SUMMATIVE ASSESSMENT – II, 2015, SCIENCE, Class – IX

1 mark

[JST201502]

1. Write the symbols of the following elements. (a) Iron (b) Silver

2. State the phylum to which antedon (feather star) and asterias (Starfish) belong.

3. Mention two factors that influence the pattern of winds.

2 marks

4. Distinguish between Bryophyta and Thallophyta stating two examples of each.

5. List the causative organisms for the following diseases.

(i) Kala-azar (ii) Sleeping sickness (iii) Acne (iv) AIDS

6. The volume of 50g of a substance is 20cm3. If the density of water is 1 g/cm3, will the substance float or sink in water ? Justify your answer.

7. What is the work done by the force of gravity in the following cases ?

(a) Satellite moving around the earth in a circular orbit of radius 35000 km.

(b) A stone of mass 250 g is thrown up through a height of 2.5 m.

3 marks

8. Define formula unit mass ? How is it calculated. ? Write the formula unit mass of $(NH4)_2$ SO4 . (Given atomic mass : N = 14 u, H= 1 u, S = 32 u, O= 16 u).

9. (a) If an atom contains one electron and one proton Will it carry any charge or not ?

(b) On the basis of Thomson's model of an atom explain how the atom is electrically neutral.

10. (a) If the K and L shells of an atom are full then what would be the number of electrons in the atom ?

(b) Helium atom has atomic mass of 4u and has 2 protons in its nucleus. How many neutrons does it have ?

(c) Why are isotopes of an element chemically similar ?

11. Draw diagram of hydra and label the following parts : Tentacles, Stinging cells, Gastrovascular Cavity, Epidermis

12. State appropriate terms for the following :

(i) Animals that are able to maintain a certain body temperature over a wide range of temperature in the environment

(ii) Plants which bear naked seeds (iii) Animals which have pseudocoelom.

13. (a) If penicillin is given to a patient suffering from Jaundice, it doesn't have any effect on the infection. Why

(b) Name a disease which has been eradicated from the world.

(c) State the principle behind its eradication

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

15. (a) An arrow moves forward when released from a stretched bow. Explain the transformation of energy in the process.

(b) A boy of mass 50 kg climbs up a vertical height of 100 m. Calculate the amount of potential energy he gains.

16. (a) What is the commercial unit of energy ? Give its relationship with S.I. unit of energy. (b) An electric bulb of 60 W is lighted for 10 hrs. every day. How many units of electrical energy is consumed by this bulb in one day.

17. (a) Draw the sound waves for a low pitched and the high pitched sound. (b) Write one use of ultrasonography. (c) Which wave property determines pitch ?

18. (a) Name the process by which carbon is incorporated into life forms ? Also name a process by which carbon is recycled back into the atmosphere. (b) What would happen if the percentage of carbon dioxide increases in the atmosphere ?

19. (i) What is the main function of ozone layer that is present in the atmosphere ? (ii) How are CFC's harmful to us ? (iii) What is smog ?

5 Marks

20. An element $^{14}_{7}A$ exists as diatomic gas in nature which is relatively inert and forms 78% of earth's atmosphere.

(a) Identify the gas and write its molecular formula. Write the formulae of its nitrite and nitrate ions.

(b) How many moles of this gas would contain 12.044□1023 atoms of this element. (Aragadros No= 6.22×10^{23})

(c) Calculate the molecular mass of : (i) NH_4NO_3 and(ii) HNO_3 (Given atomic mass N=14 u, O=16 u H = 1 u)

OR

(a) A sample of vitamin C is known to contain $2.58 = 10^{24}$ oxygen atoms $^{16}_{8}O$ How many moles of oxygen atoms are present in the sample. (Aragadros No= 6.22×10^{23})

(b) Write another elemental form of this element (oxygen). (c) Find the valency of oxygen in CO_2 and MgO.

21. (a) State two characteristic features of vertebrates

(b) State reasons for each of the following statements

(i) Echidna and platypus lay eggs but considered as mammals. (ii) Forelimbs of birds are modified.

(iii) Crocodiles have four chambered heart but are still reptiles.

OR

(a) State two characteristic features of amphibians.

(b) Identify the following organisms.

i) Cold blooded animals that lay eggs in water and have three chambered heart

(ii) Spiny skinned organisms which have a peculiar water-drivern tube system that they use for moving around. (iii) Organisms which have an open circulatory system having blood filled coelomic cavity.

22. (a) Derive an expression for Kinetic energy of a body having mass 'm' and moving with a velocity v. (b) When velocity of a body is increased 5 times, what is the change in its kinetic energy ? (c) Two masses m and 2m are dropped from heights h and 2 h. On reaching ground, which will have a greater Kinetic Energy and why ?

OR,

(a) State the law of conservation of energy. (b) What is the work done to increase the velocity of a car from 36 km/hr to 72 km/hr if the mass of the car is 1500 kg. Does the work done by the force have a + ve or a - ve magnitude ? (c) Where does an oscillating pendulum has maximum PE and KE ?

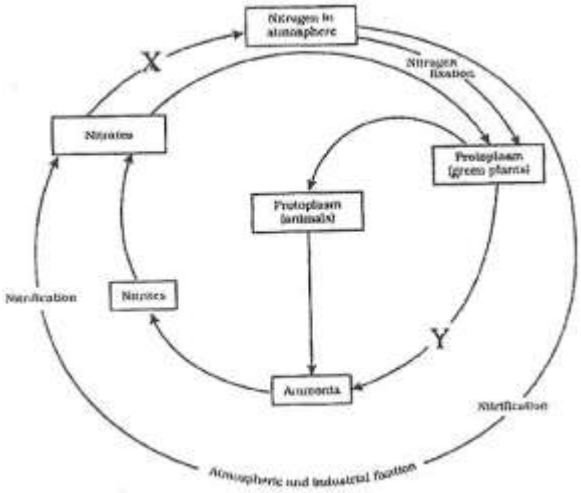
23. (a) What is reverberation ? Write two ways of reducing reverberation. (b) Distinguish between tone and note.

(c) With the help of a simple diagram, explain how defects in a metal block can be detected using ultrasound.

OR,

(a) With the help of a diagram, explain how the SONAR method is used to locate the underwater objects ?

(b) A SONAR device on a submarine sends out a signal and receives an Echo 6 second later. If the speed of sound in salt water is 1531 m/s, calculate the distance between the object and the submarine.

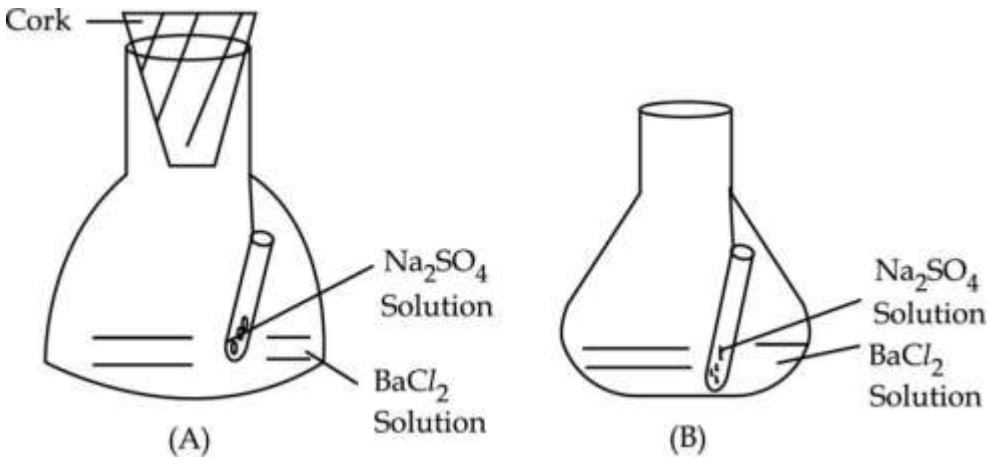


24. (a) Explain the Biological and Physical methods of Nitrogen fixation. (b) (i) Complete the Nitrogen Cycle in nature by labelling 'X' and 'Y' in the Biogeochemical Cycle shown below : (ii) Explain the part marked 'X'.

OR, (a) With the help of labelled diagram, show Oxygen Cycle in nature. (b) Give reason-Why the process of Nitrogen fixation by bacteria does not take place in presence of oxygen ? (c) (i) Name a process by which oxygen is utilized from the atmosphere. (ii) Name the process by which oxygen is returned to the atmosphere.

SECTION - B /

25. Two Experimental setups are shown below to verify the law of conservation of mass. Which amongst the following is a correct option ?



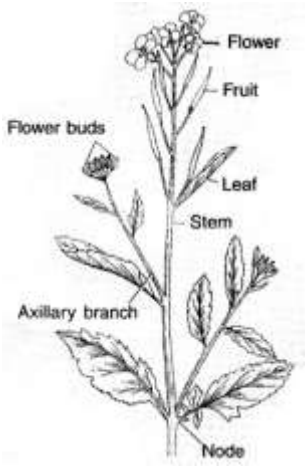
(a) (A) because no gas is allowed to escape.
(b) (B) because gas is allowed to escape.

(c) Both (A) and (B) can not be used as it is always to be carried out in a test tube.
(d) Both (A) and (B) can be used as no gas is evolved in this case.

26. To verify the law of conservation of mass, which one is the correct statement for the following chemical reactions. (A) Burning of 16 g of coal in 32 g of oxygen. (B) Mixing of 208.5 g of BaCl2 solution and 142 g of Na2SO4 solution.
(a) Law of conservation of mass is not followed in these two cases
(b) Law of conservation of mass is followed in (A) but not in (B)
(c) Law of conservation of mass is followed in both (A) and (B)
(d) Law of conservation of mass is followed in (B) but not in (A)

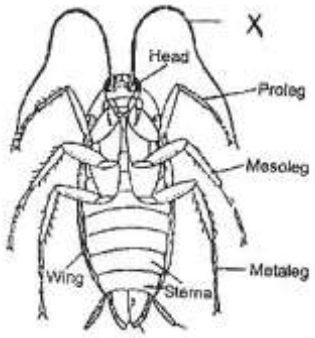
27. Preeti studied a preserved specimen, 'a' and observed the following features. Bilateral symmetry, True segmentation, Clitellum, Mouth She identified the organism 'a' as :-
(a) Tapeworm (b) Cockroach (c) Earthworm (d) Roundworm

28.After observing the features of an angiospermic plant as shown below a student reported that the kind of plant it is



(a) monocot (b) dicot (c) pinus (d) spirogyra

29. Anushka forgot to label the part marked 'x' in the given figure. Identify the part :



(a) Spiracles (b) Antennae (c) Appendages / Legs (d) Wings

30. The features that best describe the spirogyra are :-

a) Multi cellular, autotrophic, root like rhizoids (b) Cytoplasmic strands, autotrophic, presence of rhizome

(c) Presence of male cones, non-vascular, filamentous

(d) Filamentous, presence of cytoplasmic strands, presence of Pyranoids.

31. Select the correct observations of leaves and seeds of pea plants as reported by four different students.

(a) Reticulated venation in leaves and dicotyledonous seeds

(b) Reticulated venation in leaves and monocotyledonous seeds

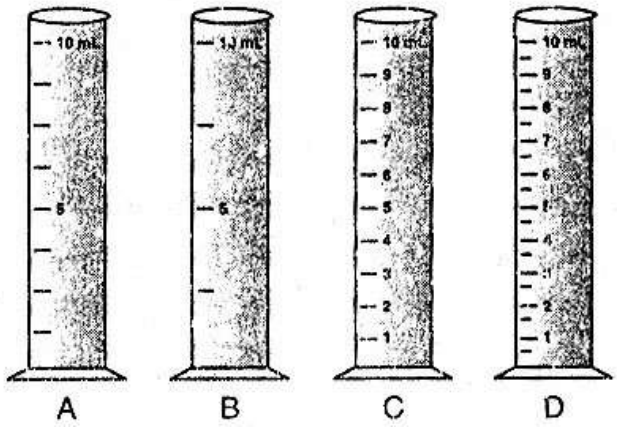
(c) Parallel venation in leaves and dicotyledonous seeds

(d) Parallel venation in leaves and monocotyledonous seeds

32.The different stages in the life cycle of a mosquito are given below – pupa eggs larva adult I II III IV The correct sequence of the stages in the life cycle of mosquito are –

(a) I II III IV (b) II III I IV (c) IV II I III (d) III II I IV

33. Four measuring cylinder are given below. The cylinder which has maximum least count is :

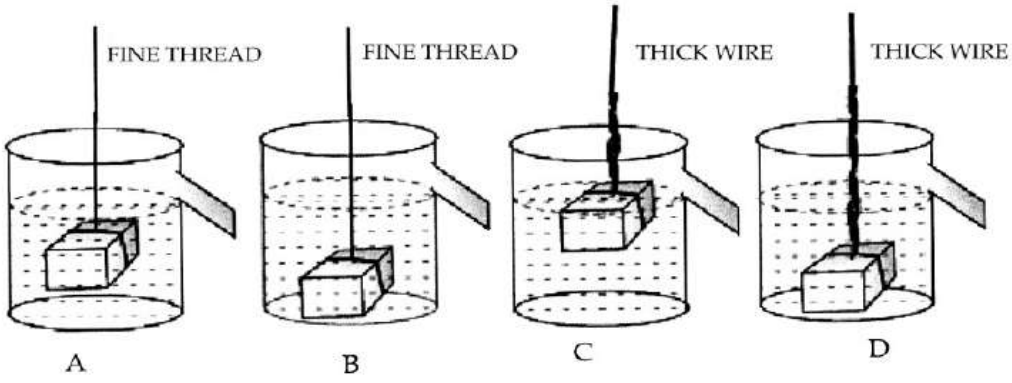


(a) A (b) B (c) C (d) D

34. Meera was given a solid sphere of a metal of mass 100g. She immersed it in a measuring cylinder and found that the level of water was raised by 30 mL. The density of the metal as measured by her would be :

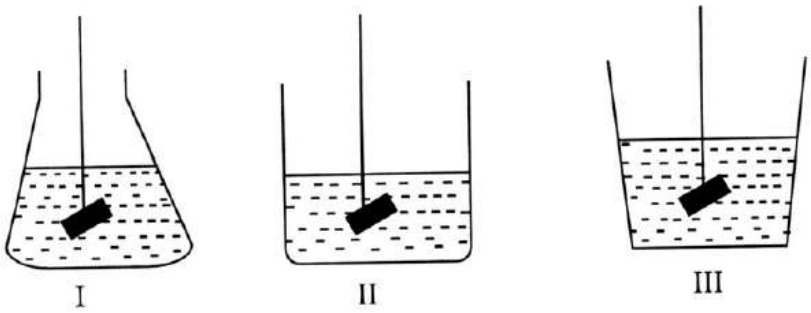
(a) 3000 g/mL (b) 0.3 g/mL (c) 3.33 g/mL (d) 300 g/mL

35. The correct set up shown for an experiment to establish relationship between loss in weight of an immersed solid with the weight of water displaced by it is :



(a) A (b) B (c) C (d) D

36. A body is weighed in liquid by immersing it fully in each of the three containers shown. The apparent weight of the solid will be :



(a) Least in I (b) Least in II (c) Least in III (d) Equal in all

37. An iron cuboid of dimensions 100 cm □ 60 cm □ 10 cm when placed on a bed of sand will depress the sand bed the least, when it is made to lie on the face having dimensions :

(a) 100 cm □ 10 cm (b) 100 cm □ 60 cm (c) 60 cm □ 10 cm (d) the pressure will be same for all the surfaces

38.Student A placed the iron cuboid gently on the loose sand while B placed it on the surface of table top. Who will observe the exerted pressure by the cuboid easily ?

(a) A (b) B (c) Both A and B (d) Neither A nor B

39.While studying the laws of reflection of sound, the student couldn't hear the reflected sound of the clock when one of the pipes is raised vertically up. Which law is violated ?

(a) Angles of incidence and reflection are equal

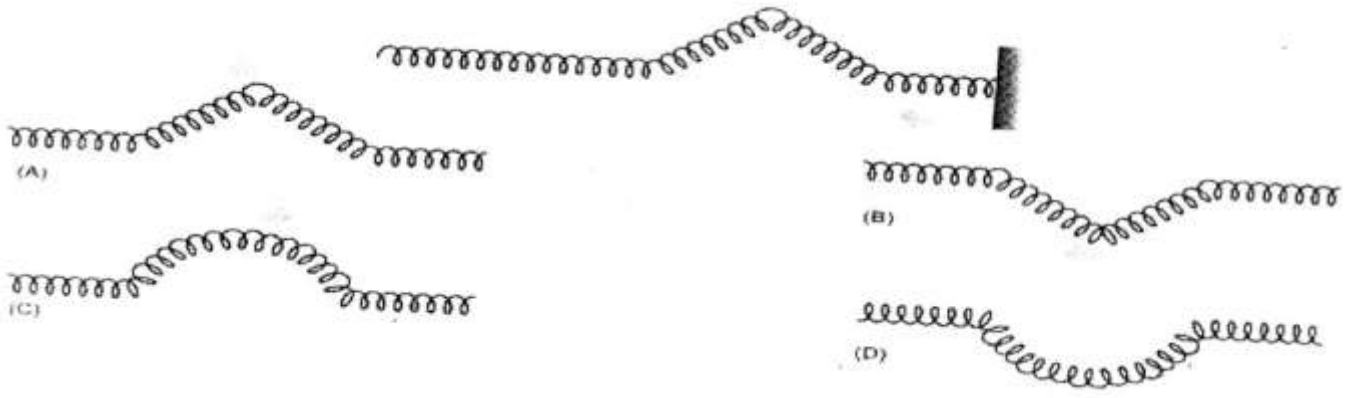
(b) Incident sound wave, normal and reflected sound wave all lie in the same plane

(c) Both of these (d) None of these

40.While studying the laws of reflection of sound three students used different reflecting surfaces. The best result would be obtained by the student using the reflecting surface

(a) a thermocole sheet (b) a polished, plain metal sheet (c) a rough card board sheet (d) a cushioned chair

41. The following figure shows an incident pulse P reflected from a rigid support. Which one of A, B, C, D represent the reflected Pulse correctly ?



(a) A (b) B (c) C (d) D

1. Fe, Ag **1**

2. Echinodermata. **1**

3. Two factors that influence the pattern of winds are – uneven heating of the atmosphere, rotation of the earth and presence of mountain ranges. (any two) **½+½**

4. Thallophyta – do not have well differentiated body design. **½**
Eg. Spirogyra, Ulothrix. Ulva, Chara (any two) **½**
Bryophyta-plant body is differentiated to form stem and leaf like structures **½**
Eg. Riccia, Funaria, Marchantia (any two) **½**

5.

(i)	Kala-azar	-	Leishmania	**½x4=2**
(ii)	Sleeping sickness	-	Trypanosoma	
(iii)	Acne	-	Staphylococci	
(iv)	AIDS	-	Human immune deficiency virus	

6. Density of body $= \frac{50}{20} = 2.5\ g/cm^3$ **2**

Since density of body greater than water the body will sink. **(1+1)**

7. (a) Zero **1**
(b) $mgh = 0.25 \times 10 \times 25 = -6.25\ J$ **1**

8. It is the sum of the atomic masses of all atoms in a formula unit of a compound. It is calculated by adding the atomic masses of all the atoms present in one formula unit. Formula unit mass of $(NH_4)_2\ SO_4$ **1,1**
$= 14 \times 2 + 4 \times 2 + 32 + 16 \times 4 = 132u.$

9. (a) No. of protons = No. of Electrons **1**
Hence no charge. Atom is neutral. **1**
(b) The positive charge due to protons and negative charge due to electrons balance each other. Atom is neutral. **1**

10. (a) No. of electrons in K shell = 2
No. of electrons in L shell = 8
Total = 10 **½**
½
(b) mass no. of helium is = 4
No. of protons = 2 **½**
No. of neutrons = 4 – 2 = 2 **½**
(c) Isotopes of an element have the same atomic number. Hence same no. of electrons. Electrons are the sub atomic particles involved in chemical reactions. **1**

11. Diagram ref. Tex. Page 89, fig. 7.13. **1**
Labelling of tentacles, stinging cells, gastro vascular cavity, epidermis **½x4=2**

12. (a) Warm blooded animals
(b) gymnosperms
(c) Nematodes as ascaris

13. (a) Jaundice is caused by Virus. **1**
Penicillin is an antibiotic which can block biochemical pathways in Bacteria. Viruses do not use such pathways.
(b) Small pox.
(c) Based on the principle of immunization by small pox vaccine. **1**
1

14. (i) Downward gravitational force and upward buoyant force. ½,½

(ii) Upward force depends upon density of the fluid **1**

(iii) The object will sink in the fluid if the density of the object is more than the density of the fluid **1**

15. (a) While stretching, mechanical energy → Potential energy of stretched stny K.E of arrow. ½+½ **2**

(b) $PE = mgh = 50 \times 10 \times 100 = 5000\ J$

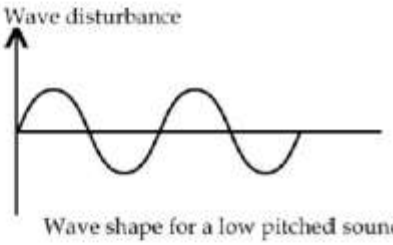
16. (a) kWhr. 1 kWhr = 3600000 J **1**

(b) $E = P \times T$ ½

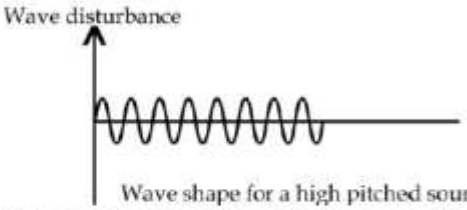
$= 60 \times 10 = 600$

$= 0.6$ units 1½

17. (a)



Wave shape for a low pitched sound ½+½



Wave shape for a high pitched sound

(b) Ultrasonography is used for examination of the foetus during pregnancy to detect congenial defects and growth abnormalities/any other use from the text book page no. 171. **1**

(c) frequency **1**

18. (a) Carbon is incorporated into life forms through the basic process of photosynthesis. Process by which carbon is recycled back – respiration/combustion. ½+½

(b) Carbon dioxide is a green house gas. If the percentage of such a gas increase in the atmosphere, it would cause the average temperature to increase world wide. This is called Green house effect. This further leads to Global Warming. **2**

19. (i) Ozone layer absorbs harmful ultraviolet radiations from the sun and prevents these radiations from reaching the surface of the earth. **1**

(ii) CFC's persist in the atmosphere. When they reach the ozone layer, they react with the ozone molecule which results in the depletion of ozone layer. **1**

(iii) Smog – Pressure of high level of pollutants in the atmosphere along with condensed water (fog) especially in cold weather. **1**

20. (a) Nitrogen gas, N_2 **1**

Nitrite ion NO_2^-

Nitrate ion NO_3^-

(b) 1 mole of N_2 gas = 6.022×10^{23} molecules of N_2 1

= 12.044×10^{23} atoms of N 2

(c) $NH_4NO_3 = 14 + 1 \times 4 + 14 + 16 \times 3 = 80u.$

$HNO_3 = 1 + 14 + 16 \times 3 = 63u$ 1

OR

(a) no. of moles $= \frac{2.58 \times 10^{24}}{6.022 \times 10^{23}} = 4.28$ mol 1,1

(b) O_3 – ozone layer – 1

(c) Valency of oxygen in CO_2 = 2 1,1

Valency of oxygen in MgO = 2

21. (a) Refer NCERT Book Page 92

(b) (i) They have mammary glands for the production of milk to nourish their young ones

(ii) To reduce body weight for flight.

(iii) Crocodiles are cold blooded, lay eggs, have Scale on their body.

OR

(a) Refer NCERT Book Page 93

(b) (i) Reptiles (ii) Echinoderms (iii) Arthropods

22. (a) $KE = \frac{1}{2}mv^2$ refer text 2

(b) KE increases by 25 times 1

(c) Body with mass 2m because greater the height greater is the potential energy. Hence greater kinetic energy. 2

OR

(a) Energy can neither be created nor be destroyed but can be changed from one form to another. 1

(b) $W = \frac{1}{2} \times m \times v \times v$

$KE\ 1 = \frac{1}{2} \times 1500 \times 10 \times 10$

$= 75000$ J ½

$KE\ 2 = \frac{1}{2} \times 1500 \times 20 \times 20$

$= 300000$ J ½

$W = KE2 - KE1$ 1

$= 300000 - 75000$ 1

$= 225000$ J

Work done is + ve

(c) PE max – extreme ends ½

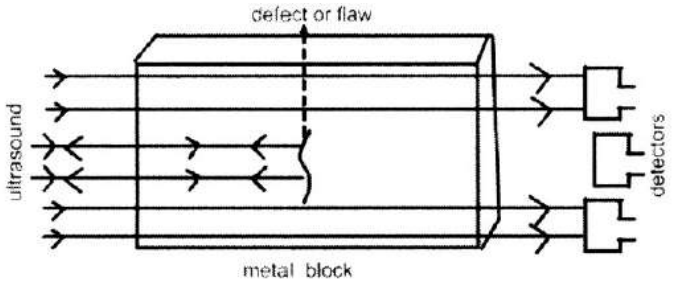
KE max – mean position ½

23. (a) The persistence of sound in an auditorium is the result of repeated reflections of sound and is called reverberation. 1

(b) A sound of single frequency is called a tone. ½

The sound which is produced due to a mixture of several frequencies is called a note. ½

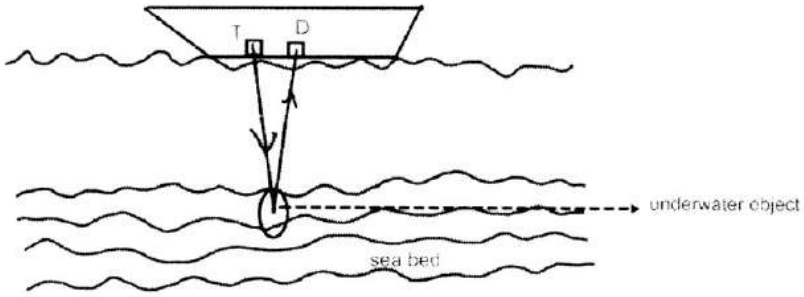
(c) Ultrasounds can be used to detect cracks and flaws in metal blocks. The cracks or holes inside the metal blocks, which are invisible from outside reduces the strength of the structure. Ultrasonic waves are allowed to pass through the metal block and detectors are used to detect the transmitted waves. If there is even a small defect, the ultrasound gets reflected back indicating the presence of the flaw or defect. **2**



1

OR

(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 'v'. 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**



1

(b) Speed of ultrasound in seawater (v) = 1531 m/s
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 seawater × time **½**
$2d = 1531 \text{ m/s} \times 6 \text{ s} = 9186 \text{ m}$

Therefore $d = 9186/2 = 4593$ m **1**
½

24.	(a)	**Biological method –** Nitrogen fixing bacteria associated with species of dicot plants /in the root nodules of leguminous plants convert free Nitrogen/inert nitrogen into Nitrates and Nitrites which can be utilized by the plants.	**1**
		Physical method – During lighting, high temperatures and pressures created in the air convert Nitrogen into oxides of Nitrogen. These oxides dissolves in water to give nitric and nitrous acids and fall on ground along with rain. These are then utilized by the plants.	**1+1=2**
	(b)	(i) fig 14.6 page, 198, NCERT book X = Denitrification Y = Ammonification	**1**
		(ii) X = Denitrification – Conversion of nitrates and nitrites by a different type of bacteria into elemental nitrogen.	**1**
		OR	
	(a)	Fig. 14.8, page 200, NCERT book	**2**
	(b)	The process of Nitrogen fixation does not take place in presence of oxygen because the bacteria are poisoned by the elemental form of oxygen.	**1**
	(c)	(i) Combustion, Respiration and in the formation of oxides of nitrogen.	**½+½+½**
		(ii) Photosynthesis	**½**
25.	(a)		**1**
26.	(c)		**1**
27.	(c)		**1**
28.	(b)		**1**
29.	(b)		**1**
30.	(d)		**1**
31.	(a)		**1**
32.	(b)		**1**
33.	(b)		**1**
34.	(c)		**1**
35.	(a)		**1**
36.	(d)		**1**
37.	(b)		**1**
38.	(a)		**1**
39.	(b)		**1**
40.	(b)		**1**
41.	(b)		**1**
42.	(d)		**1**