Delhi Public school, Jammu
Important Question/Answers

Sub: Physics

Chapter-1 (Motion)

1 Mark Questions

Q1: What is the significance of slope in velocity time graph?

Ans: It gives the measurement of acceleration.

Q2: What is the nature of the distance time graphs for uniform and non-uniform motion of an object?

Ans: Distance time graph for uniform motion is straight line not parallel to time axis.

   Distance time graph for non-uniform motion can be curve or zig-zag line not parallel to time axis.

Q3: Under what condition displacement of a body is zero?

Ans: When after covering a given path length returns to its original position.

Q4: Name the quantity which is measured by the area under velocity time graph.

Ans: Displacement.

Q5: Define uniform circular motion. Name the physical quantities which remains constant and which changes in uniform circular motion.

Ans: It is the motion when a body moves along a circular path with a constant speed.

For example:

1.   Motion of satellite and moon around the earth.

Speed remains same while velocity changes at every instant.

2 or 3 Marks Questions

Q1: Define displacement and average velocity. Also give their SI units.

Ans: Displacement is defined as the shortest path covered between two points.

Average velocity is defined as the ratio of total displacement covered to the total time taken.

Mathematically,

$$\overrightarrow{v_{av}} = \frac{\text{total displacement}}{\text{total time}} = \frac{x_1 + x_2 + - - + x_n}{t_1 + t_2 + - - + t_n}$$

Or it is also defined as the arithmetic mean of the initial and final velocities over a given period of time when velocity changes continuously at a uniform rate.

Mathematically,

$$\vec{v}_{av} = \frac{v_i + v_f}{2} = \frac{u + v}{2}$$

SI unit of displacement is meter (m) and SI unit of average velocity is ms^{-1}.

Q2: Give difference between speed and velocity.

Ans:

Speed	Velocity
It is the distance travelled by a moving body per unit time.	It is the distance travelled by a moving body in a particular direction per unit time.
It is a scalar quantity.	It is a vector quantity.
Its SI unit is ms^{-1}.	Its SI unit is ms^{-1}
It is always positive and is greater than or equal to velocity.	It may be positive, negative and is less than or equal to speed.

Q3: Give difference between distance and displacement.

Ans:

Distance	Displacement

It is the actual path covered by a body between two points.	It is the shortest path covered by a body between two points.
It is a scalar quantity.	It is vector quantity.
It is always positive.	It may be positive, negative and zero.
It is always greater than or equal to the displacement.	It is always less than or equal to distance travelled.

Q4: Define a) Acceleration and b) Retardation (de-acceleration). Also give SI units.

Give an example of an accelerated body, moving with a uniform speed.

Ans: Acceleration:- It is defined as the change in the velocity of a body per unit time.

It is denoted by symbol 'a'

Its mathematical relation is; $a = \frac{change\ in\ velocity}{time} = \frac{v_f - v_i}{t_2 - t_1} = \frac{v - u}{t}$

If $v_f = v = final\ velocity, v_i = u = initial\ velocity$ and

$t_1 = 0\ is\ initial\ time\ while\ t_2 = t$ is final time.

The acceleration of the body is actually an average value of the acceleration over time interval t.

If velocity of a body does not changes, its acceleration is zero as $v_f = v_i$

Retardation: It is defined as the decrease in the velocity of a body per unit time.

Retardation is called negative acceleration or deceleration.

Acceleration and retardation both are vector quantities.

Its SI unit is $m\ s^{-2}$ and cgs unit is $cm\ s^{-2}$.

5 Marks Questions

Q1: (a) Give difference between uniform and non-uniform motion.

(b) Give difference between uniform linear motion and uniform circular motion.

Ans: (a)

Uniform motion	Non-uniform motion
A body is said to be uniform motion when it travels equal distance in equal interval of time	A body is said to have non-uniform motion when it travels unequal distance in equal interval of time or vice-versa.
It graph is a straight line.	It graph is curved.
In this acceleration is zero.	In this acceleration cannot be zero.

(b)

Uniform linear motion	Uniform circular motion
In this body moves along a straight line	In this body moves along a circular path.
The direction does not changes	The direction changes continuously.
This is not an accelerated motion.	This is an accelerated motion.

Q2: Derivations of the equations of motion by graphical method.

Ans:

The various equations of motion are derived for any object moving with a uniform acceleration in a straight line.
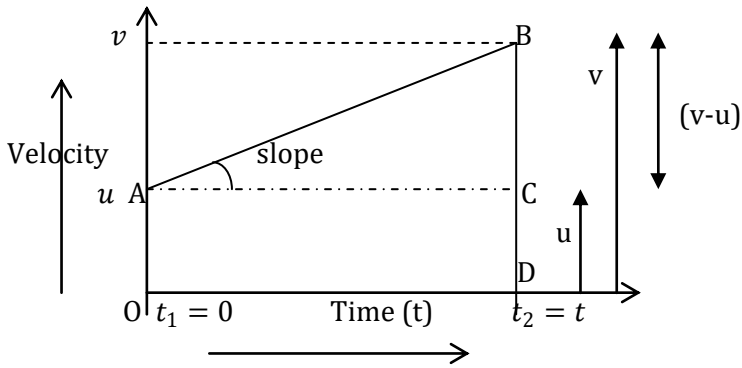
The equations are:

(a) $v = u + at$

(b) $S = ut + \frac{1}{2}at^2$

(c) $2aS = v^2 - u^2$

Proofs:

Let us consider a body is moving with some initial velocity u at time $t_1 = 0$ and after some time $t_2 = t$, it acquires a final velocity v.

2

First we draw the velocity-time graph as:

Now from the given velocity-time graph,

(a) We have to derive the first equation of motion (velocity-time relation);

$$v = u + at$$

In this slope of the graph gives the measure of acceleration,

So, $slope = a = \frac{BC}{AC} = \frac{DB - DC}{OD} = \frac{v-u}{t}$

Or $at = v - u$ or $v = u + at$ (Proved)

(b) From the same graph we have to derive the second equation of motion (position-time relation);

$$S = ut + \frac{1}{2}at^2$$

From the graph, area under v-t graph gives the measure of distance or displacement.

So, $S = Area = Area\ of\ reactangle\ (OACD) + Area\ of\ triangle\ (ABC)$

S=$(OD \times OA) + \frac{1}{2}(AC \times CB) = t \times u + \frac{1}{2}(t) \times (v - u)$

But $v - u = at$

Thus, $S = ut + \frac{1}{2}t \times (at) = ut + \frac{1}{2}at^2$ (Proved)

(b) At last from the same graph we have to derive third equation of motion (position-velocity relation);

$2aS = v^2 - u^2$

From the graph, area under v-t graph gives the measure of distance or displacement.

So, $S = Area\ of\ trapezium = \frac{1}{2}(Sum\ of\ parallel\ sides) \times height$

Or $S = \frac{1}{2}(OA + DB) \times OD = \frac{1}{2}(u + v) \times t$

But $t = \frac{v-u}{a}$

Thus, $S = \frac{1}{2}(u + v) \times \left(\frac{v-u}{a}\right)$ or $S = \frac{(v+u)(v-u)}{2a}$

Or $2aS = v^2 - u^2$ (Proved)

Chapter-2 (Force and Laws of Motion)
1 Mark Questions
Q1: Define 1 newton of force?

Ans: Force is said to be 1 newton if it produces an acceleration of $1ms^{-2}$ in a body of mass 1kg.

Q2: Name the factor on which the inertia of a body depends.

Ans: Mass of the body.

Q3: Define momentum and give its SI unit.

Ans: It is defined as the quantity of motion possessed by a body as a product of mass and velocity.

P=mv, where m is the mass and v is the velocity.

Its SI unit is $kgms^{-1}$.

Q4: Why it is advised to tie any luggage kept on the roof of a bus with a rope?

Ans: It is to prevent forward and backward movement of the luggage when bus starts moving and stops.

Q5: Convert 1 newton into dynes.

Ans: 1N=$10^5 dyne$

2 or 3 Marks Questions
Q1: Define force and inertia. Also give their SI units.

Ans: Force: It is also defined as the push or pull applied on a body to changes or tends to change its original state.

Mathematically, $F = ma$

Inertia: It is the natural tendency/property of a body to resist any change in its state of rest or of uniform motion in a straight line.

Inertia depends upon the mass of an object.

SI unit of force is newton (N)

SI unit of inertia is Kg, i.e the SI unit of mass.

Q2: Give difference between balanced and un-balanced force?

Ans:

Balanced force	Un-balanced force
It is defined as the force when the resultant of force due to number of forces acting on a body is zero. $$\sum F_i = 0$$	It is defined as the force when the resultant of force due to number of forces acting on a body is not zero. $$\sum F_i \neq 0$$
It do not cause any change in its state of rest or of uniform motion in a straight line.	It cause change in the state of rest or of uniform motion of a body.
For example: A body at rest without any motion.	For example: A body at rest is set in motion.

Q3: Prove the relation, $F = ma$ for Newton's 2nd law of motion.

Ans:

Proof: -

As we know that from Newton's second law of motion,

F $\propto \frac{dp}{dt}$ ----------------------1. (i.e applied force is directly proportional to the change in momentum)

F=k$\frac{dP}{dt}$, where k is constant

But p=mv

$\Rightarrow F = k\left(\frac{d(mv)}{dt}\right)$ ----------------2.

$= km\frac{dV}{dt} = kma$ (where acceleration, a=$\frac{dV}{dt}$)

In SI System k=1

⇒ F=ma   (Proved)

Q4: (a) Give the importance of Newton's laws of motion? (b) Define Newton's laws of motion?

Ans: (a) 1st law defines force, 2nd law measures force and 3rd law shows that forces always exists in pairs.

(b) NEWTONs 1st LAW:-

It is defined as the inability of a body to change its state of rest or uniform motion until some external force is applied.

It is also called Galileo's law of inertia.

NEWTONs 2nd LAW:-

It is defined as the rate of change of linear momentum of a body is directly proportional to the applied external force and this change takes place in the direction of the applied force.

NEWTONs 3rd LAW:-

It states that to every ACTION there is an equal and opposite REACTION and the action and reaction are always equal.

Q5: Define all the types of inertia and give 2 examples for each.

Ans:

[1]Inertia of Rest

It means a body at rest remains at rest and cannot change its state of rest by itself.

For e.g.:-

1. Passengers sitting in bus or train moves backward when it starts suddenly.

2. Dust particles falls off when carpet is beaten by stick.

[2]Inertia of motion

It means a body in uniform motion cannot changes its uniform velocity by itself.

For e.g.:-

1. Passengers sitting in a moving bus or train moves forward when it stops suddenly.

2. A person jumping out of moving train may fall forward.

[3] Inertia of direction

It means a body in a given direction cannot change its original direction by itself.

For e.g.:-

1. An umbrella protects us from rain in a given direction.

2. The stone flies off along the tangent to the circle when whirled string suddenly breaks.

5 Marks Questions

Q1: State and prove law of conservation of linear momentum with neat diagram?

Ans: It states that if no external force acts on a system then the momentum of the system remains constant or it is defined as in isolated system the vector sum of the linear momentum of all the bodies of the system is conserved and is not affected due to their mutual action and reaction.

Proof:- Let us consider bodies A and B of masses m_1 and m_2 collides head-on, such that both moves in a straight line before and after collision.

Before collision($u_1 > u_2$)   After collision
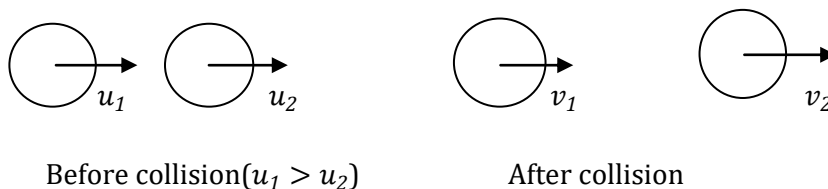
Now according to Newton's 2nd law of motion,

$F = \frac{dp}{dt}$

So, let $\overrightarrow{F_{AB}}$ and $\overrightarrow{F_{BA}}$ be the force exerted by body B on A and body A on B, then

$\overrightarrow{F_{AB}} = m_1 \frac{(v_1 - u_1)}{t}$ --------1.

$\overrightarrow{F_{BA}} = m_2 \frac{(v_2 - u_2)}{t}$ --------2.

As from Newton's 3rd law.

$\overrightarrow{F_{AB}} + \overrightarrow{F_{BA}} = 0$ or $\overrightarrow{F_{AB}} = -\overrightarrow{F_{BA}}$

$m_1 \frac{(v_1 - u_1)}{t} = m_2 \frac{m_2(v_2 - u_2)}{t}$

$\Rightarrow m_1(v_1 - u_1) = m_2(v_2 - u_2)$

$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$

This shows that initial momentum is equal to final momentum, hence proves the law of conservation of linear momentum.

Q2: Define Newton's 2nd law of motion. Explain, why it is called real law?

Ans: It is defined as the rate of change of linear momentum of a body is directly proportional to the applied external force and this change takes place in the direction of the applied force.

i.e, $F \propto \frac{dp}{dt}$

Newton's 2nd law is the real law as 1st and 3rd law follows it.

(1) 1st law follows N's 2nd law as acc to 2nd law F=ma , if F=0 then

ma = 0 where m≠ 0 ⇒ a=0 and we know that v=u + at ⇒ v=u +at or v=u

i.e. initial velocity is equal to final velocity, hence proves that first law follows N's 2nd law.

(2) 3rd law follows N's 2nd law as force is given as rare of change of linear momentum

i.e. $F = \frac{dP}{dt}$ so for two body system we have
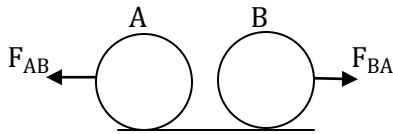
$F_{BA} = \frac{dP_1}{dt} - - - 1.$ and

$F_{AB} = \frac{dP_2}{dt} - - - 2.$

Adding 1 and 2 we get

$F_{BA} + F_{AB} = \frac{dP_1}{dt} + \frac{dP_2}{dt}$

$\Rightarrow F_{BA} + F_{AB} = \frac{d}{dt}(P_1 + P_2),$

Since no external force act on the system so total momentum of the system must be constant i.e., $P_T = 0$

$\Rightarrow F_{BA} + F_{AB} = 0$

Or

$F_{BA} = -F_{AB}$ i.e action and reaction are equal and opposite, hence 3rd law follows N's 2nd law.

This shows that 1st and 3rd law follows Newton's 2nd law.

Hence Newton's 2nd law is the real law.

Chapter-3 (Gravitation and Floatation)

1 Mark Questions

Q1: Define gravitation and gravity.

Ans: Gravitation: It is defined as the force of attraction between two bodies in the universe.

Gravity: It is defined as the force of attraction between earth and any other body nearby it.

Q2: Has gravity any effect on inertial mass?

Ans: No effect.

Q3: What is the acceleration of gravity at the centre of the earth?

Ans: Zero.

Q4: Why a person jumps higher at moon?

Ans: Due to low gravity.

Q5: How mass is different from weight?

Ans: Mass is the measure of amount of matter and can never be zero but weight is the gravitational pull and can be zero at the centre of the earth.

Mass is a scalar quantity and measured by physical balance but weight is a vector quantity and measured by spring balance.

2 or 3 Marks Questions

Q1: Define buoyancy and buoyant force. What are the factors affecting buoyancy or buoyant force?

Ans: Buoyancy: It is the tendency of a fluid to exert an upward force on a body immersed partly or wholly/ completely in it.

Buoyant force: It is the resultant upward normal force experienced by a body when immersed in a fluid.

The two basic factors are:

    (a) Volume of the immersed body and

    (b) Density of the fluid in which body is immersed.

So, greater the volume of the immersed body greater will be the buoyancy or buoyant force acting on it.

i.e. $U_T \propto V \ (volume \ of \ body \ immersed)$

    Secondly greater the density of the fluid in which the body is immersed greater will the buoyant force acting on it.

    i.e, $U_T \propto \rho \ (density \ of \ the \ fluid)$

Q2: Define Thrust and Pressure and also give their SI units.

Ans:

Thrust: It is defined as the normal or perpendicular force acting to the surface of body in contact with fluid(liquid or gas).

It is a vector quantity.

Its SI unit is newton or N

Pressure: It is defined as the normal force acting per unit surface area in contact with fluid or liquid.

$P = \frac{F}{A}$

Where F is the normal force or thrust and A is the area in contact with fluids.

It is a scalar quantity.

Its SI unit is pascal or Nm^{-2}

Its other units are bar, atmosphere.

Q3: Define Archimede's principle. Also give its applications.

Ans: Archimedes' principle:-

It is also called *law of buoyancy.*

It states that when a object or a body is immersed wholly or partially in a fluid, it experiences a buoyant force which is equal to the weight of the fluid displaced by it.

Hence,

Up-thrust $= mg = weight\ of\ fluid\ displaced$.

Apparent weight of the object=true weight of the object – Buoyant force.

Its applications are:

1. It helps in designing submarines.
2. It helps in designing lactometers to check the purity of milk.
3. It helps in designing hydrometers to measure densities of liquids.

Q4: Define 1) density and 2) relative density. Also give their SI units.

Ans: Density:- It is defined as the mass per unit volume.

Or $d = \rho = \frac{m(mass)}{V(volume)}$

It is measured in $kgm^{-3}\ or\ g\ cm^{-3}$.

$$1g\ cm^{-3} = 1000kg\ m^{-3}.$$

Density of water is maximum at 4°C and is equal to $1g\ cm^{-3} or 1000kg\ m^{-3}$.

Relative density:- It is defined as the ratio of the mass of the substance to the mass of an equal volume of water at 4°C.

Or it is defined as the ratio of density of given substance to the density of water at 4°C.

$$R.D = \frac{density\ of\ given\ substance}{density\ of\ water\ at\ 4°C}$$

Relative density has no units; it is just a simple ratio.

Density in $kg\ m^{-3} = R.D \times 1000$

Q5: Give three properties of gravitational force. What are the factors affecting acceleration due to gravity?

Ans: Properties of gravitational force are:

1. These are attractive forces.
2. These are long range forces.
3. These are weakest force in nature.

Factors affecting 'g' are:

1. $g \propto M$ (directly proportional to mass of the planet)
2. $g \propto \frac{1}{R^2}$ (inversely proportional to radius of the planet)
3. g is inversely proportional to height and depth.

Q6: Give difference between acceleration due to gravity and universal gravitational constant.

Ans:

Acceleration due to gravity 'g'	Universal gravitational constant 'G'
It is the constant acceleration acquired by a body under gravity.	It is the constant of proportionality between two masses in the universe.
It changes from place to place.	It remains constant throughout the universe.
It value for earth is 9.8 ms^{-2}	Its value is, G=6.67$\times 10^{-11}$ Nm$^2 kg^{-2}$
It is a vector quantity.	It is a scalar quantity.

Q7: Define Kepler's law of planetary motion.

Ans:

K's 1st law (Law of orbit): It states that all planets revolves around the sun in elliptical orbits.

K's 2nd law (Law of Areas): It states that areal velocity of a planet revolving around the sun is always constant.

K's 3rd law (Law of Time period): It states that square of the time period of rotation of a planet around the sun is proportional to the cube of radius vector drawn from sun to the planet.

5 Marks Questions

Q1: State and prove universal law of gravitation. Also give applications of gravitational force.
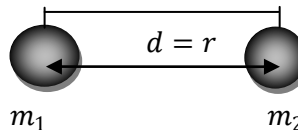
Ans: Newton's law of Gravitation: -

It states that everybody in this universe attracts every other body with a force, which is directly proportional to the product of their masses and inversely proportional to the square of distance from their centers.

Proof: -

Let us consider the two bodies of masses m_1 and m_2 are lying at a distance 'r' from their centers, then

$F \propto m_1 m_2$ --------------------1.

and $F \propto \frac{1}{r^2}$ ----------------2.

Thus from 1 and 2,

We get $F \propto \frac{m_1 m_2}{r^2}$

$F = k \frac{m_1 m_2}{r^2}$, where k=G

or $F = G \frac{m_1 m_2}{r^2}$,

Where G is the universal constant of gravitation $=[G=6.67 \times 10^{-11} \text{Nm}^2 kg^{-2}]$

Applications of gravitational force are:

1. It binds the planets with sun and enables them to rotate around it.
2. It helps in the formation of tides in oceans.
3. It forms the galaxies in the universe.

Q2: Define 1) acceleration due to gravity and 2) free fall. Derive an expression for acceleration due to gravity.
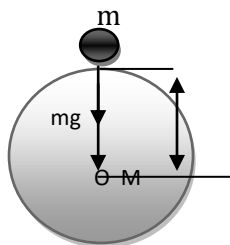
Ans:

Acceleration due to gravity: It is the constant acceleration acquired by the freely falling body under gravity.

Its value is 9.8ms^{-2}

Free fall: It is the motion acquired by a body under gravity.

Expression for 'g':

Let us consider a spherical body of mass 'm' be placed on the surface of the earth having mass 'M' and radius equals to 'R' and F be the force of attraction , then

$F = G\frac{Mm}{R^2}$ -------------------------1. (Acc to Newton's law of gravitation)

And from gravity pull (weight is acting downward), Weight=F'=mg -------------2.

Weight of the body is balanced by gravitational force, so

Weight of an object=gravitational force

$\Rightarrow mg = G\frac{Mm}{R^2}$

$g = \frac{GM}{R^2}$

This shows that 'g' depends upon the mass and the radius of the earth or planet.

If body lies at certain height, then

g (at height h)$= \frac{GM}{(R+h)^2}$

Q3: Define law of floatation. How will you know that a body sinks or floats?

Ans: It states that the body or object placed in a liquid floats only when the weight of the liquid displaced by its immersed portion is equal or greater to its weight.

Effect of density of the objects or bodies with the liquid:

(a) If density of fluid is greater than the density of the body, body will floats partially immersed.

(b) If the density of fluid is smaller than the density of body, body will sink.

(c) If the density of fluid is equal to the density of body, then body will float wholly/completely immersed.

Density	Floats/sinks
If $\rho_l > \rho_b$	Body floats partially immersed
If $\rho_l < \rho_b$	Body sinks
If $\rho_l = \rho_b$	Body floats wholly immersed.

Sub: Chemistry
Topics: Matter in our surroundings

Is Matter Around us Pure.

Q1. A drop of ink and a drop of honey are placed in water in different beakers. Which of the two will spread faster? Give reason for your answer.

Ans. Ink will spread faster as compared to honey. The density of honey is more than that of ink. Therefore, particles in ink diffuse faster as compared to the particles in honey.

Q2. A rubber band can change its shape on stretching; will you classify it as solid or not? Justify your answer.

Ans. Yes, it can be classified as a solid. It is an elastic solid which changes its shape on stretching and regains the same when the stretching force is removed.

Q3. A diver is able to cut through water in a swimming pool. Which property of matter does this observation show?

Ans. The observation explains the following properties of water:

   i) The inter particle forces of attraction are not very strong in water.

   ii) The inter particle spaces are somewhat large in water.

Q4. Why does a gas fill completely the vessel in which it is kept?

Ans. This happens due to the fast diffusion of the particles of a gas. The number of vacant spaces in the gaseous state is very large. Thus, the gas molecules move very fast with random motion and fill completely the vessel in which it is kept.

Q5. Why should we call a wooden table a solid?

Ans. We call a wooden table a solid because it matches the characteristics of the solid state:

   i) It is very hard and rigid.

   ii) It has high density.

   iii) There is no movement of particles.

   iv) It's shape does not change.

Q6. A gas exerts pressure on the walls of the container. Assign reason.

Ans. The molecules of gas have high kinetic energy. They strike the walls of the container with certain force and impart some momentum to them. The force per unit area is responsible for the pressure of the gas.

Q7. Liquids generally have low density as compared to solids. But you must have observed that ice floats on water. Find out why?

Ans. We observe that the ice floats on water. Actually, ice has a cage like structure which means that vacant spaces are left when H_2O molecules are linked in ice. The number of these spaces are comparatively less in water. Therefore, water is dense as compared to ice.

Q8. Suggest a method to liquefy atmospheric gases.

Ans. The atmospheric gases can be liquefied either by increasing pressure or by decreasing temperature.

Q9. Why can we sip hot tea from a saucer faster than from a cup?

Ans. Since the surface area of saucer is more, the evaporation becomes faster. As a result, the temperature of the tea in the saucer falls and we can sip the same comfortably.

Q10. Convert the following temperatures to Celsius scale:

    i) 293 K   ii) 470 K

Ans. i) $(293-273) = 20^0C$ ii) $(470-273) = 197^0C$

Q11. What is the physical state of water at:

    a) 25^0C b) 0^0C c) 100^0C

Ans. a) At 25^0C , water is in the liquid state.   b) At 0^0C , water can exist both in solid and in liquid state . c) At 100^0C , water can be present in both liquid and vapour states.

Q12. Arrange the following substances in increasing order of attraction between the particles: water, sugar ,oxygen.

Ans. oxygen $<$ water $<$ sugar.

Q13. Ice at 273K causes more cooling than water at the same temperature. Explain.

Ans. Ice has extra energy in the form of latent heat of fusion as compared to water. When ice is to melt, it takes energy from the surroundings to overcome this latent heat. As a result, the temperature of the surroundings gets lowered. Since water is already in the liquid state, it will hardly take up any energy from the surroundings.

Q14. Why does steam produce more severe burns on the skin as compared to boiling water?

Ans. Steam is formed when water at it's boiling point temperature of 100^0C absorbs latent heat of vaporisation. Therefore, steam has more energy than boiling water. Hence, steam produces more severe burns on the skin as compared to boiling water.

Q15. Name the term used for the following:

 (i) Conversion of vapours to solid   (ii) Conversion of solid to liquid   (iii) Conversion of vapours to liquid.

Ans: i) Freezing or solidification   ii) Melting   iii) Condensation.

Q16. List points of difference between homogeneous and heterogeneous mixtures.

Ans.

Homogeneous mixture	Heterogeneous mixture
1. The constituents are uniformly mixed and have no boundaries of separation.	The constituents may not be uniformly mixed and have clear boundaries of separation.
2. The constituents cannot be easily seen.	The constituents can be easily seen.
3. The constituents cannot be easily separated.	The constituents can be easily separated.
Example: Air is an example of homogeneous mixture.	**Example**: Mixture of iron filings and sulphur powder is an example of heterogeneous mixture.

Q17. Name the technique to separate

    i) butter from curd   ii) salt from sea water   iii) camphor from salt

Ans. i) Centrifugation   ii) crystallisation or evaporation   iii) sublimation.

Q18. Classify the following into physical and chemical changes.

  i) Cutting of trees   ii) Melting of butter in a pan   iii) Rusting of almirah

  iv) Boiling of water to form steam   v) Passing of electric current through water and the water breaking down into hydrogen and oxygen gases   vi) Dissolving common salt in water   vii) Making of fruit salads with raw fruits   viii) Burning of paper and wood.

Ans. i) Chemical change   ii) Physical change   iii) Chemical change

    iv) Physical change   v) Chemical change   vi) Physical change

    vii) Physical change   viii) Chemical change.

Q19. a) Classify Brass and Diamond as element and mixture.

    b) How is a chemical change different from a physical change?

Ans. a) Brass is a mixture of 30% Zn and 70% Cu whereas, Diamond is an element made up of carbon.

    b) Physical change involves change of state only and no new substance is formed. eg, melting point, boiling point, density, etc. Chemical change involves the formation of new substance having different chemical composition. e.g, $Fe + S \longrightarrow FeS$

Q20. A solution contains 60g of sugar in 480g of water. Calculate the concentration of solution in terms of mass by mass percentage of the solution.

Ans.   Mass of sugar (solute) = 60g

           Mass of solvent (water) = 480g

           Mass of solution = (60+480) = 540g

   Concentration in terms of mass by mass percentage = $\dfrac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$

$$= \underline{60g} \times 100 \quad = \quad 11.1 \text{ \%}$$
$$540g$$

Q21. How would you confirm that the colourless liquid given to you is pure water?

Ans. This can be confirmed by the following experiments:

    i)   Filter the colourless liquid through a filter paper. If no residue is left on the filter paper, this means that the liquid is pure water.

    ii)   Evaporate the colourless liquid in a beaker. In case no residue is left, this means that it is pure water.

    iii)   If the boiling point of the liquid comes out equal to 373K, this means that the liquid is pure water.

Q22. Which of the following will show " Tyndall effect" ?

    a) Salt solution

    b) Milk

    c) Copper sulphate solution

    d) Starch sol.

Ans. Tyndall effect is shown by colloidal sol. Since milk and starch sol are colloidal sol therefore, these will show Tyndall effect.

Q23. Classify the following into elements, compounds and mixtures:

    a)Sodium   b) Soil   c) Sugar solution   d) Silver   e) Calcium carbonate

    f) Tin   g) Silicon   h) Coal i) Air j) Soap k) Methane   l) Carbon dioxide

    n) Blood.

Ans. Elements: Sodium, Silver, Tin and Silicon.

     Compounds: Calcium carbonate, Methane, Carbon dioxide.

     Mixtures: Soil, Sugar solution, Coal, Air, Blood, Soap.

Q24. a)Why is crystallisation technique better than evaporation?

    b) Write any two physical properties of each of metals and non metals.

    c) Name the technique used to separate butter from curd.

Ans. a) Crystallisation is considered better because during evaporation certain solids may decompose or may get charred ,e.g. sugar.

    b) i)Metals have a shining surface known as lustre.

      ii)Metals are malleable and ductile.

      iii)Non metals are mostly poor conductors of electricity.

      iv)Non metals are generally soft.

    c) Butter can be separated from curd by the process of centrifugation.

Q25. What is saturated solution? What happens when a saturated solution is heated?

Ans. A solution is said to be saturated if no more of a solute can dissolve in it at a given temperature. A saturated solution becomes unsaturated upon heating.

Q26. State one instance where water undergoes a physical change and one in which it undergoes a chemical change.

Ans. Physical change: Evaporation of water or freezing of water.

    Chemical change: Electrolysis of water.

Q27. List any three differences between true solution and suspension.

Ans. True solution: a) The particle size is so small that these cannot be seen by naked eyes.

                    b) The particles can pass through the filter paper.

                    c) These solution are quite stable.

Suspension: a) The particle size is so large that these can be easily seen by naked eyes.

b) The particles cannot pass through the filter paper.

c) The suspension are unstable.

Q28. How will you separate a mixture of common salt, camphor and iron filings?

Ans. Iron filings are first separated with the help of a magnet. Camphor is separated from the the remaining mixture with the help of sublimation process leaving behind common salt.

Q29. Which of the following materials fall in the category of pure substances.

a) Ice   b) Milk   c) Iron   d) Hydrochloric acid   e) Calcium oxide   f) Mercury g) Brick

h) Wood   i) Air

Ans. Pure substances are: a) Ice (compound)   c) Iron (element)   e) Calcium oxide (compound)

f) Mercury(element) .

Q30. What types of mixtures can be separated by technique known as crystallisation?

Ans. The solid mixtures in which one component or impurity is less soluble in a particular solvent as compared to the other. For example, impure samples of copper sulphate, potassium nitrate, potash alum etc. can be purified by the method.

Subject: Biology

CHAPTERS: 1. The Fundamental Unit Of life.

        2. Tissues

        3.Improvement in Food Resources

        4.Why do we fall ill?

Q1.Make a comparison and write down ways in which plant cells are also different from animal cells.
Answer:

Plant Cell	Animal Cell
1. Plant cells have cell wall.	1. Animal cells don't have a cell wall.
2. They contain chloroplast.	2. They don't have chloroplasts.
3. They do not have centriole.	3. Centriole is present in them.
4. Vacuole is large and present in centre of the cell.	4. Vacuole is small.
5. Nucleus is present in the side of the plant cell.	5. Nucleus is present in the centre of the animal cell.

Q2. How is prokaryotic cell different from a eukaryotic cell?
Answer: Prokaryotic cell is generally smaller in size (1-10 pm), nuclear region is poorly defined, the cell organelles are not membrane-bound and has a single chromosome.
Eukaryotic cell is generally larger in size (5-100 pm), nuclear region is well defined with nuclear membrane. Membrane-bound cell organelles are present and has more than one chromosome.

Q3. State two conditions required for osmosis.
Answer: (i) The difference in the concentration of water, one should have higher concentration than the other.
(ii) Semi-permeable membrane is also required through which water will flow.

Q4. What is plasmolysis?
Answer: When a living plant cell loses water through osmosis there is shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is known as plasmolysis.

Q5. How does fungi and bacteria can withstand much greater changes in the surrounding medium than animal cells?
Answer: The cell wall present in fungi and bacteria permits these cells to withstand very dilute external medium without bursting.
The cells take up water by osmosis, swells, and builds the pressure against the cell wall. The wall exerts an equal pressure against the swollen cell. It is because of the cell wall, such cells can withstand much greater changes in the surrounding medium than animal cells.

Q6. Give the function of nuclear membrane.
Answer: The nuclear membrane present as outer covering in the nucleus allows the transfer of material inside and out of the nucleus to cytoplasm.

Q7. Name the cell-organelles that have their own DNA and ribosomes.
Answer: The cell organelles with their own DNA and ribosomes are mitochondria and plastids.

Q8. State the difference between smooth endoplasmic reticulum and rough endoplasmic reticulum.
Answer:

Smooth Endoplasmic Reticulum	Rough Endoplasmic Reticulum
1. It looks smooth.	1. It looks rough.
2. SER helps in the manufacture of fat molecules or lipids.	2. Ribosomes are attached to RER which synthesise proteins.

Q9. What is endocytosis?
Answer: The cell membranes flexibility allows the cell engulf in food and other material from its external environment. This process is known as endocytosis. E.g., Amoeba acquires its food through such processes.

Q10. What is the function of vacuoles?
Answer: Vacuoles are storage sacs for solid or liquid content. In plant cells it provides turgidity and rigidity to the cell. In single-celled organisms vacuoles store food, e.g., Amoeba.

Q11. Which tissues are present at the nodes of the plants?
Answer: Intercalary tissue.

Q12. What are the various types of blood cells?
Answer: There are three types:
(a) RBC's
(b) WBC's and
(c) Platelets.

Q13. What are tracheids?
Answer: They are elongated cells with tapering ends.

Q14. What are guard cells?
Answer: Each stomata is bounded by a pair of specialized kidney-shaped epidermal cells called guard cells.

Q15. What are the functions of cuboidal epithelium?
Answer: It helps in absorption, excretion, secretion, it also provides mechanical support.

Q16. Give four differences between bone and cartilage.
Answer:

Bone	Cartilage
1. Hard and non-flexible	1. Flexible not very hard
2. Porous	2. Non-porous
3. Blood vessels present	3. Blood vessels absent
4. Matrix made up of protein and mineral salts.	4. Matrix made up of proteins.

Q17. Give the functions of bone.
Answer: The functions of bone are:
(i) It provides shape to the body.
(ii) It provides skeletal support to the body.
(iii) It anchors the muscles.
(iv) It protects the vital body organs like brain, lungs, etc.

Q18. Give the functions of cartilage. .
Answer: (i) It provides support and flexibility to the body parts.
(ii) It smoothens surface at joints.

Q19. Give difference between xylem and phloem.
Answer:

Xylem	Phloem
1. It consists of mainly dead elements. 2. It conducts water and minerals. 3. It provides mechanical strength to the plant.	1. It consists of mainly living elements. 2. It conducts food. 3. It does not provide mechanical strength to the plant.

Q20. What are fibres?
Answer: Fibres consist of very long, narrow and thick cells. Example, jute fibre.

Q21. Name the tissues for the following:
(a) Stores fat in animal body.
(b) Divides and re-divides to grow in plants.
(c) Tissue that joins hone to hone.
(d) Covers the external surface of animal body.
Answer: (a) Adipose tissue
(b) Meristematic tissue .
(c) Ligament
(d) Epithelial tissue.

Q22. What is stomata?
Answer: Stomata are small pores present on the surface of a leaf which helps in the exchange of gases and in transpiration.

Q23. Why does epidermal tissue have no intercellular space?
Answer: The epidermal (layer) tissue forms a protective outer covering for the plants and it protects the internal parts of the plant. It aid in the protection against loss of water, mechanical injury and invasion by parasitic fungi.
For this protective role to play the continuation of cells is necessary, hence it does not have intercellular space.

Q24. Name and give the function of each cell of xylem:.
Answer: Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibres.
Tracheids and vessels—Allows the transport of water and minerals.
Xylem parenchyma—Stores food and helps in the sideways conduction of water.
Xylem fibres—Are supportive in function.

Q25.Give difference between ligament and tendon.
Answer:

Ligament	Tendon
1. Ligament helps in connecting bone to bone.	1. Tendon helps in connecting bone to muscles.
2. It is elastic and flexible.	2. It is strong and non-flexible.

Q26. What are the main characters required in a crop during its improvement practices?
Answer: The useful characters that are required in a crop during its improvement:
(a) Disease resistance (b) Response to fertilizer
(c) Product quality and (d) High yield.

Q7. State the difference between macro-nutrients and micro-nutrients.
Answer:

Macro-nutrients	Micro-nutrients
1. These are required by crops in larger quantity.	1. These are required by crops in very small quantity.
2. **Six** macro-nutriets are: Nitrogen, phosphorus, potassium, calcium, magnesium and sulphur.	2. **Seven** micro-nutrients are : Iron, manganese, boron, zinc, copper, molybdenum and chlorine.

Q28. State the difference between manure and fertilizer.
Answer:

Manure	Fertilizer
1. It consists of organic matter.	1. It consists of inorganic matter.
2. Prepared from animal excreta and plant waste.	2. It is prepared commercially from chemicals.
3. Its use causes no pollution.	3. It causes pollution in soil and water.

Q29. What is organic farming?
Answer: It is the farming in which no chemical fertilizers, pesticides or herbicides are used. But uses all organic matter for its growth like manure, neem leaves as pesticides and for grain storage.

Q30. State the preventive and control measures used before grains are stored.
Answer:

- Cleaning of the grains
- Proper drying of the produce in sunlight, there should be no moisture.
- Fumigation of produce using chemicals that kills pest.

Q31.Name few varieties of bees used for commercial honey production.
Answer:
Apis cerana indica – Indian bee
A. dorsata – rock bee (local varieties)
A. florae – the little bee
A. mellifera – Italian bee variety

Q32. How are crops useful to us? What do they provide?
Answer: Crops provide us food for our daily body nutrient. Carbohydrate for energy
requirement – Cereals such as wheat, rice, maize.
Protein for body building — Pulses like gram, lentil
Fats for energy — Oil seed like mustard, sunflower
Vitamins and minerals — From vegetables, spices and fruits
Fodder crops — For livestocks

Q33. What are the factors for which variety improvement of crop is done?
Answer:
(a) Higher yield: It increases production of crop.
(b) Biotic and abiotic resistance: Crop should be resistant to biotic factors
like diseases, insects, pests and abiotic factor like drought, salinity, heat, cold, frost and water logging.
(c) Change in maturity duration: Short-duration maturity allows farmer to grow more crops in a year and
reduces the cost of crop production.
(d) Wider adaptability: Crop'should be able to adapt to changing environmental conditions.
(e) Desirable agronomic characteristics: The tallness and dwarfness of crop. Dwarfness is required for
cereals, so that less nutrients are consumed.

Q34. Name the sources and the nutrients supplied by them to the plants.
Answer:

Source	Nutrients
Air	Carbon, oxygen
Water	Hydrogen, oxygen
Soil	**Macro-nutrients** (six)
	Nitrogen, phosphorus, potassium, calcium, magnesium, sulphur
	Micro-nutrients (seven)
	Iron, manganese, boron, zinc, copper, molybdenum, chlorine

Q35. What are manures? Give its classification.
Answer: Manures contain large ' quantities of organic matter and supplies small quantities of nutrients to the
soil. It is prepared naturally by the decomposition of animal waste, excreta and plant waste.

- It helps in the soil enrichment with nutrients.
- It helps in improving the soil structure.
- It helps in increasing the water holding capacity in sandy soils.
- In clayey soils it helps in the water drainage and prevent water logging. Manure is classified based on
  the kind of biological material used to make it as : (i) Compost (ii) Vermi-compost (iii Green manure
  (i) Compost: The farm waste and livestock excreta, along with vegetable waste, sewage waste, weeds,
  straws etc. are allowed to decompose in a pit is called compost. The compost is rich in nutrients.
  (ii) Vermi-compost: When the above given matter is allowed to decompose in the pit along with some
  earthworms, the decomposition speeds up and is called vermi-composting.
  (iii) Green manure: Some plants like sun-hemp or guar are grown and then mulched by ploughing them
  into the soil. This is done before the sowing of crop seeds into the field.
  These green plants present in the soil acts as green manure which enriches the soil in nitrogen and
  phosphorus.

Q36. What are fertilizers? Excess use of fertilizers is not advisable, explain?
Answer: Fertilizers are obtained artificially on commercial basis. It is a chemical which contains the nutrients
required for the crop to grow. Fertilizers supply various nutrients as they are nutrient specific e.g.-urea provides

nitrogen. Mixed fertilizer provides any two mixture of nutrients. They are expensive but their use yield large production hence are a factor of high cost farming.

Excessive use of fertilizers are not advisable as:

(a) It leads to soil and water pollution.

(b) It can destroy the fertility of soil. As the soil is not replenished, micro-organisms in the soil are harmed by fertilizers.

Q37Give different methods of weed control.

Answer: Weeds can be controlled by different methods:

(a) Weedicides: These are the chemicals sprayed on the weeds to kill them. Excessive use is poisonous and causes environmental pollution.

(b) Mechanical removal: In this method weeds are uprooted by removing manually or by machines.

(c) Preventive methods: Proper seed bed preparation, timely sowing of crops, intercropping and crop rotation helps in weed control.

Q38. What is a disease? Classify disease based on duration and infection cause.

Answer: Disease can be defined as the state of human health which is not at ease is not comfortable. During disease, the functioning or appearance of one or more systems of the body changes.

Classification:

(a) Based on duration:

Acute diseases: Diseases that last for only short period of time. Example, headache, common cold etc.

Chronic diseases: Diseases that last for long time is called chronic disease Example, tuberculosis.

(b) Based on cause: Disease can be grouped as infectious/communicable disease and non-infectious or non-communicable disease.

Infectious diseases: These diseases are caused due to microbes and can spread from one person to another.

Non-infectious diseases: These type of diseases do not spread in the community, but remains internal. Example, cancer, genetic abnormalities.

Q39. What are the different ways used for the treatment and prevention of diseases?

Answer: Principles of treatment for diseases are:

(1) To reduce the effect of the diseases.

(2) To kill the cause of the disease i.e., to kill the microbes like bacteria, fungi, protozoa.

Principles of prevention are:

(a) General ways: It relate to preventing exposure to the microbes. This can be done in following ways:

1. **For avoiding air-borne infections—**Avoid visiting public place, cover your nose and mouth while sneezing or coughing
2. **For water-borne infection—**Drink safe, clean and boiled water.
3. **For vector-borne diseases—**Keep the surroundings clean, keep food and water covered and clean. Do not allow any water to stand as it becomes a breeding ground for mosquitoes.
4. **Self immunity—**It is self-defence mechanism in our system that can fight off and kill microbes that enter our body.

(b) Specific ways—By giving vaccines, childhood immunisation that is given to children for preventing infections and diseases.

Q40. State the mode of transmission for the following diseases:

Malaria, AIDS, Jaundice, Typhoid, Cholera, Rabies, Tuberculosis, Diarrhoea, Hepatitis, Influenza.

Answer:

SL. No.	Diseases	Mode of transmission

1.	Malaria	Mosquito bite (female Anopheles mosquito carries protozoa)
2.	AIDS	Infected blood, semen, mother's milk, from mother to foetus.
3.	Jaundice	Contaminated water.
4.	Typhoid	Contaminated food and water.
5.	Cholera	Contaminated food and water.
6.	Rabies	Bite of rabid animal.
7.	Tuberculosis	Cough and sneeze droplets.
8.	Diarrhoea	Contaminated food and water.
9.	Hepatitis	Contaminated food and water.
10.	Influenza	Cough and sneeze droplets.

Q41. State two main causes of disease.
Answer: Two main causes of disease are immediate cause and contributory cause. Immediate cause: This is due to the organisms that enter our body and cause disease. Example, virus, protozoa, bacteria.
Contributory cause: These are the secondary factors which lead these organisms to enter our body. Example, dirty water, unclean surrounding, contaminated food etc.

Q42. Define vaccine and name two vaccines.
Answer: Vaccine is a chemical /drug given in advance to a body to give immunity against certain diseases.
Vaccines given to children are:
(a) BCG—for tuberculosis prevention
(b) Polio drops—for polio prevention

Q 43. What is antibiotic penicillin? Give its function.
Answer: Penicillin antibiotic blocks the bacterial processes that build the cell wall. Due to this drug, the bacteria is unable to make a protective cell wall and dies easily. It is used to cure the diseases and infections caused by bacteria.

Q44. Bacteria is a cell, antibiotics can kill these bacteria (cell), Human body is also made of cells how does it affect our body?
Answer: Antibiotics block the biochemical pathway of bacteria by which it makes a protective cell wall around it. Antibiotic does not allow the bacteria to make this cell wall because of which they die.
Human body cell don't make any cell wall so antibiotics cannot have any such effect on our body.

Q45. How does cholera becomes an epidemic in a locality?
Answer: Cholera is an infectious disease that spreads due to unsafe water. It can spread in a locality; if a person suffering from cholera lives in the locality and
the excreta of this person, get mixed with the drinking water used by people living nearby. The cholera-causing microbe enters the new hosts through the water they drink and cause disease in them.

Q46. Name the organs affected due to the following diseases:
Malaria, jaundice, Japanese encephalitis, typhoid.
Answer:

1. **Malaria:** Infects liver and red blood cells
2. **Jaundice:** Infects the liver.
3. **Japanese encephalitis:** Infects the brain

4. **Typhoid:** Infects blood.

Q47. Why can't we make antiviral medicines/drugs?
Answer: The viruses lie on the border line of living and non-living organisms. The viruses can live, grow and multiply only inside the host body. They cannot be grown or cultured and their .biological pathways cannot be affected. Hence, the antiviral medicines/drugs is difficult to make.

Q48. Write a short note on malaria as a disease, its symptoms and control.
Answer: Malaria is caused by protozoa that lives in blood. This parasite enters our body through a female Anopheles mosquito bite which is the vector, visits water to lay eggs, the protozoa enters our blood stream when female mosquito bites us. This protozoa affects our liver and red blood cells.
Symptoms: Very high fever with periodic shivering, headache and muscular pain. –
Control: Use of quinine drug, keeping the surroundings clean with no stagnant water, use of mosquito repellent creams, nets, can control the spread of this disease.

**Q49. What is AIDS? How does a person get affected with HIV?**
Answer: AIDS is Acquired Immuno Deficiency Syndrome, it is caused due to HIV— human immuno deficiency virus. This virus reduces the immunity of human body. Therefore if any microbe enters the body of a person it causes disease killing the person.
The virus is transmitted from infected person to other person by any of the following way:
(a) Blood transfusion.
(b) From mother (infected) to baby in the womb.
(c) From mother's milk to lactating baby.
(d) By sexual contact.
(e) Sharing of needle with an infected person.

Q50. Give the common methods of transmission of diseases.
Answer:
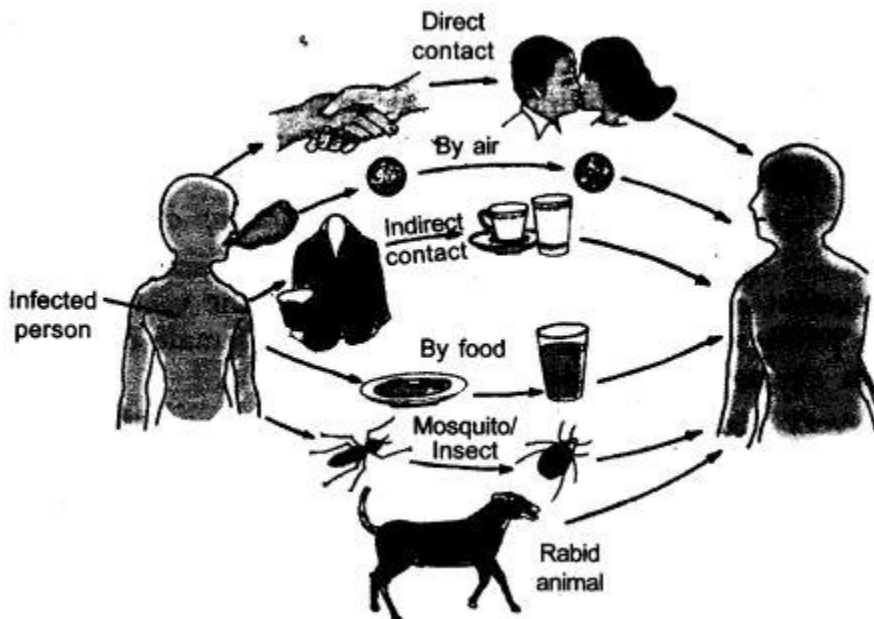
The common methods of transmission of diseases are:
(1) By air – cough, cold, tuberculosis
(2) By food and water – typhoid, jaundice
(3) By mosquito bite – malaria
(4) By rabid animal – rabies

(5) By direct contact – skin infection, small pox, AIDS
(6) By indirect contact – typhoid, chickenpox