This book is prepared to endure application side of the NCERT textbook. This book contains:- Assignments, Modules for all the lesson and Model question paper.

Activity Book

Class :- 9

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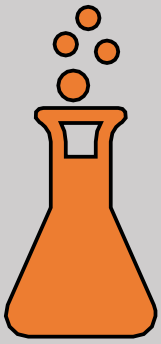
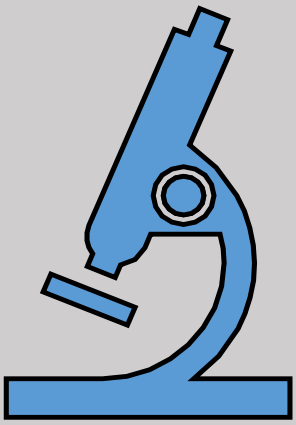
“Experience the thunder……”





PHYSICS MODULES

Module : 9P (01 & 02)

Chapter : Motion

Contents:

1. Motion in Living and Non-Living things.
2. Uniform and Non-Uniform Motion.
3. Distance Traversed and Displacement
4. Scalar and Vector Quantities.
5. Speed and velocity

Learning Objectives

The students will:

1. Understand and distinguish between Rest and Motion
2. Understand Scalar and Vector quantities.
3. Differentiate between Uniform and Non-Uniform motion.
4. Understand and explain the meaning of Average Speed.

Key Term

Scalars and Vectors, Distance and Displacement, Average Speed, Velocity, Average Velocity

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Module : 9P (03 & 04)

Chapter : Motion

Contents:

1. Velocity and Acceleration
2. Graphs: Distance – Time
   Displacement – Time
   Speed – Time
   Velocity – Time

Learning Objectives

The students will:

1. Understand the concept of Acceleration.
2. Understand the importance of graphs.
3. Learn how to plot graphs.
4. Compute Speed and Acceleration from graphs.

Key Term
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1. Acceleration **2.** Retardation
3. Area under the graph **4.** Slope of graph

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Module : 9P (05)

Chapter : Motion

Contents :

1. Derivation of three Equation of Motion (By numerical as well as by graphical method)
2. Numerical based on Equations of Motion
3. Circular Motion (qualitative idea)

Learning Objectives

The students will:

1. Understand the relation between Acceleration, Velocity and Time.
2. Derive the three Equations of Motion.
3. Solve numericals.
4. Explain Circular Motion and identify it as an accelerated motion.

Key Terms

1. Angular displacement **2.** Angular velocity

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Module : 9P (06)

Chapter : Force & Laws of Motion

Contents :

1. Forces and its consequences.
2. Balanced and Unbalanced forces.
3. Newton's I Law of Motion.
4, Inertia of a body.
5. Inertia & Mass
6. Second Law of Motion
7. Mathematical Formulation of Second Law of Motion - Momentum
8. Numerical

Learning Objectives

The students will:

1. Be able to learn about Force and its consequences.
2. Think about various phenomenon in nature and to relate them to Newton's I law.

3. Understand and appreciate the importance of inertia in daily life
4. Be able to solve numerical problems.
5 Relate Inertia with Mass.
6 Realize the importance of Newton's II law in everyday life.

Key Terms

1. Resultant Force **2.** Balanced Forces **3.** Unbalanced Forces
4. Inertia **5.** Momentum

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Module : 9P (07)

Chapter : Force & Laws of Motion
Contents :

1. Third law of Motion
2. Conservation of Momentum
3. Numerical

Learning Objectives

The students will:

1. Realize that forces do not occur in isolation but in pairs.
2. Appreciate the importance of Newton III Law of Motion in daily life.
3. Understand the concept of Action and Reaction forces.
4. Apply Conservation of Momentum in daily life.

Key Terms

1. Isolated System **2.** Action **3.** Reaction

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Module : 9P (08)

Chapter: Gravitation
Contents:

1. Meaning of Gravitation.
2. Universal Law of Gravitation.
3. Importance of the Universal law of Gravitation.
4. Free Fall.
5. Motion of objects under the influence of gravitational force of the Earth
6. Mass
7. Weight
8. Weight of an object on the Moon.

Learning Objectives

The students will:

1. Understand and explain the meaning of Gravitation.
2. State Newton's law of Gravitation and write its mathematical statement.
3. Appreciate the role of Gravitation.
4. Understand Acceleration due to gravity.
5. Define and differentiate between Mass and Weight.
6. Calculate Weight of an object on Moon.

Key Terms

1. Gravitational constant, G
2. Acceleration due to gravity, g
3. Free fall
4. Mass
5. Weight

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Module : 9P (09)

Chapter : Gravitation

Contents :

1. Thrust and Pressure
2. Pressure in Fluids
3. Buoyancy
4. Why objects sink or Float when placed on surface of water?
5. Archimedes Principle
6. Relative Density

Learning Objectives

The students will:

1. Understand the difference between Thrust and Pressure.
2. Apply Pressure to daily life.
3. Explain Pressure in fluids.
4. Understand Buoyancy.
5. Understand and explain Archimedes Principle.
6. Applies Archimedes Principle on floating objects.
7. Understand relation between Density of a Solid and Density of a Liquid.

Key Terms

1. Thrust
2. Pressure
3. Pascal
4. Buoyancy
5. Archimedes Principle
6. Relative Density

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Module : 9P (10)

Revision Module for S A – I

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Module : 9P (11)

Chapter : Work & Energy

Contents :

1. Work
2. Work done by a Force
3. Numerical

Learning Objectives

The students will:

1. Define Work and its unit.
2. Find work done by a constant force.
3. Establish scientific conception of work.

Key Terms

1. Work   2. Joule

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Module : 9P (12)

Chapter : Work & Energy

Contents :

1. Energy
2. Forms of Energy
3. Kinetic energy
4. Numerical

Learning Objectives

The students will:

1. Understand the concept of Energy.
2. List different forms of energy.
3. Define Kinetic Energy.
4. Relate work with change in Kinetic Energy.

Key Terms

1. Energy   2. Kilo joule   3. Kinetic energy

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Module : 9P (13 & 14)

Chapter : Work and Energy

Contents :

1. Potential Energy
2. Laws of Conservation of Energy
3. Rate of doing Work - Power

Learning Objectives

The students will:

1. Define Potential Energy.
2. Understand and define law of Conservation of Energy.
3. Appreciate the importance of Energy Conservation.

Key Terms

1. Potential energy **2.** Power **3.** Watt
4. Kilowatt hour (kWh)

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Module : 9P (15)

Chapter : Sound

Contents:

1. Production of Sound.
2. Propagation of Sound.
3. Sound needs a medium to travel.
4. Sound waves are Longitudinal waves.

Learning Objectives

The students will:

1. Understand how Sound is produced by different vibrating bodies.
2. Explain propagation of Sound in different media.
3. Deduce from experiment that Sounds needs material medium to travel.
4. Infer that Sound Waves are Longitudinal in nature.

Key Terms

1. Vibration **2.** Disturbance **3.** Propagation
4. Longitudinal waves **5.** Compression **6.** Rarefaction

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Module : 9P (16)

Chapter : Sound

Contents :

1. Characteristics of Sound Wave.
2. Speed of Sound in Different Media.

3. Reflection of Sound.
4. Echo and Reverberation.

Learning Objectives

The students will:

1. List and explain various characteristics of a Sound Wave.
2. Compare speed of sound in Solids, Liquids and Gases.
3. Define Echo and Reverberation.

Key Terms

1. Frequency **2.** Velocity of a wave **3.** Wavelength
4. Amplitude **5.** Pitch **6.** Echo **7.** Reverberation

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Module: 9P (17)

Chapter : Sound

Contents:

1. Uses of Multiple Reflection of Sound.
2. Range of hearing in Human.
3. Applications of Ultrasound.
4. Structure of Human Ear.

Learning Objectives

The students will:

1. List various uses of multiple reflection of sound
2. Compare range of hearing in Humans and Animals
3. List various applications of Ultrasound
4. Understand the importance of SONAR
5. Describe structure of Human Ear.

Key Terms

1. Hertz **2.** Infra sound **3.** Ultra sound
4. Ultrasonography **5.** Sonar **6.** Terms related to Human Ear

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Module : 9P (18)

Revision Module for S A – II

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LIST OF PRACTICALS

1. To determine the density of a solid (denser than water) by using spring balance and a measuring cylinder.

2. To establish the relation between loss in weight of a solid when fully immersed in (i) tap water (ii) strongly salty water, with weight of water displaced by it taking at least two different solids.

3. To determine the velocity of a pulse propagated through a stretched string / slinky.

4. To Calculate the pressure exerted by a wooden block on sand.

5. To verify laws of reflection of sound.

PHYSICS ASSIGNMENTS

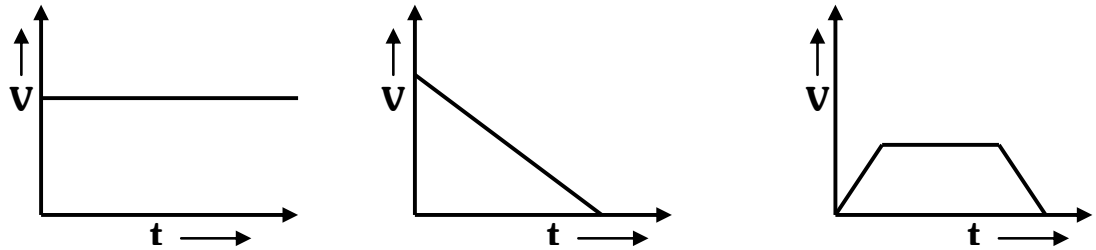
Module : 9P (01 & 02)

Section A

1. Fill in the blanks :-

   (i) Velocity of a body is its _____in a particular direction.
   (ii) In v – t graph, the area enclosed by the curve and the time – axis, gives the _____ travelled by the body.
   (iii) A rubber ball dropped from a certain height is an example of _____ speed.
   (iv) 20m/s = _____ km/hr.
   (v) When a body is moving with uniform velocity, its acceleration is_____.
   (vi) A ball moving down on inclined plane has uniform _____.

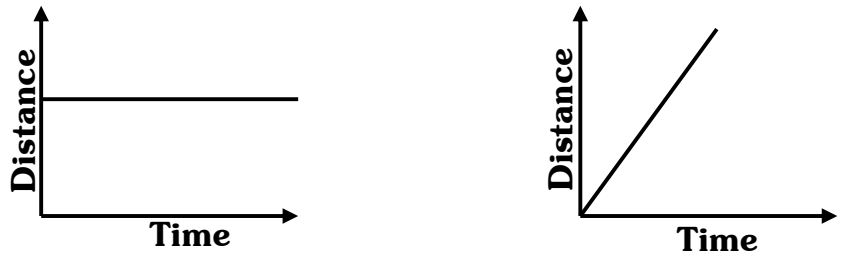
2. What type of motion is represented by the following graphs?



Q3. State which of the following quantities are scalars and which are vectors:-

a)	Velocity	*b)*	Speed	*c)*	Displacement
d)	Time	*e)*	Area	*f)*	Force

Q4. Interpret the following graphs



Section B

1. A body travels a distance of 5m from P to Q and then moves a distance of 10 m at right angle to PQ. Calculate the total distance travelled and the resultant displacement. Draw a diagram using appropriate scale.

2. Arrange the following in the increasing order of speed.

   (i) A bicycle moving with a speed of 18km/hr.
   (ii) A fast runner moving with a speed of 7m/s
   (iii) A car moving with a speed of 2000 m/min.

3. A body is moving in a circle of radius R. The body moves through half the circle. Calculate distance and displacement.

4. The distance between the house and the market is 7.2 km. If a man takes 10min to reach to market, calculate speed in m/s. Also express it in km/hr.

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Module: 9P (03 & 04)

Chapter : Motion

Section A

1. The area under speed – time graph is represented in units of

   (i) m *(ii)* m^2 *(iii)* m^3 *(iv)* m^{-1}

2. The v-t graph of a particle is not a straight line. Its acceleration is

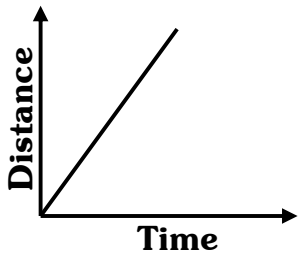
   (i) zero *(ii)* constant *(iii)* negative *(iv)* variable

3. If a particle moves with a constant speed, the distance-time graph is a

   (i) straight line sloping upward *(ii)* circle
   (iii) stair like line *(iv)* polygon

4. The distance – time graph of an object moving in fixed direction is shown below.

   The object
   (i) is at rest
   (ii) moves with a variable velocity
   (iii) moves with a constant acceleration
   (iv) moves with a constant speed



5. In circular motion the

   (i) direction of motion is fixed
   (ii) direction of motion changes continuously
   (iii) acceleration is zero
   (iv) velocity is constant

6. A car increases its speed from 15 km/h to 30km/hr. in 12 seconds. Its acceleration is

   (i) 30 m/s^2 *(ii)* 0.3 m/s^2 *(iii)* 50 m/s^2 *(iv)* 18 m/s^2

7. The motion of the wheel of a cycle is

   (i) rectilinear *(ii)* rotatory *(iii)* translatory
   (iv) both rotatory and translatory.

8. Define the following terms:

   (i) uniform speed *(ii)* uniform acceleration
   (iii) retardation *(iv)* displacement

9. Which is greater?

   (i) 60 km/hr. *(ii)* 15 m/s

10. Distinguish between uniformly and non-uniformly accelerated motion.

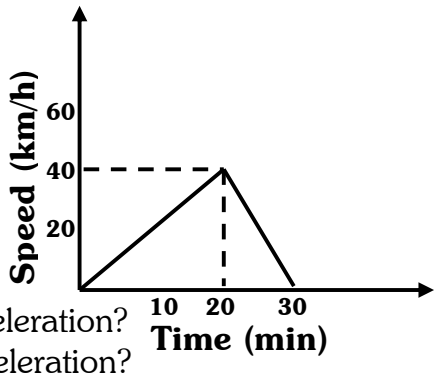
Section B

1. A bus takes 8 hours to cover a distance of 320 km. What is the average speed of the bus?

2. A car moves through 20 km with a speed of 40 km/h, and the next 20 km with a speed of 60 km/h. Calculate it average speed.

3. The driver of a car travelling at 36 km/h applies the brakes to decelerate uniformly. The car stops in 10 s. Plot the speed – time graph for this period. Find the distance travelled by the car during this period by calculating area under the graph.

4. Speed – Time graph of a bus is shown below.



   (i) In which period is the bus accelerating?
   (ii) In which period is the bus decelerating?
   (iii) What is the distance covered during its acceleration?
   (iv) What is the distance covered during its deceleration?
   (v) What is the average speed during the entire journey?

5. A ship moves at a speed of 56 km/h. One second later, is moving at 58 km/h. What is the acceleration in m/s^2?

6. Choose the wrong statement (s)

   (i) Acceleration due to gravity is a vector quantity.
   (ii) Displacement is a scalar quantity.
   (iii) Retardation is a vector quantity.
   (iv) Average speed is a vector quantity.

7. A train is moving at a speed of 90km/h. On applying brakes, a retardation of $2.5m/s^2$ is created. At what distance before, should the driver apply the brakes to stop the train at the station?

8. The initial velocity of a car is 15m/s. It moves with an acceleration of $2m/s^2$. What will be its speed after 25 sec?

9. A train 100m long moving on a straight level track passes a pole in 5 seconds. Find

   (i) The speed of the train
   (ii) The time it will take to cross a bridge 500m long

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Module: 9P (05)

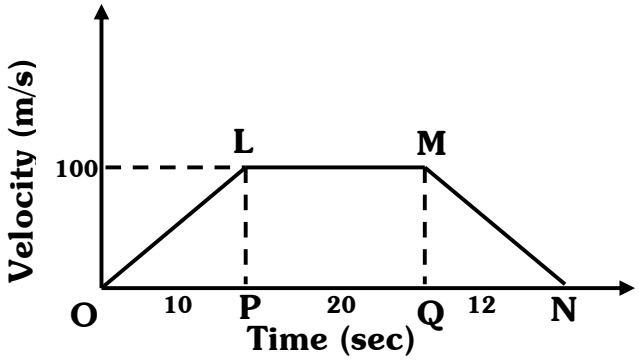
Chapter : Motion

Section A

1. The area under the velocity-time graph represents

   a) Displacement *b)* Velocity
   c) Change in velocity *d)* Distance

2.



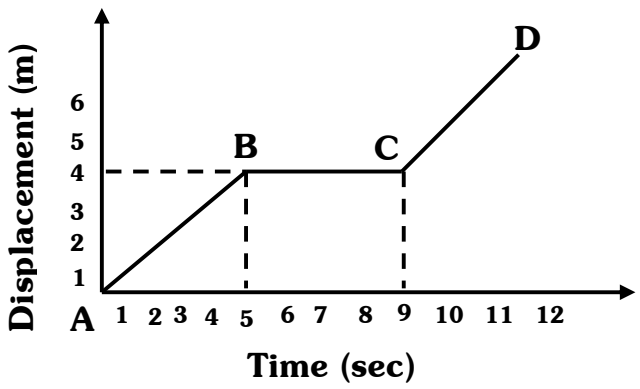
   The graph shows velocity of a moving bus during different time intervals. Calculate

   a) total distance covered by the bus from 0to N, time interval between P to Q being 20 sec.
   b) the uniform acceleration and retardation of the bus.

3. A particle with a velocity of 2m/s at t=0 moves with a constant acceleration of 0.2 m/s^2. The distance covered by the particle in 10s is

   a) 20 m *b)* 10 m *c)* 30 m *d)* 40 m

4.



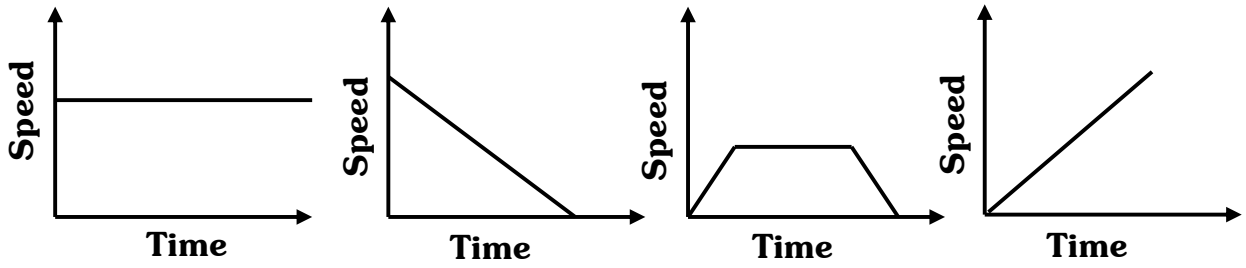
The graph shows the position of a body at different times. Calculate the speeds of the body as it moves from

a) A to B *b)* B to C *c)* C to D

5. A racing car has a uniform acceleration of $5m/s^2$. The distance covered by it in 20 sec after starting from rest is

a) 100 m *b)* 1000 m *c)* 20 m *d)* 200 m

6. The following speed-time graphs represent four cases.



a) In which case is the speed constant?
b) In which is the speed decreasing?
c) In which case is the speed increasing?
d) What happens in the third case?

7. A quantity is measured to be -30m/s. Is it speed or velocity? Give reason for your answer.

Section B

1. Derive $s = u\,t + 1/2\,at^2$ graphically, where symbols have their usual meaning.

2. A bullet hits a wall with a velocity of 20m/s and penetrates it up to a distance of 5 cm. Find the deceleration of the bullet in the wall.

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H.O.T.S. Questions

Q.1 Calculate the speed of the tip of the second's hand of the watch of length 1.5cm.

Q.2 Two bodies are moving with constant speed *v* such that they are always at a constant distance *d* apart and their velocities are always equal in opposite. After what time they will return to their initial positions?

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Value Based Question

Q.1 Pooja and Neha are close friends. Pooja is a science graduate and Neha is a commerce graduate. Pooja finds that while driving on a clear highway, Neha often exceeds the speed limit and argues that there is no harm in doing so when the road is cleared. Pooja does not agree with her and tells her that with increase in speed,

stopping distance of car would increase and she would not be able to manage things if some stray cattle etc, appears suddenly on the way.
Read the above passage and answer the following questions
(i) Is Pooja right in her statement?
(ii) What values are displayed by Pooja in her statement?
(iii) How is stopping distance related to the speed of vehicle?

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Module: 9P (06)

Chapter : Force

Section A

1. Which of the following has the largest inertia?

   a) A pin *b)* Your physics notebook *c)* An inkpot
   d) Your body.

2. c.g.s. unit of force is

   (*a)* metre/sec (*b)* Sec/metre (*c)* dyne
   (d) Newton

3. An unbalanced force acts on body. The body

   (a) must remain at rest *(b)* must move with uniform velocity
   (c) must be accelerated *(d)* must move along a circle.

4. By applying a force of 1N, one can approximately hold a body of mass.

   a) 100mg (*b)* 100g (*c)* 1kg (*d)* 10kg

5. If no force acts on a body, it will

   (a) gets deshaped *(b)* move with increasing speed
   (c) break *(d)* either remain at rest or move in straight line

6. A coin flicked across a table stops because

   (a) no force acts on it *(b)* it is very heavy
   (c) the earth attracts it. *(d)* the table exerts a frictional force on it

7. Newton's second law establish relation between

   (a) force and velocity (*b)* mass and velocity
   (c) force and acceleration (*d)* mass and acceleration
   (e) Both c and d

8. A force of a given magnitude acts on a body. The acceleration of the body depends on the

(*a*) mass of the body (*b*) volume of the body
(*c*) density of the body (*d*) shape of the body

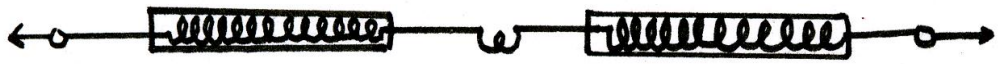
9. The momentum of a body of given mass is proportional to its

(*a*) volume (*b*) shape (*c*) colour (*d*) speed

10. A body at rest can have

(*a*) speed (*b*) energy
(*c*) momentum (*d*) velocity

11. Consider two spring balance hooked as shown in fig. We pull them in opposite directions. If the reading shown by A is 1.5N, the reading shown by B will be



(*a*) 1.5 N (*b*) 2.5 N (*c*) 2.0 N (*d*) Zero

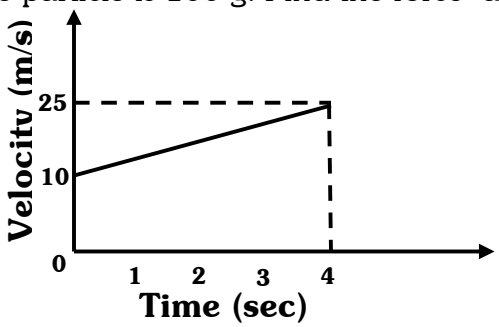
Section B

1. Define balanced and unbalanced forces.
2. What is the law of inertia? Give example of inertia of rest.
3. Explain why
   (a) the passenger fall backward when a bus suddenly starts
   (b) We beat the carpet to remove dust particles
   (c) It is advised to tie the luggage with a rope on the roof of buses
4. In oil tankers some space is left at the top while filling them. Explain.
5. State Newton's I law of motion and deduce it from II law.
6. Why does a moving ship take a much longer time to stop than a car when brakes are applied to both?
7. What is the relation between Newton and a Dyne?
8. Why does the electric fan continue to rotate for some time after the current is switched off?
9. Why does a cricketer lower his hands when holding a catch?

Section C

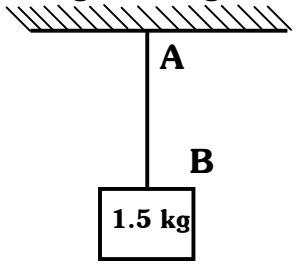
1. A force produces an acceleration of 0.5 m/s^2 in a body of mass 3 kg. If the same force acts on a body of mass 1.5 kg, how much acceleration will be produced in it?

2. The velocity - time graph of a particle moving on the ground is shown in the figure. if the mass of the particle is 100 g. Find the force acting on the particle.



3. A block of mass 1.5 kg is hanging from a fixed support through a string AB.

(a) Find the force exerted by the string on the block.
(b) Find the force exerted by the block on the string.



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Module : 9P (07)

Chapter: Force and Laws of Motion

Section A

1. Action – reaction forces

   a) act on same body
   b) act along different lines
   c) act in the same direction
   d) act on different bodies

2. Athelete runs some distance before taking a long jump so that he may

   a) acquire large inertia of motion *b)* overcome inertia of rest
   c) get inertia of direction *d)* acquire kinetic energy

3. A body of mass 10 kg and velocity 10 m/s collides with a stationary body of mass 5 kg. After collision, both bodies stick to each other. The common velocity would be

   a) 3/20 m/s *b)* 20/3 m/s *c)* 10/3 m/s *d)* 3/10 m/s

4. The principle of Conservation of Momentum states that Linear Momentum of a system.

   a) cannot be changed *b)* cannot remain constant
   c) can be changed only if internal forces act.
   d) can be changed only if external forces act.

5. The rate of change of momentum is measured in

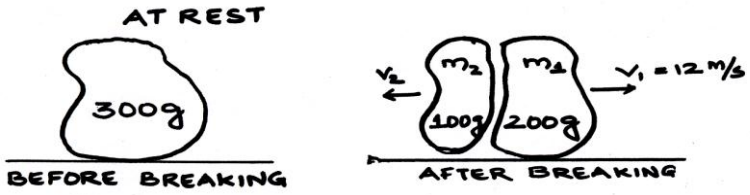
a) kg ms^{-2} *b)* kg ms^{-1} *c)* kg m *d)* kg

Section B

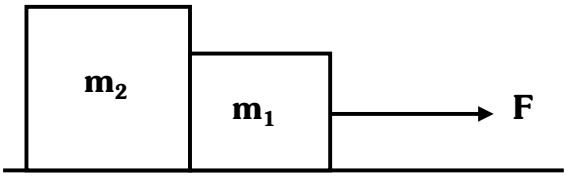
1. State Newton's III law of motion.
2. Give an example to demonstrate Newton's III law of motion.
3. Explain why it is difficult for a fireman to hold a hose, which ejects large amounts of water at a high velocity?
4. It is difficult to stop a cricket ball than a tennis ball moving with same speed. Explain why?
5. When you jump from a certain height, why do you bend your legs rather than keep them rigidly straight?
6. Answer the following questions
   (i) Force of action reaction act on two different bodies or same body.
   (ii) Do action reaction cancel each other?
   (iii) Do action reaction produce accelerations of same magnitude?
   (iv) Force of reaction appears after some time of force of action. Is it correct?

Section C

1. A body of mass 300g kept at rest breaks into two parts due to internal forces. One part of mass 200 g is found to move at a speed of 12 m/s towards east. What will be the velocity of other part?



2. Two blocks of mass m_1 = 1 kg and m_2 = 2 kg are placed in contact on a friction less horizontal surface. A force of 10 N is acting on m_1. What is the acceleration of m_1 and m_2. What is the value of action and reaction?



3. A body of mass 'm' moving with constant velocity 'v' hits another body of same mass moving with same velocity 'v' but in opposite direction and sticks to it. What is the velocity of compound body after collision?
4. A boy weighing 30 kg is riding a bicycle weighing 50 kg. If the bicycle is moving at a speed of 9 km/ h towards the west, find the linear momentum of the bicycle - boy system in SI units.

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H.O.T.S. Questions

Q.1 A body is acted upon by number of external forces. Can it remain at the rest?

Q.2 If a body is not at rest, the net external force acting on it cannot be zero. Is it correct?

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Value Based Question

Q.1 A body at rest continues to be at rest unless some external force is applied to move it. Rather, the body at rest opposes the force that tends to move it. Left to itself, the body at rest will never start moving. This is well known property of inertia of rest of bodies.

Read the passage and answer the questions:

(i) When a bus starts moving suddenly, the passengers tend to fall backwards why?

(ii) Give one more example of inertia of rest.

(iii) What values do you inculcate in life from this study?

Q.2 Impulse of force measures the effect of force. It is the product of force and time for which force acts. Impulse = F×t. It is equal to the change in linear momentum of body.

For a given change in linear momentum F×t is constant. If t increases, F decreases and vice versa.

Read the passage and answer the questions:

(i) Why is crockery wrapped in straw?

(ii) Why are vehicles provided the shockers?

(iii) What message you will get from the paragraph?

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Module : 9P(08)

Chapter :Gravitation

Section A

1. The universal gravitational constant G has the unit

a) N *b)* $N\ m^2 / kg^2$ *c)* m/s^2 *d)* J

2. The earth attracts a body of mass 1 kg kept on its surface with a force of

a) 1 N *b)* $6.67\times10^{-11}N$ *c)* 9.8 N *d)* 1/9.8 N

3. The value of g.

a) is constant everywhere in space

b) is constant on the surface of the earth

c) is greater at the poles than at the equator
d) is greater at the equator than at the poles.

4. The force acting on a ball due to the earth has a magnitude F_b and that acting on the earth due to the ball has a magnitude F_e . Thus

a) $F_b > F_e$ *b)* $F_b = F_e$ *c)* $F_e = 0$ *d)* $F_b < F_e$

5. If the distance between two objects is tripled, the force of attraction between them will become

a) 4 times *b)* ¼ time *c)* 2 times *d)* remains the same

6. The force of gravitation between two bodies does not depend on

a) their separation *b)* the product of their masses
c) sum of their masses *d)* gravitational constant

7. When an object is thrown up, the force of gravity is

a) in the downward direction
b) in the upward direction
c) zero
d) in the horizontal direction

8. The force acting on a ball due to the earth has a magnitude F_b and that acting on the earth due to ball has a magnitude Fe. The

a) $F_b > F_e$ *b)* $F_b = F_e$ *c)* $F_e = 0$ *d)* $F_b < F_e$

9. The acceleration due to gravity near the moon's surface is

a) approximately equal to that near earth's surface
b) approximately six times that near earth's surface
c) approximately one-sixth of that near earth's surface
d) slightly greater than that near earth's surface.

10. If a planet existed where mass and radius were both half those of the earth, the acceleration due to gravity at its surface would be

a) 19.6 m/s^2 *b)* 9.8 m/s^2 *c)* 4.9 m/s^2 *d)* 2.45 m/s^2

11. The weight of a body of mass 2 kg is

a) 15 N *b)* 19.6 N *c)* 49 N *d)* 5.5 N

12. The weight of a body is measured to be 120N on the earth. If it is taken to the moon, its weight will be about

a) 120 N *b)* 60N *c)* 20N *d)* 720N

Section B

1. State whether the following statements are true or false

a) The value of g at the centre of earth is zero
b) G and g are two ways of writing the same quantity.
c) Due to gravitational force, all bodies in the universe attract each other
e) The earth revolves around the sun due to the gravitational attraction of the sun.
f) The value of acceleration due to gravity does not depend on the mass of the body.

2. Distinguish between G and g
3. Fill in the blanks:

a) The force of gravitation exerted on one body by the other is F. If the mass of each body is doubled the force will become_____
b) The force of gravitation between two spherical bodies is $Gm_1 m_2 /r^2$, where r is separation between their _____
c) If the distance between two objects is doubled, the force of gravitation between them becomes_____ of initial value.

4. Distinguish between mass and weight.
5. If the moon attracts the Earth, why does the Earth not move towards the Moon?
6. Explain why a 10 kg stone and 1 kg stone dropped from the same height reach the ground at same time?
7. What happens to the weight of a person when he is

a) at the top of a high mountain?
b) deep inside the earth?
c) at the centre of the earth?

Section C

1. Calculate the gravitational force between a 10 kg ball and 20 kg ball placed at a separation of 5 m.
2. Calculate the value of g on the surface of moon

   (Mass of moon = 7.4×10^{22} kg, Radius of moon = 1740 km)
3. Calculate value of acceleration due to gravity at a place 3200 km above the surface of the earth.
4. A body weighs 120 N on the earth. Find its weight on the moon.

==========

Module : 9P (09)

Chapter: Gravitation

Section A

1. Pascal is a unit of

a) pressure *b)* force *c)* linear momentum *d)* energy

2. The buoyant force on a body acts in a

   a) vertically downward direction
   b) vertically upward direction
   c) horizontal direction
   d) direction between the horizontal and the vertical

3. The force acting normally on a surface is called

   a) pressure *b)* Thrust *c)* Force *d)* Balanced

4. Mark the statements true (T) or false (F)

   a) The pressure at all points in a liquid at the same horizontal plane is equal.
   b) Pascal and N/m^2 represent the same unit.
   c) Pressure has magnitude as will as direction.

5. 1 bar = _____ Pa

   a) 10^5 *b)* 10^{-5} *c)* 10^3 *d)* 10^{-3}

Section B

1. Define pressure at a point.
2. State Archimedes principle.
3. Why is it easier to swim in sea water than in fresh water?
4. Does a liquid press an immersed body from all sides?

Section C

1. A body of volume 50 cm^3 is completely immersed in water. Find the force of buoyancy on it.
2. A block weighing 1 kg is in the shape of a cube of length 10 cm. It is kept on a horizontal table. Find the pressure on the portion of the table where the block is kept.
3. A bottle weighs 30 g when empty, 53.4 g when filled with a liquid and 48 g when filled with water. Calculate the density of the liquid. Given, density of water at 4^0C = 1000 kg/m^3.
4. A metallic sphere of radius 2.0 cm is completely dipped in water. Find the force of buoyancy on it.
5. A cubical block of copper is dipped completely in water. Each edge of the block is 1cm in length. Find the buoyant force acting on the cube.

==========

H.O.T.S. Questions

Q.1 A body weighs more at poles than at equator of earth why?

Q.2 Two particles of equal mass (m) move in a circle of radius (r) under the action of their mutual gravitational attraction. Find the speed of each particle.

==========

Value Based Question

Q.1 Earth attracts everything towards its centre therefore every object when free falls towards the earth due to gravitational force of earth on it. This is called free fall. Acceleration produced in a body due to gravitational force of earth when the body is under free fall, is called acceleration due to gravity (g) on the surface of earth $g=9.8 m/s^2$ this value is independent of mass or the nature of body.
Read the passage and answer the questions:
(i) Convert the value of in km/hr^2.
(ii) Is value of g on the other planet is same as on earth?
(iii) What values do you inculcate in life from this study?

==========

Module : 9P (11)

Chapter: Work and Energy

Section A

1. Newton-metre is the unit of

   a) Power *b)* Work *c)* Momentum
   d) Gravitational Intensity

2. A body is moved through a distance of 3 m in the following different ways. In which case is the maximum work done?

   a) When pushed over an inclined plane
   b) When lifted vertically upward
   c) When pushed over smooth rollers
   d) When pushed on a plane horizontal surface.

3. No work is done when

   a) a donkey is carrying a load on its back
   b) on engine is pulling a train
   c) a sail boat is moving due to wind energy
   d) a wind mill is lifting water from a well.

4. What is the work done by a boy in pushing a book with a force of 5 N and displacing it through 20 cm along the push?

   a) 1J *b)* 2J *c)* 1.5 J *d)* 3J

Section B

1. Define work. Is it scalar or vector quantity?
2. What is the condition for a force to do work on a body?
3. A man is rowing a boat upstream, but his boat remains at rest with respect to the shore. Is he doing any work?
4. Give an example where the displacement of a particle is in the direction opposite to force acting on this particle.
5. What happens to the work done when the displacement of a body is at right angles to the direction of force acting on it? Explain your answer.

Section C

1. A ball of mass 1 kg thrown upwards, reaches a maximum height of 5 m. Calculate the work done by the force of gravity during this vertical displacement.
2. A person pulls a body on a horizontal surface by applying a force of 5 N at an angle of 30^o with the horizontal. Find the work done by this force in displacing the body through 2 m. ($\cos 30^o = \sqrt{3}/2$)
3. A horizontal force of 50 N displaces on object of mass 100 kg. Calculate the distance moved and work done by the force in 8 seconds.
4. A car of mass 2500 kg travelling at a speed of 40 m/s stops after covering a distance of 50 m when brakes are applied. Calculate (a) the force exerted on it by the brakes (b) work done by brakes.

==========

Code : 9P (12)

Chapter : Work and Energy

Section A

1. The kinetic energy of a body depends

   a) on its mass only
   b) on its speed only
   c) on its mass as well as on its speed
   d) neither on its mass nor on its speed.

2. A body of mass 10 kg is dropped from a height of 2m. If g is taken to be 10 m/s^2, the kinetic energy of the body just before striking the ground will be

   a) 400J *b)* 4J *c)* 40J *d)* none

3. A ball is thrown upwards from a point A. it reaches up to the highest point B and returns at the same point. Which of the following statement is correct:

a) Kinetic energy at A = kinetic energy at B
b) Potential energy at A = potential energy at B
c) Potential energy at B = kinetic energy at B
d) Potential energy at B = kinetic energy at A

4. When the speed of a particle is doubled, its kinetic energy

a) remains the same *b)* gets doubled *c)* becomes half
d) becomes 4 times.

5. When the speed of a body is doubled, the ratio of kinetic energy to its momentum.

a) gets doubled *b)* remains the same *c)* becomes half
d) becomes 4 times.

6. Two bodies of unequal masses are dropped from a cliff. At any instant, they have equal

a) momentum *b)* acceleration *c)* kinetic energy
d) potential energy.

Section B

1. Differentiate between work, power and energy. Also state their S.I. units.
2. Define kinetic energy. Give one example also.
3. By what factor does the kinetic energy of a particle of mass m increase if the speed is increased by factor of 3?
4. Does the kinetic energy of a body depend on its direction of motion?
5. By how much will the kinetic energy of a body increase if

i) Speed is doubled *ii)* Speed is halved.

6. Deduce the formula of kinetic energy of a body moving with velocity, v

Section C

1. A ball of mass 0.5 kg slows down from a speed of 5m/s to that of 3m/s. Calculate change in kinetic energy of the ball.
2. A block is thrown upwards with a K.E. of 2J. If it goes up to a maximum height of 2m, find the mass of the block.
3. The mass of a ball A is double the mass of Ball B. The ball A moves at half the speed of ball B. Calculate the ratio of K.E. of A to K. E. of B.
4. A body A of mass 3 kg and body B of mass 2 kg are dropped simultaneously from a height of 14.9 m. Calculate

a) Their momenta *b)* their kinetic energies

When they are 5 m above the ground

==========

Module : 9P (13 & 14)

Chapter: Work and Energy

Section A

1. A body is dropped form a certain height above the ground when it is half way down, it possesses

   a) Only kinetic energy *b)* Only potential energy
   c) Both kinetic and potential *d)* no energy at all energy

2. A flying aeroplane possesses

   a) Only P.E. *b)* Only K. E.
   c) both potential and kinetic energy
   d) Neither potential nor kinetic energy.

3. In which of the following cases is the potential energy of a spring minimum?

   a) When it is compressed
   b) When it is extended
   c) When it is at its natural length
   d) When it is at its natural length but kept at a height above ground.

4. When a body roller down an inclined plane,

   a) Only K.E *b)* only P.E
   c) both K.E and P.E *d)* neither K.E. nor P.E.

5) kWh is unit of

   a) Power *b)* momentum *c)* impulse *d)* energy

6) The unit of power is

   a) Watt *b)* joule *c)* newton *d)* kg

7) No. of joules in kWh is

   a) 36×10^{3} *b)* 36×10^{-4} *c)* 36×10^{2} *d)* 3.6×10^{6}

Section B

1. Differentiate between work, power and energy. Also state their SI units.

2. Define potential energy. Give one example.

3. Which of the following are examples of potential energy?

   a) A boy at the top of a slide *b)* a stretched catapult
   c) a hot iron *d)* a stretched bow

e) the arrow in stretched bow

4. State the principle of conservation of energy.

Section C

1. A ball is dropped from a height H. When it reached the ground, its velocity is 50 m/s. Find height H.

2. A body of mass 100 kg is lifted up by 10 m. Find

   i) Amount of work done
   ii) Potential energy of the body at that height (value of g = 10 m/s^2)

3. A boy weighing 40 kg carries a box weighing 20 kg to the top of building 15 m high in 25 sec. Calculate the power. (g = 10 m/s^2)

4. Two persons do the same amount of work in 10s and 20 s respectively. What is the ratio of the power used by first person to that by second person?

5. Calculate the power developed by a 110 kg mass climbing up a vertical staircase at the rate of 2m/s. (g= 9.8 m/s^2)

==========

H.O.T.S. Questions

Q.1 A lorry and a car moving with same kinetic energy are brought to rest by application of brakes which provide equal retarding forces. Which one of them will come to rest in a shorter distance?

==========

Value Based Question

Q.1 The global climate as always fluctuated. Millions of years ago, some parts of the world that are now quite warm were covered with ice and over recent centuries average temperature have risen. What is new, however is that current and future climate change will be caused not just by natural events but also by activities of human beings.

Read the passage and answer the questions:

(i) Suggest three simple ways to help to save the climate of our planet.
(ii) Suggest any four ways by which we can reduce consumption of electricity.
(iii) What values do you inculcate in life from this study?

==========

Module: (15/16)
Chapter: Sound

Section A

1. Sound is a type of

   a) Energy *b)* force *c)* charge *d)* matter

2. Sound waves can travel through
   a) Gases only *b)* vacuum only *c)* gases and liquids only
   d) Solids, liquids and gases.

3. Sound waves are
   a) longitudinal *b)* transverse *c)* both a) & (b)
   d) None of the above

4. Sound waves can be
   a) Reflected *b)* Absorbed *c)* Diffracted *d)* All of the above

5. Speed of sound waves in water is about
   a) 332 m/s *b)* 1440 m/s *c)* 5000 m/s *d)* 15000 m/s

6. Speed of sound in ordinary air
   a) is less than Carbon dioxide *b)* greater than CO_2
   c) equal to CO_2 *d)* None of these

7. In which of the following mediums will sound travel fastest
   a) liquid *b)* solid *c)* gas *d)* vacuum.

8. Hertz is a unit of
   a) frequency *b)* wave speed *c)* displacement *d)* wavelength

Section B

1. What type of waves are produced in air when a bell rings?
2. How does sound from a sound producing body travel through air to reach our ears?
3. When we open a gas tap for a few seconds, the sound of escaping gas is heard first but smell of gas comes later why?
4. Describe an experiment to show that sound is not transmitted through vacuum.
5. Define the following terms
   a) echo *b)* amplitude *c)* wavelength *d)* frequency
   e) pitch *f)* loudness *g)* time period
6. Distinguish between echo and reverberation.

Section C

1. A stone is dropped from the top of a tower 300m high splashes into water of a pond near the base of the tower. When is splash heard at the top?

   Given, Speed of sound in air = 340 m/s and g = 9.8 m/s^2

2. If 5 seconds elapse between a lightning flash and the clap of thunder how far away is the storm? Speed of sound in air = 332 m/s

3. A person makes a loud sound and hears the echo of this sound 1.2 s later. Calculate how far the person is from the object causing the echo. Assume speed of sound is 332 m/s

==========

Module : 9P (17)

Chapter : Sound

Section A

1. The upper frequency limit of the audible range of human hearing is about

   a) 20 KHz *b)* 2000 Hz *c)* 2 KHz *d)* 200000 Hz

2. Ultrasonic waves have frequencies

   a) below 20 Hz *b)* between 20 Hz and 200000 Hz
   c) above 20000 Hz *d)* no lower or upper limit of frequency.

3. Infrasonic waves have frequencies

   a) below 20 Hz *b)* between 20 Hz and 20000 Hz
   c) above 20000 Hz *d)* no upper or lower limit of frequencies

4. Ultrasound is an application of

   a) infrasonic waves *b)* ultrasonic waves
   c) sound waves *d)* light waves

5. In order to hear an echo, time gap between original sound and reflected sound is

   a) equal to 1/10 and *b)* greater than 1/10 and
   c) both (a) and (b) *d)* none of the above

6. The properties of ultrasound that make it useful are:

   a) high power and high speed
   b) Good directionality and high power
   c) High speed and frequency
   d) Good directionality and ability to move around objects.

Section B

1. Describe the relation between velocity, wavelength and frequency?

2. What is the difference between the terms 'ultrasonic' and 'supersonic'?

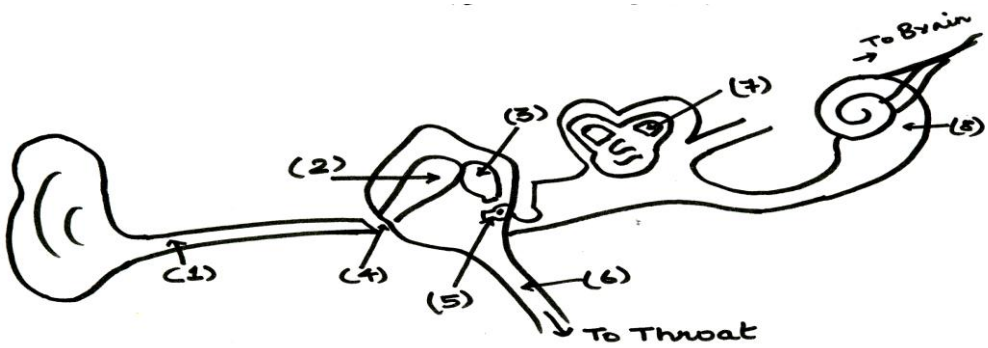
3. Name an animal which navigates and finds food by echo location.

4. How are bats able to fly at night without colliding with other objects?

5. Name the principle on which a megaphone works? Explain that principle.

6. Give various uses of ultrasound.

7. Given below is the structure of ear. Label its various parts.



Section C

1. A bat emits ultrasonic sound of frequency 100 KHz in air. If this sound meets a water surface, what is the wavelength of

   (a) The reflected sound *(b)* transmitted sound?
   (Speed of Sound in air = 340 m/s)

2. A hospital uses an ultrasonic scanner to locate tumours in a tissue what is the wavelength of sound in a tissue in which speed of sound is 1.7 km/s? The operating frequency of scanner is 4.2 MHz.

3. A tuning fork makes 284 vibrations per second in air. Compute the wavelength of the tone emitted.

   Given speed of sound = 330 m/s.

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H.O.T.S. Questions

Q.1 After the snow fall, why does it seem particularly quite?

Q.2 Why do empty rooms sound hollow?

Q.3 Which travels faster: a radio signal or sound in air?

Q.4 A child watching Dussehra celebrations from a distance sees the effigy of Ravana burst into flames and hears the explosion associated with it 2 s after that. How far was he from the effigy of the speed of sound in air that night was 335 m/s.

==========

Value Based Question

Q.1 Hearing may be damaged by excessive noise. So our ears sometimes need protection from continuous loud sound. Hearing damage depends on the sound intensity level (decibel label) and exposure time, and exact combination vary for different people. Normally, at 90dB, it takes 8 hr or less for the damage. Further, it is found that if the sound level is increased by 5 dB, thus same exposure limit is cut to half.

Read the passage and answer the questions:

(i) How long will it take for a very loud sound of 95 dB to damage the hearing?

(ii) What should be done to protect the society from the danger of losing hearing power?

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SYLLABUS (CHEMISTRY)

TERM – I

Chapter 1 - Matter in Our Surroundings

Chapter 2 - Is Matter Around us Pure

TERM – II

Chapter 3 - Atoms and Molecules

Chapter 4 - Structure of Atom

Chapter 5 - Natural Resources (till page 194)

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LIST OF PRACTICALS

1. To determine the melting point of ice and the boiling point of water.

2. To separate the components of a mixture of sand, common salt and ammonium chloride (or camphor) by sublimation.

3. To prepare:

(i) a true solution of salt, sugar and alum
(ii) a suspension of soil, chalk power and sand in water
(iii) a colloidal of starch in water and egg albumin in water and distinguish between these on the basis of
- ***(a)*** Transparency
- ***(b)*** Filtration criterion
- ***(c)*** Stability

4. To prepare

(i) a mixture
(ii) a compound

Using iron filing and sulphur powder and distinguish between these on the basis of

(i) Appearance i.e. Homogeneity and heterogeneity
(ii) Behaviour towards a magnet
(iii) Effect of heat

5. To carry out the following chemical reactions and record observations. Also to identify the type of reaction involved in each case.

(i) Iron with copper Sulphate solution in water
(ii) Burning of magnesium in air
(iii) Zinc with dilute Sulphuric Acid
(iv) Heating of copper sulphate
(iv) Sodium Sulphate with Barium chloride in the form of their solution in water.

6. To verify the law of conservation of mass in a chemical reaction.

MODULES CHEMISTRY

Module : 9 C (01)

Chapter : Matter In Our Surroundings

Contents:

1. Definition of matter
2. Physical nature of matter
   - *(i)* Matter is made up of particles
   - *(ii)* The particles of matter are very small
3. Characteristics of particles of matter
   - *(i)* Particles of matter have spaces between them
   - *(ii)* Particles are continuously moving.
   - *(iii)* Particles attract each other

Learning Objectives

After studying the contents the students will be able to understand

1. What is matter?
2. What are the characteristics of the particles of matter?
3. What is diffusion?

Key Terms:

1. Diffusion
2. Matter

Activity

Students are shown diffusion of potassium permanganate and copper sulphate crystals in water.

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Module : 9 C (02)

Chapter : Matter In Our Surroundings

Contents :

1. Three states of matter and their examples.
2. Properties of solids, liquids and gases.
3. Differences between solids, liquids and gases.

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Module : 9 C (03)

Chapter : Matter In Our Surroundings

2. Interchangeability between the three states of matter.
3. Effect of change of temperature and pressure.

(i) Boiling and melting point of a substance of matter.
(ii) Latent heat of fusion.
(iii) Sublimation

Learning Objectives

After the Completion of the content the students will be able to understand.

1. How are the molecules arranged in different states of matter?
2. How can the different states of matter be interchanged?
3. What are the differences between the three states of matter?

Key Terms:

1. Latent heat of fusion is the amount of heat energy required to change 1 kg of solid into liquid at its melting point.
2. Latent heat of vaporization is the heat energy required to change 1 kg of liquid to gas at atmospheric pressure at its boiling point.
3. What is the effect of change of pressure on the various states of matter?
4. How does the temperature bring about the inter changeability between the three states of matter?

Activity: Students are shown the sublimation of ammonium chloride.

Practical No. 1 To determine the melting point of ice and the boiling point of water.

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Module : 9 C (04 & 05)
Chapter : Matter In Our Surroundings
Contents :

1. Conversion of Celsius scale to Kelvin scale and Vice versa.
2. Evaporation

(i) Its definition and cause.
(ii) Factors affecting evaporation.
(iii) How does evaporation cause cooling?
(iv) Difference between evaporation and boiling.

Learning Objectives

After the Completion of the content the students will be able to

1. Define evaporation
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2. What are the various factors affecting evaporation.

Key Terms:

Students are given numericals on the conversions of temperature in Kelvin scale to celsius scale and vice versa.

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Module : 9 C (06)

Chapter : Is Matter Around Us Pure.

Contents :

1. What is a mixture?
2. Types of mixture – homogenous and heterogeneous mixtures.
3. What is a solution? Properties of solution.

Learning Objectives

After the Completion of the topic the students will be able to understand

1. Definitions of mixtures, solution.
2. Types of mixtures, differences between homogenous and heterogeneous mixtures.
3. Examples of solutions

Practical No. 2 To separate the components of a mixture of sand, common salt and ammonium chloride (or camphor) by sublimation.

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Module : 9 C (07)

Chapter : Is Matter Around Us Pure

Contents :

1. Concentration of a solution.

(i) Calculation of mass by mass percentage of a solution.
(ii) Calculation of mass by volume percentage of a solution.

2. Definition of suspension. Properties of a suspension.
3. What is a colloidal solution?
4. Properties of a colloid.
5. Common examples of colloids.
6. Separation of coloured components from blue-black ink (evaporation).
7. Separation of cream from milk (centrifugation).

Learning Objectives

After the Completion of the content the students will be able to understand.

1. To identify colloids and suspension.
2. Examples of colloids and suspension used in day to day life.
3. Separation techniques : Evaporation, centrifugation.

Practical No. 3 :

To Prepare :

1. A true solution of common salt, sugar and alum.
2. A suspension of Soil, chalk powder and fine sand in H_2O.
3. A colloidal of starch in water.

And to distinguish between these on the basis of :-

1. Transparency
2. Filtration Criterion
3. Stability.

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Module : 9 C (08)

Chapter : Is Matter Around Us Pure

Contents :

1. Separation of mixtures of two immiscible liquids (using separating funnel).
2. Separation of mixtures of salt and Ammonium chloride (sublimation).
3. Separation of dyes in black ink using chromatography.
4. Separation of mixtures of two miscible liquids (Distillation).
5. Fractional distillation.

Learning Objectives

Study of following separation techniques and their applications

1. Using separating funnel.
2. Sublimation.
3. Chromatography.
4. Distillation.
5. Fractional Distillation.

Practical No. 4:

To carry out the following reactions and classify them as physical and chemical changes.

(i) Iron with copper Sulphate solution in water.
(ii) Burning of magnesium in air.
(iii) Zinc with dilute Sulphuric Acid.
(iv) Heating of copper sulphate.
(v) Sodium Sulphate with Barium chloride in the form of their solution in water.
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Module : 9 C (09)

Chapter : Is Matter Around Us Pure.

Contents :

1. Process to obtain different gases from air Fractional distillation.
2. Process to obtain pure copper sulphate from an impure sample- crystallisation.
3. Applications of crystallization.
4. Physical and chemical changes.
5. Type of pure substance – elements and compounds.
6. Differences between elements and compound.

Learning Objectives

After the Completion of the above module the students will be able to understand.

1. Method of crystallization and its applications.
2. Examples of physical and chemical changes.
3. Differences between elements and compounds.

Practical No. 5:

To Prepare (i) a mixture (ii) a compound using Iron fillings and sulphur powder and to distinguish between them on the basis of :-

(i) Appearance.
(ii) Behaviour towards a magnet.
(iii) Behaviour towards carbon disulphide as a solvent.
(iv) Effect of heat.

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Module : 9 C (10) **Revision for SA – I**

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Module : 9 C (11)

Chapter : Atoms And Molecules

Contents :

1. Ancient Indian and Greek Philosophers's idea of Matter and the particles constituting it.
2. Laws of chemical combination
   (i) Law of conservation of mass
   (ii) Law of constant proportion
~~~~~~

3. Dalton's atomic theory of matter.

Learning Objectives

After the Completion of the above module the students will be able to understand

1. The concept of ancient and Greek Philosophy.
2. Modern concept of an atom
3. Proposal of Dalton's theory of matter on the basis of Law of constant proportion.

Practical No. 6

To verify the law of conservation of mass in a chemical reaction.

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Module : 9 C (12)

Chapter : Atoms And Molecules

1. Concept of an atom
2. Modern day symbols of atoms of different elements?
3. Atomic mass and existence of atoms.

Learning Objectives

After the Completion of the above module the students will be able to understand

1. Concept of atomic mass.
2. Significance of symbol of an element

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Module : 9 C (13)

Chapter : Atoms And Molecules

1. Concept of a molecule.
(i) Molecules of Elements.
(ii) Molecules of compounds.

2. Concept of an Ion (common, simple and polyatomic ions).
3. Writing Chemical formulae.

Learning Objectives

After the Completion of the above module the students will be able to understand

1. The concept of a molecule and an ion.
2. They can differentiate between the two.
3. What is a Chemical formula?
4. What information is conveyed by a chemical formula?

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Module : 9C (14)

Chapter : Atoms and Molecules (Topic : Mole concept)

Contents :

1. Mole concept.
2. Problems based on moles of atoms.
3. Problems based on moles of molecules.
4. Problem based on mass from mole of molecule, mole of atoms, atomic mass, molecular mass.

Learning Objectives

After studying the contents the students will be able to understand:

1. Mole is equal to Avogadro number ie 6.022×10^{23} entities. These entities or particles are atoms, molecules, ions etc.
2. Gram atomic mass : atomic mass of elements in grams.
3. Gram molecular mass : Molecular mass of molecule in grams.
4. Relationship between n (no. of moles), N (given number of particles) and Avogadro no. ($N_{A.}$)

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Module : 9C (15)

Chapter : Structure of Atom

1. Charged particles in matter
2. The structure of an atom.
3. Thomson's model of an atom.
4. Rutherford's model of an atom
5. Drawbacks of Rutherford's model of an atom.

Learning Objectives

After studying the contents the students will be able to understand:

1. Different charged particles present in an atom.
2. Arrangement of positive and negative charges according to Thomson's model.
3. Rutherford's experiment that led to the discovery of nucleus.
4. Rutherford's model of an atom and its drawback.

Key Terms:

1. Canal rays
2. Protons
3. Nucleus
4. Alpha – Particles
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Suggested Readings:

Fundamentals of Chemistry
(Lakhmir Singh)

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Module : 9C (16)
Chapter : Structure of Atom
Contents :

1. Present concept of an atom (Bohr's Concept)
2. Bohr's model of an atom.
3. Discovery of Neutrons.
4. How are Electrons Distributed in different Orbits (shells).
5. To draw the electronic configuration of an atom of an element.
6. Concept of Valence electrons and Valency.
7. Atomic number and mass number.

Learning Objectives

After studying the contents the students will be able to understand:

1. To write and draw the electronic structure of an atom of an element.
2. Postulates of Bohr's atomic model.
3. Bohr – Burry Scheme.
4. Rules to write electronic configuration of an element. (up to atomic number 20)

Key Terms:

1. Shells or orbits
2. Electronic Configuration.

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Module : 9C (17)

Chapter : (1) Structure of Atom

Contents :

1. Isotopes and their examples.
2. Fractional atomic weight of the isotopes.
3. Applications of Isotopes.
4. Isobars.

Chapter : (2) Natural Resources (till page no. 194)

Contents :

1. The breath of life – air
2. The role of the atmosphere in the climate control

3. Wind, Rain
4. Air pollution
5. Water pollution

Learning Objectives

1. To calculate valency of an element from atomic structure.
2. To find out the number of neutrons with the help of atomic number and mass number.
3. Difference between Isotopes and Isobars.

Tutorials:

Valency of an element is equal to number of outermost electrons if they are one, two or three. If the outermost electrons are 4 or more then the number is subtracted from eight and given a negative sign. The outermost electrons are also known as valence electrons.

Key Terms:

1. Valency.
2. Inert gases.
3. Isotopes.
4. Neutrons.
5. Atomic Number.
6. Atomic Mass.
7. Radio Carbon dating.
8. Land Breeze.
9. Sea Breeze.
10. Air Pollution.
11. Water Pollution.

Suggested Reading

Fundamentals of Chemistry
(Lakhmir Singh)

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Module : 9C (18) Revision for SA - II

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CHEMISTRY ASSIGNMENT

Module : 9C (1 & 2)

Q1. Give one word for the following :-

(i) Which state of matter can easily change its shape and volume?
(ii) In which state of matter are the molecules most tightly packed?
(iii) In what form should energy be supplied to an object to change its state?
(iv) What is the process of change of state from a gas to a liquid called?
(v) What is mass per unit volume of a substance called?

Q2. When a crystal of copper sulphate is placed at the bottom of a beaker containing water the water slowly turns blue. Give reason?

Q3. Why is it difficult to change the shape of a solid?

Q.4. If we heat a solid, it ultimately changes into a liquid? At what stage does this happen?

Q.5. A sponge can be compressed. Is it a solid or not? Why?

Q.6. Give an activity which demonstrate that particles of matter have space between them.

Q.7. Why are gases so easily compressible whereas it is impossible to compress a solid or liquid?

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Module : 9C (3)

Q.1. When a solid starts melting, its temperature does not rise till whole of it has melted. Explain.

Q.2. Define the following terms :-

(i) Latent heat of vaporization.
(ii) Sublimation.
(iii) Diffusion
(iv) Latent heat of fusion.

Q.3. Describe an activity which demonstrate the process of sublimation.

Q.4. Which contains more heat 1 kg of water at 100^0 C or 1 kg of steam at 100^0 C? Give reason for your answer.

Q.5. What is meant by saying that the latent heat of fusion of ice is 3.34×10^5 J/kg.

Q.6. Explain why, ice at 0^0 C is more effective in cooling than water at the same temperature.

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Module : 9C (04 & 05)

Q.1. What are the two factors which decide whether a given substance would be in a solid, liquid or gaseous state?

Q.2. Define evaporation. What are the factors affecting evaporation?

Q.3. Why do people sprinkle water on the roof or open ground after a hot sunny day?

Q.4. It is a hot summer day Priyanshi and Ali are wearing cotton and nylon clothes respectively. Who do you think would be more comfortable and why?

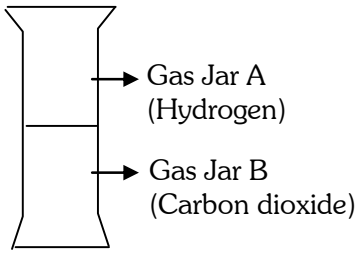
Q.5. How does perspiration or sweating help to keep our body cool on a hot day.

Q.6. Butter is generally wrapped in wet cloth during summer if no refrigerator is available. Explain.

H.O.T.S. Questions:

Q.1. The diagram show an experiment in which gases hydrogen and carbon dioxide are placed in two jars as shown in the figure. If the lid separating the two jars be removed, what will the constituents in the gas jar A after a few minutes?

(i) carbon dioxide
(ii) hydrogen only
(iii) mixture of carbon dioxide and hydrogen.

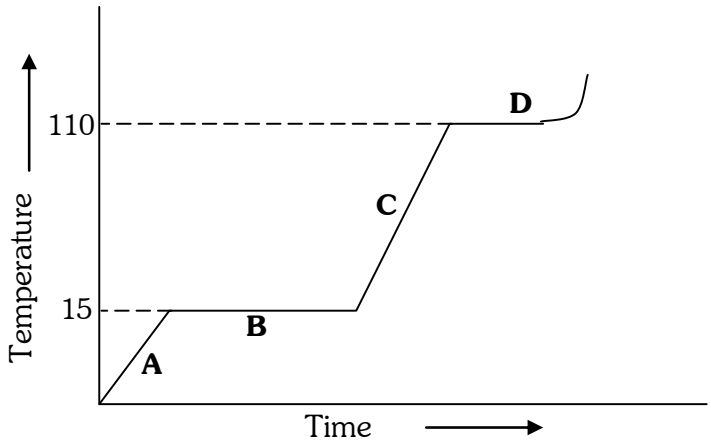


Q.2. In severe cold weather, a family burnt wood in the room during the night by keeping the windows close. After some time, they felt suffocated. They immediately opened the windows and got relief. What did actually happen?

Q.3. A cold compress is applied on the fore head of a person suffering from high fever. Explain.

Q.4. The graph alongside shows the heating curve for a pure substance. The temperature rises with time as the substance is heated:

(i) What is physical state of the substance at the points A, B, C and D?
(ii) What is the melting point of the substance?
(iii) What is its boiling point?
(iv) What happens to the temperature while the substance is changing state?
(v) The substance is not water. How can you judge from the graph?



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Value Based Question

Q.1. Shelly and her mother went to shop to buy some cooling equipment for her house to beat the summer heat. The shop keeper showed them two types of cooling equipment – a desert cooler and an all-weather air conditioner, The desert cooler was much cheaper than the air conditioner, Shelly's mother wanted to buy the desert cooler as it was much cheaper.
Now answer the following questions:

(i) As a student of science, why would you suggest to Shelly's mother to buy the expensive air-conditioner? Give two reasons.
(ii) What are the values associated with above decision?

Q.2. In cold countries where large amount of snow falls during winter season the roads are cleared of snow by sprinkling either common salt or magnesium chloride or calcium chloride or mixture of these. Since these chemicals have damaging effect on the environment, therefore, potassium acetate is preferred.
Now answer the following questions:

(i) How does common salt or magnesium chloride help in clearing snow from roads?
(ii) At what temperature common salt and at what temperature magnesium chloride or calcium chloride is effective?
(iii) Discuss the damaging effects of these chemicals on the environment and how does the use of potassium acetate remove these damaging effects?

Q.3. Regular cooking in vessels open to atmosphere takes long time in mountains therefore cooking in pressure cooker is advised.
Now answer the following questions:

(i) Why does cooking in vessels open to atmosphere take long time in mountains?
(ii) Why does cooking in pressure cookers take less time?

(iii) Name any other advantage of using pressure cooker instead of cooking in open vessels.

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Is Matter Around Us Pure

Module : 9C (06)

Q.1. Identify solutions amongst the following mixtures:-

Lemonade, Sea water, Brass, Mixture of Salt and Sulphur

Q.2. Define the terms solute and solvent.

Q.3. What is tincture of Iodine? Identify solute and solvent in the above solution.

Q.4. What is a saturated solution? What happens when a saturated solution at a certain temperature is cooled slowly?

Q.5. What are the different types of solutions? Given one example of each type of solution?

Q.6. Give two examples each of a homogeneous and heterogeneous mixture.

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Is Matter Around Us Pure

Module : 9C (07)

Q.1. To make a saturated solution, 37 g of Aluminium chloride is dissolved in 100 g of water at 293 K. Find its concentration at this temperature.

Q.2. 3g of a solute are dissolved in 30g of water to form a saturated solution at 298K. Calculate the solubility of the solute at this temperature.

Q.3. A solution contains 40 cm^3 of alcohol mixed with 150 cm^3 of water. Calculate the concentration of this solution.

Q.4. Compare the properties of a solution, colloid and suspension in terms of :-

(i) Particle size
(ii) Behaviour towards beam of light passed through them.
(iii) Stability

Q.5. What is Tyndall effect? Where is it observed?

Q.6. Explain the terms dispersed phase and dispersion medium with reference to a colloidal solution.

Q.7. What is the principle of centrifugation method?

Q.8. Give two applications of centrifugation method used to separate mixtures.

Q.9. Give two examples each of the following colloids:-

(i) Foam (gas in liquid)
(ii) Solid sol
(iii) Emulsion
(iv) Aerosol (solid in gas)

Q.10. Name any two simple physical methods used to separate heterogenous mixtures into their constituents.

Q.11. Which method of separation can be used to separate volatile component from its non volatile solute in a solution?

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Is Matter Around Us Pure

Module : 9C (08 & 09)

Q.1. Which separation techniques will you apply for the separation of the following?

(i) Benzene (B.P. 80^0C) from Toluene (B.P. 110^0C)
(ii) Iodine from sand
(iii) Pigments from natural colours
(iv) Sugar from sand
(v) Carbon disulphide from alcohol
(vi) Butter from cream / water from wet clothes
(vii) Slag from molten iron
(viii) Salt from ammonium chloride
(ix) Sugar from its solution in water
(x) Fine mud particles suspended in water

Q.2. Name the method used for the separation of components of a mixture containing two miscible liquids having sufficient difference in their boiling points.

Q.3. Give the principle of technique used for separation of those solutes that dissolve in the same solvent.

Q.4. Give two applications each of :-

(i) Fractional Distillation
(ii) Separating funnel
(iii) Chromatography

Q.5. Why is crystallisation technique better than simple evaporation technique?

Q.6. Distinguish between a physical and a chemical change.

Q.7. Classify the following into elements, compounds and mixture :-

(i) Lead
(ii) Steel
(iii) Granite
(iv) Hydrogen peroxide
(v) Salt solution
(vi) Washing soda
(vii) Aluminium
(viii) Graphite

Q.8. Name the following :-

(i) Two metalloids
(ii) Two elements that are liquid at room temperature.
(iii) Two elements which become liquid at a temperature slightly above room temperature.
(iv) Scientist who gave the basic definition of an element.

Q.9. Classify the following into metals, non metals, metalloids.
Barium, Hydrogen, Silver, Helium, Bromine, Boron, Aluminium, Germanium.

Q.10. Distinguish between a compound and a mixture (three points).

Q.11. *(i)* Is cutting of trees a chemical or a physical change? Explain.

(ii) Identify the solute and solvent in the following solutions.

(a) Dental amalgam
(b) 22 Carat Gold
(c) Tincture of Iodine
(d) Rectified spirit

H.O.T.S. Questions:

Q.1. Complete the following based on separation techniques. The first one is done for you.

Mixture	**Type**	**Separation Technique**	**Principle**
1. Alcohol + Water	Homogenous	Fractional Distillation	Difference in boiling point
2. Sulphur + Carbon disulphide	–	–	–
3. Sand + Water	–	–	–
4. Pigments of flower	–	–	–

Q.2. Some solid dissolve easily while in liquids the other do not.

(i) What is the name given to the liquids which dissolve solids?
(ii) What is the name given to the clear liquid formed when a solid dissolve in a liquid?
(ii) What is the name given to the liquid which contains in it some suspended particles?

Q.3. The table given below shows number of grams of five different solids dissolving in 100 g of the solvents: water, alcohol and chloroform (all at 20°C).

Solvent	**Salt**	**Sugar**	**Iodine**	**Chalk**	**Urea**
Water	36.0	204.0	0.6	0.0	100.0
Alcohol	0.0	0.0	20.0	0.0	16.0
Chloroform	0.0	0.0	3.0	0.0	0.0

(i) Which solid dissolves best in water at 20°C?
(ii) Which solid is maximum soluble in alcohol?

(iii) Which solid is insoluble in all three solvents?

Q.4. Butter is an example of one type of colloidal solution. Name it. Give the reason for your choice.

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Value Based Question

Q.1. Iron is a useful structural material. It has been used extensively for manufacture of wires, rails, ships, boats, dams, iron frames for houses etc. In spite of its benefits, iron is prone to rusting over the years. Although many methods are available to protect iron from rusting, yet steel which does not rust is preferred.
Now answer the following questions:

(i) What is rust? How is it formed?
(ii) Is conversion of iron into rust a physical or a chemical change?
(iii) What is steel?

Q.2. A large number of small scale industries are operating in almost all parts of our countries. These industries use coal as a fuel and produce large of quantities of smoke and carbon dioxide in spite of these industrial growth which promotes the economy of the country and its people, the two products of combustion of coal i.e. smoke and CO_2 pollute our environment.
Now answer the following questions:

(i) What is smoke? How does it affect our health?
(ii) What do you suggest reduce the hazards of smoke?
(iii) How does CO_2 affect our environment?
(iv) Should the use of coal as a fuel in industries be banned? Suggest two environment friendly sources of energy to run our factories?

Q.3. During rainy season, the river water becomes muddy. It cannot be made fit for drinking purposes just by the decantation or filtration.
Now answer the following questions:

(i) What makes water muddy?
(ii) Why can't muddy water be purified by either decantation or filtration?
(iii) Suggest two methods to make muddy water fit for drinking purposes.

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Module : 9C (10) **Revision for SA – I**

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Atoms and Molecules

Module : 9C (11)

Q.1. Name the Indian philosopher who postulated that on dividing matter we come across the smallest particles.

Q.2. Name the philosopher who called these particles as atoms.

Q.3. Define the following laws –

(i) Law of conservation of mass

(ii) Law of definite / constant proportion

Q.4. In a chemical reaction 100 g of limestone on heating decomposes to give 56 g of quick lime and 44 g of carbon dioxide. Show that these observations are in agreement with the Law of conservation of mass.

Q.5. Magnesium and oxygen combine in the ratio of 3:2 by mass to form magnesium oxide. What mass of oxygen gas would be required to react completely with 24 g of magnesium?

Q.6. Give the postulates of Dalton's atomic theory.

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Atoms and Molecules

Module : 9C (12)

Q.1. What symbols were proposed by Dalton for the following elements :-

(i)	Phosphorous	*(ii)*	Lead
(iii)	Gold	*(iv)*	Iron

Q.2. Define the atomic mass unit. Give the early and the latest abbreviation of atomic mass unit.

Q.3. What is meant by saying that atomic mass of oxygen is 16.

Q.4. Explain the significance of symbol 'H'.

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Atoms and Molecules

Module : 9C (13)

Q.1. (i) Define a molecule.

(ii) H_2, Cl_2, CO_2, NO_2, H_2SO_4, H_2O, O_3

Differentiate the above as molecules of Elements and molecules of compounds.

Q.2. The formula of a compound is $Ca_3(PO_4)_2$. What is the valency of Ca and the valency of PO_4 in it?

Q.3. What is an ion? Give three differences between Na^+ ion and an Na atom.

Q.4. Explain the difference between 2N and $2N_2$.

Q.4. Which one of the following is tetraatomic molecule?

CH_2OH, CH_4, H_2O_2, PCl_5

Q.6. Write down the formulae of the following :-

(i)	Calcium Sulphate	*(ii)*	Ammonium hydroxide
(iii)	Sodium bicarbonate	*(iv)*	Aluminium nitride
(v)	Ferric sulphide	*(vi)*	Mercuric chloride

Q.7. Write down the names of compounds represented by the following formulae :-

(i)	KNO_2	*(ii)*	Na_2S
(iii)	$Al_2 (SO_4)_3$	*(iv)*	$Ca_3 (PO_4)_2$
(v)	$HgNO_3$	*(vi)*	$Ca (HCO_3)_2$

Q.8. Give symbols of the following ions :-

(i)	Phosphate	*(ii)*	Ammonium
(iii)	Sulphite	*(iv)*	Bromide
(v)	Fluoride	*(vi)*	Aluminium
(vii)	Copper (II)	*(viii)*	Borate
(ix)	Iron (III)	*(x)*	Chlorate
(xi)	Hydride	*(xii)*	Sulphite

Q.9. Calculate the molecular mass of the following compounds in a.m.u.

(i)	Ferric nitrate	*(ii)*	Ammonium hydroxide
(iii)	Calcium phosphate	*(iv)*	CH_3OH

(at. Mass Fe = 56, N = 14, O = 16, P = 31, C = 12, H = 1, Ca = 40)

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Module 9C (14) Atoms and Molecule

Mole Concept (Numericals)

Q.1. Calculate the number of Sodium ions in 53g of Na_2CO_3.

Q.2. Calculate the numbers of sodium atoms in 0.2 moles of sodium element.

Q.3. Calculate the number of iron atoms and number of moles in a piece of iron weighing 2.8 g (Given Atomic mass of iron = 56u).

Q.4. Express the following into moles

(i)	14.7g H_2SO_4	*(iii)*	3.15g HNO_3
(ii)	2.2g CO_2	*(iv)*	6.44g NaOH

Q.5. Express the following into grams:

(i) 0.7 moles of H_2O *(iii)* 3.77 mole of HCl

(ii) 4.0 moles of HNO_3 *(iv)* 8.75 mole of $CaSO_4$

Q.6. How many molecules of water are present in 10 grams of water? (Given $N_a=6.022\times10^{23}$)

Q.7. If 2g of carbon contains x atoms, what will be the number of atoms in 2g of magnesium? (C=12u, Mg=24u)

Q.8. Convert 12.044×10^{23} molecules of sulphur dioxide into moles.

Q.9. The mass of one molecule of a substance is 4.65×10^{-23} g. What is its molecular mass? What could this substance be?

Q.10. How many moles of oxygen atoms are present in one mole of the following compounds?

(i) Al_2O_3 *(iv)* $Al_2(SO_4)_3$

(ii) CO_2 *(v)* $A_2Cr_2O_7$

(iii) Cl_2O_7

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Module 9C (15 & 16) Atoms and Molecule

Q.1. Compare an electron, and a proton in respect of mass and charge.

Q.2. State the drawbacks of Rutherfords experiment.

Q.3. Draw the electronic structure of the following

(i) Calcium *(ii)* Potassium

Q.4. What was the bold new concept incorporated by Niel's Bohr in the model of the atom?

Q.5. Describe Rutherford's alpha scattering experiment, leading to the discovery of the nucleus.

Q.6. What problem of atomic structure was solved by the discovery of neutron?

Q.7. Name the scientist who discovered

(i) electron *(ii)* proton *(iii)* neutron

Q.8. Why do most of the alpha – particles pass straight through the gold foil?

Q.9. Write the electronic configuration of the following atoms and determine their valency.

(i) Lithium *(ii)* Nitrogen *(iii)* Magnesium *(iv)* Silicon

Q.10. What is the most important discovery made through the alpha – particle scattering experiment

Q.11. An element has an atomic number of 11 and its mass number is 23. What is the arrangement of electrons in the shells. State nuclear composition of an atom of the element.

Q.12. The element A, B, C, D have atomic numbers of 3, 9, 12, 18 respectively. What are the number of valence electrons in them. Classify them as metals and non metals.

Q.13. The mass number of an element is 18. It contains 7 electrons. What is the number of protons and neutrons in it? What is the atomic number of an element?

Q.14. An atom of an element X may be written as $_4X^9$

(i) What do figures 9 and 4 indicate?
(ii) What is the number of protons, neutrons and electrons in atom X.

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Module 9C (17) Atoms and Molecules

Q.1. What name is given to the pair of atoms such as $_7N^{14}$ and $_7N^{15}$. What are the number of valence electrons in them. Classify them as metals and non metals.

Q.2. Which two of the following nuclei are isotopes of each other?

$_{90}Z^{231}$ $_{91}Z^{230}$ $_{88}Z^{230}$ $_{90}Z^{233}$

Q.3. What is the reason for the different atomic masses of the isotopes of an element?

Natural Resources

Q.4. Give three applications of isotopes.
Q.5. Give four causes of water pollution.
Q.6. List two ways by which CO_2 is fixed in atmosphere.
Q.7. List any two harmful effects of Air pollution and water pollution.

H.O.T.S. Questions:

Q.1. Both helium (He) and beryllium (Be) have two valence electrons. Whereas 'He' represents a noble gas element, 'Be' does not. Assign reason.

Q.2. Study the data given below and answer the questions which follow:

Particle	Electrons	Protons	Neutrons
A	2	3	4
B	10	9	8
C	8	8	8
D	8	8	10

(i) Write the mass number and atomic number of the particles A, B, C and D.
(ii) Which represent a pair of isotopes?

Q.3. Which of two chemically more reactive; element X with atomic number 17 or element Y with atomic number 16?

Q.4. *(i)* Does the atomic number of the element change when its atom gets converted into cation and anion?

(ii) Calculate the atomic number and mass number of the elements X and Y from the following:

(a) X^- ion containing 18 electrons and 18 neutrons.

(b) Y^{3+} containing 10 electrons and 14 neutrons.

Name the elements X and Y.

(iii) What are nucleons ? What is their number called?

Q.5. An unknown species X has 17 protons and 18 electrons. Predict its nature.

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Value Based Question

Q.1. According to Law of conservation of mass, mass destroyed in one form is converted into another form and there is no net loss. The products formed may be useful or harmful e.g. Coke is burnt as a source of heat, and CO_2 produced is needed for photosynthesis but can also be one of the pollutants. CO_2 also enters into the atmosphere through respiration or production of quicklime from limestone Now answer the following questions:

(i) Should the burning of fossil fuels be completely banned? Give reasons in favour or against.

(ii) What should be done with respect to vehicles causing a lot of air pollution due to burning of fuels like petrol, diesel etc.?

(iii) Do you think CO_2 is useful for any other purpose besides photosynthesis? Explain with example.

Q.2. Dalton had postulated that all matter is made up of atoms and molecules. Further the atom was indivisible. Later researchers prove that atom can be destroyed producing such a large amount of energy that it lead to the production of atom bomb which is a source of destruction. However, the scientists found that the energy could be utilized in a controlled manner for useful purposes and they built nuclear reactor for production of electricity.

Now answer the following questions:

(i) Do you think that Dalton's discovery of atom is boon or bane (curse) to the mankind?

(ii) Which do you think is better a thermal power plant or a nuclear reactor? Discuss.

Q.3. All sources of energy such as sun, electric bulb, heater emits energy which travels in the form of waves called electromagnetic waves because they are associated with electric and magnetic fields. Depending upon the nature of source, we have different types of electromagnetic waves such as microwave, radio waves, X-rays, γ-rays, cosmic rays etc. differing from each other in their frequency or wavelength.

Now answer the following questions:

(i) Should microwave ovens be used for heating or cooking the food at home? Comment with point in favour and against.
(ii) Why is it advised not to keep your cell phone in the breast pocket of your shirt?
(iii) Why is it advised to watch the TV from a little far off distance and also to watch less TV?
(iv) Why a person should go for minimum X-ray and a pregnant women should not go for X-ray at all?
(v) Give one important application of Ultrasound waves in medical field? How is it being misused in the medical field?

Q.4. Nobody has seen electrons, protons and neutrons. However, the discovery of Rutherford's model, Bohr's Model and further modifications have revolutionized their application in different fields.

Now answer the following questions:

(i) Give one application where electron beam is used.
(ii) Give one application of proton in the medical field.
(iii) How has the discovery of neutron been useful as well as harmful to the society?

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Module 9C (18) Revision for SA – II

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BIOLOGY MODULES

Module : 9B (01)
Chapter : The fundamental unit of Life.
Contents :

1. What are living organisms made up of?
2. Cells vary in shape and size
3. History of Cell discovery, Cell theory
4. What is cell made up of?
   - *(i)* Plasma membrane: - hypertonic, hypotonic and isotonic solutions, diffusion, osmosis.
   - *(ii)* Cell Wall – structure, plasmolysis.
   - *(iii)* Nucleus – nuclear envelope, pore, nucleolus, chromatin network, genes, DNA.
   - *(iv)* Cytoplasm – prokaryotic and eukaryotic cells

Learning Objectives

The students will understand:

1. Structure of a typical cell
2. What controls the activities of a cell.
3. Difference between prokaryotic and eukaryotic cell

Key Term

Plasmalemma, Osmosis, Prokaryotic, Eukaryotic

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Module : 9B (02)
Chapter : The fundamental unit of Life.
Contents :

Cell Organelles

1. Endoplasmic reticulum – RER, SER their structure and function.
2. Golgi Apparatus – Packaging units of cell.
3. Lysosomes – suicidal bags of cell.
4. Mitochondria – release ATP, the energy currency of cell. Also known as power house
5. Plastids- present in plant cell, are of two types:

   (i) Chromoplast *(ii)* Leucoplast

6. Vacuoles – storage sacs.

Learning Objectives

The students will understand:
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The role of organelles in the functioning of cell

Key Term

Vescicles, Plastids, Vacuoles.

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Module : 9B (03)
Chapter : Tissues
Contents :

1. A group of cells that are similar in structure and/or work together to achieve a particular function forms a tissue.
2. Are all plants and animals made of same types of tissue?
3. Plant tissues: they are of two types

(i) Meristematic tissue *(ii)* Permanent tissue

4. Meristematic tissue found in growing regions of plants

(i) Apical meristem *(ii)* Intercalary meristem
(iii) Lateral meristem

Learning Objectives

The students will understand:

1. What is a tissue?
2. Various kinds of plant tissues.
3. The functions of meristematic tissues

Key Term

Meristem – apical, lateral, intercalary
Activity – To observe the growth of roots in onion bulbs.

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Module: 9B (04)
Chapter : Tissues
Contents :

1. Permanent tissue – These cells have shape, size and perform a function called differentiation.
2. Permanent tissues are of two kinds

(i) Simple permanent. These are further divided into three kinds

a) Parenchyma b) Collenchyma c) Sclerenchyma

(ii) Complex permanent tissue eg. Xylem and Phloem.

Learning Objectives

The students will understand:

1. Different kinds of permanent plant tissues
2. The structure and function of different types of permanent plant tissues.

Key Term

Cambium, Chlorenchyma, Parenchyma, Sclerenchyma

Activity: To observe permanent slides of plant tissues.

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Module : 9B (05)
Chapter : Tissues
Contents :

1. Animal tissues These are of four types
   (i) Epithelial tissue- Forms continuous protective covering over most organs and cavities inside body. These are of four kinds.

      a) squamous *b)* cuboidal *c)* columnar *d)* stratified

2. Connective tissue – Blood, bone, ligament, tendons, cartilage, areolar, adipose

Learning Objectives

The students will understand:
Different kinds of animal tissues, their structure and functions.

Key Term

Areolar, adipose, tendon, ligament

Activity

To observe permanent slides of animal tissues

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Module : 9B (06)
Chapter : Tissues
Contents :

1. Animal tissues (Continued)

   (i) Muscular tissues. These are of three kinds

   a) striated b) smooth c) cardiac.

2. Nervous tissue. Highly specialized cells. Made of nerve cells or neurons. These receive and conduct impulses.

Learning Objectives

The students will understand:

The structure and function of muscular and nervous tissue.

Key Term

Cardiac, axon, cyton, synapse.

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Module : 9B (07)
Chapter : Improvement in food resources.
Contents :

1. Introduction, green and white revolutions
2. Improvement in Crop yields – Crop variety, Crop production and Crop protection, Improvement and management.

(i) **Crop variety improvement –** hybridization, good quality seeds, cultivation practices, tolerance to soil salinity, diverse climatic conditions

(ii) **Crop production management**

a) Nutrient management – Manure, fertilizers
b) Irrigation c) Cropping patterns.

3. Crop protection management - uses of herbicides, insecticides and fungicides.
4. Storage of grains – fumigation

Learning Objectives

The students will understand:

1. Need and ways to improve production of crops.
2. Ways to protect and store crop

Key Term

Macro – nutrients, genetically modified crop, Fumigation.

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Module : 9B (08)
Chapter : Improvement in food resources.
Contents :

1. Animal husbandry – management of animal livestock, its need.

2. Cattle farming – milch animals, draught animals, Exotic breeds.

3. Animal husbandry (continued)
4. Poultry farming – improves and enhances egg production and chicken meat.
5. Fish production – It is cheap source of protein

(i) Marine fisheries *(ii)* Inland fisheries

6. Bee keeping – source of honey and wax

Learning Objectives

The students will understand:

1. Need for the management of livestock.
2. Need and ways of improving production of poultry, fish and honey.

Key Term

Breed, livestock, Poultry, fisheries, pasturage.

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Module: 9B (09) Revision.

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Module : 9B (10)
Chapter : Diversity in living organisms

Contents :

1. Introduction, need for classification
2. Basis of classification.
3. Classification and evolution. Charles Darwin and his idea of evolution.
4. Biodiversity – variety of forms found in a region
5. Hierarchy of classification groups –

Kingdom, Phylum/Division, Class, Order, Family, Genus, species

Learning Objectives

The students will understand:

1. Need and importance of Classification
2. Basis of terming organisms as primitive and advanced.

Key Term

Hierarchy, Biodiversity

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Module: 9B (11)
Chapter : Diversity in living Organisms.
Contents : five kingdom classification

1. **Monera** – do not have a defined nucleus or organelles.
2. **Protista** – unicellular eukaryotic organisms, have organelles.
3. **Fungi** – These are heterotrophic eukaryotic organisms
4. **Plantae** – Multicellular eukaryotes with cell walls.
5. **Animalia** – Multicellular eukaryotes without cell walls. These are heterotrophs.

Learning Objectives

The students will understand:

The need to classify plants into different divisions.

Key Term

Monera, protista, cyanobacteria

~~~~~~

Module : 9B (12)
Chapter : Diversity in living organisms
Contents :Kindgom Plantae

1. **Thallophyta** – Such plants do not have well-differentiated body design
2. **Bryophyta** – Amphibians of plant kingdom Body differentiated into stem and leaf – like structure.
3. **Pteridophyta** – Plant body differentiated into roots, stems and leaves and has specialized tissue for the conduction of water
4. **Gymnosperms** – Plants bear naked seeds.
5. **Angiosperms –** Plants bear covered seeds . Also known as flowering plants.

Learning Objectives

The students will understand:
Characteristic features and examples of each group.

Key Term

Thallus, Vascular tissue, Phanerogams, Cotyledons.

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Module : 9B (13)
Chapter : Diversity in living organisms
Contents : Divisons of kingdom Animalia.

1. **Porifera** – Pore bearing animals found largely in marine habitats.
2. **Coelenterata** – Water dwelling animals, body made up of two layers of cell

3. **Platyhelminthes –** Body bilaterally symmetrical three layers of cell. Also known as flat worms
4. **Nematoda –** Presence of pseudocoelom.
5. **Annelida –** Have true coelom
6. **Arthropoda –** Largest group of animals, body segmented, open circulatory system
7. **Mollusca –** Coelom reduced, foot used for locomotion.
8. **Echinodermata –** Marine animals, have water – driven tube system for locomotion.
9. **Protochordata –** Have notochord, marine animals

Learning Objectives

The students will understand:
The characteristic features of non – vertebrate phyla.

Key Term

Diploblastic, Triploblastic, Bilateral symmetry, Coelom, Pseudocoelom.

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Module : 9B (14)
Chapter : Diversity in living organisms
Contents :

Vertebrata and its classes.

1. **Pisces –** Respire by gills
2. **Amphibia –** Can live both on land and water Have three – chambered heart, respiration through gills/lungs.
3. **Reptilia –** Cold blooded, have scales on their body
4. **Aves –** Warm blooded, four chambered heart.
5. **Mammalia –** warm blooded, four chambered, have mammary glands for production of milk.
6. **Nomenclature –** Binomial nomenclature

Learning Objectives

The students will understand:

The characteristic features of various class of phylum vertebrata.

Key Term

Generic and specific name, warm and cold blooded, gills.

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Module : 9B (15)
Chapter :Why do we fall ill.

Contents :

1. Health and its failure – significance of health, personal and community issues both matter for health.
2. Distinctions between healthy and disease free.
3. Diseases and causes – What does diseases look like, acute and chronic diseases, infectious and non- infectious causes.

Learning Objectives

The students will understand:

1. The meaning of the term disease.
2. Reason for suffering from diseases.

Key Term

Chronic, acute diseases

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Module : 9B (16)
Chapter : Why do we fall ill

Chapter : Natural Resources

Contents :

1. Infectious diseases – study of infectious agents like fungi, protozoa, virus, bacteria etc. Examples of diseases and their causal organisms.
2. Means of spread – direct contact, by air, by food, by insects, animals.
3. Organ- specific and tissue – specific manifestations
4. Principles of treatment
5. Principles of prevention
6. Immunization.
7. Minerals in soil
8. Soil formation

Learning Objectives

The students will understand:

1. The means of spread and ways to reduce infection
2. Immunization programmes.
3. How different biotic and abiotic factors help in soil formation.
4. How soil erosion can be prevented.

Key Term

Infection, Vector, Immunization, Immune system

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Module : 9B (17)

Chapter : Natural Resources

Contents :

1. Biogeochemical cycles
2. Global warming
3. Ozone layer

Learning Objectives

The students will understand:

1. The importance of Nitrogen cycle, Carbon cycle, Water cycle and Oxygen cycle in maintaining balance in nature.
2. The cause of Global warming and Depletion of ozone layer

Key Term

Biogeochemical cycle, Nitrogen fixation, Global warming

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Module : 9B (18) Revision

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LIST OF PRACTICALS

1. To prepare stained temporary mount of *(a)* onion peel and *(b)* human cheek cell and to record observation and draw labeled diagrams.

2. To identify parenchyma and sclerenchyma tissues in plant, striped muscle fiber and nerve cell in animals, from prepared slides and to draw their labeled diagrams.

3. To test *(a)* the presence of starch in the given food sample *(b)* the presence of the adulterant metanil yellow in dal.

4. To study the characteristics 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.

5. To observe and draw the given specimen-earth worm, cockroach, bony fish and bird and for each specimen, record

(a) One specific feature of phylum
(b) One adaptive feature with reference to its habitat.

BIOLOGY ASSIGNMENTS

Module: 9B (01)

Q.1. Differentiate between prokaryotic and eukaryotic cells.

Q.2. Fill in the blanks.

(i) One micron is equal to _____ metres
(ii) Membrane-bound organelles are absent in _____
(iii) True nucleus is present in _____
(iv) The term protoplasm was coined by _____
(v) The cell theory was given by _____

Q.3. Draw a diagram of nucleus of a cell and label the following parts:

(i) Nuclear membrane *(ii)* Nuclear pore
(iii) Nucleolus *(iv)* Chromatin network

Q.4. Which of the two cells, plant or animal, can withstand greater changes in the surrounding medium? Why?

Q.5. Write one word for:

(i) Nuclear region in prokaryotic cell
(ii) Process of cell membrane building
(iii) Movement of water through selectively permeable membrane.

Q.6. What is plasmolysis?

Q.7. Why is plasmalemma also known as selectively permeable membrane?

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Module: 9B (02)

Q.1. Write one word for the following:

(i) Suicidal bags of a cell *(ii)* Powerhouse of the cell
(iii) Organelle of packaging in a cell. *(iv)* Coloured plastids

Q.2. How are plastids and mitochondria different from other cell organelles?

Q.3. What happens to cell organelles that get old and worn – out?

Q.4. What are leucoplasts and what is their function?

Q.5. What are vacuoles and what is their function?

Q.6. Draw a well – labelled diagram of a mitochondria.

Q.7. What are the functions of endoplasmic reticulum?

==========

Value Based Questions

Q.1. Amit's younger brother is suffering from loose motions. He took him to a doctor and enquired about the cause. The doctor said that it could be a bacterial, protozoan or viral infection and advised a stool test. Amit immediately got the test conducted for his brother and took the pathology report to the doctor for proper treatment to start.

(i) What are the two types of cells based on complexity of organisation?

(ii) State two differences between them.

(iii) Which values are shown by Amit?

Q.2. One day Mira saw her mother making pickles. Her mother put the cut turnip, cauliflower, carrot in the sun for drying after cutting them. Mira inquired from her mother the possible reason for doing so.

(i) What can be the possible reason given by Mira's mother?

(ii) Why is it important to remove water?

(iii) What value is being displayed by Mira's mother?

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Module: 9B (03)

Q.1. What are tissues?

Q.2. What are the various types of tissues found in plants?

Q.3. Where are meristematic tissues present?

Q.4. What is cambium?

Q.5. What is the main function of meristematic tissues?

Q.6. Draw a diagram to show the presence of types of meristematic tissues in a plant.

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Module: 9B (04)

Q.1. Fill in the blanks.

(i) Permanent tissues are derived from _____ tissues
(ii) Phloem fibre is a _____tissue.
(iii) Xylem parenchyma _____tissue.
(iv) Collenchyma provides _____ to the plant
(v) The space between the guard cells is known as _____

Q.2. Where is collenchyma located?

Q.3. What is the function of sclerenchyma?

Q.4. What is the major difference between permanent and meristematic tissues?

Q.5. Name four types of cells found in Xylem.

Q.6. What is the difference between sclerenchyma and collenchyma?

Q.7. Categorize the following as simple or complex tissues:

Xylem, Collenchyma, Parenchyma, Phloem

Q.8. Differentiate between xylem and phloem.

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Module: 9B (05)

Q.1. Name one place in living organisms where the following are located.

(i) Squamous epithelium *(ii)* Areolar connective tissue
(iii) Ligament *(iv)* Glandular epithelium
(v) Tendon.

Q.2. Differentiate between

(i) Bone and cartilage *(ii)* Tendon and ligament.

Q.3. Fill in the blanks.

(i) Blood is a _____ tissue.
(ii) Bone consists of _____ cells.
(iii) Cartilage consists of _____ cells.
(iv) Tendons connect _____ to _____

Q.4. Brush bordered epithelium is found in

(i) Stomach *(ii)* small intestine
(iii) Fallopian tube *(iv)* Trachea.

Q.5. The hardness of the bone tissue is due to the phosphates and carbonates of

(i) Calcium and sodium *(ii)* Calcium and Magnesium
(ii) Magnesium and Sodium *(iv)* Magnesium and potassium.

Q.6. What is the function of adipose tissue?

==========

Module: 9B (06)

Q.1. How many types of muscles are found in animals?

Q.2. Which of the cells is uninucleate – the smooth muscle or the cardiac muscle?

Q.3. Differentiate between striated and non-striated muscles.

Q.4. Draw and label a neuron.

Q.5. Smooth muscles occur in

(i) Uterus *(ii)* Artery
(iii) Vein *(iv)* All of the above

Q.6. Which tissue makes up brain, spinal cord and nerves?

Q.7. The region of union of axon of one neuron with dendrites of another neuron is called as:

(i) Synapse *(ii)* Cyton
(iii) Node of Ranvier *(iv)* Axon

Q.8. Which tissue performs the function of binding, supporting and packing together different organs of the body?

Q.9. What are the muscles of heart also known as?

Q.10. Draw well-labelled diagrams of the three types of muscles.

==========

Value Based Question

Q.1. Aman and Rishabh are close friends. Over the past few months, Rishabh has put on a lot of weight. Aman explains to Rishabh that obesity is a common health problem nowadays which results due to deposition of fats in various parts of the body. It may lead to other health problems like diabetes, high blood pressure and heart attacks.

(i) Which tissue is responsible for storage of fats in the body?

(ii) How can we control obesity?

(iii) What are the effects of morning walk and regular physical exercise on obesity?

(iv) Which values are shown by Aman?

==========

Module: 9B (07)

Q.1. What are green revolution and white revolution?

Q.2. What nutrients do the following provide:

(i) Pea *(ii)* Linseed *(iii)* Vegetables *(iv)* pigeon pea
(v) Wheat *(vi)* Castor *(vii)* Spices *(viii)* fruits.

Q.3. Differentiate between Kharif and Rabi crops.

Q.4. What is interspecific hybridization?

Q.5. How does change in maturity duration of crop help the framers?

Q.6. Categorize the following as macronutrients and micronutrients:

(i)	Calcium	*(ii)*	Molybdenum	*(iii)*	Phosphorus
(iv)	Iron	*(v)*	Boron	*(vi)*	Magnesium.

Q.7. What is organic farming?

Q.8. What is vermicomposting?

Q.9. Differentiate between mixed and inter cropping.

Q10. What are river lift systems?

Q.11. Why are weeds considered as unwanted plants in cultivated lands?

Q.12. In what three ways do the pests attack plants?

==========

Module: 9B (08)

Q.1. What qualities are expected in a cross-breed variety of fowl?

Q.2. Differentiate between capture fishing and culture fishing.

Q.3. What is composite fish culture system?

Q.4. Which Italian bee variety is used in India to yield honey?

Q.5. What is the use of Satellites and echo sounders in marine fishery?

Q.6. _____, _____ and _____ are some biotic factors responsible for storage losses.

Q.7. _____ is the scientific management of animal livestock.

Q.8. Milk-producing animals are called _____

Q.9. What qualities of Brown Swiss and Sahiwal are considered to use them for crossbreeding?

==========

Value Based Questions

Q.1. Seema and her mother went to a party and were appalled by the amount of food wasted by the people. Sema's mother told her to take only that much food in her plate that she could eat. After the party got over, Seema's mother asked the host to call the local NGO that would distribute the unused food to poor people.

(i) State two methods to increase the production of food crops.

(ii) Why is storage of grains considered a very important aspect of agriculture?

(iii) What values are shown by Seema's mother?

Q.2. Arnav went to live with his grandfather in his native village during the summer vacations. His grandfather wants to buy some cows and buffaloes and is in the process of making a goshala. Arnav has read in his school about animal husbandry. He tells his grandfather about the proper housing and high yielding varieties.

(i) State any two features of a cattle shed.

(ii) Name a high yielding variety of a cow and a buffalo.

(iii) What values are shown by Arnav?

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Module: 9B (9) Revision

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Module: 9B (10)

Q.1. Who proposed the five kingdom classification?

Q.2. What is the importance of Classification?

Q.4. What is biodiversity?

Q.5. Which region is also known as region of mega diversity?

Q.6. Arrange the following groups in correct sequence:

Class, Species, Kingdom, Phylum, Order, Genus, Family

Q.7. Give one term for:

(i) A group of related families *(ii)* The smallest unit of classification
(iii) The largest unit of classification *(iv)* A collection of related species.

Q.8 What is the basis of the five kingdom classification?

Q.9 Who wrote the book 'The origin of Species?'

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Module: 9B (11)

Q.1. What is the cell wall of fungi made up of?

Q.2. What is blue green algae also known as?

Q.3. What are lichens?

Q.4. Differentiate between prokaryotes and eukaryotes.

Q.5. Differentiate between fungi and plantae.

Q.6. Draw well labelled diagram of Paramecium, Amoeba and Euglena.

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Module: 9B (12)

Q.1. What are thallophytes?

Q.2. Fill in the blanks.

(i) _____ are the amphibians of plant kingdom
(ii) Three division of Cryptogamae are _____, _____ and ____.
(iii) Seed bearing plants are known as _____.
(iv) _____ are also known as seed leaves.
(v) Cycas and Pinus belong to _____ subdivision of plant kingdom.

Q.3. What is the major difference between Gymnosperms and Angiosperms?

Q.4. Give two examples of monocots.

Q.5. Differentiate between monocot and dicot plants.

==========

Module: 9B (13)

Q.1. To which phyla do the following animals belong?

(i) Toad *(ii)* Scorpion *(iii)* Cockroach *(iv)* Hydra.

Q.2. Give one example of each of the following phyla.

(i) Protozoa *(ii)* Cnidaria *(iii)* Annelida

(iv) Mollusca *(v)* Echinodermata

Q.3. Name the phylum in which animals have segmented body, jointed appendages and compound eyes.

Q.4. Give characteristic features of:

(i) Phylum Annelida *(ii)* Phylum Echinodermata *(iii)* Phylum Mollusca.

Q.5. What is notochord?

Q.6. Identify the phylum of the following animals.

(i)	Euplectella	*(ii)*	Sea anemone	*iii)*	Ascaris
(iv)	Liverfluke	*(v)*	Leech	*(vi)*	Prawn
(vii)	Octopus	*(viii)*	Starfish	*(ix)*	Balanoglossus
(x)	Pila.				

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Module: 9B (14)

Q.1. What are the characteristic features of phylum vertebrata?

Q.2. Fill in the blanks.

(i) Pisces have _____ chambered heart while amphibians have _____ chambered heart.
(ii) The exoskeleton of class _____ is made of scales.
(iii) The young ones of the class _____ use gills for breathing while the adults have _____.
(iv) Forelimbs are modified into _____ in birds.

Q.3. Differentiate between:

(i) Pisces and Amphibia *(ii)* Reptilia and Aves
(iii) Aves and Mammalia.

Q.4. Write the characteristic features and two examples of:

(i) Mammalia *(ii)* Pises *(iii)* Reptilia
(iv) Aves *(v)* Amphibia

Q.5. What points should be kept in mind while writing the scientific names of organisms?

Q.6. Who proposed the binomial system of nomenclature?

Q.7. Rewrite the following scientific names correctly.

(i) Amoeba histolytica *(ii)* Althala rosea
(iii) Brassica Campestris *(iv)* brassica Capitata

Q.8. Write the scientific names of :

(i) Potato *(ii)* Man *(iii)* Tiger *(iv)* Wheat

==========

Value Based Questions

Q.1. After monsoons a blue green layer was formed on the moist village soil. Hari collected it and dried it. He put this in his field and was able to get a good harvest without putting any fertilizer in the soil.

(i) Which group of organism forms this blue green layer?

(ii) Why was there an increased yield on addition of this blue green layer?

(iii) What values are shown by Hari?

Q.2. Rita wondered aloud to her friend Katie about the presence of such a large number of organisms on the surface of earth. She felt that most of these organisms have no

role to play on earth. Katie explained that all organisms have a part to play in maintaining equilibrium on earth.

(i) What will happen if all the microorganisms get obliterated from the surface of earth?

(ii) What values are shown by Katie?

==========

Module: 9B (15)

Q.1. What is meant by the term health?

Q.2. Differentiate between acute and chronic diseases.

Q.3. What are the causes of diseases?

Q.4. What does the term 'infectious disease' mean?

Q.5. Are the diseases cancer and high blood pressure infectious diseases? What could be the causes behind their occurrence?

==========

Module: 9B (16)

Q.1. Do antibiotics work in viral infections? Why?

Q.2. List out the ways in which diseases spread?

Q.3. With an example, explain how the tissue- specificity of the infection leads to very general – seeming effects

Q.4. Why is immunization essential?

Q.5. What diseases are taken care of in public health programme of childhood immunization?

==========

Value Based Questions

Q.1. Sonam has flu and fever. She insists on playing outside with her friends but her mother does not allow her to do so. She tells her to stay at home and rest.

(i) Why does Sonam's mother ask her to stay at home?

(ii) What is the cause of flu?

(iii) What values are displayed by Sonam's mother?

Q.2. The number of dengue cases have risen in Pooja's village. She has read that the mosquito that spreads dengue breeds in water. She asks her friends to kill all the mosquitoes in the water bodies. They also takes the help of the municipal office.

(i) What causes dengue?

(ii) What preventive measures should be employed to prevent the spread of the disease?

(iii) What values are displayed by Pooja in taking this initiative?

(iv) Suggest one such activity to promote such values in school students.

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Module 9B (17)

Q.1. Explain the role of Sun, water, wind and living organisms in the formation of soil.

Q.2. What are the various ways by which

(i) Carbon is removed from atmosphere.
(ii) Carbon is added to the atmosphere

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Module 18 – Revision

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MODEL TEST PAPER
HALF YEARLY EXAMINATION

Time : 2 hrs 30 min **M. M. 60**

General Instructions:

1. *The Question paper comprises of **two** Sections, A and B. You are to attempt both the Sections.*
2. *The candidates are advised to attempt all the question of Section A separately and Section B separately.*
3. *All questions are compulsory.*
4. *There is no overall choice. However, internal choice has been provided in some questions. You are to attempt only one option in such questions.*
5. *Marks allocated to every question are indicated against it.*
6. *Question **1 - 8** in Section A and Question **21 - 23** in Section B are very short answer questions. These are to be answered in **one word** or **one sentence**.*
7. *Question **9 - 13** in Section A and Question **24 - 26** in Section B are short answer questions. These are to be answered in **30-40** words each.*
8. *Question **14 – 18** in Section A and Question **27 - 28** in Section B are also short answer questions. These are to be answered in **40-50** words each.*
9. *Question **19 - 20** in Section A and Question **29** in Section B are long answer questions. These are to be answered in **70** words each.*

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Section - A

Q1. Why do Gases diffuse very fast? (1)

Q2. Name the process which can be used to purify an impure sample of Copper sulphate. (1)

Q3. Name the law that supports the following observation: (1)

Carbon dioxide obtained from different sources contain carbon and oxygen in the ratio of 3:8

Q4. What is SI unit of momentum? (1)

Q5. When is a body said to have a uniform velocity? (1)

Q6. Define uniform acceleration. (1)

Q7. State Newton's I Law of motion. (1)

Q8. Write the formula for work done on a body when the body moves at an angle to the direction of force. Give the meaning of each symbol used. (1)

Q9. How does the water kept in an earthen pot become cold during summer? (2)

Q10. Describe a method of separating common salt from a mixture of common salt and chalk powder. (2)

Q11. Magnesium and oxygen combine in the ratio of 3:2 by mass to form magnesium oxide. What mass of oxygen gas would be required to react completely with 24 g of magnesium? (2)

Q12. Deduce the formula for the kinetic energy of a body moving with velocity, *v*. (2)

Q13. A body of mass 100g is at rest on a smooth surface. a force of 0.2N acts on it for 5 seconds. Calculate the distance travelled by the body. (2)

Q14. ***(a)*** What is the effect of temperature on the rate of diffusion? **(1 + 2)**

(b) Which produces more severe burns steam or boiled water? Give reason.

Q15. ***(a)*** How many molecules of water are present in 10 grams of water? ($N_a = 6.022 \times 10^{23}$) **(2 + 1)**

(b) Calculate the numbers of molecules of sulphur (S_8) present in 16 g of solid sulphur.

Q16. How are sol, solution and suspension are different from each other? (3)

Q17. State and derive Newton's II Law of motion. (3)

Q18. A 5 g bullet traveling at a speed of 100 m/s strikes a 2 kg target and remains embedded in it, which is originally at rest, but free to move. At what speed does the target move off? (3)

Q19. ***(a)*** A solution contains 40 g of common salt in 350 g of water. Calculate the concentration in terms of mass by mass percentage of the solution. **(3)**

(b) Write down the formula of ***(i)*** Sodium oxide ***(ii)*** Magnesium chlorate. **(1)**

(c) Name the source from which nitrogen and oxygen are obtained on large scale. **(1)**

Q20. State the law of conservation of momentum and prove the law for the two colliding bodies. (5)

Section - B

Q21. Which organelle is known as the powerhouse of the cell? (1)

Q22. Which tissue forms the inner lining of our mouth? (1)

Q23. What is animal husbandry? (1)

Q24. What are the different means by which infectious diseases are spread? (2)

Q25. Identify the type of tissue in - **(2)**

(a) Bark of a tree
(b) Tissue that stores fat in our body
(c) Tissue in brain
(d) Vascular bundle.

Q26. Write four differences between prokaryotic and eukaryotic cell. **(2)**

Q27. Differentiate between striated, unstraited and cardiac muscles on the basis of their structure and site / location in the body. **(3)**

Q28. Answer the following **(3)**

(i) Why is plasma membrane called a selectively permeable membrane?
(ii) Where are proteins synthesized in a cell?
(iii) What is the function of leucoplasts?

Q29. *(i)* What is the specific function of the cardiac muscle? **(5)**

(ii) Draw a labelled diagram of a neuron

OR

What is muscular tissue? Explain the types of muscular tissue?

MODEL TEST PAPER
ANNUAL EXAMINATION

Time : 2 hrs 30 min **M.**

M. 60

Instructions :-

(i) The paper is divided into section A, section B and section C.
(ii) All the questions are compulsory, however an internal choice has been provided in question no. 27 of section C.

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SECTION 'A' (Physics)

Q.1. The mass of each of the two objects placed close to each other is doubled and the separation between them is also doubled, how would the mutual gravitational force of attraction between them be affected? [1]

Q.2. An old car A , speeds up from rest to 'v' in a time 't'. A new car B, speeds from rest to '2v' in the same time 't'. What is the ratio of powers of the two cars, if they have the same mass? [1]

Q.3. What does SONAR stand for? [1]

Q.4. 10 kg of thrashed cotton have same weight as 10 kg of lead. If they are placed on an equal arm balance surrounded by air, will it balance? Justify your answer. [2]

Q.5. Differentiate between Mass & Weight. (any 4 points) [2]

Q.6. *(i)* A pan balance and a spring balance give some reading on the earth. If they are taken to moon, will they give the same readings? Explain your answer.
(ii) Why are sound waves called mechanical waves? [2]

Q.7. *(i)* An observer standing between two cliffs hears two successive echoes at 2s and 3s. Calculate the distance between the cliffs. (speed of sound in air = 340 m/s)
(ii) What do you mean by an echo? State any 2 conditions necessary for the formation of an echo. [3]

Q.8. A body thrown vertically upwards, rises to a height of 10m. Calculate – [3]
(i) the velocity with which the body was thrown upwards and
(ii) the time taken by the body to reach the highest point ($g = 9.8\ m/s^2$)

Q.9. *(i)* Consider a tug-of-war, in which the two teams pulling the rope, are evenly matched, so that no motion takes place. Is work done on the rope? On the pullers? On the ground? Is work done on any system? Justify.

(ii) Why is the depression caused in a cushion surface much more when a man stands on the cushion than when he lies down on it?

(iii) What is the audible range of frequencies for human being? [5]

SECTION 'B' (Chemistry)

Q.10. Name one natural and one man made process by which CO_2 returns to the atmosphere. [1]

Q.11. Write down the chemical formulae of the following. [1]
(i) Lead Nitrate *(ii)* Calcium Fluoride.

Q.12. Which subatomic particle is not present in an ordinary Hydrogen atom? Name the scientist who discovered it. [1]

Q.13. *(i)* Calculate the numbers of moles in 34g of NH_3. (At. mass, N=14 **u** , H=1 **u**)
(ii) What is the mass of 0.2 mole of oxygen atoms (At. mass, O=16 **u**) [2]

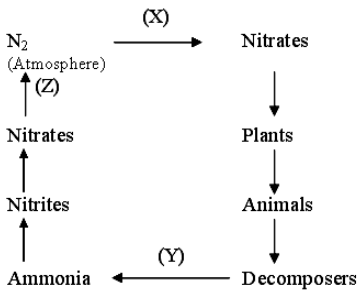
Q.14. From the symbol $_{15}P^{31}$ state :- [2]
(i) Mass number of P *(iii)* Electronic configuration of P
(ii) Atomic number of P *(iv)* Valency of P

Q.15. Boron has two isotopes, $_5B^{10}$ and $_5B^{11}$ in the ratio of 19% and 81% respectively. Calculate the average atomic mass of Boron. [2]

Q.16. *(i)* Give an experimental evidence along with diagram to show that the nucleus of an atom is positively charged.
(ii) Explain why, Isotopes have same chemical properties but different physical properties. [1.5+1.5=3]

Q.17. *(i)* What is the importance of ozone layer in the atmosphere? Name the class of compounds that is destroying the ozone layer. State any (two) consequences of depletion of this layer on the life of the earth.
(ii) Name any two green house gases. [2+1=3]

Q.18. *(i)* *(a)* In the given bio-geochemical cycle, name the processes marked as (x), (y), (z).
(a) Define the process (x).
(b) Name any (one) organism which is responsible for bringing out the above process (x).



(ii) The relative atomic mass of an element A is 16.2 . There are two isotopes $_8A^{16}$ and $_8A^{18}$. Calculate the percentage of these two isotopes present in the atmosphere.
(iii) Write down the electronic configuration of any (one) pair of isobars.
(iv) Calculate the molar mass of Baking Soda ($NaHCO_3$)
(At. mass, Na=23**u**, H=1**u**, C=12**u**, O=16**u**) [2.5+1+1+0.5=5]

SECTION 'C' (Biology)

Q.19. *(i)* Who proposed the binomial nomenclature of classification?
(ii) Name the group in which seeds are naked. [1]

Q.20. *(i)* Which division of plants is called the amphibians of the plant kingdom?
(ii) To which phylum do earthworm and leech belong? [1]

Q.21. What is the difference between milch and draught animals? [1]

Q.22. What is radial symmetry? Write two examples of organisms that exhibit this phenomenon. [2]

Q.23. Write any four main characteristics of chordates. [2]

Q.24. What is organic farming? [2]

Q.25. *(i)* Write two differences between mixed and intercropping.
(ii) The young ones of which class use gills for breathing while the adults have lungs? [3]

Q.26. *(i)* Write four differences between manure and fertilizers.
(ii) Categorize the following as macronutrients and micronutrients : [3]

(a) Magnesium *(c)* Molybdenum
(b) Zinc *(d)* Calcium

Q.27. *(i)* Write four characteristic features of the class Reptilia.
(ii) Bony fish have _____ mouth, while cartilaginous fish have_____ mouth.
(iii) Draw a well labelled diagram of a cartilaginous fish. [5]

OR

(i) Write two characteristic features of the class Mammalia.
(ii) Write two differences between Reptiles and Mammals.
(iii) Draw a well labelled diagram of a bony fish.

SOLVED MODEL TEST PAPER

Half Yearly Examination

Class: IX (Science)

Time: 2hr. 30 min. **M.M.: 60**

Section – A

Instructions:

Q.1. to Q.8. in Section A and Q.20. to Q.22. in Section B carry 1 mark.
Q.9. to Q.13. in Section A and Q.23. to Q.26. in Section B carry 2 marks.
Q.14. to Q.17. in Section A and Q.27. to Q.29. in Section B carry 3 marks.
Q.18. and Q.19. carry 5 marks each.

==========

Q.1. What is the angle between force applied and displacement to get maximum work done?

Ans 0°

Q.2. When you put on object on spring balance, do you get mass of the object or its weight?

Ans. When we put an object on spring balance, we get weight of the object.

Q.3. A roller is pushed with a force of 100 N along its handle, which is at an angle of 30° with the horizontal, Find the work done in moving it through 11 m. (cos 30°= √3/2)

Ans. Force, F = 10 N
Distance covered by roller, s = 11m
$\theta = 30°$
$W = F\ s \cos\theta° = 100 \times 11 \times \cos 30° = 100 \times 11 \times \sqrt{3}/2 = 550\sqrt{3}J$

Q.4. State Law of conservation of momentum.

Ans. If a group of bodies are exerting force on each othr, their total momentum remains conserved before & after interaction provided there is no external force acting on them.

Q.5. Why does a gun recoil when a shot is fired from it?

Ans. This is because the gun exerts a force on the bullet in the forward direction and the bullet exerts and equal force on the gun in the backward direction.

Q.6. What is a saturated solution. In which unit the solubility of substance is expressed?

Ans. Saturated solution is the one in which no more amount of solute can be dissolved at a given temperature. The solubility of solid in a given liquid at a given temperature is expressed in Gram unit.

Q.7. How can the evaporation of a liquid be made faster? (Give any two factors).

Ans. (i) By increasing temperature of the liquid.
(ii) By increasing the surface area of the liquid.
(iii) Wind speed (any two factors)

Q.8. An element shows the valencies of 4 and 6. Write the formula of its two oxides.

Ans. Let the given element has symbol X.

X	O	X	O
4	2	6	2

Simplifying the valencies.

Q.9. When the bus starts suddenly, the passengers lean backward, using Newton's first law, explain your answer.

Ans. The passengers lean backward when the bus suddenly starts because our feet are in direct contact with the floor of the bus and friction at the contact is high. This force does not allow the feet to slip on the floor. The feet therefore, move forward. The upper part of the body still does not feel the forward force and remains at rest and thus, we get a backward jerk.

Q.10. A body of mass 3kg kept at rest breaks into two parts due to internal forces. One part of mass 2 kg is found to move at a speed of 10 m/s towards east. What will be the velocity of other part?

Ans. Before the body broke, it was at rest. When it breaks the linear momentum,
$p = mv = 0$
The linear momentum of the first part,
$p_1 = m_1 v_1 = 2 \times 10 = 20$ kgm/s
The linear momentum of the other part,
$p_2 = m_2 v_2 = 1 \times v_2$
According to law of conservation of momentum,
momentum before breaking = momentum after breaking
$0 = p_1 + p_2$
$= 20 + 1v_2$
⇨ $v_2 = -20$ m/s
is it flew in opposite direction towards west.

Q.11. Magnesium and oxygen combine in the ratio of 3:2 by mass to form magnesium oxide. what mass of oxygen gas would be required to react completely with 24 g of magnesium.

Ans. $2Mg(s) + O_2(g) \longrightarrow MgO(s)$
48g 32g 80g
As per the equation
48g of Magnesium reacts with 32 g of oxygen
24g of magnesium reacts with 16 g of oxygen.

Q.12. What is distillation process. Briefly describe its principle

Ans. The process of converting a liquid to its vapours and recondensing the vapours to get back the liquid is called Distillation. The liquid so collected is called as distillate.

The distillation process can be used to separate volatile liquid from a non-volatile substance or it can be used to separate the mixture of two liquids, which have different boiling point, or different volatility.

In this process the mixture of two liquids or liquid having a nonvolatile impurity (Salt solution) is taken in a round bottom flask and it is heated the volatile liquid at its boling point or low boiling component of the liquid mixture boils first and changes to vapour phase

The vapours of it are collected and allowed to pass through the condenser, vapours on passing through the condensor condense and changes to liquid again the pure liquid is collected using a receiver. The non-volatile impurity or high boiling component remains in the round bottom flask.

Q.13. How does the water kept in an earthen pot becomes cold during summer days?

Ans. The water when kept in an earthen pot gets cooled due to the process of evaporation taking place at its surface.
When water is stored in an earthen pot the water oozes out from the tiny pores of the earthen pot and as a result the outer surface of the earthen pot becomes wet.
The water on the outer surface of the earthen pot evaporates because of the surrounding air and when it evaporates it takes heat from the stored water and in this process the stored water loses heat and becomes cool.

Q.14. A bullet of mass 50g is fired horizontally into a suspended block of wood in which it embeds itself. If the block of wood (Mass 1 kg.) starts to move with a velocity of 3 m/s, what is the velocity by which the bullet hits the wood?

Ans. Given mass of bullet, $m_b = 50\ g = 0.05\ kg$
Mass of block, $m_B = 1\ kg$.
Before collision,
Speed of bullet, u_b =?

Speed of block, $u_B = 0$
After collision, bullet is embedded in the block,
Speed of (bullet + block) = v = 3 ms^{-1}
From the law of conservation of momentum,

$m_b u_b + m_B u_B = (m_b + m_B)v$

$0.05\ u_b + 0 = 1.05 \times 3$

$\rightarrow u_b = \frac{1.05 \times 3}{0.05} = 63\ ms^{-1}$

Q.15. (a) State Newton's III law of motion.
(b) Why it is difficult to walk on a slippery road?

Ans. (a) If a body A exerts a force on the body B the body B will also exert an equal and opposite force on A. The force exerted by A on B is called action while force exerted by B on A is called reaction.
Thus, to every action there is an equal and opposite reaction.

(b) It is difficult to walk on slippery road because , friction is reduced between sole of our shoes and ground. While walking we push the ground obliquely (action) and force of friction acts in opposite direction (reaction) which gets reduced on slippery road.

Q.16. A solution contains 30 grams of sugar is dissolved in 370 grams of water. Calculate the concentration of the solution.

Ans. Mass Percentage of the solution $= \frac{\text{Mass of solute x 100}}{\text{Mass of solute + Mass of Solvent}}$

Mass percentage of the solution $= \frac{30g \times 100}{30g + 370g}$

$= \frac{30 \times 100}{400}$

$= 7.5\ \%(\text{w/w})$

Q.17. Differentiate between Colloids and Solutions giving relevant examples.

Ans.

True solution	***Colloid***
Size of dispersed phase is lesser than 10^{-7} cm.	Size of dispersed phase is between 10^{-7} cm to 10^{-5} cm.
The dispersed particles are not visible to naked eyes as well as under powerful microscope.	The dispersed particles are not visible to naked eyes but can be seen under powerful microscope.
They are homogeneous in nature.	They are hetrogeneous in nature.
They cannot be separated using filter paper or parchment paper.	They cannot be separated using filter paper but can be separated using a parchment paper.
They do not show Tyndall effect.	They do show Tyndall effect.

(Any three relevant points, each point of difference carries one mark and examples given as a difference is not to be awarded)

Q.18. (a) Describe how will you separate a mixture of Sand and Iodine.

(b) What is "Atomic mass of an element". Calculate the relative atomic masses of

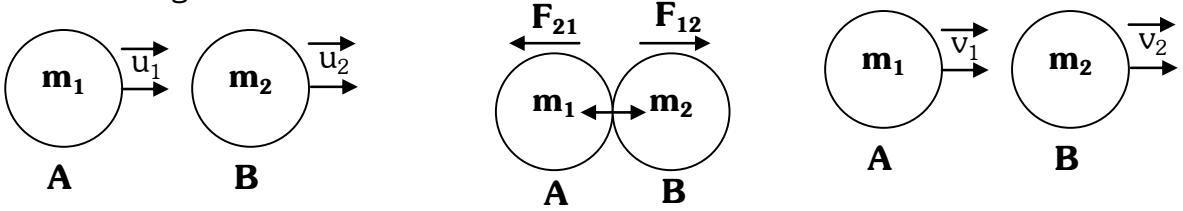
(i) Sodium Chloride *(ii)* Ethyl alcohol.

Ans. (a) We can separate the given mixture of Iodine and sand by the process of Sublimation. The method is based on the difference in the property of the given substances; Iodine is a sublimable solid whereas sand is not a sublimable substance. When heated the iodine goes to the vapour phase directly without changing to the liquid state and sand having a high melting point remain as solid.
The mixture is taken in a china dish and the mixture is gradually heated using a tripod stand and a burner the mouth of the china dish is covered with an inveted glass funnel whose tip is choked with a cotton plug so as the vapours of the Iodine do not escape. The Iodine being a volatile sublimable solid changes to the vapour phase and the vapours rises above and comes in contact with the inner surface of the funnel there they condense and again changes to the solid. The sand being non-volatile remains in the china dish.

(b) "Atomic mass of an element is the relative mass of its one atom compared with the mass of ^{12}C atom taken as 12 units"
Molecular mass of Sodium Chloride (NaCl) = 23 x 1 + 35.5 x 1
= 58.5u
Molecular mass of Ethyl alcohol (C_2H_5OH) = 12 x 2 + 1.0 x 6 + 16 x 1
= 46.0u

Q.19. Prove the law of conservation of linear momentum in case of elastic linear collision of balls.

Ans. Law of conservation of linear momentum states that total momentum of the system is always conserved if no external force acts on an object or system of objects.
The momentum before the event is equal to the momentum after the event.
Consider a collision between two metal balls where in there occurs no energy losses during the collision.



Before collision During collision After collision

Momenta of the two balls before collision,

$P_{1i} = m_1u_1$
$P_{2i} = m_2u_2$
Total momentum of the system of two balls before collision :
$P_i = P_{1i} + P_{2i} = m_1u_1 + m_2u_2$
During the collision m_1 exerts an action force F_{12} on m_2.
In response from Newton's third law, m_2 exerts a reaction on m_1, that is, F_{21}, such that $F_{12} = F_{21}$
Negative sign implies that the two forces are directed in opposite directions. After the collision since each mass individually experiences a force, they undergo change in velocity and eh corresponding change in momentum. Momenta of the balls after collision $P_{1f} = m_1v_1$, $P_{2f} = m_2v_2$
Total momentum of the system of two balls after collision, $P_f = P_{1f} + P_{2f} = m_1v_1 + m_2v_2$. Also from Newton's Second Law.

$$\text{Force} = \frac{\text{Change in momentum}}{\text{Time interval}}$$

Hence,

$$F_{12} = \frac{\text{Change in momentum produced in } m_2}{\text{Collision time}}$$

$$F_{12} = \frac{\text{Final momentum of } m_2 - \text{Initial momentum of } m_2}{\text{Collision time}}$$

$$F_{12} = \frac{m_1v_1 - m_1u_1}{t}$$

$$F_{21} = \frac{m_2v_2 - m_2u_2}{t}$$

Similarly,
From Newton's Third Law,
$F_{12} = - F_{21}$

$$\frac{m_2v_2 - m_2u_2}{t} = -\left(\frac{m_1v_1 - m_1u_1}{t}\right)$$

$$=> \quad m_2v_2 - m_2u_2 = - m_1v_1 + m_1u_1$$
$$=> \quad m_1v_1 + m_2v_2 = m_1u_1 + m_2u_2$$

In this equation,

LHS : Final momentum of system of two balls after the collision.
RHS : Initial momentum of system of two balls before collision.

Section – B

Q.20. Name the plastid that stores starch and protein granules in it.

Ans. Leucoplast stores starch and protein granules in it.

Q.21. In which tissue are chondrocyte cells present?

Ans Chondrocytes are present in cartilage.

Q.22. What is the difference between milch and draught animals?

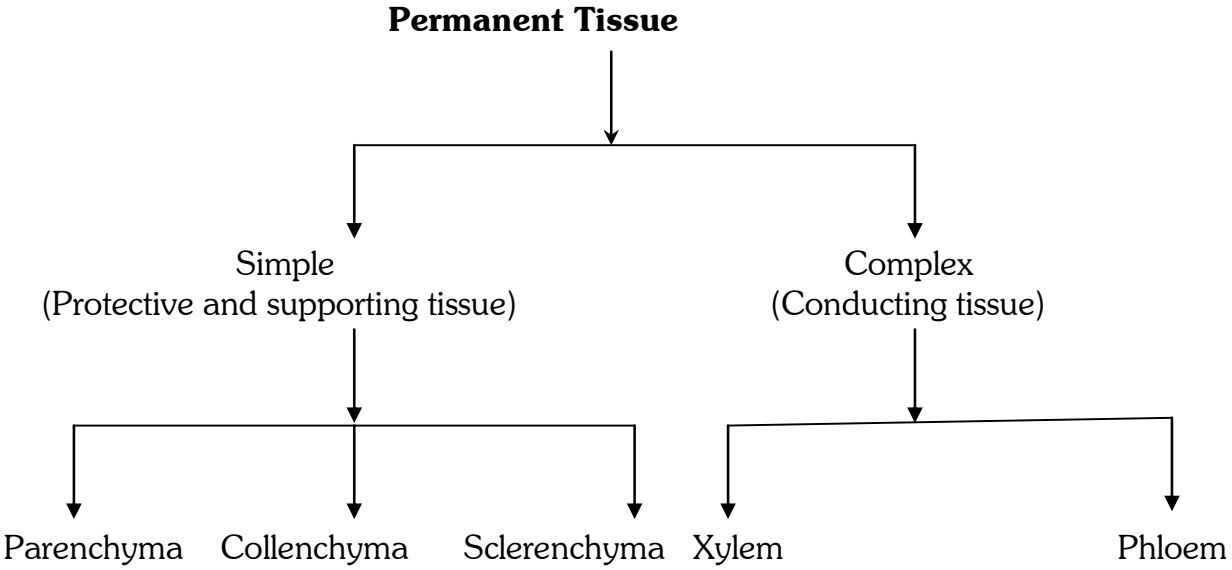
Ans. Animals that provide us with milk are milch animal while the ones that help in the farms are draught animals.

Q.23. Differentiate between prokaryotic and eukaryotic cell.

Ans.	**Prokaryotic cell**	**Eukaryotic cell**
1.	Size is very small. (1-10um)	Size generally large (5 - 100 um)
2.	Nuclear region not well defined and not surrounded by nuclear membrane.	Nuclear region well defined and surrounded by nuclear membrane.
3.	Chromosome single	More than one chromosome present
4.	Membrane bound organelles absent	Membrane bound organelles present.

Q.24. How are permanent tissues classified?

Ans. Permanent tissues are classified as follows:



Q.25. Classify the following as simple or complex tissues: Xylem, parenchyma, Collenchyma, Phloem,

Ans.	**Simple**	**Complex**
	Parenchyma	Xylem
	Collenchyma	Phloem

Q.26. 5-6 species of fish are being cultured in a pond. What feature has to be kept in mind while choosing the fish. Explain with the help of an example.

Ans. When 5-6 species of fish are cultured together in a pond, they are chosen on the basis of different types of food habit, so that they do not compete with each other for food. For example – Catlas, Rohus, Mrigals, common carps and Grass carps can be cultured together as Catlas are surface feeders, Rohus feed in middle zone, Mrigals and Common carps are bottom feeders and Grass carps feed on weeds.

Q.27. What are the various types of plastids? Write their functions also.

Ans. Plastids are of two types:

(i) Chromoplast – coloured plastids

(ii) Leucoplast – white or colourless plastids.

Plastids containing pigment chlorophyll are known as chloroplast. These are important for photosynthesis in plants.

Leucoplasts are plastids which store starch, oil and protein granules.

Q.28. Describe the three types of muscular tissues.

Ans. The three types of muscular tissues are –

(i) **Straited or voluntary muscles** – Also known as skeletal muscles. These are attached to the bones and help in body movement. The cells are elongated, cylindrical and have a number of nuclei. They have alternate light and dark bands.

(ii) **Smooth or involuntary muscles** – The cells are long with pointed ends and uninucleate. These muscles do no work under our will. Eg iris of eye, ureter.

(iii) **Cardiac muscles** – These are present in the heart. The cells are cylindrical, branched and uninucleate. These work throught out our life.

Q.29. *(i)* **What is intercropping?**

(ii) **Give two factors for which variety improvement of plants is done.**

Ans. *(i)* Growing two or more crops simultaneously on the same field in definite patterns is called intercropping.

(ii) The two factors are

(a) To increase the productivity of crop per acre i.e. for higher yield.

(b) To improve the quality of plant i.e. for increasing oil quality in oilseeds, protein quality in pulses etc.

SOLVED MODEL TEST PAPER

Final Examination

Class: IX (Science)

Time: 2hr. 30 min. **M.M.: 60**

Section – A

Instructions:

Q.1. to Q.6. in Section A and Q.20. to Q.23. in Section B carry 1 mark.
Q.7. to Q.13. in Section A and Q.24. to Q.27. in Section B carry 2 marks.
Q.14. to Q.18. in Section A and Q.28. to Q.29. in Section B carry 3 marks.
Q.19. Carries 5 marks.

==========

Q.1. What is the scientific name of the upward force acting on a body immersed in a liquid?

Ans. Buoyant force

Q.2. What is the potential energy of a body of mass m at a height h above earth's surface?

Ans. Potential energy = m g h where g is acceleration due to gravity

Q.3. What do you mean by weight of a body on the moon?

Ans. The force with which the moon attracts an object towards itself.
Weight on moon = 1/6 weight on earth.

Q.4. Name any two abiotic components of environment.

Ans. Air, water.

Q.5. Name the positively charged particle present in the atoms of all the elements.

Ans. Proton.

Q.6. Cathode rays are a beam of fast moving _____ .

Ans. Electrons

Q.7. Distinguish between longitudinal and transverse waves. Give examples of each kind of wave.

Longitudinal wave	**Transverse wave**
If the particles of the medium moves along the direction of propagation of the wave . eg. Sound wave	If the particles of medium move perpendicular to the direction of motion of the wave. eg. Light wave.

Q.8. State Archimedes Principle. Give the relation between buoyant force and weight of a body for a floating body.

Ans. When a solid body is fully or partially immersed in a fluid, the fluid exerts an upward force on the body which is equal to weight of displaced fluid.
For a floating body, weight of displaced fluid i.e. buoyant force = weight of solid body.

Q.9. Calculate the wavelength of a sound wave whose frequency is 300 Hz and speed is 330 m/s.

Ans. We know, wave speed = frequency × wavelength

$$\text{or wave length} = \frac{330 \text{ m/s}}{300 \text{ s}^{-1}} = 1.1 \text{ m}$$

Q.10. An apple falls towards the earth due to gravitational force. The apple also attracts earth with equal and opposite force. Then, why does the earth not move towards apple?

Ans. Let F be the gravitational force which produces acceleration a, in apple of mass m
then a = F/m ---------- (1)
Let a' be acceleration produced in earth of mass M
then a' = F/M ----------(2)

Since value of m is much smaller as compared to M therefore value of a is much greater than value of a'.
The, acceleration produce in earth is negligible and hence, we are not able to see earth moving towards apple.

Q.11. Define Soil Erosion?

Ans. The process of removal of superficial fertile top layer of soil by various agencies or forces is called Soil Erosion.

Q.12. Calculate the atomic number of an element whose atomic nucleus has mass number 23 and neutron number 12. What is the symbol of the element.

Ans. Mass number = Atomic no + No of neutrons
23 = Atomic no + 12
Atomic number = 23 – 12
= 11
The element having atomic number 11 is sodium and its symbol is Na.

Q.13. What are Valence electrons? Find the number of valence electrons in Nitrogen atom.

Ans. The number of electrons present in Valence shell of an atom is called Valence electrons.

$_7N = 2, 5$
Nitrogen has 5 Valence electrons.

Q.14. Derive the expression for kinetic energy of a particle of mass m moving at a speed v.

Ans. Suppose a body of mass m is kept at rest on a smooth horizontal surface at A. A force,F starts acting on it in the horizontal direction and keeps acting till it reaches B.
The distance AB be X

The acceleration of body is $a = F/m$
Velocity, v at B : $v^2 = u^2 + 2ax$
Initial velocity (at A), $u = 0$
So, $v^2 = 2\ ax$
$=> v^2 = 2Fx/m \quad => \quad Fx = ½\ mv^2$
But Fx is work done by force on the body and should be equal to increase in kinetic energy as it moves from A to B.
Since, at A, K.E = 0
K.E = K.E at B
=> K.E. of a body of mass m moving with speed
$v = ½\ mv^2$

Q.15. (a) Give two differences between g and G.
(b) What is the weight of body of 1 kg mass?
Take $g = 9.8\ ms^{-2}$. Determine its weight at centre of earth.

Ans. (a)

g	**G**
1) The acceleration produced in a body falling freely under the action of gravitational pull of the earth is called acceleration due to gravity, g	**1)** The gravitational force between two bodies of unit mass separated by a unit distance is numerically equal to universal gravitational constant, G
2) Value of g on surface of earth is $9.8\ ms^{-2}$	**2)** Value of $G = 6.67 \times 10^{-11}\ Nm^2\ kg^{-2}$ throughout universe.

(b) Weight of a body = mg
$= 1\ kg \times 9.8\ ms^{-2}$
$= 9.8\ kg\ ms^{-2}$
$= 9.8\ N$

Weight of the body at centre of earth is zero as value of g is zero at centre of earth.

Q.16 (a) A body of mass 100 kg is lifted up by 10 m. Find

(i) Work done

(ii) Potential energy of the body at that height ($g = 10\ m/s^2$)

(b) State Law of conservation of energy. How is energy conserved in a moving simple pendulum?

Ans. (a) *(i)* Work done against gravity

Work done = mgh

$= 100 \times 10 \times 10$

$= 10000\ J$

(ii) Potential energy = Work done against gravity

$= 10000\ J$

(b) According to law of conservation of energy

"Energy can neither be created nor be destroyed but it can only be transformed from one form to another form or energy."

eg. Consider case of moving simple pendulum

(Explain the diagram)

Q.17. What is nitrification? Give any (two) examples of nitrogen fixing bacteria.

Ans. The process of conversion of ammonia into nitrates by certain microorganisms (Nitrosomonas, nitrobacter) is called nitrification.

Example: Azotobactor

Rhizobium

Q.18. (a) The atomic number of an element X is 16.

(i) Write down the electronic configuration of X.

(ii) What will be the Valency of X.

(b) Give any (one) example of noble gas. Why it is called so.

Ans. (a) X = 2, 8, 6

(i) 16

(ii) Valency of X will be 2 as it has 6 valence electrons so it gains 2 electrons to reach inert gas configuration.

(b) Noble Gas = Argon

$_{10}Ar = 2, 8$

Since Argon has inert gas configuration so it is stable does not react with anybody.

Q.19. (a) What are isobars. Give any two examples.

(b) *(i)* List any two Green house gases

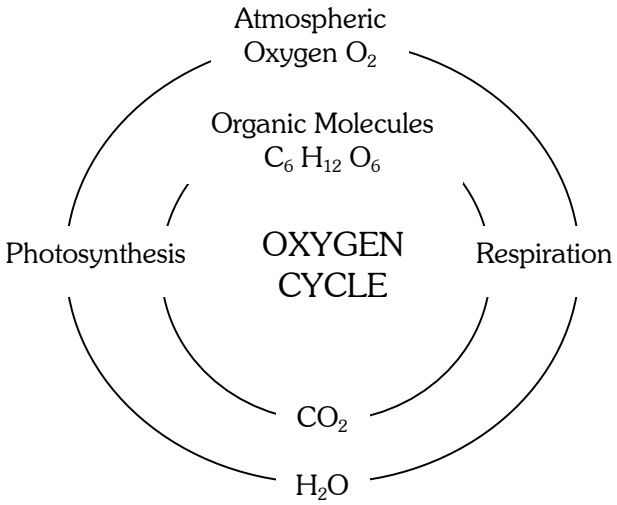
(ii) Draw a neat and labeled diagram of Oxygen cycle in nature.

Ans. (a) Isobars are the atoms of different elements having different atomic number but the same mass number

Ex – (1) $_{18}Ar^{40}$ $_{20}Ca^{40}$
(2) $_{11}Na^{24}$ $_{12}Mg^{24}$

(b) *(i)* CFC (chloro flouro Carbons)
CO_2 (Carbondioxide gas).

(ii)



Section – B

Q.20. Name a mammal that lays eggs.

Ans. Platypus / Echidna

Q.21. Give one difference between gymnosperms and angiosperms

GYMNOSPERMS	ANGIOSPERMS
They bear naked seeds. Example – Pinus, Cycas	Seeds are enclosed in fruits. Eg. mango, orange.

Q.22. State four characteristics present in all chordates.

Ans. The four characteristics present in all chordates are:

(i) They have a notochord
(ii) They have a dorsal nerve cord
(iii) They are triploblastic
(iv) They have paired gill pouches.

Q.23. How does addition of manure help to improve the soil structure?

Ans. The organic matter present in manure helps to improve the soil structure. It increases the water holding capacity in sandy soil. In clayey soil, it helps in drainage and in avoiding water logging.

Q.24. Give two differences between Reptilia and Aves.

	REPTILIA	AVES
(i)	They are cold blooded	They are warm blooded
(ii)	Most of them have three chambered heart. Exception – crocodile where heart is four chambered.	They have four chambered heart.

Q.25. Identify the phylum based on the characteristics given below. Also give one example of an organism belonging to that phylum.

(i) Bilaterally symmetrical and segmented body with jointed legs.
(ii) Non motile organisms with pores all over that lead to a canal system
(iii) Bilaterally symmetrical, triploblastic and dorsoventrally flattened

Ans. *(i)* Phylum – Arthropoda
Example – Housefly / spider / scorpion / crab

(ii) Phylum – Porifera
Example – Sycon / Euplectella / Sponges

(iii) Phylum – Platyhelminthes
Example – Liver fluke

Q.26. What are the various means by which diseases spread?

Ans. Diseases spread by the following means: (Any four)

(i) Through air
(ii) Through direct contact
(iii) Through water
(iv) Through vectors eg. mosquito
(v) Through contaminated food.

Q.27. Draw a neat and labeled diagram of a Hydra. Name the phylum to which it belongs.

Ans. Hydra belongs to phylum Coelenterata

Q.28 (a) What are the preventive measures to remain disease free?
(b) What is meant by immunization?

Ans. ***(a)*** The following are some preventive measures-

(i) By drinking safe water
(ii) Not living in over crowded conditions
(iii) Sufficient nourishment.
(iv) Immunization.

(b) Injecting weak microbes to provide immunity against a disease is known as immunization. Vaccines are available for diseases like tetanus, diphtheria etc.

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MULTIPLE CHOICE QUESTIONS

CHAPTER 1 – (Matter in our surroundings)

Q.1. During evaporation of sweat from our body we feel cool due to

(i) During sweat evaporation heat energy equal to the latent heat of vaporization is absorbed from the body.
(ii) During sweat evaporation heat energy less than the latent heat of vaporization is absorbed from the body.
(iii) During sweat evaporation heat energy more than the latent heat of vaporization is absorbed from the body.
(iv) None of these.

Q.2. Which is not an example of evaporation?

(i) Drying of wet clothes.
(ii) Change of liquid water into water vapour.
(iii) Feel relieved under a fan when we perspire.
(iv) Get the smell of perfume several metres away

Q.3. Which one is correct?

(i) Higher humidity in air causes lesser evaporation.
(ii) Higher humidity in air causes more evaporation.
(iii) With increase in the wind's speed the rate of evaporation decreases.
(iv) Rate of evaporation becomes faster in rainy day.

Q.4. Steam at 10^0C is a more effective heating agent than water at the same temperature due to

(i) Latent heat of vaporization of water
(ii) Latent heat of fusion of ice.
(iii) Boiling point of water
(iv) None of these.

Q.5. Which one of the following statement is not correct during increase in pressure?

(i) Molecule come close together.
(ii) The distance between the molecules decreases.
(iii) The force of attraction between the molecules increases.
(iv) The distance between the molecules increases.

Q.6. Which one of the following will be not correct on heating a sold?

(i) The kinetic energy of the molecules increases.
(ii) The molecules start vibrating with higher speed.
(iii) The heat energy overcomes attractions forces present between the molecules.
(iv) Molecular distance will be decreased.

Q.7. Minimum temperature at which ice melts is

(i) 0^0 C
(ii) 1^0 C
(iii) -1^0 C
(iv) 2^0 C

Q.8. Liquids remain mobile and shapeless due to

(i) Particles are bound to each other with weaker force and are loosely packed.
(ii) Particles are bound together by strong inter-particle attractive forces and are closely packed.
(iii) No inter-particle attractive force between the particle and particles are very loosely packed
(iv) None of these

Q.9. Gases are liquefied

(i) By increasing pressure and decreasing temperature.
(ii) By increasing pressure and increasing temperature.
(iii) By decreasing pressure and decreasing temperature.
(iv) By decreasing pressure and increasing temperature.

Q.10. When water changes to ice, heat is

(i) Evolved.
(ii) Absorbed.
(iii) No change.
(iv) Evolved or absorbed depending upon the condition.

Q.11. One gas mixes very easily with another gas is called

(i) Diffusion
(ii) Evaporation
(iii) Condensation
(iv) compression

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CHAPTER 2 – (Is Matter Around us Pure)

Q.1. Which one of the following is not a physical change?

(i) Conversion of ice into water
(ii) Expansion and contraction of substances on heating and cooling respectively
(iii) Melting of gallium metal on the palm of our hand
(iv) Ripening of fruit

Q.2. Which one of the following is the characteristic of physical change?

(i) One or new more substances are formed
(ii) Energy change takes place
(iii) The change is irreversible
(iv) The mass of a substance undergoing a physical change remains the same
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Q.3. Which one of the following is not a step to make water suitable for human consumption?

(i) Chlorination
(ii) Filtration
(iii) Loading
(iv) Centrifugation

Q.4. Pigments from natural colour can be separated by

(i) Chromatography
(ii) Centrifugation
(iii) Distillation
(iv) Separating funnel

Q.5. Separating funnel method is used to

(i) Separate mixture of water and kerosene oil
(ii) Separate components in a dye
(iii) Separate fine mud particles floating in water
(iv) Separate sodium chloride from its solution

Q.6. Fractional distillation is used to separate

(i) The compounds of liquid air
(ii) A mixture containing water and benzene
(iii) Benzene from a mixture of benzene and methylbenzene
(iv) Tea leaves from tea

Q.7. Mixture of iodine and sand can be separated by

(i) Sublimation
(ii) Filtration
(iii) Hand picking
(iv) None of these

Q.8. Identify the incorrect statement

(i) The colloidal particles pass through a filter paper
(ii) Colloidal solution is heterogeneous in nature
(iii) The colloidal particles cannot pass through animal membrane
(iv) Colloidal particles does not exhibit tyndal effect

Q.9. Which of the following statement is true?

(i) The formation of a compound is accompanied by evolution or absorption of energy.
(ii) A compound is a homogenous substance.
(iii) The constituent elements of a compound cannot be separated by physical methods.
(iv) The properties of a compound are similar to its constituent elements.

Q.10. The constituents are held together by strong valence force of attraction in

(i) Compound
(ii) Mixture
(iii) Element
(iv) None of these

Q.11. Chalk in water is an example of

(i) Solid in liquid
(ii) Liquid in solid
(iii) Solid in solid
(iv) None of these

Q.12. Solution is

(i) Homogenous in nature
(ii) Not transparent to light
(iii) The particle of solute in solution does not pass easily through a filter paper
(iv) None of these

Q.13. Identify incorrect statement from the following

(i) Suspension is heterogeneous in nature
(ii) The diameter of the particles in a suspension is in the range of $10^{-7} - 10^{-5}$ m
(iii) A suspension is hazy to opaque in appearance
(iv) A suspension is transparent to light

Q.14. Paint is an example of

(i) Suspension
(ii) Colloid
(iii) Solution
(iv) None of these

Q.15. Identify incorrect statement

(i) the particles in a colloidal solution are not visible to the naked eye
(ii) the particles of suspension do not pass through the pores of filter paper
(iii) the solute particles in solution do not settle down on standing
(iv) suspension is a homogenous mixture

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CHAPTER 3 – (Atoms and Molecules)

Q.1. Which one of the following is diatomic molecule?

(i) Iodine
(ii) Ozone
(iii) Phosphorous (P_4)
(iv) Sulphur (S_8)

Q.2. Which of the following is not a correct statement?

(i) Empirical formula indicates the simplest ratio between the atoms in its molecule.
(ii) It does not indicate the number of atoms of the elements present in the compound.
(iii) Empirical formula mass is the sum of the atomic masses of various elements.
(iv) Molecular formula = n × Empirical formula

Q.3. The valencies of nitrogen, oxygen and fluorine respectively are

(i) –1, –2, –1
(ii) –2, –1, –3
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(iii) –1, –2, –3 *(iv)* –2, –3, –1

Q.4. Which of the following is not a postulate of Dalton's atomic theory?

(i) Atoms are capable of being destroyed or created
(ii) Matter is composed of very tiny particles called atoms
(iii) All atoms of an elements are identical in terms of their mass, size and other properties.
(iv) Atoms of one elements differ in its mass and other characteristics from those of other elements

Q.5. Mass of an atom is the sum of the masses

(i) of protons and neutrons *(iii)* of electrons and protons
(ii) of neutrons and electrons *(iv)* none of these

Q.6. Zero is the valency of

(i) Noble gases *(iii)* Non-metals
(ii) Metals *(iv)* metalloids

Q.7. Which of the following has the maximum number of atoms?

(i) 188 g of Ag *(iii)* 50 g of Al
(ii) 80 g of Fe *(iv)* 30 g of ^{12}C

Q.8. Which of the following is not a compound?

(i) Baking soda *(iii)* Common salt
(ii) Lime water *(iv)* Stainless steel

Q.9. How many moles of oxygen atoms are present in one moles of compound Fe_2O_3?

(i) 3 *(iii)* 6
(ii) 13 *(iv)* 8

Q.10. The number of atoms in 4.25 g of NH_3 is

(i) 6×10^{23} *(iii)* 7×10^{23}
(ii) 6×10^{22} *(iv)* 6.5×10^{23}

Q.11. Which of the following has minimum number of molecules?

(i) 3 g of CO_2 *(iii)* 3 g of CH_4
(ii) 3 g of N_2 *(iv)* 3 g of H_2

Q.12. Cation is always

(i) Positively charged *(iii)* Neutrally charged
(ii) Negatively charged *(iv)* None of these

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CHAPTER 4 – (Structure of Atom)

Q.1. Isotopes are the

(i) Atoms of same elements having same atomic number but different mass number.
(ii) Atoms of same elements having same atomic number and same mass number.
(iii) Atoms of different elements having same atomic number but different mass number.
(iv) Atoms of different element having different atomic number and different mass number.

Q.2. Which one of the following is not correct?

(i) Cathode rays travel in straight line.
(ii) Cathode rays produce mechanical effects.
(iii) Cathode rays are deflected by an electric field.
(iv) Cathode rays are not deflected by a magnetic field.

Q.3. The mass of an electron is

(i) Much smaller than the mass of one hydrogen atom.
(ii) Equal to the mass of one hydrogen atom.
(iii) Much greater than the mass of one hydrogen atom.
(iv) None of these.

Q.4. Which one of the following is not true?

(i) Anode rays travel in straight line.
(ii) The nature of anode rays does not depend upon the nature of the gas taken in the discharged tube.
(iii) Anode rays are deflected by magnetic fields.
(iv) Anode rays are of positively charged particles.

Q.5. Which one of the following is not correct?

(i) The isotopes of an element posses the same electronic configuration.
(ii) The isotopes of an element exhibit different chemical properties.
(iii) The isotopes of an element exhibit different physical properties.
(iv) None of these.

Q.6. Number of protons, electrons and neutrons respectively present in chlrine-35 is

(i) 17, 17, 18
(ii) 17, 18, 17
(iii) 18, 17, 17
(iv) None of these

Q.7. Isobars have

(i) Same mass number but different atomic numbers.

(ii) Different mass number and atomic number.
(iii) Different mass number but same atomic number.
(iv) None of these.

Q.8. Isobars have

(i) Different physical and chemical properties
(ii) Different physical properties but similar chemical properties.
(iii) Similar physical properties but different chemical properties.
(iv) Similar physical and chemical properties.

Q.9. The elements having valence electrons 1 or 7 in its valence shell

(i) Exhibit greater chemical reactivity.
(ii) Exhibit lesser chemical reactivity.
(iii) Exhibit medium chemical reactivity.
(iv) Exhibit much lesser chemical reactivity.

Q.10. The outer shell of an atom except Helium cannot accommodate

(i) More than 8 electrons.
(ii) More than 2 electrons.
(iii) More than 18 electrons.
(iv) More than 32 electrons.

Q.11. The maximum number of electrons that can be accommodated in N shell of an atom is

(i) 32 *(iii)* 22
(ii) 18 *(iv)* 20

Q.12. A divalent anion of an element contain 12 electrons. The atomic number of the element is

(i) 12 *(ii)* 13 *(iii)* 14 *(iv)* 15

Q.13. Which one of the following is not correct?

(i) Atomic mass = no. of protons + no. of neutrons.
(ii) Xenon loses electrons to be stable.
(iii) Valency of Fe is 2.
(iv) Neutron is chargeless.

MODEL TEST PAPER
SUMMATIVE ASSESSMENT – I

Time: 3hrs **M.M.:90**

General Instructions:–

(i) The question paper comprises of **two Sections, A** and **B**. You are to attempt both the sections.
(ii) **All** questions are **compulsory**.
(iii) There is no overall choice. However, internal choice has been provided in all the five questions of five marks category. Only one option in such questions is to be attempted.
(iv) **All** questions of **Section-A** and **all** questions of **Section-B** are to be attempted separately.
(v) Question numbers **1** to **3** in **Section-A** are **one mark** questions. These are to be answered in **one word** or in **one sentence**.
(vi) Question numbers **4** to **7** in **Section-A** are **two marks** questions. These are to be answered in about **30 words** each.
(vii) Question numbers **8** to **19** in **Section-A** are **three marks** questions. These are to be answered in about **50 words** each.
(viii) Question numbers **20** to **24** in **Section-A** are **five marks** questions. These are to be answered in about **70 words** each.
(ix) Question numbers **25** to **42** 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.

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SECTION: 'A'

1. The boiling point and freezing point of water is 100°C and 0°C respectively. Convert these temperatures in K. **[1]**

2. Mention the change in human red blood cells when they are placed in hypotonic salt/ sugar solution. **[1]**

3. Define a force of 1 N. **[1]**

4. Give reason for the following: **[2]**
(a) The salt disappears when dissolved in water.
(b) Sponge is a solid yet it can be compressed.

5. Identify the separation technique used: **[2]**
(a) To separate the components of ink.
(b) To separate cream from milk.
(c) To separate alcohol from water.
(d) To separate mustard oil from water.

6. Name the tissue that makes the husk of coconut. Write three characteristics of this tissue. **[2]**

7. State two factors on which gravitational force depends and also mention, how it depends on these factors? **[2]**

8. Define crop rotation, What is the basis of choice of the crop to be cultivated after one harvest? In what way is crop rotation advantageous? **[3]**

9. What are weeds? Give two examples. Mention any two methods of preventing the growth of weeds. **[3]**

10. Neena took some ammonium chloride in a china dish and put an inverted funnel with a cotton plug on its stem. She then heated it slowly: **[3]**

(a) What would she observe?

(b) Name and define the phenomenon that takes place.

(c) Name any two other substances with which she can make similar observation.

11. Classify sol, aerosol and gel, from the following list: Milk of magnesia, smoke, cheese, mist, mud, butter. **[3]**

12. Two beakers A and B contain plain water and concentrated sugar solution respectively. Equal number of dried raisins are kept in them for a few hours and then taken out.

(i) Explain the reason for the difference in the physical appearance of raisins which were taken out of the two beakers

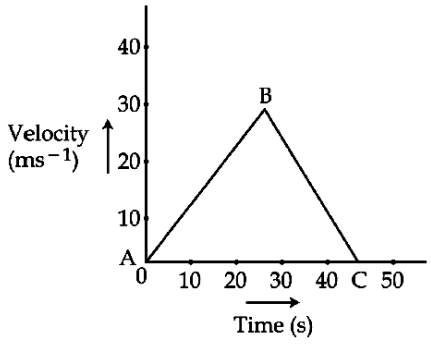
(ii) On the basis of above observation, categorise the two solutions as hypotonic and hypertonic **[3]**

13. Draw a well labeled diagram of neuron with any four labellings. **[3]**

14. (i) Which plant tissue will you associate with the conduction of food in plants ? How is it different from xylem? **[3]**

(ii) Write its four components.

15. Velocity-time graph of a car is shown by the figure given below: **[3]**



(a) State the kind of motion of the car as represented by AB and BC.

(b) Identify the part which represents motion of the car with positive acceleration. Give reason for your answer.

(c) Identify the part which represents motion of the car with negative acceleration. Give reason for your answer.

16. State Newton's first law of motion and use it to explain how: **[3]**

(i) Dust comes out of the carpet when it is beaten with a stick?
(ii) leaves fall when branch of tree is shaken vigorously ?

17. State the factors on which momentum of a body depends. A body of mass 80 kg moving with 10 m/s collides with another body of mass 60 kg moving with 20m/s. If after collision they entangle and continue to move, determine their velocity after collision. **[3]**

18. Define acceleration due to gravity. Write its SI unit. Derive an expression for it in terms of mass M of earth and radius 'R' **[3]**

19. (a) How does the magnitude of the force of gravitation between two objects change when: **[3]**
(i) mass of one of the objects is halved
(ii) distance between the two objects is halved
(b) Mention any two phenomena which can be successfully explained by Universal law of Gravitation.

20. (a) Define animal husbandry. Mention its any two aspects. **[5]**
(b) Specify the two advantages that a farmer is looking for when he crosses a Jersey cow (exotic breed) with a Sahiwal (Local breed)
(c) Explain how parasites attack cattle.

OR

(a) Name any one fresh water resource and one brackish water resource which are important fish reservoirs. Write the names of two scientific methods to detect large schools of fish.

(b) Explain composite fish culture system with examples.

21. (i) State one similarity and two differences between boiling and evaporation. **[5]**
(ii) Give reason for the following:
(a) While putting clothes for drying we spread them out.
(b) Clothes dry faster on a windy day.

OR

(i) How would increase in pressure and decrease in temperature of a gas affect:

(a) the distance between particles?

(b) strength of force of attraction between particles ?

(c) the physical state of the gas ?

(ii) Write the chemical formula of dry ice. How is it stored? Explain why is it named so?

22. (a) State the principle of centrifugation. Give its two applications. **[5]**
(b) Give two points of difference between mixtures and compounds.
(c) List two properties of metals in which they differ from non-metals.

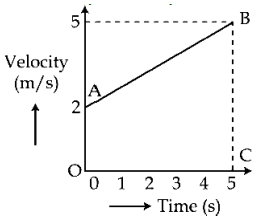
OR

(a) Few iron fillings and a pinch of sulphur powder are taken in a china dish and mixed properly. Justify the change as physical/chemical change giving two points in favour of your answer.

(b) Classify the following as homogeneous and heterogeneous mixtures.
Air, lemonade, mixture of oil and water and tincture of iodine.

23. (i) Define uniformly accelerated motion. **[5]**

(ii) From the graph given below, find the acceleration and the distance covered by the body in 5 s.



OR

Use velocity – time graph to derive the relation. $S=ut +½ at^2$,

24. (a) When a bullet is fired from a gun, the gun moves backward. Give reason. **[5]**

(b) A gun of mass 500g fires a bullet of mass 10g with a speed of $100ms^{-1}$. Find:

(i) Initial momentum of 'gun+bullet'.

(ii) Momentum gained by the bullet after firing.

(iii) Recoil velocity of the gun.

OR

State Newton's Second law of motion.
Derive the relation between force and the acceleration produced in a body.

SECTION – B

25. The following statements describe the steps to detect the presence of metanil yellow in dal. One of the four statements given below is incorrect and it is: **[1]**

(a) grind 3-5g of dal
(b) prepare solutions of grounded dal
(c) add 2-4 drops of conc. sulphuric acid to the filtrate
(d) filter the solution and collect the filtrate

26. The colour of starch solution is: **[1]**

(a) blue black (c) milky white
(b) yellow brown (d) colourless

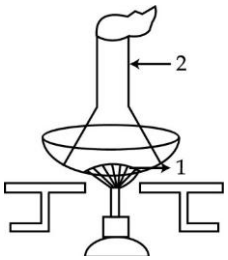
27. For the accurate determination of the boiling point of water, we should use – **[1]**

(a) tap water (c) boiled water
(b) distilled water (d) hard water

28. Priyal set up an apparatus for finding the melting point of ice. When the ice melted, the temperature shown by thermometer is: - **[1]**

(a) More than 0^oC (c) 0^oC
(b) Less than 0^oC (d) None of the above

29. A diagram is provided for the method of separation of a mixture of ammonium chloride and common salt by the method of sublimation. In this diagram the component 1 and 2 after separation will be: **[1]**



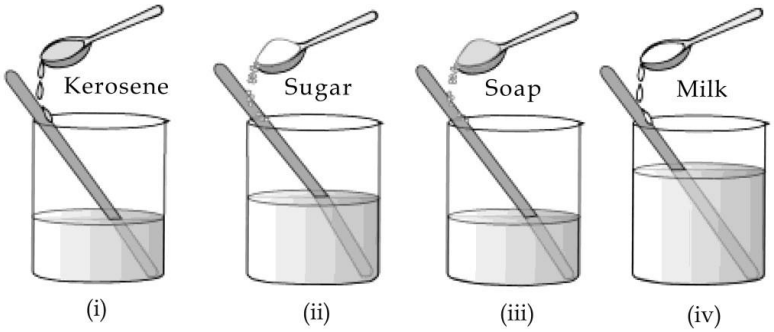
(a) Common salt and ammonium chloride

(b) Ammonium chloride and common salt

(c) both ammonium chloride

(d) both common salt

30. The following substances are added to water in a beaker as shown below. The mixture is stirred well. A true solution is found in the beaker. **[1]**

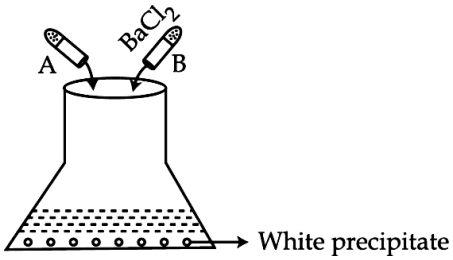


(a) (i) (b) (ii) (c) (iii) (d) (iv)

31. When we heat a mixture of sulphur powder and iron filings, we would observe that: **[1]**
(a) Sulphur starts melting
(b) Iron filings start melting
(c) Mixture becomes red hot
(d) Mixture evaporates

32. When CS_2 is added to iron and sulphur powder mixture the sulphur dissolves and then reappears after sometime. For this kind of action you will say that: **[1]**
(a) chemical change has taken place
(b) physical change has taken place
(c) no change has taken place
(d) chemical as well as physical change has taken place

33. A student poured clear solution of test tube A and equal quantity of clear solution in test–tube B in a conical flask, shaked it well and kept undisturbed for some time. After sometime a white precipitate settled down. The student forgot to write the name of the solution in the test tube A. What could it be? **[1]**



(a) Barium sulphate
(b) Sodium chloride
(c) Sodium hydroxide
(d) Sodium sulphate

34. When water is added to anhydrous $CuSO_4$, we observe that the colour – **[1]**
(a) changes from white to blue
(b) changes from blue to white
(c) remains unchanged
(d) changes from white to green

35. Which of the following liquid is not used in the preparation of stained temporary mount of onion peel? **[1]**
(a) water
(b) glycerin
(c) safranin
(d) methyl alcohol

36. Cell are stained to: **[1]**
(a) make the cell turgid
(b) nourish the cell
(c) help in cell multiplication
(d) highlight the cell organelles

37. The cellular component not seen while observing the slide of an onion peel under a compound microscope is: **[1]**
(a) chromosomes
(b) cell wall
(c) nucleus
(d) cytoplasm

38. The most common type of ground tissue is : **[1]**
(a) collenchyma
(b) sclerenchyma
(c) parenchyma
(d) Epidermis

39. Striated muscle fiber can be identified by : **[1]**
(a) nuclei lying towards the periphery
(b) star like structure
(c) cells with tapering ends
(d) centered nuclei

40. A student soaked 5 grams of raisins in water. Weight of soaked raisins was found to be 7g. The percentage of water absorbed by raisins is – **[1]**
(a) 50%
(b) 70%
(c) 20%
(d) 40%

41. In the experiment to establish relation between weight of a rectangular block and minimum force required to just move it by spring balance, a student measured the minimum force

required as 90 gwt for moving a wooden block of 100 gwt. Now he placed a weight of 50 gwt on the wooden block. The minimum force required now would: **[1]**

(a) increase
(b) decrease
(c) remains same
(d) either decrease or increase

42. Area of three different faces of a rectangular block is A1, A2, A3 such that A1 > A2 > A3 Minimum force required to just slide it was done by keeping it successively on three faces and the forces measured were F1, F2, F3 respectively. The relation between the three forces would be – **[1]**

(a) F1 > F2 >F3
(b) F2 > F3 > F1
(c) F3 > F2 > F1
(d) F1 = F2 = F3

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MODEL TEST PAPER
SUMMATIVE ASSESSMENT – II

Time: 3hrs **M.M.:90**

General Instructions:–

(i) The question paper comprises of **two Sections, A** and **B**. You are to attempt both the sections.
(ii) **All** questions are **compulsory**.
(iii) There is no overall choice.
(iv) **All** questions of **Section-A** and **all** questions of **Section-B** are to be attempted separately.
(v) Question numbers **1** to **3** in **Section-A** are **one mark** questions. These are to be answered in **one word** or in **one sentence**.
(vi) Question numbers **4** to **7** in **Section-A** are **two marks** questions. These are to be answered in about **30 words** each.
(vii) Question numbers **8** to **19** in **Section-A** are **three marks** questions. These are to be answered in about **50 words** each.
(viii) Question numbers **20** to **24** in **Section-A** are **five marks** questions. These are to be answered in about **70 words** each.
(ix) Question numbers **25** to **42** 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.

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SECTION: 'A'

1. If 'K' and 'L' shells of an atom are completely filled with electrons, then what would be: **[1]**
(i) The total number of electrons in the atom, (ii) Find its valency

2. Name the phylum to which Sea urchin and sea cucumber belong. **[1]**

3. Mention the percentage composition of carbon dioxide in the atmosphere of planets Venus and Mars. What is the percentage of carbon dioxide in our atmosphere? **[1]**

4. Some fungal species live in permanent mutually dependent relationships with olive green algae. Name the relationship. Mention where these forms are grown and what are they called? **[2]**

5. State two different ways by which infectious diseases spread. **[2]**

6. When a plastic ball is released under water, it never stays under water but instead comes to the surface of water. Explain why? **[2]**

7. Represent graphically: **[2]**
(i) Two sound waves with same amplitude but different frequency.
(ii) Two sound waves with different amplitude and same frequency.

8. Write the chemical formulae of sulphates (SO_4^{2-}) of Na^{+1}, K^{+1}, Al^{+3}, Mg^{+2}, Ca^{+2}, Zn^{+2}. **[3]**

9. Identify the tri-atomic and tetra atomic molecules from the following: **[3]**
CH_3Cl, $CaCl_2$, NH_3, H_2O

10. The atomic numbers of four elements A,B,C and D are given below: **[3]**

Element	Atomic Number
A	9
B	12
C	13
D	17

(a) Write the number of Valence electrons in their atoms
(b) Write the names of elements whose atoms will lose electrons to obtain octet.

11. State appropriate terms for the following: **[3]**

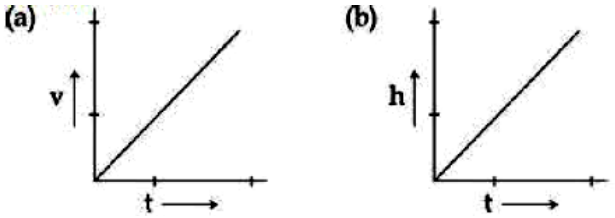
(i) Animals that are able to maintain a certain body temperature over a wide range of temperature in the environment.
(ii) Plants which bear naked seeds.
(iii) Animals which have pseudocoelom.

12. Explain the following terms:-
(a) Phanerogams (b) Symbiosis (c) Binomial Nomenclature **[3]**

13. Answer the following questions regarding AIDS.
[3]

(a) What causes this disease?
(b) List three ways by which this disease spreads.
(c) What happens to the person who is infected with this disease?

14. Interpret the following graphs in terms of increase or decrease in kinetic energy. **[3]**



15. How pressure is related with the area of contact of an object? Find the area of contact of an object when pressure exerted by it is 90 Pa and total force acting is 900N. **[3]**

16. A mass of 3 g is moving with a velocity of 18km/h. Calculate kinetic energy of the body in Joule. **[3]**

17. A ringing bell produces sound. **[3]**
(a) How sound is produced by bell?
(b) How it reaches to our ears?
(c) What will happen if it is kept in vacuum?

18. (a) How does nitrogen occur in nature? Explain.
(b) What are the usable forms of nitrogen which are taken up by plants from the soil? **[3]**

19. Raju went for immersion of his Ganesh idol. He saw huge containers where he was told to put his clay idol, not in pond water directly. He saw people throwing flowers and idols in

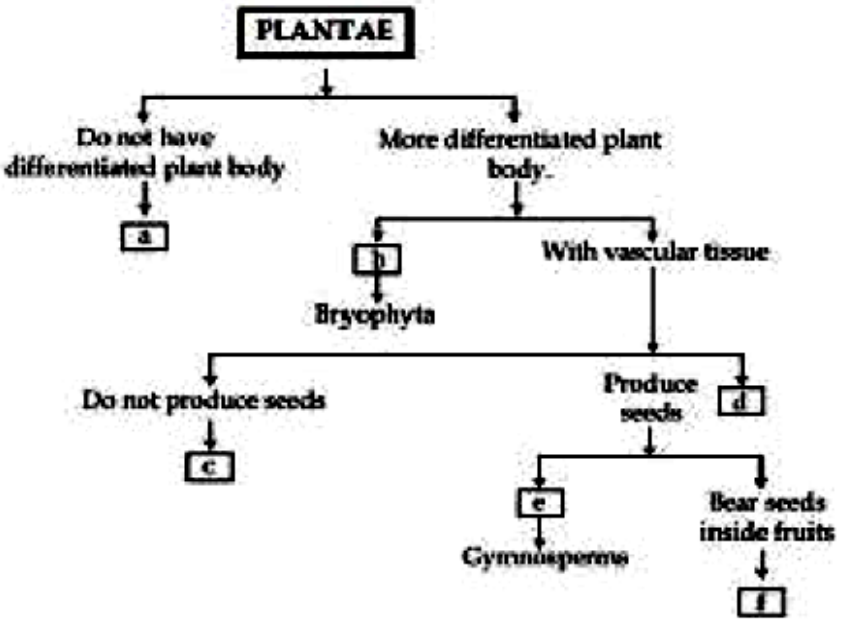
water of pond. He stood at the entrance and took away all the flowers from the idols collected all the puja material and directed people where should they be immersing their idols.

Answer the following questions based on the above information.

(a) Why did Raju take this initiative?
(b) What values are displayed by Raju?
(c) What initiative can you take being school student regarding this ritual? **[3]**

20. (a) Calculate the number of molecules in: **[5]**
(i) 1.7 gms of NH_3
(ii) 96 grams of SO_2
(b) Calculate the number of moles in 2.3gms sodium.
(Atomic mass of N = 14u,H= lu, S = 32u, O = 16u, Na = 23u)

21. (a) A flow chart of plant classification with six unknown characters / plant groups a, b, c, d, e, f is given. Identify them and fill in the boxes with appropriate characteristics /plant groups. **[5]**



(b) Cell wall of fungi is made up of chitin.
(i) What is the chemical nature of chitin?
(ii) What is the mode of nutrition in fungi?

22. State whether the work done in the following cases is positive/negative/or zero:
(a) Work done by gravity when a meteorite falls towards the earth. **[5]**
(b) When a spring of the spring balance is stretched by hanging an object on it.
(c) When the ball is thrown upwards, work done by gravitational force.
(d) Work done by centripetal force when we sit in a merry go round.
(e) Work done by a coolie on the luggage on his head while carrying it on a horizontal platform.

23. (i) Explain how ultrasonic waves are used to find cracks and flaws in metal blocks?
(ii) A person is listening to a tone of 500 Hz sitting at a distance of 450m from the source of sound. What is the time interval between successive compression from the source? **[5]**

24. Explain how the Sun and water help in soil formation. **[5]**

SECTION – B

25. A stethoscope utilizes the principle of: **[1]**
(a) refraction of sound (b) reverberation
(c) conservation of energy (d) reflection of sound

26. During the life cycle of mosquito, the stage in which the appearance is like a worm is: **[1]**
(a) egg (b) pupa (c) larva (d) adult

27. While determining the weight of the solid in water, solid block hanged to spring balance to be immersed in water should be: **[1]**
(a) partially immersed
(b) fully immersed
(c) should touch the bottom of the container
(d) all are correct

28. It is easier to swim in sea water as compared to fresh water because the swimmer: **[1]**
(a) loses its mass due to common salt
(b) experiences less buoyant force than fresh water
(c) experiences more buoyant force than fresh water
(d) the sea water does not flow like fresh water

29. When an object is placed over the surface of water it will float, when: **[1]**
(a) the weight of the body is less than the weight of the liquid displaced
(b) weight of the body is equal to the weight of liquid displaced
(c) both (a) and (b)
(d) weight of the body is more than the weight of the liquid displaced

30. A spherical ball of copper and a cube of iron having same volume are immersed in salty water. The buoyant force acting on them is: **[1]**
(a) more on iron ball because its surface area is more
(b) more on iron ball because its weight is more
(c) same because they both have same volume
(d) same because they both are denser than salty water

31. The statement which is not correct while finding the density of a solid block using measuring cylinder and spring balance is: **[1]**
(a) we can ignore the zero error
(b) while taking reading one should keep his eyes to the level of liquid horizontally
(c) solid block should be fully immersed
(d) the thread used should be thin and of cotton

32. Two slinkies A and B are of same length and made up of two different materials. The time taken by 10 pulses to travel the same distance in both of them is 80 seconds and 70 seconds respectively. It will be found that: **[1]**
(a) the pulse travelled faster in A
(b) the pulse travelled faster in B
(c) the speed of pulse cannot be decided from the observation taken
(d) the speed of pulse in both the slinkies is same.

33. The type of pulse generated in a slinky is: **[1]**

(a) Longitudinal (b) Transverse
(c) both transverse and longitudinal (d) neither transverse nor longitudinal

34. The units of velocity of sound and frequency of sound respectively are: **[1]**

(a) ms^{-1}, s (b) ms^{-2}, Hz
(c) kms^{-2}, s (d) ms^{-1}, Hz

35. You are identifying a plant that possesses seeds but not fruits. It may belong to **[1]**

(a) Pteridophyta (b) Gynmosperm
(c) Bryophyta (d) Angiosperm

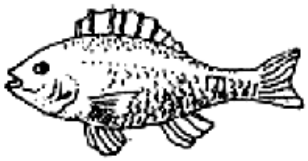
36. A student identified a specimen as mushroom. The basis on which he has identified this is: **[1]**

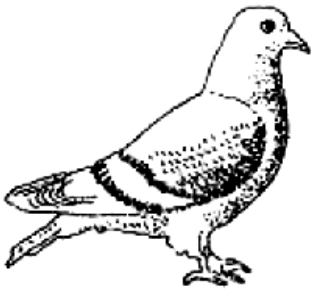
(a) umbrella shaped with chlorophyll.
(b) umbrella shaped without chlorophyll.
(c) it has root, stem and leaf.
(d) it has capsule at its tip.

37. Bony fish is characterized by the presence of: **[1]**

(a) Scales as endoskeleton, bones as exoskeleton
(b) Bones as endoskeleton, scales as exoskeleton
(c) Bones and scales as exoskeleton
(d) Bones and scales as endoskeleton

38. Observe the pictures of a bird and a bony fish. The feature that places them in the same phylum is **[1]**





(a) Pointed heads (b) Dorsal nerve cord
(c) Presence of scales (d) Bulky thorax.

39. In the chemical reaction.
$A + B \rightarrow C + D$ **[1]**
according to law of conservation of mass, mass of

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

40. The teacher had shown a student a specimen R and asked him to find if it is spirogyra. The features that the student will look for the identification is: **[1]**

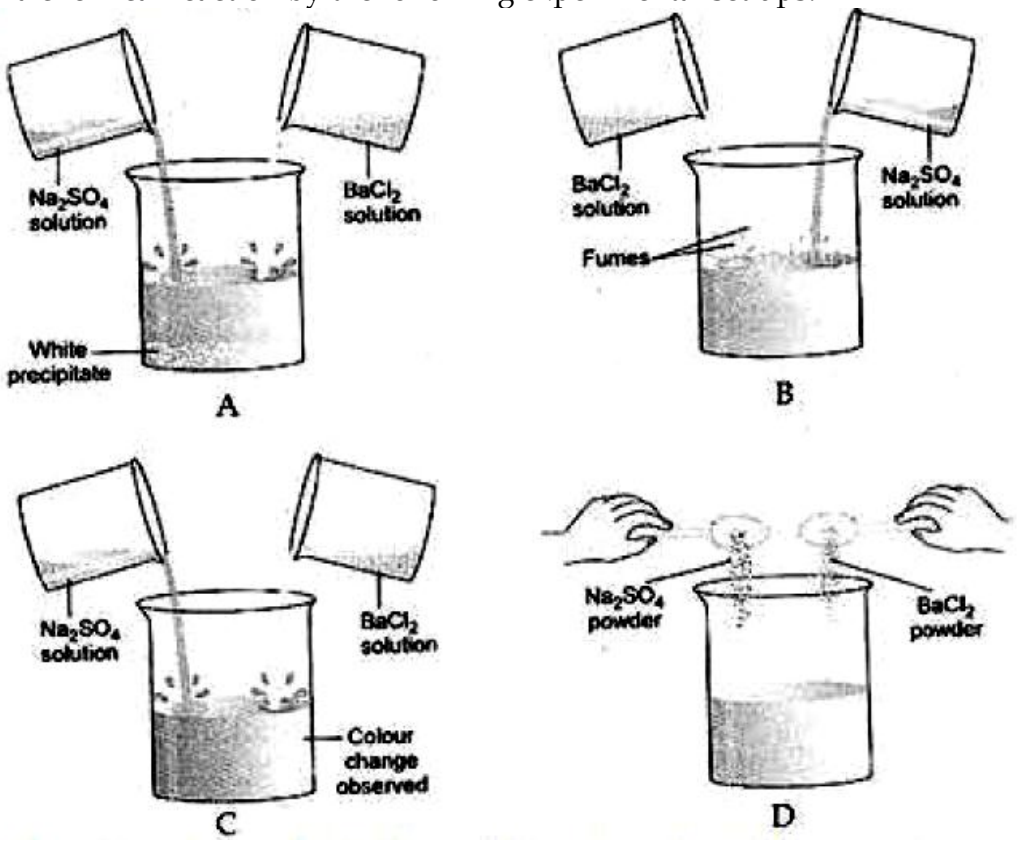
(a) filamentous, presence of cytoplasmic strands, presence of pyrenoids
(b) Presence of cones, presence of rhizoids
(c) cytoplasmic strands, root like rhizoids, female cones
(d) presence of filaments, node, internodes

41. Some development stages of living organisms are given below.

The stage which is not a stages of mosquito life cycle – **[1]**

(a) larva (b) pupa
(c) egg (d) cyst

42. Four students A, B, C and D depicted the experiment to verify the law conservation of mass in a chemical reaction by the following experimental set ups. **[1]**



Which of the above depictions of the experiment is correct:

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

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