CBSE
Continuous and Comprehensive Evaluation (CCE)

Sample Question Papers Solutions

Term 2 (October to March 2014)

SCIENCE

Class 9

OSWAAL BOOKS

CONTENTS

- **Solutions**

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SAMPLE QUESTION PAPER-6

SECTION 'A'

1. The sum of kinetic and potential energy of an object is its total mechanical energy. **1**

2. When the speed of an object exceeds the speed of sound, it is said to travel in supersonic speed. For example, bullets, jet crafts etc travel in supersonic speeds. **1**

3. Because density of fresh water is less than salty water. **1**

4. (i) Photosynthesis.

(ii) Denitrification. **1 + 1**

5. (a) Fertile soil is rich in organisms that decompose dead organic matter forming humus gives minerals, absorbs water. **1**

(b) Suspended particulate matter may cause respiratory disorders. **1**

6. 1 mole of hydrogen = 1 g of hydrogen

Mass of $6{\cdot}022 \times 10^{23}$ hydrogen atoms = 1 g **1**

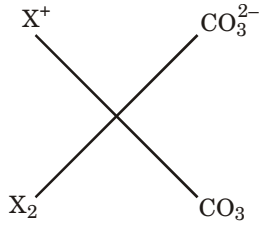
$$\text{Mass of 1 hydrogen atom} = \frac{1\,\text{g}}{6{\cdot}022 \times 10^{23}}$$

$$= 1{\cdot}66 \times 10^{-24}\ \text{g} \quad \textbf{1}$$

7. (a) Atom. no. of P = no. of $e^- \Rightarrow$ 11 (2, 8, 1) **1**

Ion : no. of P $\neq$ no. of $e^- \Rightarrow$ 10 (2, 8) **1**

(b)



Compound formed : X_2CO_3 **1**

8. (a) $X \rightarrow 8 + 8 = 16$ u

$Y \rightarrow 8 + 10 = 18$ u

(b) No. of protons = no. of electrons.

Atomic no. of X = 8

E.C. = 2, 4, 2

(c) They are isotopes because their atomic number is same while atomic mass is defferent. **1 + 1 + 1**

9. Three criteria are :

(a) Cell structure

(b) Mode and source of nutrition.

(c) Body organisation. **1 + 1 + 1**

10. (a) Sub-atomic particles of atom are – electrons, protons and neutrons. **1½**

(b) (i) Atomic number = K L

2 6

= 8

(ii) Valency = 8 – 6 = 2

(iii) Element is oxygen. **1½**

11. (a) Kingdom – Protista.

(b) Mode of nutrition is both heterotrophic and autotrophic.

(c) Paramecium, Euglena. **1 + 1 + 1**

12. (a) It is called dead sea because no body can sink in this sea. The density of water in it is very high.

(b) Because the content of salt in this sea is very high.

(c) Upthrust force. **1 + 1 + 1**

13. Work is the product of force and displacement. It is measured in joules.

When the force is acting opposite to the direction of displacement, the work done is said to be negative. **1 + 1 + 1**

14. (a) An object increases its energy when raised throught a height. This is because work is done on it against gravity while it is being raised. The energy present in such an object is the gravitational potential energy. This gravitational potential energy of an object at a point above the ground is defined as the work done in raising it from the ground to that point against gravity. **2**

(b) An object of mass m, when raised through a height h from the ground then work done by this object will be

$$\begin{aligned} W &= \text{force} \times \text{displacement} \\ &= mg \times h \\ &= mgh \end{aligned}$$ **1**

15. $f = \frac{v}{\lambda}$ $\qquad f = \frac{300 \times 100}{1{\cdot}5} = 22000$ Hz

Sound is not audible. **3**

16. (a) Difference in temperature and pressure on the surface of earth causes winds.

(b) Methods to control soil pollution are :

(i) Preventing deforestation.

(ii) Growing deep rooted plants at slopes. **1 + 1 + 1**

17. (a) Lactometer is used to test the purity of milk. It works on Archimedes Principle of Buoyancy.

(b) It shows milkman's honesty. **2 + 1**

18. Yes, because immunization with small pox vaccine doesn't have any effect against the rabies virus. Rabies virus is different from the small pox virus. So, the immunisation with the small pox vaccine doesn't induces our immune system to fight against the rabies virus. So the person needs to immunised with the vaccine effective against the rabies virus. **3**

19. (a) Mass unit exactly equal to $1/12^{\text{th}}$ the mass of one atom of C – 12 is called atomic mass unit.

(b) Number of atoms present in a compound or a molecule is called its atomicity.

(i) Phosphorus etc.

(ii) CO_3^{2-}, OH^-, etc.

(c) (i) $AlPO_4$

(ii) $Al_2(SO_4)_3$. **1 + 2 + 2**

20. (a) (i) Thallophyta—Do not have well differentiated body. **1½**

(ii) Gymnosperms—Naked seeds. **1½**

(iii) Bryophyta—Differentiated body. **1½**

(b) Autotrophic mode of nutrition. **½**

21. $W = \frac{1}{2} m\ (v^2 - u^2)$ **½**

If the object is starting from its stationary position, that is, $u = 0$, then

$$W = \frac{1}{2} mv^2$$ **½**

If is clear that the work done is equal to the change in the kinetic energy of an object.

If $u = 0$, the work done will be $\frac{1}{2} mu^2$. **1**

Thus, the kinetic energy possessed by an object of mass, m and moving with a uniform velocity, v is : **1**

$$E_k = \frac{1}{2}mv^2$$

(b) Given that $m_1 = 70$ kg ½

$m_2 = 10$ kg

therefore, Total mass = $m_1 + m_2 = 70 + 10 = 80$ kg ½

$h = 100$ m

Work done = ?

Work done = Potential energy of the object (mgh) ½

$= 80 \times 10 \times 100 = 80{,}000$ J ½

22. (a) This is due to green house effect. The sun rays are trapped inside by the glass and inner temperature gets high.

(b) Lichens are bio indicators and sensitive to sulphur dioxide which is a major pollutant from automobiles. Delhi has maximum automobiles hence highly polluted. Lichens cannot grow in such environment.

(c) Root nodules have rhizobium bacteria which helps in the fixation of nitrogen. **2 + 2 + 1**

23. (a) Stethoscope is an instrument used by doctors to hear the sound of patient's heart beat.

(b) The sound of a patient's heart beat reaches the doctor's ears by multiple reflection of sound.

(c) Megaphones, Trumpets.

(d) Narendra was interested in knowing the science of sound. Mukesh was kind and intelligent to explain Narendra the concept of multiple reflection of sound. **2 + 1 + 1 +1**

24. (a) (i) The HIV goes to the immune system and damages its function. **1**

(ii) Sexual contact, from mother to child, infected syringe/needle, blood transfusion. **½ + ½**

(iii) No, antibiotics do not respond to viral infections. **1**

(b) Virus ½

- Through mosquito bite ½
- Brain ½
- Headache, fits, vomiting, unconsciousness. ½

SECTION 'B'

25. (c) Lead nitrate solution was added to sodium chloride solutions in a sealed conical flask.

26. (d) A – Pileus, B – gitls.

27. (a) Main feature of phylum Arthropoda is jointed legs.

28. (d) Phanerogams, *i.e.* angiosperms and gymnosperms produce seeds.

29. (c) At larva stage a mosquito looks like a worm.

30. (a) Apparatus should be placed upright without any touch with hands.

31. (b) $\angle i = 90^\circ - 60^\circ = 30^\circ$, $\angle i = \angle r$.

32. (b) The loss of weight of the object is more in salty water.

33. $t = 1$ min 15 sec $= 75$ sec.

$d = 7{\cdot}5$ m

$$s = \frac{d}{t} = \frac{7{\cdot}5}{75} = \frac{1}{10} = 0{\cdot}1 \text{ m/s.}$$

34. (a) Always select a slinky of appropriate length, elasticity and flexibility.

(b) The end of the slinky should be fixed properly. **1 + 1**

35. The fins are – the dorsal, pelvic and anal fins.

The tail fin works as a rudder and helps the fish in changing the direction. **1 + 1**

36. $$\text{Pressure} = \frac{\text{Force}}{\text{Area}} = \frac{75 \text{ N}}{25 \times 10^{-4}\left(m^2\right)} = 3 \times 10^4 \text{Nm}^{-2}$$

$= 3 \times 10^4$ Pa. **2**

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SAMPLE QUESTION PAPER-7

SECTION 'A'

1. Power is the rate of doing work. It's SI unit is Watt. **½ + ½**

2. A sound of single frequency is called tone. **1**

3. So, that large area will decrease the pressure. **1**

4. Because the amount of nitrogen remain constant throughout the entire cycle and no nitrogen is lost. Hence it follows law of conservation of matter. **2**

5. (1) Fast flowing water carries big and small particles of rock downstream. These rocks rub against other rocks and the resultant abrasion causes rocks to wear into smaller and smaller particles.

(2) Water expands on freezing. So when it is deposited in crevices of rocks it cracks rocks into smaller pieces. **1 + 1**

6. Since two electrons are present in the M-shell, therefore, the K-shell and L-shell of the element are completely filled. Electronic configuration of the element is 2(K), 8(L), 2(M). So, the total number of electrons in the netural atom is 2 + 8 + 2 = 12 or atomic number of the element is 12.

Thus the element is identified as magnesium (Mg). **2**

7. (a) 1 gram of hydrogen gas requires 8 grams of oxygen ;

5 g of hydrogen gas will require 5 × 8 = 40 g of oxygen. **2**

(b) XO_2 and XO_3. **1**

8. (a) Protons are positively charged with 1 unit of mass.

Electrons are negatively charged with 1/1836 unit of mass. **2**

Neutrons are neutral with one unit mass.

(b) Proton = 1, Electron = 1, Neutron = 1 **1**

9. Postutates of Neil Bohr's model of an atom :

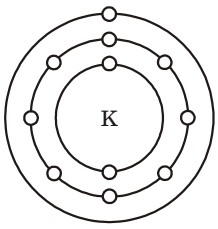
(a) Electrons revolve around the nucleus in a limited number of orbits called discrete orbits of electrons or also called a permissible orbits.

(b) While revolving in discrete orbits the electrons does not radiate energy *i.e.* energy of an electron remains constant so long as it stays in a given orbit. Electrons present in different orbits have different energies. **½ + ½**

(c) Rutherford had proposed that electrons move around a positively charged nucleus at very high speed in circular orbits. To remain in a circular orbit electron would have to be accelerated centripetally (tending to move toward a center). But according to electromagnetic theory if charged body (electron) is accelerated around another charged body (nucleus) then there would be continuous radiation of the moving body (*i.e.* electron). This loss of energy would slow down speed of electron and eventually electron would fall into nucleus. But Rutherford's model could not explain such a collapse. **1**

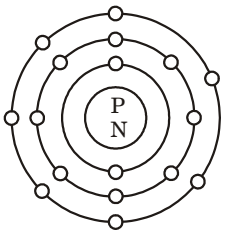
(a) Atomic number : 11. (b) At. No. 17, E.C. = 2, 8, 7.

Sodium atom



Atomic structure (atomic no. 11)

Chlorine atom



Atomic structure (atomic no. 17) **½ + ½**

10. (a) To move from one place to another. **1**

(b) Angio means covered and sperma means seed. **1**

(c) To protect their bodies from rotting in water. **1**

11.

		Bony Fish	Cartilaginous Fish
(i)	Bony endoskeleton	Cartilaginous endoskeleton	
(ii)	Gill slit covered by operculum Ex. Rohu, Tuna.	operculum absent Ex. Shark.	**2 + 1**

Phylum – Vertebrata

12. (a) Yes, I agree with Raman because tobacco smoking can lead to fatal diseases.

(b) (i) Plays and skits can be organised to create awareness.

(ii) Students can be taught in detail about ill effects of smoking.

(c) Lung cancer, bronchitis, oral cancer, throat cancer etc. **1 + 1 + 1**

13. $m = 2$ kg

$W = mg = 2 \times 9{\cdot}8 = 19{\cdot}6$ N **1**

$$A = 2 \text{ cm} = \frac{2}{100} \text{ m} = 0{\cdot}02 \text{ m}$$

Area of lower face of cube $= (\text{side})^2$

$= (0\text{-}02)^2 = 4 \times 10^{-4}$ m^2 **1**

$$P = \frac{F}{A} = \frac{19{\cdot}6}{4 \times 10^{-4}}$$

$P = 4{\cdot}9 \times 10^4$ pa **1**

14. 1 Watt = 1 joule / sec.

$P = mgh/t$

$m = pt/gh = 2000 \times 60 / (10 \times 6) = 2000$ kg **1 + 2**

15. (a) Power is the rate of doing work. **1**

SI unit of power is Watt (W). **1**

(b) $E = P \times T = 200$ W $\times$ 5 hrs.

(c) 1000 Wh or 1 kWh. **1**

16. (a) In coastal area during day, air above land get heated faster and rises. A region of low pressure is created and wind current moves from sea to land. **1**

At night, both sea and land start to cool, since water cools down lower than land, air above water is warmer and rises. **1**

$\therefore$ Wind current moves from land to sea. **1**

(b) Rotation of earth and temperature range. **½ + ½**

17. We know, $h = ut + \frac{1}{2}gt^2$ **1**

$u = 0$, $h = 78{\cdot}4$, $g = 9{\cdot}8$ m/s^2

Using these

$t^2 = 16 \Rightarrow t = 4$ *s*

Time taken by the helmet to reach the ground = 4 s

Time taken by sound to reach the height = $4{\cdot}23 - 4 = 0{\cdot}23$ s **1**

$$\text{Speed of sound in air} = \frac{78{\cdot}4}{0{\cdot}23} = 340{\cdot}87 \text{ m/s} \quad \textbf{1}$$

18. (a) To hear an echo the minimum distance between the source of sound and the obstacle or reflecting surface should be 17 metres. Since length of a room is less than 17 metres, so no echo is heard in a small room.

(b) Sound travels faster in summer season than in winter season, This is because, speed of sound increases with the increase in temperature. **1½ + 1½**

19. (a) Isotopes of an element have same atomic number as well as electronic configuration. Since the chemical properties of elements are related to their electronic configuration the elements with similar configuration will have similar properties. Thus the isotopes of an element are chemically similar.

(b) In an atom the number of protons in the nucleus is equal to the number of electrons in the extra nuclear portion. Since each proton and each electron has the same charge but with opposite magnitude, the atom is electrically neutral.

(c) The atoms of noble gas elements have complete outermost shells. Hence they are least reactive.

(d) Nucleus of an atom is made up of protons which are positively charged and neutrons that are neutral. The total mass of neutron & protons make it heavy.

(e) When an atom changes into an ion (cation or anion) the valence shell of the ion has a complete octet or duplet. **1 + 1 + 1 + 1 + 1**

20. Vertebrates are further classified into five classes on the basis of habitat, covering of skin, respiratory organs, chambers of heart and reproduction. **2**

Five classes of vertebrates :

Pisces, Amphibia, Reptilia, Aves, Mammalia. **1**

Basic diff.	**Pisces**	**Amphibia**	**Reptilia**	**Aves**	**Mammalia**
HABITAT	Aquatic	Both in water and land.	Both in water and land.	Land aerial	Mainly land
SKIN COVER	Scales	Mucus gland in skin	Scales	Feathers	Hair
RESPIRATORY ORGAN	Gills	Gills and lungs	Lungs	Lungs	Lungs
CHAMBERS OF HEART	2	3	3	4	4
RE-PRODUCTION	Lay eggs in water	Lay eggs in water	Lay eggs on land	Long eggs	Give birth to babies /young ones

2

21. (a) The plant belongs to the division – Gymnospermae. **1**

(b) Examples : Cycas, Pinus. **½ + ½**

(c) (i) Cycas and Pinus (cones) are used to make decoratives.

(ii) Pinus cones are used as fuel for burning. **½ + ½**

(d) Features are :

(i) They are perennial, evergreen and woody.

(ii) They bear naked seeds. **1 + 1**

22. (i) The speed of sound is much less than the speed of light. **1**

(ii) Properties of the medium / temperature of the medium. **1**

(iii) Speed of sound = 339 m/s **1**

$$\text{Wavelength } 1{\cdot}5 \text{ cm} = \frac{1{\cdot}5}{100} = 0{\cdot}015 \text{ m}$$

$$\text{Velocity} = \text{Wavelength} \times \text{Frequency}$$

$$v = \lambda u$$

$$339 = 0{\cdot}015 \times u$$ **2**

$$\text{Frequency, } u = \frac{\text{Speed}}{\text{Wavelength}}$$

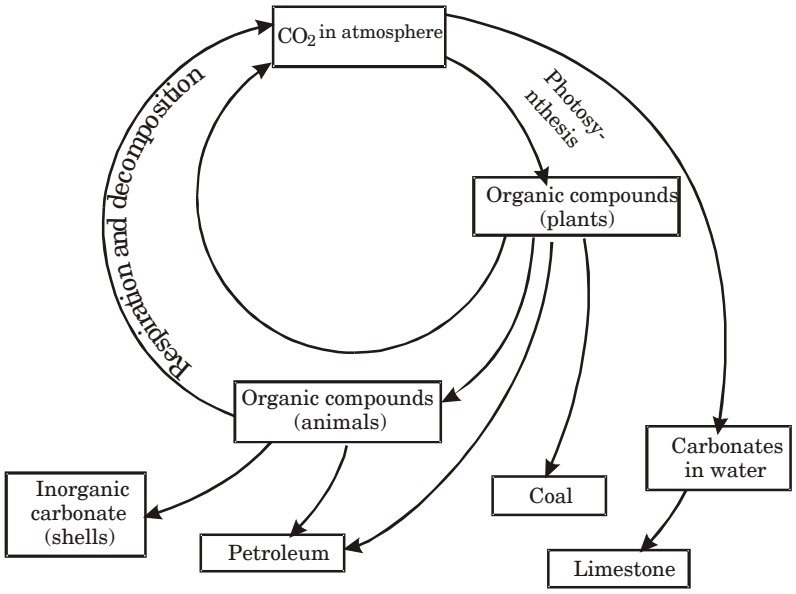
$$= \frac{339}{0{\cdot}015} = 22{,}600 \text{ Hz}$$

No, it will not be audible because it is higher than the 'upper audible range of 20,000 Hz of humans.

23. (i) X – Carbon

Y – Oxygen. **1**

(ii) Diagram of Carbon cycle :



2

(iii) Z is CO_2

$$\text{Molar mass} = 12 + 16 \times 2$$

$$= 12 + 32 = 44 \text{ g / mol.}$$ **1 + 1**

24. (a) No, there are many diseases which are not infectious. Such as cancers are caused by genetic abnormalities. High blood pressure can causes excessive weight. But, on the other hand, a lots ot disease is caused by infectious agent or micro - organisms. So, the disease caused by microbes are called **infectious diseases.** These infectious agent can spread in the community and can able to kill people at mass level, if the people leave untreated. **2½**

(b) Organisms that can cause disease are found in a wide range of categories such as viruses, bacteria, fungi, protozoans, etc. These classification is based on some common characteristics between different organisms and these helps in deciding what kind of treatment to use. Because, all viruses share or have some common process but they are different from the bacteria and vice - versa. So, drugs, that we use to treat the patient, block one of these life processess in one member of the group must be effective against the other members of the group. **2½**

SECTION 'B'

25. (a) Conical flask, cork, ignition tube, thread.

26. (d) Both crests and troughs and compressions and rarefactions.

27. (b) $P = \frac{F}{A} = \frac{50}{25 \times 10} = \frac{1}{5} = 0{\cdot}2$ Pa

28. (b) $\angle i = \angle r$, $i + r = 130^{\circ}$ $\therefore i = 65^{\circ}$.

29. (a) He observed spirogyra.

30. (a) A is thallophyta and B is pteridophyta; A is algae, B is fern.

31. (a) Given are the features of fern.

32. (a) The egg stage is the best to eradicate mosquito.

33. (a) 117·5 – 12·5 = 105 (12·5 g is zero error).

34. Wave velocity = wavelength × wave frequency.
Sound waves are longitudinal. **1 + 1**

35. (a) Body is boat - shaped streamlined. The neck is absent.
(b) The body is covered with scales, forming a protective covering. **1 + 1**

36. The surface area in contact with the table is 5 cm × 2 cm = 10 cm^2. It is because the pressure is inversely proportional to area of cross - section, *i.e.*, least the area, maximum is the pressure.

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SAMPLE QUESTION PAPER-8

SECTION 'A'

1. Kilowatt - hour (Kw-h) **½ + ½**

2. The characteristics of sound which enables us to distinguish one sound from another having the same pitch and loudness. **1**

3. Body will float on the surface. **1**

4. It is because moon has no atmosphere in it. **2**

5. The pollutants which can be decomposed by natural biological agents are biodegradable in nature like cowdung. Pollutants that can not be decomposed for long are called non-biodegradable pollutants like plastic. **1 +1**

6. We know that,

$$\text{Atomic number} = \text{Mass number} - \text{No. of neutrons}$$
$$= 16 - 8$$
$$= 8$$

Electronic configuration (of the element) = 2, 6 **1 + 1**

7. (a) In a pure chemical compound, the elements are always present in a definite proportion by mass. This is known as 'The Law of Definite Proportion'. **1**

(b) As nitrogen and hydrogen combine in the ratio 14 : 3 by mass, which means that 14 g of nitrogen combine with 3 g of hydrogen.

$\therefore$ 42 gms of nitrogen will combine with $3/14 \times 42$ g of hydrogen **½**

$= 9$ gms of hydrogen **½**

(c) The number of atoms constituting a molecule of that element is its atomicity. The atomicity of nitrogen is 2. **1**

8. (a) A $\Rightarrow$ 2, 8

D $\Rightarrow$ 2, 8, 3

(b) Yes, because its outermost shell is completely filled.

(c) Electronic Configuration of C is 2, 8, 2 $\therefore$ Valency is 2. **1 + 1 + 1**

9. (a) (i) CH_3COOH

$12 + 1 \times 3 + 12 + 16 + 16 + 1$

$= 15 + 12 + 32 + 1$

$= 60$ u.

(ii) $C_{12}H_{22}O_{11}$

$(12 \times 12) + (1 \times 22) + (16 \times 11) = 144 + 22 + 176$

$= 348$ u

(b) Symbol of Tungsten is 'W'. **1 + 1 + 1**

10. Triploblastic – Animals with three layers of cells from which differentiated tissues can be made.

Hydra is diploblastic with two layers of cells. **2**

Hydra – Phylum : Coelenterata **½**

Tapeworm – Phylum : Platyhelminthes **½**

11. (a) Warm - blooded animals

(b) Gymnosperms

(c) Nematods **1 × 3**

12. (a) She is eco-friendly and wants her city pollution free.

(b) All the garbage from the city is collected and thrown in a garbage pit area. It is allowed to degrade there and used as land fill in low lying areas or certain type of waste is recycled.

(c) Through compaign and newspaper articles we can aware people about the ill effects of scattering wastes. **1 × 3**

13. (a) Due to broad feet of camel it exerts less pressure on sand as area got increased. Hence, a camel can walk easily on sand.

(b) Because the density of plastic block is less than the density of water. **2 + 1**

14. u = 20 m/s, g = 10 m/s **½**

$$h = ut + \tfrac{1}{2} gt^2 = 0 + \tfrac{1}{2} \times 10 \times 4 = 20 \text{ m}$$

$$v = u + gt$$

$$0 = 20 - 10 \times t \quad \textbf{½}$$

10 t = 20, t = 2 s, so after 2 s the ball will start moving downwards, so it will pass the person after 2 seconds of its downward start. **½ + ½**

$$\text{Total height} = 2 + 2 = 4 \text{ s}$$

$$\text{Total time} = 105 + 20 = 125 \text{ m}$$

$$125 \text{ m} = 0 + \tfrac{1}{2} \times 10 \text{ t}^2$$

$$5 \text{ t}^2 = 125 \quad \textbf{½}$$

$$\text{t} = 5, \text{ total time} = 5 + 2 = 7 \text{ s} \quad \textbf{½}$$

15. Boy A

W = mg = 600 N h = 10 tt = 10 s

$$\text{Power, P} = \frac{\text{Work done}}{\text{Time taken}} = \frac{\text{mgh}}{\text{t}} = \frac{600 \text{ N} \times 10 \text{ m}}{10 \text{ s}} = 600 \text{ } W \quad \textbf{½ + ½ + ½}$$

Boy B W = mg = 600 N h = 10 m

$$\text{Power, P} = \frac{\text{Work done}}{\text{Time taken}} = \frac{\text{mgh}}{\text{t}} = \frac{600 \text{ N} \times 10 \text{ m}}{40 \text{ s}} = 150 \text{ } W \quad \textbf{½ + ½ + ½}$$

16. (a)

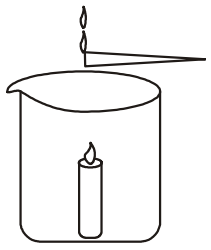
S.N.	Longitudinal waves	Transverse Waves
1.	In longitudinal waves the individual particles of the medium move in a direction parallel to the direction of propagation of the disturbance.	In a transverse wave particles do not oscillate along the line of wave propagation but oscillate up and down about their mean position.
2.	Wave travels in the form of compression and rarefaction.	Wave travels in the form of crest and through.
3.	Sound waves.	Light waves.

(*any two*) **2 + 1**

(b) (i) Longitudinal waves.

(ii) Transwerse waves. **2 + 1**

17. Place a candle in a beaker or wide - mouthed bottle and light it. Light an incense stick and take it to the mouth of above bottle.



The pattern of the smoke show us the directions in which hot and cold air move.

Nature : It shows that air currents are being caused by the uneven heating of air. **2 + 1**

18. All living organisms are identified and classified on the basis of some characteristics and these characteristics have greater effect on the body design and functions. The characteristics that appear earlier are likely to be more basic than that appear later. So, most of the life forms that we see, are an accumulation of changes in the body structure that allow them to survive better in the environment, and these complexity in body structure will increases over evolutionary time. So, to classifying the organisms gives an idea about the evolution of life form that is occurring continuously. **3**

19. (a) Correct molecular mass is $32 \times 8 = 256$ u **1**

No. of moles = given mass / molecular mass

$$n = \frac{m}{M} = \frac{25{\cdot}6}{256} = \frac{1}{10} = 0{\cdot}1 \text{ mole} \quad \textbf{2}$$

(b) (i) CaO, (ii) $MgCl_2$, (iii) $Al(OH)_3$. **2**

20. Cockroach, spider and prawns, all have jointed legs ; therefore placed under phylum Arthropoda.

Features of phylum Arthropoda :

(a) Body is bilaterally symmetrical and segmented.

(b) Animals have open circulatory system.

(c) Coelomic cavity is present which is blood filled.

Terrestrial arthropod – Butterfly

Aquatic arthropod – Crab. **1 + 3 + 2**

21. (a) Since angle between vertical force and horizontal displacement is 90°. Hence, work done is zero or W.D = 0.

For vertical motion, the angle between force + displacement is 0°. **1**

$\therefore$ Work done $W = F \times S$

$F = 10$ N, $S = 10$ m **1**

$= 10 \times 10 = 100$ J

Total work done $= 0 + 100 = 100$ J **1**

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

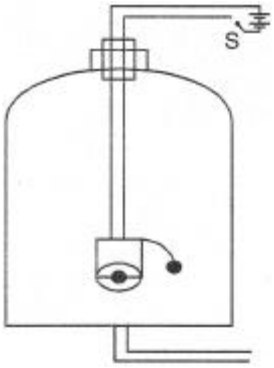
$$P = mv$$

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

$$\text{K.E.} = \frac{1}{2} \times P \times v \quad \textbf{1}$$

or $$\text{K.E.} = \frac{Pv}{2} \quad \textbf{1}$$

22. (a) Take an electric bell and an airtight glass belljar. The electric bell is suspended inside the airtight belljar. The belljar is connected to a vacuum pump. If we press the switch we will be able to hear the bell. Now start the vacuum pump to pump out the air in the jar gradually. The sound becomes fainter though the same current is passing through the bell. When the air is removed almost completely no sound will be heard, although the bell produces sound.



(b) **Uses of ultrasonic waves :**

(i) Ultrasonic waves are used to detect cracks and flaws in metal blocks.

(ii) It is used to clean the parts located in hard to reach places.

(iii) Ultrasonic waves are used in echocardiography.

(iv) It is used in scanners to detect kidney stones and for examining foetus during pregnancy.

3 + ½ × 4

23. (a) It shows that air currents being caused by the uneven heating of air.

(b) The smoke will be drawn towards outside the beaker.

(c) The smoke will be drawn towards inside the beaker.

(d) The patterns revealed by the smoke show us the directions in which hot and cold air move. **1 + 1 + 1 + 2**

24. (a) Virus is a very minute particles, which inactive or non-living outside in environment but if it enters into the cells of host organism, it becomes active. The viruses have few biochemical process of their own and uses the host's biochemical process for their life processess. That means we have very limited biochemical pathway to target for the killing of the viruses. Despite these limitation few effective anti-viral drugs have been developed tor example, AZT drugs have been developed to treat the HIV-AIDS.

(b) In HIV infection, virus doesn't kill the person but virus affect the immune system which consists of B-cell and T-cells. Virus generally affect the T-cell or helper T-cells. So that the immune cells become less efficient to fight against other diseases such as common cold, diarrhoea, etc, and ultimately kills the person suffering from HIV-AIDS. **2½ + 2½**

SECTION 'B'

25. (b) White and white.

26. (c) Exoskeleton of cockroach is made up of chitin.

27. (d) Jointed legs and body covered with feathers.

28. (c) A is monocot (trimerous), B is dicot (pentamerous)

29. (a) They are larva (caterpillar) of mosquito.

30. (d) $\angle i = 90^\circ - 45^\circ = 45^\circ$, $\angle i = \angle r \quad \therefore r = 45^\circ$.

31. (b) The pulse travels slower in B than in A.

32. (b) Least count = $\frac{10}{5}$ = 2 ml, volume shown = 96 ml

33. (d) Equal in all three as weight is irrespective of shape.

34. Velocity of pulse = $v = \frac{d}{t}$ **½**

$= \frac{5}{3}$ **½**

$= 1{\cdot}66$ m/s **1**

35. (a) The body is elongated and segmented.

(b) The body is in bilateral symmetry. **1 + 1**

36. The person exerts least pressure while lying flat on the bed. It is because, in the lying position maximum area of his body is in contact with the bed. As with the increase in area, the pressure decreases, therefore, the person exerts least pressure. **2**

●●

SAMPLE QUESTION PAPER-9

SECTION 'A'

1. K.E. = Work done. **1**

2. Timber or quality of sound. **1**

3. Body will float but slightly, immersed in the fluid. **1**

4. **Sun** : The sun heats up rocks during the day so they expand. At night these rocks cool down and contract. This results in the formation of cracks and ultimately the huge rocks breaks into smaller pieces. **2**

5. O_2 : Oxygen

O_3 : Ozone **¼ + ¼**

Oxygen is necessary for respiration and combustion. **½**

Ozone absorbs harmful ultraviolet radiations from the Sun and prevent them from reaching surface of the Earth. **1**

6. No. of electrons in Al = 13

No. of electrons in Al^{3+} = 10

$\therefore$ Electronic Configuration = 2, 8 **2**

7. (a) A negatively charged ion is called an anion.

(b) (i) NH_4OH (ii) $CaCl_2$.

(c) Molecular mass of $H_2SO_4 = 2 \times 1 + 32 + 4 \times 16$

$= 98$ u **1 + 1 + 1**

8. **Rutherford's model of an atom :**

There is a positively charged centre in an atom called the nucleus and the entire mass of atom resides in the nucleus.

Electrons revolve around the nucleus in well defined orbits.

Size of the nucleus is very small as compared to size of atom. **1 + 1 + 1**

9.

Electron	Proton	Neutron
1. Negatively charged.	Positively charged.	No charge.
2. Present in orbits revolving around the nucleus.	Present in the nucleus.	Present in the nucleus.
3. Mass is $\frac{1}{2000}$ times that of proton.	Mass of a proton is taken as one unit.	Mass is equal to that of proton.

(*any two*) **1½ + 1½ = 3**

10. (a) Saprophytes

(b) Chitin

(c) Protista

(d) Cyanobacteria

(e) Ascaris

(f) Arthropoda **½ × 6**

11. Seed producing plants. They are further classified as : **1**

Gymnosperms, *e.g.*, Cycas. **½ + ½**

Angiosperms, *e.g.*, Mango. **½ + ½**

12. (a) It shows that she is socially responsible girl and trying to do community service.

(b) Organising debates / group discussions etc.

(c) Human Immuno Virus (HIV) is responsible for it. **1 + 1 + 1**

13. (a) When the train passes over a railway track, the whole weight of the train acts on the railway line beneath it. Due to large sized concrete sleepers, the force of weight spreads over a larger area and the pressure is less. As a result the railway track can bear it. **1½**

(b) As long as the bucket is inside the water, its effective weight is less in accordance with Archimedes principle. When the bucket comes out of water, there is no up thrust due to water now. So the weight of bucket appears heavier. **1½**

14. (a) F = 250 g = 250 × 10 = 2500 N

S = 1 m

W = F × S = 2500 × 1 = 2500 J **1**

(b) Zero as there is no displacement. **1**

(c) In order to hold 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**

15. (a) m = 5 kg, h = 10 m, P.E. = mgh = 5 (kg) × (10 m/s^2) × 10 m = 500 J **1**

(b) K.E. = 500 J **1**

(c) $$V = \sqrt{\frac{2E_R}{m}} = \sqrt{\frac{2\times500}{5}} = 14{\cdot}14 \text{ m/s}$$ **1**

16. ν = 400 MHz = 400 × 10^6 Hz **½**

λ = ? **½**

$v = \lambda\nu$

$$\lambda = \frac{v}{\nu}$$ **½**

$$\lambda = \frac{3\times10^8}{400\times10^6} = \frac{3}{4} = 0{\cdot}75 \text{ m}$$ **1½**

17. (1) Presence of high levels of suspended particles like unburnt carbon particles in the atmosphere. Cause visibility to be lowered. In cold weather when water condenses out of air. This is smog.

(2) It increases the incidences of allergies, cancer and heart disease.

(3) On burning oxides of nitrogen and sulphur are formed. They dissolve in rains to give rise to acid rain. **1 × 3 = 3**

18. Weight of solid X in air (W_{air}) = 180 gf

Weight of solid X in water (W_{water}) = 150 gf

Relative density of solid (X) = ?

As, $$\text{R.D. of solid} = \frac{\text{Weight of solid in air}}{\text{Loss of weight of solid in water}}$$

$$= \frac{180}{(180-150)} = \frac{180}{30} = 6$$

Therefore, the relative density (R.D.) of X is 6. **3**

19. (a) (i) $Ca(OH)_2$ (ii) $MgNO_3$

(iii) NH_3Cl (iv) K_2O. **½ × 4**

(b) Mass of 12.044 × 10^{24} atoms of calcium

M = 40 u, N = 12·044 × 10^{24}, N_0 = 6·022 × 10^{23}, m = ?

$$m = \frac{M \times N}{N_0} = \frac{40 \times 12{\cdot}044 \times 10^{24}}{6{\cdot}022 \times 10^{23}} = 800 \text{ g} \qquad \textbf{1}$$

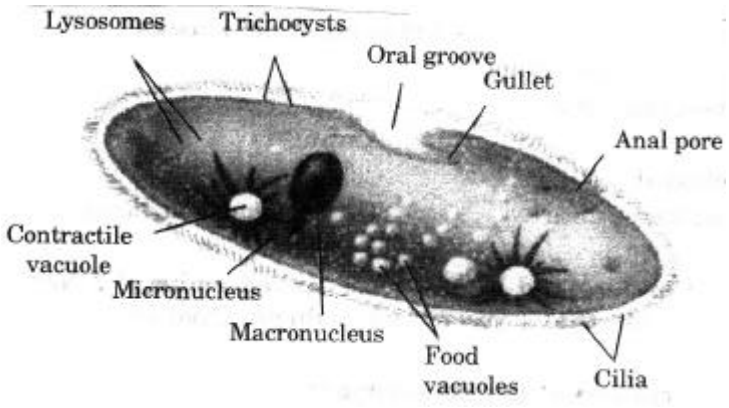
(c) $m = 0.64$ g

$$M = 32 + 32 = 64 \qquad \textbf{2}$$

$$n = ?$$

$$n = \frac{m}{M} = \frac{0{\cdot}64}{64} = 0{\cdot}01 \text{ mole}$$

20. (a)



(b) Soak the seeds for few hours. If they then can be split into two cotyledons, then they are dicots otherwise monocot.

(c) Bryophytes. **3 + 1 + 1**

21. (a)

$$\text{K.E.} = \frac{1}{2} mv^2 \qquad \textbf{½}$$

$$P_1 = P_2 \qquad \textbf{½}$$

$$m_1 v_1 = m_2 v_2$$

$$\text{K.E.}_1 = \frac{1}{2} m_1 v_1 \times v_1 = \frac{1}{2} P_1 \times v_1$$

$$\text{K.E.}_2 = \frac{1}{2} m_2 v_2 \times v_2 = \frac{1}{2} P_1 \times v_2 \qquad \textbf{½}$$

$$\frac{\text{K.E.}_1}{\text{K.E.}_2} = \frac{\frac{1}{2} P_1 V_1}{\frac{1}{2} P_2 V_2} = \frac{v_1}{v_2} \qquad \textbf{½}$$

$$v_1 = v_2 \left(\frac{\text{K.E.}_1}{\text{K.E.}_2} \right) \qquad \textbf{½}$$

$$v_1 > v_2 \qquad \textbf{½}$$

(b) Mass of the object $m = 12$ kg

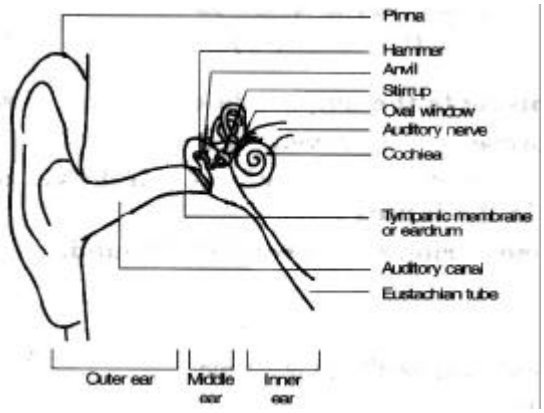
$$\text{Potential energy } P = 480 \text{ J} \qquad \textbf{½}$$

$$E_P = mgh$$

$$480 = 12 \text{ kg} \times 10 \text{ m/s}^2 \times h \qquad \textbf{1}$$

$$h = 4 \text{ m} \qquad \textbf{½}$$

22.



4

Bones of middle ear amplify the vibrations. **1**

23. (a) Glass – transparent sunlight. Glass is transparent and traps sunlignt which heats up the interior. Heat waves do not escape. Interior of the car becomes very hot similar to glass house effect. **2**

(b) Lichens are sensitive to sulphur dioxide which occur in sufficient quantity in Delhi. Delhi is semi arid and atmosphere moisture is low. In Manali and Darjeeling atmosphere is humid. Sulphur dioxide pollution is comparatively low. **2**

(c) Root nodules contain nitrogen fixing bacteria. Nitrogen from atmosphere is converted into organic compounds in soil. **1**

24. (i) Avoid water logging, proper and regular disinfection, use of mosquito net and repellents. **½ + ½ = 1**

(ii) Any two :

Community Service

Social Responsibility

Environmental Protection.

Awareness about healthy living conditions. **2**

(iii) Any two :

Organising compaigns for creating awareness amongst masses.

Organising debates.

Arranging similar community service.

Group discussion. **2**

SECTION 'B'

25. (c) The product will be formed on mixing and we are not able to measure the weight of reactants.

26. (b) Important feature is clitellum.

27. (a) Undifferentiated plant body called thallus.

28. (c) Phylum of earthworm in Annelida.

29. (d) Eggs → larvae → pupa → adult.

30. (b) No. of divisions = $\frac{20-25}{0{\cdot}5} = \frac{5}{0{\cdot}5} = 10$

31. (a) Less area more pressure.

32. (a) Here, $\angle i \neq \angle r$.

33. (b) Backward and forward along the length of slinky.

34. Sound waves travel faster in solids because the modulus of elasticity is more in them. The real cause of sound production is the vibrations produced. **1 + 1**

35. Phylum – Arthropoda.

Scientific name – *Periplaneta americana*. **1 + 1**

36. (1) Spring balance can generally measure correctly upon 1 g. Any change in weight, less than 1 g will not be measured by it. Thus, there can be an error in measuring the weight of the solid.

(2) Measuring cylinder can generally measure correctly upto 1 c c. Any change in volume, less than 1 c c will not be measured by it. Thus, there can be an error in measuring the volume of the solid. **1 + 1**

●●

SAMPLE QUESTION PAPER-10

SECTION 'A'

1. The potential energy possessed by the object is the energy present in it by virtue of its position. **1**

2. Sound (B) because amplitude is large. **1**

3. Hydrometer. **1**

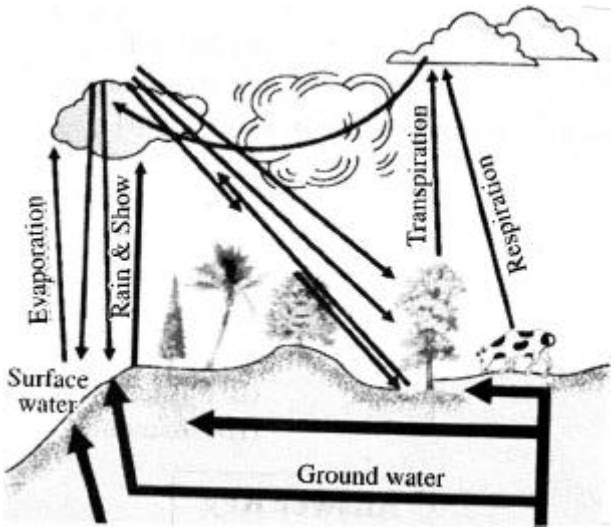
4. (a) (i) Increased the consumption of fossil fuel - increased the production of pollution like CO, SO_2, NO_2, CO_2 etc.

(ii) CFC has led to deplection in ozone layer results in one entry of UV rays in to earth's atmosphere.

(iii) Acid rain.

(iv) Production of green house gases. **½ × 4**

5.



2

6. Atomic weight of an element is equal to the average weight of the isotopes of the element. Since percentage compositions of the two isotopes of bromine are equal, therefore the weight of each isotope of bromine is also equal to 80. Atomic weight and mass number of the isotopes are generally equal, so the mass number of bromine is 80. **2**

7. Atomic mass of Ag = 108 u **1**

Mass of $6{\cdot}022 \times 10^{23}$ atoms of Ag = 108 u **1**

$$\text{Mass of } 3{\cdot}011 \times 10^{23} \text{ atoms of silver} = \frac{108 \times 3{\cdot}011 \times 10^{23}}{6{\cdot}022 \times 10^{23}} = 54 \text{ g}$$

Cost = 64 × 54 = 3420 Rs. **1**

8. (i) At. no. of Y = 8

(ii) Mass no. of X = 8 + 8 = 16 u

(iii) X and Y are isotopes as no. of electrons are same but no. of neutrons are different.

(iv) X – Oxygen.

(v) Electronic Configuration of X = K L
2 6

(vi) Anion is formed – O^{2-} **½ × 6**

9. Isotopes – Protium, Deuterium.

Isobars – Argon, Calcium.

Isotopes have similar chemical property because number of electrons in it is same. Due to difference in no. of neutrons they have same physical properties. **1 + 1 + 1**

10.

S.	Aves	Mammalios
1.	Body is covered externally with feathers.	Hairs cover the body.
2.	They lay eggs.	They give birth to live young ones.
3.	No mammary glands.	They have mammary glands with the help of which they feed their youngones.

1 × 3 = 3

11. Largest group—Arthropoda. **½**

Salient features—have jointed legs, bilaterally symmetrical, segmented, open circulatory system. (*Any three*) **1½**

Examples : Cockroach, prawn, scorpion. (*Any two*) **½ + ½**

12. Volume = $(0{\cdot}1 \times 0{\cdot}1 \times 0{\cdot}1)\ m^3 = 1 \times 10^{-3}\ m^3$

Density = 8×10^3 kg/m^3 **1**

$\therefore$ g = 10 m/s

$\therefore$ Mass = volume × density = 8 kg **1**

W = F = mg = 8 × 10 = 80 N **½**

$A = 10 \times 10\ cm^2 = 10\ cm^2 = 10^{-2}\ m^2$ **½**

$$P = \frac{F}{A} = \frac{W}{A} = \frac{80N}{10^{-2}m^2} = 8 \times 10^3\ Pa$$ **1**

13. (a) M = 5 kg, h = 10 m, P.E. = mgh = 5 (kg) × (10 m/s^2) × 10 m = 500 J

(b) K.E. = 500 J

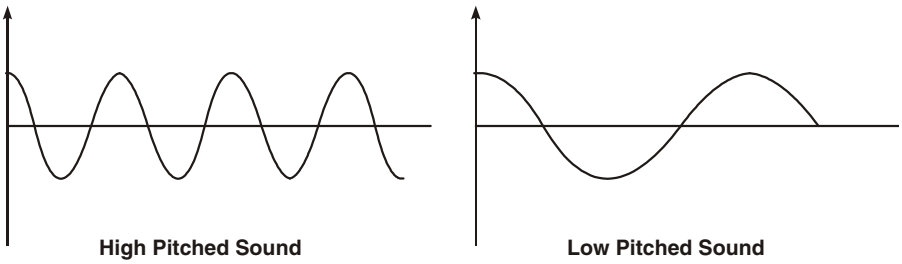
(c) $v = \sqrt{\frac{2K.E.}{m}} = \sqrt{\frac{2\times500}{5}} = 14{\cdot}14$ m/s **1 + 1 + 1**

14. P.E = mgh m = 150 kg g = 10 ms^{-2} M = 7 m

P.E. = 150 × 10 × 7 = 10500 J **2**

One joule of work is said to be done on an object when a force of one Newton displaces it by one metre along the line of action of the force. **1**

15.



They differ in the frequency. **2 + 1**

16. (a) (i) Forest cleans the air.

(ii) They are the source of raw materials for us.

(b) (i) Street plays and skits.

(ii) Debates, group discussions.

(c) Forests attracts rains and increases the amount of fresh water resources. **1 + 1 + 1**

17. Immunisation—The process of inducing immunity by administering a vaccine to allow the immune system to prevent infection or illness when it subsequently encounters the infectious agent.

The principle of immunisation is based on the memory of the immune system on encountering an infectious agent. On subsequent encounters with the same or related microbe, the response of the immune system is multiplied greatly, leading to quick elimination of the infection.

Diseases ⇒ Polio, Typhiod. **1 + 1 + 1**

18. Mass = m, u = 5 m /s, K.E. = 25 J

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

$$m = \frac{25 \times 2}{25} = 2 \text{ kg}$$

$$\text{K.E.} = \frac{1}{2} \times 2 \times (10)^2 = 100 \text{ J} \quad \textbf{1}$$

$$v = 3(5) = 15 \text{ m/s}$$

$$\text{K.E.} = \frac{1}{2} \times 2 \times (15)^2 = 225 \text{ J} \quad \textbf{1}$$

19. (a) A group of atoms carrying a charge is known as polyatomic ion. **1 + 1**

e.g., PO_4^{3-}, SO_4^{2-}, NH_4^{1-}.

(b) Mass of 10 moles of Na_2SO_3 = 10 (23 × 2 + 32 + 16 × 3) = 1260 g **1**

(c) (i) m = 8 g, M = 32 g, N = ?, $N_0 = 6{\cdot}022 \times 10^{23}$

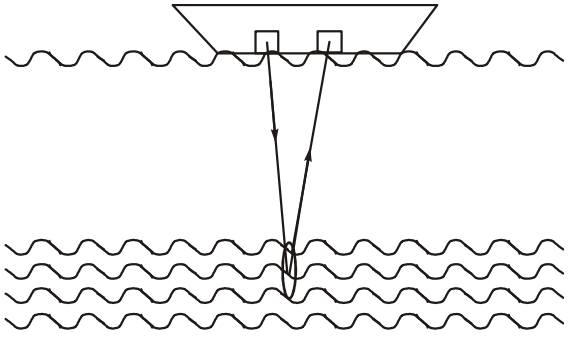
$$n = \frac{m}{M} = \frac{8}{32} = 0{\cdot}25 \quad \textbf{1}$$

$$N = n \times N_0$$
$$= 0{\cdot}25 \times 6{\cdot}022 \times 10^{23}$$
$$= 1{\cdot}50550 \times 10^{23} \text{ molecules}$$

(ii) m = 22 g, M = 44, n = ?

$$n = \frac{m}{M} = \frac{22}{44} = \frac{1}{2} = 0{\cdot}5 \text{ mole} \quad \textbf{1}$$

20. (a) SONAR is a device which is used to measure distance, direction and speed of underwater objects by using a device called SONAR.



SONAR is a device which consists of a transmitter and a detector that are installed in a ship or a boat. The transmitter produces and transmits ultrasonic waves. These waves travel through water and after striking the underwater objects get reflected back and are sensed by the detector. Let the time interval between the transmission and reception of ultrasound

signal be 't' and speed of sound through sea water be 'u'. The total distance, '$2d$' travelled by the ultrasound is then, $2d = v \times t$. Thus the underwater object is located by the method of echo ranging. **2**

(b) Speed of ultrasound in sea water (v) = 1531 m/s **1**

Time between transmission and detection (t) = 6 s

Let 'd' be the distance between the object and the submarine then $2 \times d$ = speed of sound in sea water × time

$$2\,d = 1531 \text{ m/s} \times 6 \text{ s} = 9186 \text{ m}$$

$$d = \frac{9186}{2} = 4593 \text{ m} \quad \textbf{2}$$

21. (a) While going up K.E → P.E. and going down P.E. → K.E.

At A → K.E.

B → P.E.

C → K.E. + P.E.

(b) Total Energy = mgh

$= 20 \times 10 \times 100 = 2 \times 10^4$ J **1**

After Ist second : $v = u + gt$ ms^{-1} = 10 × 1 = 10 **1**

$$\text{K.E.} = \text{m}v^2 = \frac{1}{2} \times 10 \times 10 = 500 \text{ J}$$

P.E. = T.E. – K.E. = 19,500 J = 20,000 – 500

$v = 20$ ms^{-1} **1**

After IInd second : $\text{K.E.} = \frac{1}{2} \times 10 \times 20 \times 20 = 2{,}000$ J

P.E. = T.E. – K.E. = 20,000 – 2,000 = 18,000 J **1**

$v = 30$ ms^{-1}

After IIIrd second : $\text{K.E.} = \frac{1}{2} \times 10 \times 30 \times 30 = 4500$ J

P.E. = T.E. – K.E. = 20,000 – 4,500 = 15,500 J **1**

22. (a) Biologically nitrogen is fixed by the bacterias living in the root nodules of leguminous plants and physically fix through lightning. **2**

(b) (i) X = Denitrification, Y = Ammonification. **2**

(ii) Denitrifying hacterias convert the nitrate compounds back to nitrogen which releases into the atmosphere. This process is called denitrification. **1**

23. (a) **Features of Ambhibians :**

(i) They are cold blooded.

(ii) They have three chambered heart. **2**

(b) (i) Reptiles

(ii) Echinoderms

(iii) Arthropods. **3**

24. Biodiversity or diversity of life form is commonly refer so the variety of living beings or organisms found in a particular region. They all share a particular habitat, environment and affected by each other, this leads to a stable community of different species comes into existence. On the other hand, diversity in these communities are also affected by land or soil, water, air, light, climatic condition, humidity, etc. The warm and humid climate has greater impart on the diversity of life forms. The tropical region of the earth, between the tropic of cancer and the tropic of capricorn are rich in diversity of animal and plant life. This is reason that this zone is termed as the zone of megadiversity. **5**

SECTION 'B'

25. (d) The law conservation of mass is followed in B but not in A.

26. (c) It is earthform as clitellum is present in it.

27. (b) Egg $\rightarrow$ larva $\rightarrow$ pupa $\rightarrow$ adult.

28. (d) In reflection troughs are made.

29. (c) $D = \frac{m}{v} = \frac{100}{30} = 3{\cdot}33$ g/ml

30. (a) Load should be fully submerged with a fine thread.

31. (b) Earthworm, leich belongs to Annelida.

32. (b) Antennae.

33. (c) Distance is 5 times movement of pulse = $5 \times 2 \times 2 = 20$ m

Time = 10 sec. Speed = $\frac{20}{10} = 2$ m/s

34. Distance covered in 4 to and fro motions

$= 4 \times 2 \times 25$ cm $= 200$ cm $= 2$ m, Time $= 2{\cdot}8$ s

$\therefore$ Speed of pulse $= \frac{\text{Distance}}{\text{Time}} = \frac{2\text{ m}}{2{\cdot}8\text{ s}} = \frac{20}{28}\frac{\text{m}}{\text{s}} = \frac{5}{7}\frac{\text{m}}{\text{s}} = 0{\cdot}71\ \text{ms}^{-1}$ **2**

35. (a) Seeds are nacked.

(b) They have xylem tracheids. **1 + 1**

36. $P_1 = \frac{F}{4\text{ cm}^2}$; $P_2 = \frac{F}{9\text{ cm}^2}$ $\therefore P_1 : P_2 = 9 : 4$ **2**

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