

**SYLLABUS
SCIENCE (086)
S.A.-II (2012-13)
CLASS-IX**

Second Term		TotalMarks : 90
Units		Marks
I	Matter - Its Nature and Behaviour	17
II	Organisation in the Living World	25
III	Motion, Force and Work	36
IV	Our Environment	12
	TOTAL	90

**The Question Paper will include value based question(s)
To the extent of 3-5 marks.**

- **The Problem Solving Assessment will be conducted for all students of class IX in Jan – Feb 2013 and the details are available in a separate circular.**
- **The ‘Problem Solving Assessment’ (CBSE-PSA) will be counted towards FA-4 which is 10% of total assessments of Class IX. This assessment will also be carried forward towards the FA-4 in Class X. This score will be reflected in one Language (English or Hindi), Mathematics, Science and Social Science w.e.f the session 2012-2013 for Class IX and 2013 – 14 for Class X.**
- **The same score will be reflected in FA-4 for class IX and Class X. The students will have the option to improve their PSA Score in Class X, as they can sit for the test with Class IX students of the Session 2013-2014 in January – February 2014. The best scores will be reflected in the final certificate in case of those applying for improvement.**
- **The schools which have already planned their time table and other details regarding FA-4 will take the best scores of FA-3 and FA-4 to count towards the total 10%, now available for FA-3 and FA-4 taken together.**

Theme : Materials

(28 Periods)

Unit : Matter - Nature and Behaviour

Particle nature, basic units :atoms and molecules. Law of constant proportions.Atomic and molecular masses.

Mole Concept :Relationship of mole to mass of the particles and numbers. Valency.Chemical formula of commoncompounds.

Structure of atom :Electrons, protons and neutrons; Isotopes and isobars.

Theme : The World of The Living

(23 Periods)

Unit : Organization in the living World.

Biological Diversity :Diversity of plants and animals - basic issues in scientific naming, basis of classification.Hierarchy of categories / groups, Major groups of plants (salient features) (Bacteria, Thalophyta, Bryophyta,Pteridophyta, gymnosperms and Angiosperms). Major groups of animals (salient features) (Non-chordates upto phyla and chordates upto classes).

Health and Diseases :Health and its failure. Infectious and Non-infectious diseases, their causes and manifestation.Diseases caused by microbes (Virus, Bacteria and protozoans) and their prevention, Principles of treatment and prevention. Pulse polio programmes.

Theme : Moving Things, People and Ideas

(24 Periods)

Unit : Motion, Force and Work

Floatation :Thrust and pressure. Archimedes' principle, buoyancy, elementary idea of relative density.

Work, energy and power :Work done by a force, energy, power; kinetic and potential energy; law of conservation of energy.

Sound :Nature of sound and its propagation in various media, speed of sound, range of hearing in humans; ultrasound; reflection of sound; echo and SONAR.

Structure of the human ear (auditory aspect only).

Theme : Natural Resources

(15 Periods)

Unit : Our environment

Physical resources :Air, Water, Soil.

Air for respiration, for combustion, for moderating temperatures; movements of air and its role in bringing rains across India.

Air, water and soil pollution (brief introduction). Holes in ozone layer and the probable damages.

Bio-geo chemical cycles in nature :Water, oxygen, carbon and nitrogen

PRACTICALS

Practical should be conducted alongside the concepts taught in theory classes.

SECOND TERM

1. To verify laws of reflection of sound.
2. To determine the density of solid (denser than water) by using a spring balance and a measuring cylinder.
3. To establish the relation between the loss in weight of a solid when fully immersed in
 - a. tap water
 - b. strongly salty water, with the weight of water displaced by it by taking at least two different solids.
4. To observe and compare the pressure exerted by a solid iron cuboid on fine sand/ wheat flour while resting on its three different faces and to calculate the pressure exerted in the three different cases.
5. To determine the velocity of a pulse propagated through a stretched string/slinky.
6. To study the characteristic of Spirogyra/Agaricus, Moss/Fern, Pinus(either with male or female cone) and an Angiospermic plant. Draw and give two identifying features of groups they belong to.
7. To observe and draw the given specimens-earthworm, cockroach, bony fish and bird. For each specimen record:
 - a. one specific feature of its phylum.
 - b. one adaptive feature with reference to its habitat.
8. To verify the law of conservation of mass in a chemical reaction.
9. To study the external features of root, stem, leaf and flower of monocot and dicot plants.
10. To study the life cycle of mosquito.

DESIGN OF QUESTION PAPER
SCIENCE (086)
CLASS – IX
S.A. – II (2012-13)

UNIT No.	NAME OF THE UNIT	WEIGHTAGE
I	Matter : It's Nature and Behaviour: Atoms and Molecules Structure of the atom	17
II	Organisation in the living world: Diversity in living organisms Why do we fall ill?	25
III	Motion, Force and work: Floatation Work energy and power Sound	36
IV	Our environment: Natural Resources	12
Total		90

S. NO.	Type of Questions	Marks for each question	NUMBER OF QUESTIONS	MARKS
1.	MCQ	1	18	18
2.	VSA	1	3	3
3.	SA (I)	2	4	8
4.	SA (II)	3	12	36
5.	LA	5	5	25
TOTAL			42	90

**The question paper will include value based question(s)
to the extent of 3-5 marks**

**The Question Paper will not have any choice(s) in any of
the questions.**

SAMPLE QUESTIONS

SCIENCE (086) CLASS – IX S.A. – II (2012-13)

VSA

- Que. 1 Find the ratio by mass of the elements present in molecule of ammonia (NH_3). Given that, atomic mass $\text{N}=14$, $\text{H}=1$
- Que. 2 Write the electronic configuration of an element whose atomic number is 12.
- Que. 3 A student picks up four books from the floor, walks across the room through some distance with the books at the same height and then keeps these books at the new place. In which of these sequence of actions work is said to be performed ?
- Que. 4 A body is fully immersed in water to a depth of 2m, 4m and then 5 m, in turn. Will the loss in its weight be equal or different in three cases? If different, in which case will it be least ?

ANSWER KEY

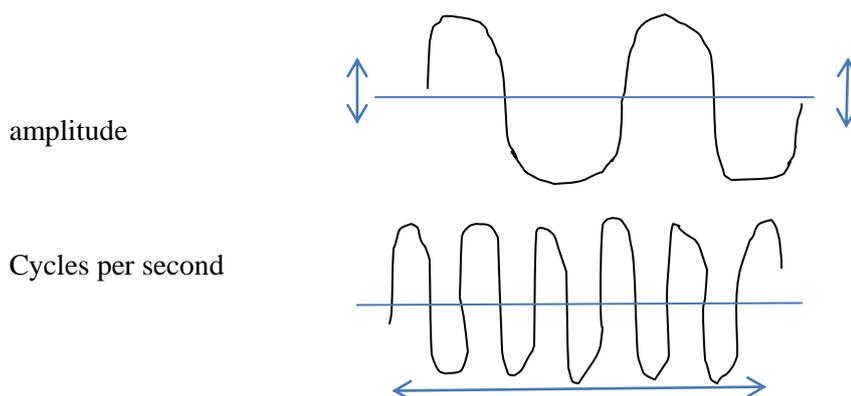
- Ans. 1 N : N (Ratio by mass) 1
14 : 3 x 1 14 : 3
- Ans.2 K , L , M 1
2 , 8 , 2
- Ans. 3 When the student is picking up books from the floor in the beginning.
Ans.4 Equal

SA I

- Que. 5 Calculate the number of moles for 60g of He (finding mole from mass). Given, atomic mass of He = 4u
- Que. 6 Write chemical formulae of
(i) Hydrogen sulphide (ii) Iron s(II) chloride
- Que. 7 List any two practices you would like to follow in order to maintain good health.
- Que. 8 The volume of a body of mass 50 g is 20 cm^3 . If the density of water is taken as 1 g cm^{-3} , will the substance float or sink in water? Why?
- Que. 9 Which wave characteristics determine the
(a) Loudness (b) pitch of sound?
Draw two different waveforms and mark these characteristics on it.

ANSWER KEY

- Ans. 5 Atomic mass of He = 4 u (2)
Molar mass of He = 4g
- Thus, number of moles = $\frac{\text{Given mass}}{\text{Molar mass}} = n = \frac{m}{M} = \frac{60}{4} = 15$
- Ans. 6 (i) H_2S (ii) FeCl_2 (1+1)
- Ans. 7 Balanced diet, personal and community hygiene, congenial environment (any two) (1+1)
- Ans. 8 It will sink. The weight of the body is greater than the weight of water displaced by it.
- Ans. 9 (a) amplitude
(b) Frequency



SA II

- Que. 10 List any three distinguishing features between the models of an atom proposed by J.J Thomson and Ernest Rutherford.
- Que. 11 Calculate the mass percentage of oxygen present in the following compounds and state the law of chemical combination associated. Given, H=1, O=16.
(i) Water (H₂O) and (ii) Hydrogen peroxide (H₂O₂)
- Que. 12 List in tabular form, three distinguishing features of dicot plants with monocot plants.
- Que. 13 State the meaning of immunisation. Mention the principle on which it is based. List two diseases for which vaccines are provided under public health program.
- Que.14 (a) Give one example of each of the following:
(i) Small mass but high kinetic energy (i) Large mass but low kinetic energy
(b) Prove mathematically that the total mechanical energy of a freely falling body in air is conserved.
- Que.15 Write full form of acronym SONAR. Explain how the method of echo-ranging is used to determine the depth of sea.

ANSWER KEY

- Ans. 10 J. J. Thomson Model of atom Rutherford's Model (1+1+1)

Plum pudding model	Nucleus (+ charge) in centre
+ charge place 'Kernels'	Electron revolve in orbits
- charge embedded on it	Most of the space is empty

- Ans. 11 Law of multiple proportions

$$\text{H}_2\text{O} \% \text{ of O} = \frac{16}{18} \times 100$$

$$\text{H}_2\text{O}_2 \% \text{ of O} = \frac{32}{34} \times 100$$

MONOCOTS	DICOTS
Posses 1 cotyledon	Possesses two cotyledons
Fibrous roots	Taproots
Parallel venation	Reticulate venation
Trimerous Flowers	Pentamerous flowers

(any three)

(1+1+1)

- Ans. 13 Process of developing artificial immunity in a person by giving biological preparations is known as immunisation. When immune system first sees the microbe it responds against it and remembers it specifically, so next time it responds with even greater vigour. Tetanus / Whooping cough / Diphtheria/ Measles are some of the common diseases, against which, the vaccines are provided under public health program. (1+1+½+½)(3)
- Ans. 14 (a) (i) A cricket/hockey ball which has been hit hard and is travelling fast.
(ii) A shot put thrown by an athlete.
(b) Let the body of mass m at height h above the ground starting from rest, be falling freely. Total energy of the body at height h is

$$=mgh \text{ (PE) } + 0 \text{ (KE) } = mgh$$

After the body has fallen freely through

a distance x (say), $K.E.= mgh$, $P.E.=mg(h-x)$

Total energy = $K.E. + P.E.$, $mgh+mg(h-x)=mgh$

When it reaches the ground $K.E. =\frac{1}{2}m 2gh= mgh$

$P.E.=0$, Total Energy = $K.E. + P.E. =mgh$

Thus the total mechanical energy, which is the sum of $K.E.$ and $P.E.$ is always equal to mgh .

- Ans. 15 Sound Navigation And Ranging: A Transmitter producing ultrasonic waves is fitted at the bottom of a ship or a boat. The ultrasound waves emitted by the transmitter go to the bottom of the sea and get reflected from the bottom. These are received back by a detector also fitted at the bottom. Knowing the time elapsing between sending and receiving back of the ultrasonic waves and the speed of these waves in water, the depth of sea can be calculated.

L.A.

- Que. 16 i) State the method of determining the valency of an element if its atomic number is given.
ii) Determine the valency of the following elements, the atomic numbers of which are given in parenthesis:- Chlorine (17)- Sulphur (16)- Aluminium(13)

- Que. 17 (i) List three characteristics which help us to distinguish amphibian to pisces.
(ii) Classify the following living organisms as cold blooded and warm blooded animals: Shark, Lizard, Sparrow, Rohu.

- Que. 18 (a) Explain, with the help of an example the difference between the terms. Thrust and pressure. Which one of the two has same SI unit as that of Force?
(b) Consider a wooden block of mass 5 Kg and dimensions 40 cm X 20cm X 10 cm with its faces 20cmX10cm and 40cmX20cm kept on the table, in turn. In which case will the pressure exerted by the box on the table be more? Justify your answer by doing mathematical calculations.

ANSWER KEY

- Ans. 16 (i) The number of electrons gained, lost or shared to make the octet of electrons (in the outermost shell), gives us directly the combining capacity of the element, that is, the valency.
(2)

(i) Chlorine = atomic no. 17, electronic configuration = 2,8,7 valency = -1 (1)

Sulphur = atomic no. 16 electronic configuration = 2,8,6 valency = -2 (1)

Aluminium = atomic no. 13 electronic configuration = 2,8,3 valency = +3 (1)

- Ans. 17 (1) Amphibians lack scales, have mucous glands, have a three chambered heart

(1+1+1)

(ii) Cold blooded – Shark Rohu, Lizard

($\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$)

Warm blooded – sparrow

($\frac{1}{2}$)

- Ans. 18 (a) Pressing the flat end of a ball point pen against the hand with some force and pressing the pointed tip of the same pen against the hand with the same force. Pressing on pointed tip produces greater pain because the area on which same force acts decreases and the effect of this force increases.

The total force acting on an area is called Thrust whereas the force acting per unit area is called pressure.-Thrust has the same SI Unit of Newton as Force.

(b) The pressure exerted will be more when the block with its face. 20cmX 10 cm is kept on the table. This is equal to 2450 Nm^{-2} . When the block is kept on the table with its face 40 cmX20cm, the pressure is equal to 612.5 Nm^{-2} .

Que. 22. The least count of the given graduated cylinder is–

- a) 0.05 mL
- b) 0.1 mL
- c) 0.2 mL
- d) 0.25 mL



Que. 23. The correct sequence of life cycle of a mosquito is

- a) larva – pupa – egg – adult
- b) egg – larva – pupa – adult
- c) egg – pupa – larva – adult
- d) egg – adult – pupa – larva

ANSWER KEY

Que. 19	(iii)	1
Que. 20	(c)	1
Que. 21	(iii)	1
Que. 22	(b)	1
Que. 23	(b)	1

VALUE BASED QUESTIONS

Que.24 Raman lives in a coastal village. He is the son of a fisherman. Whenever any unwanted animal comes in the net, instead of killing it, he puts it back in the sea.

Answer the following questions based on above information: (3)

- i) What would have happened, had he killed those animals?
- ii) Give one reason to justify that Raman's action is environment friendly.
- iii) How can you contribute in the preservation of flora and fauna around you? Mention any two steps.

Que.25 The number of dengue cases had increased in Pooja's village in last one year. She read in her textbook that diseases like dengue spread through mosquitoes which breed in stagnant water. She immediately suggested her friends and decided to kill the mosquitoes in water bodies in the locality. They also took help of nearest municipal office.

Answer the following questions based on above information: (3)

- i) Which preventive measures do you suggest for the prevention of such diseases caused by mosquitoes? Mention any two measures.
- ii) Which values are displayed by Pooja in taking initiative?
- iii) Suggest one school activity to promote such values in school students.

ANSWER KEY

Que.24

- i) It would have contributed in disturbing the ecological balance. (1)
- ii) Because he is conserving biodiversity. (1)
- iii) Creating sensitivity, by not using products derived from animals, by spreading awareness in other community members about the importance of biodiversity, by developing empathy and love for all living organisms. (1)

Que.25

- i) avoid water logging, proper and regular disinfection, use of mosquito net and repellents. (1/2+1/2=1)

ii) Any two (1/2+1/2=1)

- Community Service
- Social Responsibility
- Environmental protection.
- Awareness about healthy living conditions.

iii) Any one (1)

- Organising campaigns for creating awareness amongst masses.
- Organising debates.
- Arranging similar community service.
- Group discussion.