration is called its Time Period (T).

   $so, v = \frac{\lambda}{T}$

   $Now, v = \lambda \times \frac{1}{T}$

   $\frac{1}{T} = \gamma(\text{frequency of wave})$

   $v = \lambda\gamma$

   γ(Frequency) is defined as the no. of vibrations particle covers in 1 second.
8.

Power	Energy
It is the rate of doing work or work done per unit time.	It is ability of a body to do work.

S.I. units of Power are Joule/second	S.I. units of energy are Joules.

9. SONAR stands for sound Navigation and Ranging. It uses ultrasonic waves. It consists of a transmitter which produces and transmits ultrasonic waves. These waves travel though water and after striking the object on the sea bed gets reflected back and are sensed by detector. The waves are then converted to electrical signals by detector. The time taken by wave to reach detector is recorded. Now, distance of the object from the ship is calculated by wring formula $speed = \frac{\text{distance}}{time}$.
10. Atomic number is the number of protons in an atom and during a chemical reaction the number of protons remains unchanged. Atomic number also gives number of electrons. Electrons are present in shell which participate in chemical reactions and decides chemical properties. Whereas atomic weight is the sum of number of protons and number of neutrons so atomic number is more important in predicting the chemical properties of elements.
11. The valency is the combining capacity of an atom. For example, silicon (atomic number 14) has the following electronic distribution:

    K= 2, L = 8, M = 4.

    In the outermost shell there are 4 electrons so, the valency of silicon is 4.

    In case of oxygen (atomic number 8), the electronic distribution in various shells is given below:

    K = 2, L = 6

    There are six valence electrons in the atom of oxygen.

    Valency of oxygen = 8-6 = 2
12. Classification - The process of grouping similar things into groups or categories on the basis of similarities and differences is called classification.

    Need of classification - It is very difficult to study large number of organisms individually. So organism having similar characters grouped together and the studied easily.

    Classification - Cell structure, mode &source for the nutrition and body organization.
13. (a) Balanced diet contain all the nutrient required for maintaining proper health as well as needed for growth and repair. Lack of single nutrient causes deficiency diseases.

    (b) surrounding environmental conditions plays an important role in the maintenance of health. For ex we feel depressed if - (i) surrounding are dirty or polluted (ii) garbage is not collected or disposed off (iii) drains are not cleaned and water collects in the streets or

open spaces. Unclean surrounding causes the entry of germs via air, water, food or vectors and makes the person unhealthy.

14. Potential energy (P) = $m \times g \times h$

$= 40 \times 5 \times 10 = 2000$ J

When the object is half way down the height of the object is = 2.5 m

initial velocity (u) = 0 (thrown from ground/rest)

since, $v^2 = u^2 + 2gh$

$= 0 + 2 \times 10 \times 2.5$

$= 50$

Kinetic energy = $\frac{1}{2} \times m \times v^2$

$= \frac{1}{2} \times 40 \times 50 = 1000$ J

15. Given $\upsilon = 344 ms^{-1}$, $\upsilon_1 = 20 Hz$, $\upsilon_1 = 20 Hz$

Since, $\lambda = \frac{\upsilon}{v}$

$\lambda_1 = \lambda_{20\text{Hz}} = \frac{344}{20} = 17.2\text{m} = 0.0172\text{km}.$

and $\lambda_1 = \lambda_{20\text{Hz}} = \frac{344}{20 \times 10^3} = 0.0172\text{km}.$

16. Since area under a force displacement graph gives the work done, hence

(a) for 0<x<2

work Done = Area of triangle OAE

$= \frac{1}{2} \times$ Base $\times$ Height

$= \frac{1}{2} \times OE \times AE$

$= \frac{1}{2} \times 2 \times 8$

$= 8J$

(b) for 2<x<6

work Done = Area of rectangle A BED

$=$ Length $\times$ Bneadth

$=$ A B $\times$ BD

$= 4 \times 8$

$= 32$J

17. (i) To make the country polio-free and to increase the health standards of the country.
    (ii) Care of their children's health, prudency, social goodness.
    (iii) Service to society, social concerns, and goodness to others.
18. When water gets polluted, then following events happen:
    (a) Undesirable substances get added to water-bodies which may cause cholera.
    (b) Desirable substance may get removed from water-bodies and dissolved oxygen in water which is important for aquatic life and endangering aquatic life.
    (c) If water gets polluted, then temperature of water changes which would adversely affect the life forms in water.
19. Common symptoms which indicate sickness are:
    (i) Headache
    (ii) Cough and
    (iii) Dysentery

    If I see any one of the above symptoms, I'll immediately go to the doctor. It is because any of these symptoms can be the sign of sickness or disease. Ignoring it may lead to increase in the disease.
20. The thallophyta, bryophyta and pteridophyta are called as 'cryptogams' because the reproductive organs of these groups are inconspicuous or hidden. Seeds are absent. On the other hand 'Phanerogams' include gymnosperms and angiosperms which have well differentiated reproductive tissue and the embryo with stored food. Their embryo develops into seed.


Pinus


Cycas

21. Linear momentum of first object, $p_1 = m_1 v_1$ and of second object, $p_2 = m_2 v_2$

    But, $p_1 = p_2$

    or, $m_1 v_1 = m_2 v_2$

    If $m_1 < m_2$ then $v_1 > v_2$

$(K.E.)_1 = \frac{1}{2}(m_1 v_1) v_1 = \frac{1}{2} p_1 v_1$

and $(K.E.)_2 = \frac{1}{2}(m_2 v_2) v_2 = \frac{1}{2} p_2 v_2$

So, $\frac{(K.E.)_1}{(K.E.)_2} = \frac{\frac{1}{2}(p_1 v_1) v_1}{\frac{1}{2}(p_2 v_2) v_2} = \frac{v_1}{v_2}$

But, $v_1 > v_2$

Therefore, $(K.E.)_1 > (K.E.)_2$

22. The postulates of Dalton theory are

(a) All matter is made of vary tiny particles called atom

(b) Atoms are indivisible particle; they cannot be created or destroyed during a chemical reaction

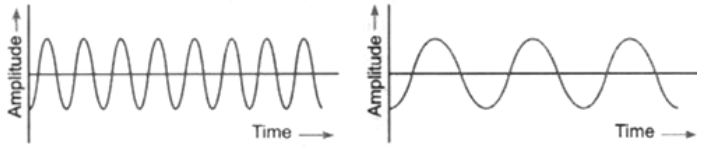
(c) Atoms of a \given element are identical in mass and chemical properties

(d) Atoms of different elements have different mass and chemical properties

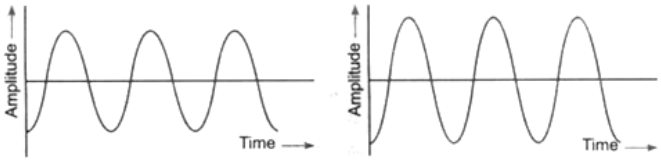
(e) Atom combines in the ratio of their whole number to form compounds

(f) The relative number and kinds of atoms are constant in a compound.

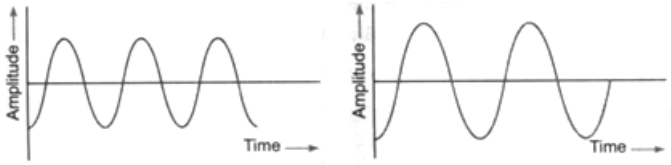
23. (i) Same amplitude but different frequency



(ii) Same frequency but different amplitude



(iii) Different amplitudes and different wavelengths



24. Industrialisation has led to increased pollution of air in following ways:

(i) Due to industrialisation, the consumption of fossil fuels has increased. Combustion of fossil fuels has increased production of gases like CO, SO_2, SO_3, NO_2 and CO_2 which are toxic.

(ii) There has been depletion in the ozone layer because of increase in the production of chemicals like chlorofluorocarbons which are used as insulators, refrigerants, solvents and aerosol propellants. This has resulted in the entry of UV rays into Earth's atmosphere, which has affected various organisms.

(iii) Combustion of fossil fuels also increases the amount of suspended particles in air causing pollution.

Steps taken to check air pollution are:

(i) Planting more trees, as they purify air by intake of CO_2 gas and release of O_2. This will reduce the greenhouse effect.

(ii) Reducing the consumption of fossil fuels.

(iii) Laying emphasis on the use of non-conventional sources of energy like wind energy, solar energy, tidal energy, etc., which reduce pollution to great extent.

Section B

25. (b)
26. (a)
27. (c)
28. (a)
29. (c)
30. (a)
31. (a)
32. (b)
33. (b)
34. Malaria is an infectious disease caused by a protozoan and is spread by **Anopheles** mosquito vector. It cannot spread by simply being with the patient or by contact.
35. It doesn't violate the law of conservation of energy because the potential energy of a freely falling object decreases progressively since it keeps changing into kinetic energy of the free falling object therefore the total energy to the object remains conserved.
36. Sound travels about 15 times faster in iron (or steel) than in air. So, sound travels much faster through the railway track made of steel than through air. That is why, we can hear the sound of an approaching train even when the train is far off but its sound cannot be heard through air.