

PHYSICS 9th

REVIEW QUESTIONS NOTES (ACCORDING TO ALP)

Name:_____

Roll No:_____ **Section:**_____

Chapter # 1 (Physical quantities and measurement)

Short Questions

- Write short answers of the following questions:

1.2. What is the difference between base quantities and derived quantities? Give three examples in each case.

(RWP, FB 15-II) (LHR 09-I) (BP 12-I) (BP II-II)

Ans:

Base quantities	Derived quantities
<ul style="list-style-type: none">• Base quantities are the quantities on the basis of which other quantities are derived. <p>Example:</p> <p>Length, mass, time, electric current, temperature, intensity of light and amount of substance.</p>	<ul style="list-style-type: none">• The quantities that are expressed in terms of base quantities are called derived quantities. <p>Example:</p> <p>Volume, speed, force, work, energy, power and electric charge.</p>

1.3. Pick out the base units in the following:

Joule, Newton, Kilogram, Hertz, Mole, Ampere, Metre, Kelvin, Coulomb and Watt.

Ans: **Base Units:** Kilogram, mole, ampere, metre and kelvin and the base units.

1.4. Find the base quantities involved in each of the following derived quantities.

(a) Speed (b) Volume (c) Force (d) Work

Ans: **Speed:** Derived from "Length and time".

Volume: Derived from "Length".

Force: Derived from "Mass, length and time".

Work: Derived from "Mass, length and time".

1.5. Estimate your age in seconds. (MN 13-I) (LHR, FB, DG 14 I-II)

Ans: My age is 17 years old. So,

1 year = 365 days

1 day = 24 hours

1 hr = 60 min

1 min = 60 sec

Total seconds in one year = $365 \times 24 \times 60 \times 60$ sec
= 31536000 sec

Total seconds in 17 years = 17×31536000

My age in seconds = 536112000 sec

1.6. What role SI units have played in the development of science? (AK 14-II) (LHR 13-I) (BP 08-I) (GW 10-I)

Ans: SI units have brought consistency and uniformity in calculation and results. SI units are very helpful to exchange scientific and technical information at the international level.

1.7. What is meant by Vernier constant? (FB, MN, LHR 14-II) (SW, MN 13 I-II) (RWP 12-I) (GW 09-I, 10-I)

Ans: The least count of Vernier calipers is known as Vernier constant.

Vernier Constant: It is ratio between smallest reading on main scale to the total division on Vernier scale.

OR

The difference between one small division on main scale and one Vernier scale division.

Formula:

$$\text{Vernier Constat} = \frac{\text{Smallest reading on main scale}}{\text{Total no. of divisions on vernier scale}}$$

1.8. What do you understand by the zero error of a measuring instrument?

(AK 14-I) (LHR 14-II) (LHR II-I) (GW 10-II)

Ans: When zero of Vernier scale does not coincide with zero of main scale, then instrument has “zero error”.

1.9. Why is the use of zero error necessary in a measuring instrument? (LHR 13-I)

Ans: Zero error is necessary in measuring instrument to obtain an extreme correct value.

1.10. What is a stopwatch? What is the least count of a mechanical stopwatch you have used in the laboratories? (RWP 13-I) (FB, BP 15-I) (GW 08-II) (GW 10-I)

Ans: **Stopwatch:** “Stopwatch is a device used to measure the time interval of an event”.

Least count: Mechanical stopwatches have least count up to 0.1 second.

1.11. Why do we need to measure extremely small interval of times? (RWP 13-I) (BP 08-I) (AK 15-I)

Ans: We need to measure extremely small interval of times to calculate the time intervals of natural and artificial events. As in nature and also in physics, there are so many phenomenon which vary with respect to the small intervals of time.

1.12. What is meant by significant figures of a measurement?

(RWP 12-II)

Ans: **Significant figures:** “All the accurately known digits and the first doubtful digit in an expression are called significant figures”.

Significant figures reflects the precision of a measure value of a physical quantity.

1.13. How is precision related to the significant figures in a measured quantity?

(SW, AK 14-I) (GW, RWP, SG 13-I-II)

Ans: An improvement in the quality of measurement by using better instrument increases the significant figures in the measured results. The significant figures are all accurately known digits and the one estimated digit.

(AK, SW 14-I) (RWP 15-I) (BP II-I)

Chapter # 2 (Kinematics)

Short Questions

2.4. Define the terms speed, velocity and acceleration.

(BP 15-I)

Ans: **Speed (V):** Rate of change of position with time is called speed. Its unit is ms^{-1} .

Velocity (V): Rate of change of displacement is called velocity. Its unit is ms^{-1}

Acceleration (a): Rate of change of velocity is called acceleration. Its unit is ms^{-2}

2.5. Can a body moving at a constant speed have acceleration?

Ans: yes, a body moving at constant speed has acceleration if it changes its direction or moving in a circular path.

2.6. How do riders in a Ferris wheel possess translatory motion but not rotatory motion?

Ans: In rotatory motion, the line, about which a body moves, is passing through the body itself. Here, riders in Ferris wheel have circular motion (a type of translatory motion) because the line about which wheel riders go around, lies outside the body.

2.7. Sketch a distance time graph for a body starting from rest. How will you determine the speed of a body from this graph?

Ans: The shape of graph is as shown in fig.

From figure

i.e. slope of this graph = speed

2.8. What would be the shape of a speed-time graph of a body moving with variable speed?

Ans: The shape of velocity time graph is zigzag i.e. not a straight line, when the body is moving variable speed.

2.9. Which of the following can be obtained from speed-time graph of a body? (AK, RP 13-II)

(a) Initial speed. (b) Final speed. (c) Distance covered in time t.
(d) Acceleration of motion.

Ans: All the above quantities can be obtained from speed-time graph of a moving body.

2.10. How can vector quantities be represented graphically? (SW 14-II) (GW, RWP, LHR 14-I) (LHR 09-II) (RWP 10-I)

Ans: Vectors are graphically represented by a straight line with an arrow head. The length of a line shows magnitude and arrow head tells about direction.

2.13. Derive equations of motion for uniformly accelerated rectilinear motion. (SG, GW 14-II)

Ans: PTB page 45-46

Chapter # 3 (Dynamics)

Short Questions

• Write short answers of the following questions:

3.2. Define the following terms: (AK, SW 13-I) (DG, MN, FB 14-I) (GW 08-I) (BP 10-I, 15-I) (FB 15-II)

(a) Inertia (b) Momentum (c) Force
(d) Force of friction (e) Centripetal force

Ans: **Inertia:** (AK, SW 13-I) (DG, MN, FB 14-I) (GW 08-I) (BP 10-I, 15-I) (FB 15-II)

Inertia of a body is its property due to which it resists any change in its state of rest or motion.

Momentum: (MN 13-I) (DG, SG, LHR 14-II) (LHR 15-I) (AK 08-I)

Momentum of a body is the quantity of motion possessed by the body. Momentum of a body is equal to the product of its mass and velocity.

Formula: $P = mv$

Unit: Ns or kgms^{-1} .

Force: (AK, SW, FB 14-II) (LHR 09-I) (FB 15-II) (RWP, FB, BP 15-I)

A force is push or pull. It moves or tends to move, stops or tends to stop the motion of a body. The force can also change the direction of motion of a body.

Unit: Its SI unit is kgms^{-2} .

Force of friction: (FB 14-II)

The force that opposes the motion of moving objects is called friction.

Centripetal force: (BP, SG 14-I-II) (RWP, LHR, BP 15-I)

The force which keeps the body to move in a circular path is called the centripetal force.

$$F_c = \frac{mv^2}{r}$$

3.3. What is the difference between:

- (a) Mass and weight
- (b) Action and reaction
- (c) Sliding friction and rolling friction

Ans: **Mass and weight:**(LHR, MN 14-II) (SG 14-I) (LHR 15-I)

Mass (m)	Weight (w)
<ul style="list-style-type: none"> Mass of a body is the quantity of matter that it possesses. Mass is a scalar quantity. 	<ul style="list-style-type: none"> Weight of the body is equal to the force with which Earth attracts it. Weight is a vector quantity.
Action and reaction: (RWP 13-I) (SW 08-I, 15-I) (BP 09-I)	
Action	Reaction
<ul style="list-style-type: none"> It is a force that is exerted by body on other body. <p>Example: Let force of A on the other body B is called action force.</p>	<ul style="list-style-type: none"> It is also a force which is exerted by the other body on first one. <p>Example: Let force of B on the first body A is called reaction force.</p>

Sliding friction and rolling friction:(SW 14- (RWP, FB 15-II) (SW 12-I)

II) Sliding friction	Rolling friction
<ul style="list-style-type: none"> A force between the sliding objects which opposes the relative motion between them is called sliding friction. 	<ul style="list-style-type: none"> Rolling friction is the force of friction between a rolling body and the surface over which it rolls.

3.4. What is the law of inertia? (LHR, FB, MN 14-I) (MN 14-II) (SG, SW 13-II)

Ans: **Law of inertia:** Newton's first law of motion deals with the inertial property of matter, so *Newton's first law of motion is also known as law of inertia.*

Statement: "A body continues its state of rest or of uniform motion in a straight line provided no net force acts on it".

3.5. Why is it dangerous to travel on the roof of a bus? (AK 10-I) (RWP 09-I) (SW 12-I)

Ans: If a person travels on the roof of a bus, it would be dangerous because when a bus takes a sharp turn, passengers fall in the outward direction. It is due to inertia that they want to continue their motion in a straight line and thus fall outwards.

3.6. Why does a passenger move outward when a bus takes a turn? (SW 10-I) (BP 12-I) (GW 09-I)

Ans: When a bus takes a sharp turn, passengers fall in the outward direction. It is due to inertia that they want to continue their motion in a straight line and thus fall outwards.

3.7. How can you relate a force with the change of momentum of a body? (FB, AK 14-I) (MN, RWP 14-II) (FB, LHR, BP 15-I) (SW 09-I)

Ans: When a force acts on a body. It produces acceleration in the body and will be equal to the rate of change of momentum of the body. We can write it as:

Change in momentum = final momentum – initial momentum

$$P_f - P_i = mv_f - mv_i$$

Thus, rate of change in momentum is given by:

$$\frac{P_f - P_i}{t} = m \frac{v_f - v_i}{t}$$

(BP 12-I) (BP, MN 14-I) (LHR, FB 14-II) (SW, AK, SG 13-II) (LHR, MN 13)

And Newton's second law of motion tells us that

$$F = ma$$

By putting the value of F in eq. (i)

$$\frac{P_f - P_i}{t} = F$$

3.8. What will be the tension in a rope that is pulled from its ends by two opposite forces 100N each? (SW 14-I) (MN 15-I) (AK 09-II)

Ans: When two forces of 100N, each are applied on a string, then the resultant tension is 100N.

3.10. A horse pulls that cart. If the action and reaction are equal and opposite then how does the cart move? (GW 12-I) (LHR 09-II)

Ans: The horse applies action by feet on the road, the reaction is given by road on horse, due to which horse moves. The cart, which is tied with the horse, also moves. Since, action and reaction never acts on same body, so the cart moves.

3.9. Action and reaction are always equal and opposite. Then how does a body move? (SW 14-I) (SW 15-I) (LHR 10-I) (GW 10-II)

Ans: According to *Newton's third law of motion*, *action and reaction are always equal and opposite in direction*. But action and reaction forces always act on different bodies, so they do not cancel the effect of each other, and under the condition of forces the body moves irrespective to this, that action and reaction are equal but opposite in direction.

3.11. What is the law of conservation of momentum? (MN, BP 13-I) (BP 14-II) (MN 14-I) (RWP 12-I) (FB, RWP 15-II)

Ans: **Law of conservation of momentum:** "The momentum of an isolated system of two or more than two interacting bodies remains constant."

Examples: Firing a bullet, release of air from balloon.

3.13. When a gun is fired, it recoils. Why? (BP 14-I) (RWP 14-II) (MN 13-I) (FB 15-I)

Ans: As the gun is fired, bullet shoots out of the gun and acquires some momentum. To conserve the momentum of the system, the gun recoils.

3.12. Why is the law of conservation of momentum important? (BP, RWP 09-I) (LHR 12-I)

Ans: By using law of conservation of momentum, it is possible to calculate force, velocity, and acceleration of a body. Most of elementary particles are discovered by the use of this law.

3.14. Describe two situations in which force of friction is needed. (FB 15-I) (BP II-I)

Ans: There are many conditions in which friction is desirable; two of them are given below:

- i. Friction is needed when we write.
- ii. Friction enables us to walk on the ground.

3.16. Describe ways to reduce friction.

I-II) (RWP 12-I, 15-II)

Ans: **Method of reducing friction:**

- i. Using grease or any other lubricant.
- ii. Using smoother surfaces.
- iii. Using rollers, wheels or ball bearings.
- iv. Objects like car and planes are modeled with streamlined shapes.

3.15. How does oiling the moving parts of a machine lower friction? (SG 12-I)

Ans: Oiling the moving parts of a machine lowers friction because the oil fills up all the rough spots (cold welds) and makes the surface smooth.

3.17. Why is rolling friction less than sliding friction? (LHR, SW, DG 14-II) (LHR 13-I) (BP, DG 14-I) Ans:

"Rolling friction is much less than sliding friction because in case of rolling friction contact area (cold weld points) of the two surfaces is very small as compared to sliding friction."

Chapter # 4 (Turning effect of forces)

Short Questions

• **Write short answers of the following questions:**

4.4. How does the head-to-tail rule help to find the resultant of forces? (BP, MN 14-I) (SW, BP 13-I-II) (FB 14-II) (FB, LHR 12-I) (FB 08-II) (GW II-I) (LHR 09-I) (FB, RWP 15-I)

Ans: **Head-to-tail rule:** The vectors are added graphically such that the tail of 2nd vector coincides with the head of 1st vector and so on. The resultant of all vectors is obtained by coinciding the tail of 1st vector to the head of last vector.

The resultant of two forces can be found by using the method for adding vectors when the vectors are geometric representation.

4.5. How can a force be resolved into its rectangular components? (BP II-I) (BP 15-II) (LHR 08-I)

Ans: **Resolution of a vector:** When a given vector is drawn graphically then it may be split up

into two parts which are perpendicular to each other. Then each of these two parts of a vector is called the rectangular component. Through this figure it is shown that the rectangular components which are $OB = F_x$ and $AB = F_y$.

4.6. When a body is said to be in equilibrium? (MN 14-II) (FB 15-II) (FB 12-I) (SG 09-I)

Ans: A body is said to be in equilibrium if it satisfies both conditions of equilibrium.

i. A body is in equilibrium if net force acting on it is zero.

$$\Sigma F = 0, \text{ or } \Sigma F_y = 0, \Sigma F_x = 0$$

ii. A body is said to be in equilibrium if the resultant torque acting on it is zero.

$$\Sigma \tau = 0$$

4.7. Explain the first condition for equilibrium. (DG 13-I) (MN 14-I) (FB 15-I) (RWP 15-II) (SW 09-I) (GW 11-I)

Ans: **First condition for equilibrium:** "A body is said to satisfy first condition for equilibrium if the resultant of all the forces acting on it is zero".

$$\Sigma F = 0$$

$$\text{i.e. } \Sigma F_x = 0$$

$$\Sigma F_y = 0$$

4.8. Why there is a need of second condition for equilibrium if a body satisfies first condition for equilibrium? (BP 12-I)

Ans: **Reason:** Two equal and opposite forces having different line of action form couple, which produces angular acceleration. Although, first condition for equilibrium is satisfied but still in this case, object need to satisfy second condition to ensure equilibrium state.

4.9. What is second condition for equilibrium? (AKM, BP, FB, BP, MN 13-I-II) (SG, BPM, RWP, AK 14-I-II) (MN, SW 15-I) (MN 15-II) (MN 08-I)

Ans: **Second condition for equilibrium:** "A body satisfies second condition for equilibrium when the resultant torque acting on it is zero".

$$\text{Mathematically: } \Sigma \tau = 0$$

4.10. Give an example of a moving body which is in equilibrium. (BP 12-I) (BP 09-II) (RWP 12-I) Ans:

A paratrooper coming down with terminal velocity (constant velocity) is in equilibrium as all the forces acting on it is equal to zero, which satisfies the first condition for equilibrium.

4.11. Think of a body which is at rest but not in equilibrium. (RWP 12-II) (GW 09-II)

Ans: A body thrown upward is at rest just for a while at highest point. But force of gravity still acts on it to produce acceleration. Thus, the body is at rest but not in equilibrium.

4.12. Why a body cannot be in equilibrium due to single force acting on it? (BP 14-II) (MN 13-I) (LHR 15-I) (SG, SW 15-II)

Ans: Single force acting on a body is not balanced and produced acceleration. Therefore under influence of single force, a body cannot be in equilibrium.

4.13. Why the height of vehicles is kept as low as possible? (FB, SG 14-I) (RWP, SW, LHR 14-I-II) (LHR 08-II) (GW 09-II)

Ans: Vehicles are made heavy at the bottom and their height is kept to be minimum. This lowers their centre of gravity and helps to increase their stability. As to make them stable, their centre of mass must be kept as low as possible.

Chapter # 5 (Gravitation)

Short Questions

• Write short answers of the following questions:

5.2. What is meant by the force of gravitation? (SG 14-I-II) (DG, BP, DG, MN 13-II) (DG 14-II) (FB, GW 15-II) (LHR, RWP, SG 15-I)

Ans: **Force of gravitation:** “The force due to which every body of the universe attracts every other body is called force of gravitation”.

Formula: $F = G \frac{m_1 m_2}{r^2}$

5.3. Do you attract the Earth or the Earth attracts you? Which one is attraction with a larger force? You or the Earth. (RWP 09-I) (LHR II-I)

Ans: Yes, Earth attracts us and in reaction we attract Earth as well. Both of these forces are equal in magnitude.

5.4. What is a field force? (AK 14-I) (DG, AK, SG, MN 14-II) (RWP 15-I) (AK, SG, SW 12-I)

Ans: **Field force:** The force acting on the body whether the body is in contact with it or not is called field force.

Example: Gravitational force.

5.5. Why earlier scientists could not guess about the gravitational force? (SG 09-I)

Ans: The earlier scientists could not guess about the gravitational force because they were not known about the concept of gravity. Concept of gravity was put forth by ISSAC NEWTON in 1665.

5.8. Why law of gravitation is important to us? (MN, FB 14-I) (FB 12-I) (GW II-I) (LHR 09-I)

Ans: It is important to us because it helps us to understand why.

- i. Binds all terrestrial objects to earth.
- ii. Keeps the atmosphere close to earth.
- iii. Keeps moon revolving around the earth.
- iv. Gravitational pull of sun on planet keeps them revolving around sun.

5.9. Explain the law of gravitation. (LHR 14-II) (BP, LHR, DG 14 I-II) (FB 15-II) (LHR 08-I) (GW 10-I) (AK 12-II)

Ans: **Law of gravitation:** The force of attraction between two objects is directly proportional to the product of their masses and inversely proportional to the square of the distance between them.

Formula:

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

Law of gravitation depends upon masses of objects and distance between them.

- i. Greater the masses of objects, greater will be force of gravitation.
- ii. Greater the distance between objects, less will be force of gravitation.

5.12. Why does the value of g vary from place to place? (DG, MN, BP, FB 13 I-II) (SW, AK, BP, RWP 14-II) (AK, SG 14-I) (BP 15-I)

Ans:

$$g_h = G \frac{M_e}{(R + h)^2}$$

The value of g is inversely proportional to the square of the radius of the earth. But it does not remain constant and decreases with altitude, that's why the value of g varies from place to place.

5.13. Explain how the value of g varies with altitude. (GW 14-I) (FB, SG, MN 15-I) (AK, SG, SW, MN 15-II)

Ans: Value of gravitational acceleration is determined by following formula:

$$g_h = G \frac{M_e}{(R + h)^2}$$

So, g is inversely proportional to $(R+h)^2$. It means that with increasing altitude, value of g decrease.

Chapter # 6 (Work and energy)

Short Questions

- Write short answers of the following questions:

6.2. Define work. What is its SI unit? (LHR, SW 14-I) (LHR 13-II) (FB 13-I) (SG, DG, MN 14-II) (FB 15-II) (LHR, RWP 15-I) (BPM, SW, AK 12-I) (SG, LHR 08-I) (GW 08-II) (LHR 09-I)

Ans: **Work:** Work is said to be done when force acting on a body displaces it in the direction of the force.

Formula: $\text{Work} = \text{Force} \times \text{distance}$

$$W = FS$$

SI unit of work: SI unit of work is joule (J) or Nm.

6.4. Why do we need energy? (FB 08-I) (LHR II-I) (GW 09-I)

Ans: **i.** Energy is used by us to perform many activities of life.

ii. Energy is necessary for running and walking for humans.

6.3. When does a force do work? Explain. (RWP, MN, GW 13-I) (RWP 08-I) (FB, LHR 12-I)

Ans: Work is done when force acting on a body displaces it in the direction of applied force.

6.5. Define energy, give two types of mechanical energy. (BP, MN 14-I) (MN, RWP 14-II) (GW 13-II) (GW, AK 14 I-II) (SW, BP, DG, FB, LHR 13-I-II) (BP, RWP 15-I) (FB 15-II)

Ans: **Energy:** A body possess energy if it is capable to do work.

Types of mechanical energy:

Mechanical energy has two following types:

i. Kinetic energy

ii. Potential energy

Kinetic energy: (LHR, SW 14-I) (SW, SG 14-II)

The energy possessed by a body due to its motion is called its kinetic energy.

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

Potential energy: (SW, BP 14-I) (RWP, SG 14-II) (BP II-I, 12-I)

The ability of a body to do work due to its position is known as its potential energy.

$$P.E = mgh$$

6.7. Define potential energy and derive its relation. (MN 13-II) (GW 09-I) (GW, SW, AK 12-I) (LHR 08-I)

Ans: **Potential energy:** Energy possessed by a body due to its position is called potential energy. $P.E = mgh$.

Derivation:

$$P.E = \text{work}$$

$$P.E = F.d = (mg) (h)$$

$$P.E = mgh$$

6.6. Define K.E and derive its relation. (BP 13-II) (LHR 08-I) (GW 08-II) (LHR 09-I) (RWP, FB 15-II) (LHR 15-I)

Ans: **Kinetic energy:** Energy possessed by a body due to its motion is called kinetic energy.

Derivation: If a ball moves with initial velocity v_i after covering some distance, it stops and its v_f is zero. During this, it does work against force of friction ($F = ma$) so

Please write from page # 122, see the text book.

6.13. What is meant by the efficiency of a system? (AK 14-I) (RWP, SW 13-I) (LHR, DG, FB, MN, BP, SW 14 I-II) (GW, FB 09-I) (RWP 15-II) (SG 15-I)

Ans: **Efficiency:** Efficiency of a system is the ratio of required form of energy obtained from a system as output to the total energy given to it as input.

Formula:

$$\text{Efficiency} = \frac{\text{input}}{\text{output}}$$

Input is the energy given to machine to work while output is work done by machine.

6.14. How can you find the efficiency of a system? (LHR, MN 14-I) (BP, FB 14-II) (BP 15-I) (LHR 12-I)

Ans: Efficiency of a system can be determined by following formula.

$$\text{Efficiency} = \frac{\text{input}}{\text{output}}$$
$$\% \text{Efficiency} = \frac{\text{input}}{\text{output}} \times 100$$

6.15. What is meant by the term power? (SW 15-II) (FB 15-I) (FB 14-II) (SW, AK, GW, RWP, SG, LHR 14-I-II) (FB, SW 13 I-II) (MN 13-II)

Ans: **Power:** Power is defined as the rate of doing work.

Formula:

$$\text{Power} = \frac{\text{Work}}{\text{time}}$$

$$P = \frac{W}{t}$$

Unit: The SI unit of power is watt (W).

6.16. Define watt. (GW, BP 14-I) (AK 14-II) (DG 13-II) (FB 15-I) (LHR, GW, DG 08-I) (LHR II-I) (GW II-II)

Ans: **Watt:** The power of a body is one watt if it does work at the rate of 1 joule per second (1Js^{-1}).

$$1\text{watt} = (1\text{J})(1\text{s})$$

Chapter # 7 (Properties of matter)

Short Questions

- Write short answers of the following questions:

7.6. Define the term pressure. (SW, RWP, FB, AK 14-I) (SG, DG, AK 14-II) (MN 13-I) (AK 13-II) (GW, LHR 08-II) (MN, LHR, FB 15-I) (FB 15-II)

Ans: **Pressure:** The force acting normally on unit area at the surface of a body is called pressure.

Formula:

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$
$$P = \frac{F}{A}$$

Units: In SI, the unit of pressure is Newton per square metre (Nm^{-2}) or Pascal (Pa).

Physical quantity: It is a scalar quantity.

7.15. State Pascal's law. (BP 14) (SG, SW 13-I) (GW, LHR 08-I) (FB, LHR 15-I) (RWP, SG, AK 15-II)

Ans: **Pascal's law:** Pressure applied at any point of a liquid enclosed in a container is transmitted without loss to all other parts of liquid.

7.17. What is meant by elasticity? (RWP, MN, SG 14-I) (SW 13-II) (BP 14-II) (RWP, MN 09-II) (SW 12-I)

Ans: **Elasticity:** Elasticity is the property of matter by virtue of which matter resists any force which tries to change its length, shape or volume.

7.22. What is Hooke's law? What is meant by elastic limit? (AK, GW 14-I) (LHR 13-I) (FB 15-I) (FB 08-II) (LHR 12-II)

Ans: **Hooke's law:** The strain produced in a body by the stress applied to it is directly proportional to the stress within the elastic limit of the body is called Hooke's law. Stress \propto strain

Elastic limit:(BP 13-II) (GW 14-II) (LHR 09-II) (AK, GW 08-I)

Elastic limit can be defined as a limit within which a body recovers its original length, volume or shape after the deforming force is removed.

Chapter # 8 (Thermal properties of matter)

Short Questions

- **Write short answers of the following questions:**

8.2. Why does heat flow from hot body to cold body? (MN 14-II) (FB 13-II) (SG 15-I) (AK 15-II) (LHR 09-I) (SW 12-I)

Ans: Heat flows from hot body to cold body to attain the condition of thermal equilibrium.

8.3. Define the terms heat and temperature. (RWP 10-I) (LHR, RWP, MN 14-I) (MN, DG 14-II) (RWP, SG, LHR, MN, DG, AK, SW 13 I-II) (DG, MN, RWP 15-I) (RWP 15-II)

Ans: **Heat:** Heat is the form of energy that is transferred from one body to another in thermal contact with each other as a result of the difference of temperature between them.

Temperature: The temperature of a body is the degree of hotness or coldness of a body”.

8.7. Explain the volumetric thermal expansion. (MN 14-I) (AK, MN, FB, BP 14-II) (DG, GW 08-II) (FB, BP 15-I) (RWP 15-II)

Ans: **Volumetric thermal expansion:** It is usually expressed as a fractional change in volume per unit temperature change.

$$V = V_0 (1 + \Delta T)$$

8.8. Define specific heat. How would you find the specific heat of a solid? (GW, MN 14-II) (FB, RWP, MN, BP 13 I-II) (DG, GW 13-II) (MN, SW, LHR, BP 14-I) (LHR, BP 15-I)

Ans: **Specific heat:** “The specific heat of a substance is the amount of heat required to raise the temperature of 1kg mass of that substance through 1K”.

Specific heat of any substance can be found out by using following formula:

$$c = \frac{\Delta Q}{m \Delta T}$$

c is the specific heat capacity.

ΔQ is the amount of heat absorbed by the body.

m is the mass of the body.

ΔT is the change of temperature.

8.9. Define and explain latent heat of fusion. (SW, RWP 13-II) (GW, RWP, SG 13-I) (FB, DG, MN, BP, AK 14 I-II) (RWP 15-I) (RWP 15-II)

Ans: **Latent heat of fusion:** Latent heat of fusion is the amount of thermal energy, which must be absorbed for 1 mole of substance to change its state from solid to liquid without change in temperature, is called latent heat of fusion.

Unit: Its SI unit is J kg^{-1} .

Formula: $H_f = \frac{\Delta Q_f}{m}$

8.10. Define latent heat of vaporization. (BP, GW, RWP 14-II) (AK, BP, DG 13 I-II) (FB 15-I) (FB 15-II)

Ans: **Latent heat of vaporization:** “The quantity of heat that changes unit mass of a liquid completely into gas at its boiling point without any change in its temperature is called its latent heat of vaporization denoted by “ H_v ”.

Formula

$$H_v = \Delta Q_v / m$$

Unit: J kg^{-1}

Chapter # 9 (Transfer of heat)

Short Questions

- **Write short answers of the following questions:**

9.2. Why metals are good conductors of heat? (GW 14-II) (DG, AK 14-I) (RWP 13-I) (LHR 08-II) (GW II-II) (MN 15-II)

Ans: Metals are good conductors of heat because they possess the freely moving electrons.

9.4. Why conduction of heat does not take place in gases? (FB 14-II) (FB 08-II) (RWP 12-I) (SG II-I) (LHR II-I)

Ans: Conduction of heat does not take place in gases because gases are bad conductor of heat.

9.5. What measures do you suggest to conserve energy in houses? (RWP 14-I-II) (DG 12-I, 13-I) (GW 08-II) (LHR 12-II)

Ans: **Measures to conserve energy:**

i. Hot water tanks are insulated by plastic or foam lagging.

ii. The bottoms of cooking pots are made black to increase the absorption of heat from fire.

iii. Solar energy is used by solar panel in houses. The solar energy is converted into electric energy.

iv. Switch off the electric appliance when these are not used by humans.

v. Energy in houses can be conserved by using energy savers instead of bulbs.

9.6. Why transfer of heat in fluids takes place by convection? (GW 14-I) (LHR 13-I) (BP 13-II)

Ans: Transfer of heat in fluids takes place by convection because fluids are not good conductor of heat. As, molecules of fluids are able to move freely, hence heat transfer takes place by convection.

9.7. What is meant by convection current? (AK, SW 14-I) (SW, GW 14-II) (LHR 13-II) (RWP, BP 13 I-II) (RWP 09-I) (MN 15-II)

Ans: **Convection current:** Hot air rises up creating gap which is filled by colder air, this air also gets warm and rises up. That is how, convection currents are produced.

BEST OF LUCK 😊