

1. What is the heat generated (in J) in a heating element of resistance 900Ω when a current of 0.3 A passes through it for 10 seconds?

A. 2700 B. 810
C. 405 D. 1350

Ans. B

- Sol. The heating effect produced by an electric current I through a conductor of resistance R for a time t is given by

$$H = I^2 R t$$

Here $I = 0.3 \text{ A}$; $R = 900 \text{ ohm}$; $t = 10 \text{ seconds}$

$$H = .3 \times .3 \times 900 \times 10$$

$$H = 810 \text{ J}$$

2. Find the current (in A) when a charge of 500 Coulomb flows in 25 seconds.

A. 12500 B. 20
C. 40 D. 6250

Ans. B

- Sol. Given Charge $Q = 500 \text{ Coulomb}$;
time $T = 25 \text{ Sec}$.

Using the formula

$$\text{Current} = \frac{\text{charge } Q}{\text{Time } T}$$

$$\text{Current} = \frac{500}{25}$$

$$\text{Current} = 20 \text{ A}$$

3. Find the work done (in J) when a charge of 10 C moves across a potential difference of 2 V.

A. 20 B. 5
C. 40 D. 10

Ans. A

- Sol. Given : Charge $Q = 10 \text{ C}$; Voltage $V = 2 \text{ V}$

Work done $W = ?$

As we know:

$$\text{WORK DONE } (W) = \text{VOLTAGE } (V) \times \text{CHARGE } (Q)$$

$$W = 2 \times 10 = 20 \text{ Joule}$$

4. Find the resistance (in mega Ω) of a wire of length 8 m, cross sectional area 2 cm^2 and made of a material of resistivity $120 \Omega \text{ m}$.

A. 1920 B. 4.8
C. 2.4 D. 960

Ans. B

- Sol. The formula should be used here,

$$R = \rho L / A$$

$$R = \frac{120 \times 8}{0.0002}$$

$$R = 120 \times 4 \times 10000 = 4.8 \times 10^{-6}$$

$$R = 4.8 \text{ mega } \Omega$$

Where,

R = resistance of the conductor (ohms, Ω)

ρ = resistivity of the conductor material (ohm meter, $\Omega \text{ m}$)

L - length of the conductor (m)

A = cross-sectional area of conductor (m^2)

5. The slope of a Distance-Time graph shows _____.

A. Acceleration
B. Momentum
C. Mass
D. Speed

Ans. D

- Sol. • The slope of a Distance-Time graph shows speed in a particular direction.

Slope represents as the ratio of the change in y axis to the corresponding change in x axis.

6. If a star is bigger than Sun, but not more than twice as big, it will turn into a _____.

A. Pulsar B. Maxima
C. Avenger D. Discover

Ans. A

Sol.

- A **pulsar** is a highly magnetized, rotating neutron star (white dwarf) that emits a beam of electromagnetic radiation. They are spherical, compact objects that are about the size of a large city but contain more mass than the sun. They are used to study extreme states of matter, search for planets beyond Earth's solar system and measure cosmic distances.

- Pulsars also could help scientists find gravitational waves.

- If a star is bigger than Sun, but not more than twice as big, when it collapses then it will turn into a Pulsar.

7. What is the unit of the Physical quantity "Jerk"?
- Meter Second
 - Meter per Second cube
 - Meter per Second cube square
 - Meter per Second

Ans. B

Sol.

- The unit of the Physical quantity Jerk is "meter per second cube".
- It is second derivative of velocity and first derivative of acceleration, Means it is a rate of change in acceleration. It is also known as jolt, lurch, and surge.

8. Find the power of a convex lens if the image formed is at a distance of 25 cm from the lens when the object is placed on the other side of the lens at 12 cm from the optical centre?
- 4.33 diopters
 - 12.33 diopters
 - 12.33 diopters
 - 4.33 diopters

Ans. B

Sol.

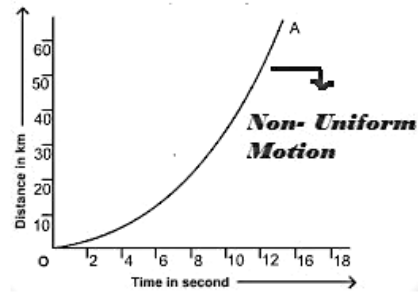
- Power of a convex lens depends upon its focal length.
- Lens formula is an equation which relates the focal length, image distance and object distance for a spherical mirror.
- It is given as, $1/v + 1/u = 1/f$.
- Taking v and u in metres.
- Applying this formula to the above question $1/0.25 + 1/0.12 = 12.33$ diopters.

9. As the object covers unequal distances in equal intervals of time, it is said to be in _____ motion.
- Uniform
 - linear
 - non-uniform
 - equilibrium

Ans. C

Sol.

- Non uniform motion is when an object travels unequal distances in equal periods of time. i.e. the object travels at different rates at different times (acceleration).



10. There is a protocol signed to reduce production of CFC, known as
- CFC Protocol
 - IR Protocol
 - Montreal Protocol
 - UV Protocol

Ans. C

Sol. Under the United Nations Framework Convention on Climate Change in 1994, the **Montreal Protocol** on Substances that Deplete the Ozone Layer was adopted.

11. The unit of measurement of a length is _____
- Hertz
 - Byte
 - Bit
 - Millimeter

Ans. D

Sol.

- The unit of measurement of a length is millimeter, centimeter, meter, kilometer, and inch.
- The unit of measurement of an information used in computing and digital communications is Bit, Byte, megabyte, gigabyte.
- The unit of measurement of a mass is gram, kilogram, pound, and ounce.

12. Formula for distance is

- speed x time
- Time / speed
- speed x acceleration
- Velocity / speed

Ans. A

Sol.

- Distance is a scalar quantity and it can never be negative as it does not consider magnitude unlike displacement.

- It is calculated as a product of speed of an object and time taken by an object to reach a particular point.
- It is expressed as Km/Hr.

13. The value of acceleration due to gravity (g) at a distance of $2R$ from the surface of earth, where R is the radius of earth is _____.
- A. $g/3$ B. $g/4$
 C. $g/9$ D. $g/2$

Ans. C
 Sol.

- Value of acceleration due to gravity at height comparable with radius of earth can be told to us by- (g is gravity) $g' = g(R/(R+h))^2$
- In problem h is $2R$
- $g' = g(R/3R)^2 = g/9 = 1/9$ is the value of acceleration due to gravity at a height of $2R$ from the surface of the earth.

14. Which of the following physical quantities is a scalar quantity?
- A. Weight
 B. Impulse
 C. Young's Modulus
 D. acceleration

Ans. C
 Sol.

- Young's modulus is a physical scalar quantity. Here, scalar is the measurement of a medium strictly in terms of magnitude. This measurement is used on Young's modulus, also known as the elastic modulus, which is a measure of the stiffness of a solid material.
- Some other **examples of scalar quantities** include speed, volume, mass, temperature, power, energy, and time.
- Weight is a force which is a vector and has a magnitude and direction. **Mass** is a scalar.

15. As the object covers equal distances in equal intervals of time, it is said to be in _____ motion.
- A. Uniform
 B. Non Linear
 C. Translational
 D. Equilibrium

Ans. A

Sol. Uniform motion is defined as the motion of an object in which the object travels in a straight line and its velocity remains constant along that line as it covers equal distances in equal intervals of time, irrespective of the length of the time.

If a body is involved in rectilinear motion and the motion is consistent, then the acceleration of the body must be zero.

Examples:

→ If the speed of a car is 10 m/s, it means that the car covers 10 meters in one second. The speed is constant in every second.

→ Movement of blades of a ceiling fan.

16. _____ is a measure of the moisture in air.
- A. Density B. Viscosity
 C. Impurity D. Humidity

Ans. D

Sol. • Humidity is the amount of water vapour present in air.

• Three primary measurements of humidity are widely employed: **absolute, relative and specific.**

1) Absolute humidity describes the water content of air and is expressed in either grams per cubic metre or grams per kilogram.

2) Relative humidity, expressed as a percentage, indicates a present state of absolute humidity relative to a maximum humidity given the same temperature.

3) Specific humidity is the ratio of water vapor mass to total moist air parcel mass.

17. During _____ motion of an object along a straight line, the velocity remains constant with time.
- A. Linear B. Translational
 C. Uniform D. Equilibrium

Ans. C

Sol. • **Uniform motion** is defined as the motion of an object in which the object travels in a straight line and

its velocity remains constant along that line as it covers equal distances in equal intervals of time, irrespective of the length of the time. If a body is involved in rectilinear motion and the motion is consistent, then the acceleration of the body must be zero.

Examples:

→ If the speed of a car is 10 m/s, it means that the car covers 10 meters in one second. The speed is constant in every second.

→ Movement of blades of a ceiling fan.

18. What is the unit of the physical quantity "Young's modulus" ?

- A. newton B. erg
C. joule D. pascal

Ans. D

Sol. Pascal is the unit of the physical quantity " Young's Modulus". It is the measure of the capacity of a material to stand against any change in length under tension or any compression force. Young modulus= longitudinal stress/ Stress

1. Newton is SI unit of force
2. Joule is SI unit is energy
3. Erg is unit of energy in CGS system.

19. Kaleidoscope was invented by ____.

- A. John Barber
B. Tim Berners-Lee
C. Alam Blumlein
D. David Brewster

Ans. D

Sol.

- Kaleidoscope was invented by David Brewster.
- The working principle of kaleidoscope is reflection where two or more mirror are placed at certain angle to produce a symmetrical mosaic pattern.

20. Instrument for measuring low temperatures is called ____.

- A. Diagonometer
B. Cryometer
C. Chromatopmeter
D. Cymometer

Ans. B

Sol.

- The instrument for measuring low temperature is called Cryometer.
- These are special type thermometer which is used to measure very low temperature.

21. Upward force on a floating body is called _____

- A. jerk
B. Buoyant force
C. Archimedial force
D. Anti-gravity

Ans. B

Sol. Upward force on a floating body is called Buoyant force It is an upward force exerted by a fluid that opposes the weight of an immersed body.

22. Electrons move around the nucleus in _____ motion.

- A. translator B. spin
C. orbital D. vibrational

Ans. C

Sol. Electrons move around the nucleus in orbital motion. Orbital motion involves the quantum mechanical motion of rigid particles (such as electrons) about some other mass, or about themselves.

23. Which among the following is false about work?

- A. If displacement is zero, work is zero
B. Work done can be negative
C. It is vector quantity
D. Its unit is Joule

Ans. C

Sol. Work is a scalar quantity not the vector quantity. Rest statements about work are correct.

- If displacement is zero, work is zero
- Work done can be negative(Work can be either positive or negative: if the force has a component in the same direction as the displacement of the object, the force is doing positive work. If the force has a component in the direction opposite to the displacement, the force does negative work)
- Its unit is Joule

24. A body in equilibrium _____.
- can move with constant acceleration
 - is always at rest
 - can move with constant velocity
 - can move with variable acceleration

Ans. C

Sol.

- A body in equilibrium can move with constant velocity.
- A body which is in equilibrium is **either moving at constant velocity** in a straight line, or it is not moving.
- If it is not moving, it said to be in static equilibrium.

25. It in a motion, the axis of the rotation passes through an object, then the motion is called_____.

- Orbital motion
- Circulatory motion
- Spin motion
- Oscillatory motion

Ans. C

Sol. Spin motion refers to the angular momentum generated by the motion of its center of mass through an external point and the axis of the rotation passes through the object. It is a vector quantity and is expressed as $\text{kgm}^2\text{s}^{-1}$.

26. Weight of a person at a height of $2R$ from the centre of the earth, where R is the radius of the earth _____.

- remains same
- becomes half
- becomes twice
- becomes one ninth

Ans. D

Sol.

- $g' = g(R/(R+h))^2$ In problem $h = 2R$
- $g' = g(R/3R)^2 = g/9$ Or($1/9$)th of acceleration due to gravity on surface of earth
- Weight of a body of mass m at height h is given as: $W' = mg'$
 $W' = mg/9$
 $W' = W/9$

27. Instrument for measuring wind velocity is called_____ .

- Coulombmeter
- Anemometer
- Cyanometer
- Chronometer

Ans. B

Sol.

- Instrument for measuring wind velocity is called Anemometer.
- The anemometer counts the number of rotations, or turns, which is used to calculate wind speed.

28. Physical quantities, which have _____ only and no _____ are called scalar quantities.

- direction, magnitude
- magnitude, direction
- speed, velocity
- velocity, speed

Ans. B

Sol. Scalar quantity is a physical quantity which has magnitude only and no direction.

For example: Mass has only a value, no direction.

29. Density of water is maximum at _____.

- 12 degree Celsius
- 8 degree Celsius
- 4 degree Celsius
- 0 degree Celsius

Ans. C

Sol.

- Density of water is maximum at 4 degree Celsius.
- At 4 degrees Celsius the thermal kinetic forces are not strong enough to break all the hydrogen bond in the water, while the h-bonds have not formed enough to widen the distance between water molecules and hence the water molecules are closely packed resulting in higher density of water.

30. Who discovered theory of relativity?

- Isaac Newton
- Albert Einstein
- Niel Bohr
- Michael Faraday

Ans. B

Sol. The theory of relativity was discovered by Albert Einstein. Albert Einstein, in his theory of special relativity, determined that the laws of physics are the same for all non-accelerating observers, and he showed that the speed of light within a vacuum is the same no matter the speed at which an observer travels.

31. What is the direction of torque?
- A. Perpendicular to the direction of applied force
 - B. Same as the direction of applied force
 - C. Opposite to the direction of applied force
 - D. Parallel to the radius

Ans. A

Sol. The direction of torque is perpendicular to the direction of applied force. Torque is inherently a vector quantity. Part of the torque calculation is the determination of direction. The direction is perpendicular to both the radius from the axis and to the force. It is conventional to choose it in the **right** hand rule direction along the axis of rotation.

32. Rate of change of momentum is _____.
- A. Area
 - B. Pressure
 - C. Force
 - D. Velocity

Ans. C

Sol. Force is defined as rate of change of momentum. Force is a push and pull motion and any interaction which when unopposed, will change the motion of an object. It causes an object with mass to change its velocity. S.I. unit of force is newton.

33. Upward force on a floating body is called
- A. jerk
 - B. buoyancy
 - C. Archimedal force
 - D. Anti-gravity

Ans. B

Sol. Upward force on a floating body is called buoyancy. It is an upward force exerted by a fluid that opposes the weight of an immersed body.

34. Instrument for measuring work performed is called _____.
- A. Eudiometer
 - B. Anemometer
 - C. Hyetometer
 - D. Ergometer

Ans. D

Sol.

- Erging is rowing on a rowing machine. It's called erging because a rowing machine is officially called a "rowing ergometer."
- **Ergometer** is an instrument for measuring the amount of work done by human muscles.

35. What will happen if an object is dropped from a height and there is no air resistance?
- A. It will fall with a constant speed and acceleration
 - B. Its acceleration will increase
 - C. Both speed and acceleration will increase
 - D. Its speed will increase

Ans. D

Sol.

- An object when dropped from a height and there is no air resistance stopping it would fall with the increased speed.
- It is so because the friction caused by the air reduces the speed of the falling ball, which obviously imply that in the absence of no such resistance the speed of the falling ball would be more.

36. Law of gravitation applies to _____
- A. Any pair of bodies
 - B. The earth and the moon
 - C. The planets around the Sun
 - D. The earth and the objects on earth

Ans. A

Sol. Newton's law of universal gravitation applies to any pair of bodies. It states that a particle attracts every other particle in the universe using a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers.

37. Farad is unit of _____.
- A. Capacitance
 - B. Reactance
 - C. Electric charge
 - D. Electric conductance

Ans. A

Sol. Farad is SI unit of Capacitance. 1 farad = 1 coulomb/volt. One farad is defined as the capacitance of a capacitor which requires a charge of one coulomb to establish a potential difference of one volt between its plates.

38. Why metals conduct electricity?
- A. Because of low melting point
 - B. Because of high tensile strength
 - C. Because of free electrons
 - D. Because of high atomic density

Ans. C

Sol.

- **Electrical conductivity in metals** is a result of the movement of electrically charged particles.
- It is these 'free electrons' that allow **metals** to conduct an **electric** current. Because valence electrons are free to move they can travel through the lattice that forms the physical structure of a **metal**.

39. Electrons move around the nucleus in _____ motion.
- A. translator
 - B. spin
 - C. orbital
 - D. vibrational

Ans. C

Sol.

- Electrons move around the nucleus in **orbital motion**.
- Orbital motion involves the quantum mechanical motion of rigid particles (such as electrons) about some other mass, or about themselves.

40. When net torque is zero, _____ will be constant.
- A. force
 - B. angular momentum
 - C. linear momentum
 - D. acceleration

Ans. B

Sol. Angular momentum remains constant when net Torque is zero. Torque on the one hand is a measure of how much of force causes an object to rotate and is a vector quantity. On other hand, angular conservation is also a vector quantity describing an object in circular motion; its magnitude is equal to the momentum of the particle, and the direction is perpendicular to the plane of its circular motion.

41. Why does a fountain pen leak in aeroplane flying at a height?
- A. Because of reduced viscosity of the ink in the pen
 - B. Because of increased viscosity of the ink in the pen
 - C. Because of higher atmospheric pressure outside the pen
 - D. Because of lower atmospheric pressure outside the pen

Ans. D

Sol.

- A fountain pen leak in aeroplane flying at a height because of lower atmospheric pressure outside the pen
- Due to this difference in air pressure, the air inside the pen forces the ink to come out. This equalizes the air pressure inside and outside the pen.

42. What is the unit of relative density?
- A. kg/m
 - B. kg/m²
 - C. kg/m³
 - D. It has no unit

Ans. D

Sol. The unit of relative density cannot be specified as it depends on the concept of densities. So one can say that it's a dimensionless quantity and has got no unit. Moreover density equals Mass/Volume, where the SI unit of density is Kg/M³.

43. Which among the following is a vector quantity?

- A. Heat
- B. Angular momentum
- C. Work
- D. Time

Ans. B

Sol. Angular momentum is a vector quantity being a product of an object's moment of inertia and its angular velocity in the same axis line. Moment of inertia depends on the shape and distribution of mass about the axis of rotation and angular velocity depends on the speed of a rotating object. Angular Momentum of an object remains constant unless an external force is applied to it.

44. Which among the following is false about alpha particles?

- A. They have high ionizing power
- B. They have high penetrating power
- C. They have high kinetic energy
- D. They are positively charged helium nuclei

Ans. B

Sol. Alpha particles discovered by Rutherford are radioactive particles produced due to alpha decay and contains two protons and two neutrons bound together similar to helium nuclei. Alpha particles have strong mass, absorption capacity and high ionizing power capable of causing cancer when inhaled but at the same time they have a weak penetration power on direct exposure.

45. What is the unit of the physical quantity "Stress"?

- A. newton second
- B. steradian
- C. pascal
- D. joule

Ans. C

Sol. A physical quantity is a quantity in physics that can be measured, thus a physical property that can be quantified. Stress is the Force per unit oriented surface area. Its Unit is Pascal(Pa).

46. Who Invented Induction Coil?

- A. Edwin Howard Armstrong
- B. John Barber
- C. Edwin Beard Budding
- D. Nicholas Callan

Ans. D

Sol. Nicholas Callan invented the Induction Coil. It is the first type of transformer and used to produce high-voltage pulses from a low-voltage direct current (DC) supply. To create the flux changes necessary to induce voltage in the secondary coil, the direct current in the primary coil is repeatedly interrupted by a vibrating mechanical contact called an interrupter.

47. Unit of impedance is _____.

- A. ohm
- B. henry
- C. tesla
- D. hertz

Ans. A

Sol.

- Unit of impedance is **ohm**.
- Impedance is the measure of the opposition that a circuit presents to a current when a voltage is applied.
- Impedance is equal to the square root of the sum of the squares of the resistance and reactance of the circuit and usually expressed in ohms.

48. Newton's first law is also known as _____.

- A. Law of friction
- B. Law of moments
- C. Law of Inertia
- D. Law of motion

Ans. C

Sol. Newton first law of motion is also called as the law of inertia. According to this law, an object will remain at rest or move at a constant speed in a straight line unless it is acted on by an unbalanced force.

49. What is the SI unit of Radius of Gyration?

- A. Kilogram square metre
- B. Metre
- C. Cubic Meter Per Second
- D. Radian

Ans. B

Sol.

- The **SI unit of Radius of Gyration is Metre (m).**
- Radius of gyration is defined as the distance from the axis of rotation to a point where the total mass of the body is supposed to be concentrated, so that the moment of inertia about the axis may remain the same.

50. What is the unit of the physical quantity "Heat capacity"?

- A. watt per kelvin
- B. joule per kelvin
- C. newton per kelvin
- D. pascal per kelvin

Ans. B

Sol. The heat capacity is the amount of heat required to raise the temperature of an object or substance one degree. The SI unit of heat capacity is joule per kelvin.

51. The amount of matter in a ball of steel is its

- A. Weight B. Density
- C. Volume D. Mass

Ans. D

Sol.

- Mass is the amount of matter in an object compared to its size. This apple floats but this steel ball sinks. Mass of an object is one of the factors that determines its weight, it is a different property.
- An object's weight is affected by gravity and can vary depending upon its location relevant to another object exerting a gravitational pull on it; however, an object's mass remains constant, even when there is no gravity acting upon it, such as in space beyond the Earth's gravitational field.

52. Rate of work done is _____

- A. Energy B. Power
- C. Momentum D. Impulse

Ans. B

Sol. Rate of work done is Power. Power is defined as the work done per unit time. Power is generally measured in watt.

1 watt= 1joule/1second

Energy is the capacity of doing work.

Impulse- Impulse is the change of momentum of an object when the object is acted upon by a force for an interval of time.

Momentum- Mass× velocity

53. When ice floats on water, its _____ part remains outside the water.

- A. 0.5 B. 0.3
- C. 0.1 D. 1

Ans. C

Sol. When ice floats on water, its 0.1 part remains outside the water. Ice floats because it has less density than water due to unique property of hydrogen bond. Water has maximum density at 4.4 degree celcius.

54. Light travels fastest in

- A. Nitrogen B. Air
- C. Steel D. Vacuum

Ans. D

Sol. The fastest thing in the whole universe is the speed of light in a vacuum (like outer space), clocking in at a great 2.99×10^8 m/s. Light in a vacuum always travels at the same speed and its speed has that exact value, no matter who measures it.

55. Which of these equals the impulse applied ?

- A. Change in momentum
- B. Change in force
- C. Change in velocity
- D. Change in acceleration

Ans. A

Sol. The result of the force acting for the given amount of time is that the object's mass either speeds up or slows down (or changes direction). The impulse experienced by the object equals the change in momentum of the object.

56. What is the unit of electric resistance?

- A. Dyne B. Pascal
C. Joule D. Ohm

Ans. D

Sol.

- Resistance is the opposition that a substance offers to the flow of electric current. It is represented by the uppercase letter R.
- The standard **unit of resistance is the ohm**, symbolized by the Greek letter omega Ω .
- When an electric current of one ampere passes through a component across which a potential difference (voltage) of one volt exists, then the resistance of that component is one ohm.

57. What will happen to the force between the two positive charges, which are released after being held near each other?

- A. Force will increase
B. Force will decrease
C. Force will stay the same
D. None of the Above

Ans. B

Sol. The force among them would decrease. The reason for it would be that since the charges among them is same, both would repel each other. And this repulsive force between them would decrease as the distance will increase.

58. If an object is thrown upwards, what will be its velocity, when it reaches its maximum height?

- A. 0 m/s B. 4.9 m/s
C. 14.7 m/s D. 20 m/s

Ans. A

Sol. When an object is thrown upwards, its velocity, when it reaches its maximum height would be 0 m/s because at the maximum height, the whole of the kinetic energy gets converted into the potential energy. So when the kinetic energy is zero, the velocity is also zero at the maximum height. Then the ball accelerates downwards towards the ground with the same value as that of acceleration due to gravity.

59. What is the SI unit of Magnetic Flux?

- A. Siemens B. Tesla
C. Weber D. Henry

Ans. C

Sol.

- **Weber** is the SI unit of **magnetic flux**.
- Tesla is the SI unit of magnetic field, magnetic flux density, magnetic induction. Siemens is the SI unit of conductance. Henry is the SI unit of inductance.

60. Which mirror is used by the dentist?

- A. Cylindrical mirror
B. Concave mirror
C. Convex mirror
D. Plane mirror

Ans. B

Sol. **Concave mirrors** are used by dentists because at a **short range** (object distances less than the focal length) they produce **magnified, erect** images. It is useful to have a magnified image of a tooth when a dentist is looking for or repairing cavities, cracks, or other abnormalities.

61. For every action, there is an equal and opposite reaction, is Newton's ?

- A. First law B. Second law
C. Third law D. Fourth law

Ans. C

Sol. For every action, there is an equal and opposite reaction is Isaac Newton's third law of motion. However the third law states that when one body exerts a force on a second body, the second body simultaneously exerts a force equal in magnitude and opposite in direction on the first body. In totality he has given three laws relating to the motion of the body and forces acting upon it.

62. X-rays are _____ waves.

- A. longitudinal
B. transverse
C. electromagnetic
D. elastic

Ans. C

Sol. X ray is an electromagnetic wave of high energy and very short wavelength, which is able to pass through many materials opaque to light.

63. Air expands when it _____.

- A. is cooled
- B. is heated
- C. is under pressure
- D. becomes more humid

Ans. B

Sol. • Air expands when it is heated due to high boiling point which leads the molecule inside the hot air moves faster and molecule collide with each other and in result air expands.

64. _____ is the perpendicular distance between point of application of force and axis of rotation.

- A. Moment arm
- B. Moment of Inertia
- C. Altitude
- D. Base

Ans. A

Sol.

- Moment arm is the perpendicular distance between point of application of force and axis of rotation.
- The longer the moment arm is the more load will be applied to the joint axis through leverage.

65. Human beings `hearing range is.....

- A. 50 to 50,000 Hz
- B. 40 to 40,000 Hz
- C. 30 to 30,000 Hz
- D. 20 to 20,000 Hz

Ans. D

Sol. Hearing range of Human beings is 20 to 20,000 Hz. This is a standard range for human that is not harmful for his health. The frequency above 20k Hz is harmful for Environment as well as for Human ears and below 20 Hz it is not easily and clearly Audible.

66. What is the distance from the centre of the earth to the centre of the moon called?

- A. Orbital length of the moon
- B. Orbital length of the earth
- C. Orbital radius of the moon
- D. Orbital radius of the earth

Ans. C

Sol.

- The distance from the centre of the earth to the centre of the moon is called **orbital radius of the moon**.
- The Moon has an orbital eccentricity of 0.0549, so its path around the Earth is not perfectly circular and the distance between the Earth and the Moon will vary from the Earth's frame of reference (Perigee at 363,295 km and apogee at 405,503 km)

67. Instrument for measuring thickness or amount of rainfall is called

- A. Lucimeter
- B. Galactometer
- C. Hyetometer
- D. Hygrometer

Ans. C

Sol.

- Instrument for measuring thickness or amount of rainfall is called is **Hyetometer**. The first records of rainfall was kept by greeks in the year 500 B.C.
- Hygrometer is used for measuring the the water vapor in the atmosphere.
- Lucimeter is used to measure intensity of light.

68. What are the two kinds of Rotatory motion?

- A. Spin and Vibrational motion
- B. Spin and Orbital motion
- C. Spin and Translatory motion
- D. Spin and Projectile motion

Ans. B

Sol.

Two kinds of Rotatory motion are Spin and Orbital motion. However in a rotational motion an object moves around an axis passing through its body. Say the rotation of earth, earth rotates around an axis passing through both of its poles(north pole and south pole).

69. If ice floating on water in a vessel melts, the water level in the vessel _____.
- increases
 - does not change
 - first increases before decreasing
 - decreases

Ans. B

Sol.

- The water level **remains the same** when the ice floating on water in a vessel melts. A floating object displaces an amount of water equal to its own weight.
- In other words, it happens so because the water ice displaces the same volume of water as it would contribute once it melts.

70. One nanometer is equal to _____ meters.
- 10^{-3}
 - 10^{-7}
 - 10^{-9}
 - 10^{-12}

Ans. C

Sol. One nanometer is equal to 10 raised to power of 9 meters, which means it is one billionth of a meter. Such measurements are most commonly used in nanotechnology, for building of extremely small machines.

71. The glowing surface of the Sun is called ____.
- Photosphere
 - Chromosphere
 - Corona
 - Troposphere

Ans. A

Sol. The atmosphere of the sun is composed of several layers, mainly the photosphere, the chromosphere and the corona. The lowest layer of the sun's atmosphere is the photosphere. This layer is where the sun's energy is released as light. It is the visible "surface" of the Sun Hence refer as the glowing surface of Sun.

72. In a projectile motion, the horizontal range achieved is same whether the body is projected at theta and _____.
- 180 degree minus theta
 - 60 degree minus theta
 - 120 degree minus theta
 - 90 degree minus theta

Ans. D

Sol. Projectile motion is a type of motion in which an object moves along a curved path under the action of gravity. A projectile launched on level ground with an initial speed V_0 at an angle θ above the horizontal will have the

- Same range as a projectile launched with an initial speed V_0 at $90^\circ - \theta$.
- Maximum range when $\theta = 45^\circ$.

73. Device used for the detection and measurement of all types of radiation (alpha, beta and gamma)
- Geiger counter
 - Polarimeter
 - Calorimeter
 - Radiometer

Ans. A

Sol. Geiger counter is used for measuring ionizing radiation such as alpha particles, beta particles, or gamma rays. Geiger-Müller tube uses radiation sensors which gives out an electronic signal when radiation is present which is displayed in "counts per second". And its unit is Sievert.

74. If a ball is thrown up, which of the following does not change?
- Acceleration
 - Speed
 - Potential energy
 - Distance

Ans. A

Sol.

- When a ball is thrown up, **acceleration does not change**. Acceleration is the rate of change of velocity.
- The acceleration does not change due to the presence of air resistance

and gravitational force which pulls the ball downwards with the same acceleration in which the ball goes up.

- So, the acceleration remains g towards earth.
75. If a body is moving on a circular path (uniform circular), what is its average velocity if it completes one cycle in one second?
- A. Average velocity depends upon time taken to complete one cycle
B. One
C. Average velocity is same as average speed
D. Zero

Ans. D

Sol.

- If a body is moving on a circular path, the average velocity of the body when it completes one cycle in one second would be zero.
- Car moving in uniform circular motion is moving around the

perimeter of the circle with a constant speed and velocity changing with a constant magnitude but different direction hence average velocity would be zero.

76. What is the unit of the physical quantity Entropy?
- A. watt per kelvin
B. newton per kelvin
C. pascal per kelvin
D. joule per kelvin

Ans. D

Sol. Joule per Kelvin is the unit for physical quantity Entropy. The thermodynamic entropy therefore has the dimension of energy divided by temperature, and the unit joule per Kelvin. Entropy is related to the number of microscopic configurations Ω that a thermodynamic system can have when in a state as specified by some macroscopic variables.

77. Light rays enter the eye through the outer, transparent structure at the front of the eye called the _____.

- A. Lens B. Iris
C. Cornea D. Optic nerve

Ans. C

Sol.

• Light rays enter the eye through the outer, transparent structure at the front of the eye called **Cornea**.

• The cornea serves as a protective covering for the front of the eye and also helps focus light on the retina at the back of the eye.

78. What is the SI unit of pressure?

- A. Ohm B. Pascal
C. Volt D. Ampere

Ans. B

Sol.

• **The Pascal is the SI unit of pressure.**

• The unit, named after **Blaise Pascal**.

• It is defined as one newton per square metre.

79. Which force helps swimmers float in water?

- A. Muscular force B. Frictional force
C. Buoyant force D. Magnetic force

Ans. C

Sol.

Buoyant forces help swimmers float in water.

* The buoyant force acts through the center of buoyancy, which is the centroid of the immersed part of the object - this is the volume of water that is displaced by the object.

* Note here that for balancing body in swimming the buoyancy force must pass through the center of mass.

* There are major four forces that apply to swim that are- **the Buoyant Force, Weight, Drag Force and Thrust Force.**

* There are four major techniques used for swimming. They are- **Front Crawl (freestyle), Breaststroke, Backstroke, and Butterfly stroke.**

80. Hertz is the SI unit of which of the following?

- A. Frequency B. Force
C. Pressure D. Energy

Ans. A

Sol.

• **The hertz is the derived unit of frequency** in the International System of Units (SI).

• It is defined as cycles per one second.

• It is named after Heinrich Rudolf Hertz.

• Heinrich Rudolf Hertz was the first person to provide conclusive proof of the existence of electromagnetic waves.

81. Who among the following coined the term “battery” to describe linked capacitors?

- A. Benjamin Franklin
B. Luigi Galvani
C. John Frederic Daniell
D. Lewis Urry

Ans. A

Sol.

* **In 1749, Benjamin Franklin** coined the term “battery” to describe linked capacitors.

* As an inventor, Benjamin Franklin is known for the lightning rod, bifocals, and the Franklin stove, among other inventions.

* He was an American Scientist.

* **Batteries** are a collection of one or more cells whose chemical reactions create a flow of electrons in a circuit.

82. What is the heat generated (in J) in a heating element of resistance 900Ω when a current of 0.3 A passes through it for 10 seconds?

- A. 2700 B. 810
C. 405 D. 1350

Ans. B

Sol. The heating effect produced by an electric current I through a conductor of resistance R for a time t is given by

$$H = I^2 R t$$

Here $I = 0.3 \text{ A}$; $R = 900 \text{ ohm}$; $t = 10$ seconds

$$H = .3 \times .3 \times 900 \times 10$$

$$H = 810 \text{ J}$$

83. The phenomenon which causes mirage is _____.

- A. Total internal reflection
- B. Diffraction
- C. Polarisation
- D. Interference

Ans. A

Sol.

- The phenomenon which causes mirage is Total internal reflection.
- A Mirage is an optical phenomenon or an optical illusion caused due to refraction of light.
- Mirage happens in desert areas where people see water near the horizon and try to get it, but as they go closer, water goes further. This is because actually there is no water.

84. If a star is bigger than Sun, but not more than twice as big, it will turn into a _____.

- A. Pulsar
- B. Maxima
- C. Avenger
- D. Discover

Ans. A

Sol.

- A **pulsar** is a highly magnetized, rotating neutron star (white dwarf) that emits a beam of electromagnetic radiation. They are spherical, compact objects that are about the size of a large city but contain more mass than the sun. They are used to study extreme states of matter, search for planets beyond Earth's solar system and measure cosmic distances.
- Pulsars also could help scientists find gravitational waves.
- If a star is bigger than Sun, but not more than twice as big, when it collapses then it will turn into a Pulsar.

85. The slope of a Distance-Time graph shows _____.

- A. Acceleration
- B. Momentum
- C. Mass
- D. Speed

Ans. D

Sol. • The slope of a Distance-Time graph shows speed in a particular direction. Slope represents as the ratio of the change in y axis to the corresponding change in x axis.

86. Law of gravitation applies to _____.

- A. Any pair of bodies
- B. The earth and the moon
- C. The planets around the Sun
- D. The earth and the objects on earth

Ans. A

Sol. Newton's law of universal gravitation applies to any pair of bodies. It states that a particle attracts every other particle in the universe using a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers.

87. The energy in reflected light _____.

- A. does not depend on the angle of incidence
- B. increases with the increase in angle
- C. decreases with the increase in angle of incidence
- D. becomes maximum for angle of incidence equal to 45°

Ans. B

Sol.

- The amount of incident-wave energy that is reflected from a surface depends on the nature of the surface and the angle at which the wave strikes the surface.
- **The amount of wave energy reflected increases as the angle of incidence increases.**

88. The dimensional formula for universal gravitational constant is

- A. $M^{-1}L^3T^2$ B. $M L^2T^{-2}$
C. M^{-2} D. $M^{-1}L^3T^{-2}$

Ans. D

Sol.

- The gravitational constant, approximately **$6.674 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$** .
- It usually appears in Newton's law of universal gravitation, and in Albert Einstein's general theory of relativity.
- It is also known as the universal gravitational constant.
- The dimensional formula for universal gravitational constant is **$M^{-1}L^3T^{-2}$** .

89. Atmospheric pressure is measured by _____.

- A. Barometer B. Hexameter
C. Nanometer D. Glaxometer

Ans. A

Sol. Atmospheric pressure is measured by barometer. Barometer was invented by Evangelista Torricelli in the year 1643. Atmospheric pressure changes with distance above or below sea level, a **barometer** can also be used to measure altitude.

90. What are the two kinds of Rotatory motion?

- A. Spin and Vibrational motion
B. Spin and Orbital motion
C. Spin and Translatory motion
D. Spin and Projectile motion

Ans. B

Sol. Two kinds of Rotatory motion are Spin and Orbital motion. However in a rotational motion an object moves around an axis passing through its body. Say the rotation of earth, earth rotates around an axis passing through both of its poles (north pole and south pole).

91. Who invented the contact lens?

- A. Enrico Fermi
B. Adolf Gaston Eugen Fick

- C. Sandford Fleming
D. Benoit Fourneyron

Ans. B

Sol. Adolf Gaston Eugen Fick invented the contact lens. He was a German ophthalmologist. In 1888, he constructed and fitted what was to be considered the first successful model of a contact lens: an afocal scleral contact shell made from heavy brown glass, which he tested first on rabbits, then on himself, and lastly on a small group of volunteers.

92. Which of the following is caused by atmospheric refraction of light ?

- A. Mirage
B. Twinkling of stars at night
C. Sun appearing higher in the sky than it actually is
D. All of these

Ans. D

Sol. All of these are caused by atmospheric refraction of light.

93. Elasticity of demand with respect to price is

A. elasticity = $\frac{\% \text{ change in demand}}{\% \text{ change in price}}$

B. elasticity = $\frac{\% \text{ change in price}}{\% \text{ change in demand}}$

C. elasticity = $\frac{\% \text{ change in demand}}{\% \text{ change in supply}}$

D. elasticity = $\frac{\% \text{ change in supply}}{\% \text{ change in price}}$

Ans. A

Sol. Price elasticity of demand (PED or Ed) is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price. The formula for the coefficient of price elasticity of demand for a good is

$$: e_{(R)} \text{ where } e_{(R)} = \frac{dQ / Q}{dP / P}$$

Elasticity of demand; $dQ/Q = \% \text{ change in demand}$ and $dP/P = \% \text{ change in price}$

94. Who Invented Induction Coil?

- A. Edwin Howard Armstrong
- B. John Barber
- C. Edwin Beard Budding
- D. Nicholas Callan

Ans. D

Sol.

- **Nicholas Callan invented the Induction Coil.**
- It is the first type of transformer and used to produce high-voltage pulses from a low-voltage direct current (DC) supply. To create the flux changes necessary to induce a voltage in the secondary coil, the direct current in the primary coil is repeatedly interrupted by a vibrating mechanical contact called an interrupter.

95. The motion of a body that repeats itself after a regular interval of time is

- A. Periodic motion
- B. Simple harmonic motion
- C. Rotary motion
- D. Oscillatory motion

Ans. A

Sol. Periodic motion, in physics, **motion** repeated in equal intervals of time. **Periodic motion** is performed, for example, by a rocking chair, a bouncing ball, a vibrating tuning fork, a swing in **motion**, the Earth in its orbit around the Sun, and a water wave.

96. For every action, there is an equal and opposite reaction, is Newton's

_____?

- A. First law
- B. Second law
- C. Third law
- D. Fourth law

Ans. C

Sol.

- For every action, there is an equal and opposite reaction is Isaac Newton's third law of motion.
- However the third law states that when one body exerts a force on a

second body, the second body simultaneously exerts a force equal in magnitude and opposite in direction on the first body.

- In totality he has given three laws relating to the motion of the body and forces acting upon it.

97. Which of the following is the SI unit of temperature?

- A. Kelvin
- B. Reaumur scale
- C. Candela
- D. Ampere

Ans. A

Sol.

a) **Kelvin** is the SI unit of the temperature and it is represented by 'K'.

b) **0 kelvin = 273.15 degree celsius.**

c) The degree or intensity of heat present in a substance or object, especially as expressed according to a comparative scale is called temperature.

98. The audible range of sound for an average adult human being is _____.

- A. 2 Hz - 20000 Hz
- B. 2 Hz - 2000 Hz
- C. 20 Hz - 2000 Hz
- D. 20 Hz - 20000 Hz

Ans. D

Sol.

a) 20Hz- 20000Hz is the audible range of sound for an average adult human being.

b) **Human infants** can actually hear frequencies **slightly higher than 20 kHz**, but lose some high-frequency sensitivity as they mature and the upper limit in **average adults** is often closer to **15–17 kHz**.

c) The SI unit of audio frequency is the **hertz (Hz)**.

99. The waves used in radar systems are _____ waves.

- A. ultraviolet
- B. infrared
- C. micro
- D. radio

Ans. D

Sol.

a) **Radio waves** are used in Radar systems. The full form of **RADAR** is **RA**dio **D**etection **A**nd **R**anging.

b) It is a type of a detection system that uses radio waves to determine the range, angle or velocity of objects.
c) Some other uses of radio waves are broadcasting and television, and navigation and air-traffic control. It is even used in remote-controlled toys.
100. Rusting of iron is an example of _____.

- A. combustion B. corrosion
C. evaporation D. condensation

Ans. B

Sol.

- Rusting of iron is an example of **corrosion**.
- The term 'rusting' is generally used to refer to the corrosion of objects that are made of iron or iron-alloys.
- Rust is an iron oxide (a usually red oxide).
- It formed by the redox reaction of iron and oxygen in the presence of water or air moisture.

101. When pressure is applied to a fluid, the pressure change is transmitted to every part of the fluid without any loss. Which one of the following laws explains this phenomenon?

- A. Hooke's Law B. Bernoulli's Law
C. Avogadro's Law D. Pascal's Law

Ans. D

Sol.

The statements of laws given in options are as follows:

* **Pascal's Law** -When pressure is applied to a fluid, the pressure change is transmitted to every part of the fluid without any loss.

* **Hooke's Law**- The force needed to extend or compress a spring by some distance is proportional to that distance.

* **Bernoulli's Law**- An increase in the speed of a fluid occurs simultaneously with a decrease in static pressure or a decrease in the fluid's potential energy.

* **Avogadro's Law**- The volume of a gas is directly proportional to the amount of gas at a constant temperature and pressure.

102. Which of the following are the highest-frequency electro magnetic waves?

- A. Gamma Rays B. Radio Waves
C. Ultraviolet Rays D. Microwaves

Ans. A

Sol.

• **Gamma rays** have the highest energies, the shortest wavelengths, and the highest frequencies.

• **Radio waves**, on the other hand, have the lowest energies, longest wavelengths, and lowest frequencies of any type of electro magnetic radiation.

103. With reference to Remote Sensing Technology, what does LIDAR stand for?

- A. Light Detection and Ranging
B. Light Direction and Revolving
C. Light Dimension and Reflection
D. Light Distraction and Refraction

Ans. A

Sol.

* LIDAR stands for **Light Detection and Ranging**. It is also called **3D laser scanning**.

* It is commonly used to make high-resolution maps.

104. The SI unit of radioactivity is _____ .

- A. Ampere B. Becquerel
C. Decibel D. Cobolt

Ans. B

Sol.

a) **Becquerel** is the SI unit of radioactivity.

b) 1 becquerel = 1 radioactive decay per second .

c) An older radioactivity unit is the curie (Ci) and named after Pierre and Marie Curie.