UNITS – WORKSHEET – C

1. The unit of energy in MKS system is
a) Volt b) Erg c) Ohm d) Joule

2. 'Light Year' is
a) The time which Sun rays take to reach the Earth
b) The year in which February has 29 days
c) The distance travelled by light in one year
d) The time in which a spacecraft reaches Moon from the Earth

3. Light year is
a) the distance travelled by light in free space in one year
b) light emitted by the sun in one year
c) time taken by light to travel from sun to earth
d) time taken by earth to go once around the sun

4. Which one of the following is **not** a dimensionless quantity?
a) Frequency b) Strain c) Relative density d) Angle

5. Which of the following systems of units is **not** based on units of mass, length and time alone?
a) CGS b) SI c) MKS d) FPS

6. The numerical ratio of displacement to the distance covered is always.
a) equal to or less than one b) less than one
c) equal to one d) equal to or greater than one

7. Which of the following is **not** a fundamental unit?
a) metre b) newton c) kilogram d) second

8. A passenger in a moving train tosses a five rupee coin. If the coin falls behind him, then the train must be moving with a uniform
a) speed b) acceleration c) deceleration d) velocity

9. The unit of the force is
a) Newton b) Faraday c) Fermi d) Rutherford

10. How many watts are there in a horsepower?
a) 746 b) 1000 c) 750 d) 748

ANSWERS

1. D

- Joule is a unit of energy and is indicated by 'J' in MKS System.
- It is expressed as the work required to produce one watt of power for one second.
- Joule is the unit of work/energy; in the International System of Units or (SI).

2. Answer: (c)
Light-year is the distance light travels in one year.
Light zips through interstellar space at 186,000 miles (300,000 kilometres) per second and 5.88 trillion miles (9.46 trillion kilometres) per year.

3. A
A light-year, alternatively spelt lightyear, is a large unit of length used to express astronomical distances and is equivalent to about 9.46 trillion kilometres (9.46×1012 km), or 5.88 trillion miles (5.88×1012 mi).
As defined by the International Astronomical Union (IAU), a light-year is a distance that light travels in a vacuum in one Julian year (365.25 days).
Because it includes the time-measurement word "year", the term light-year is sometimes misinterpreted as a unit of time.
The way to calculate the light-year distance is henceforth explained:
299792458 x 60 x 60 x 24 x 365.25
Where:

- 299 792 458 is the number of meters light travels in one second.
- 60 is the number of seconds in a minute.
- The other 60 is the number of minutes in an hour.
- 24 is the number of hours in a day.
- 365.25 is the number of days in a Julian year.

4. A
A **dimensionless quantity** (also known as a bare, pure, or scalar quantity as well as a quantity of dimension one).

It is a quantity to which no physical dimension is assigned, with a corresponding SI unit of measurement of one (or 1), which is not explicitly shown. Dimensionless quantities are widely used in many fields, such as mathematics, physics, chemistry, engineering, and economics. Dimensionless quantities are distinct from quantities that have associated dimensions, such as time (measured in seconds).

Dimensionless units are dimensionless values that serve as units of measurement for expressing other quantities, such as radians (rad) or steradians (sr) for plane angles and solid angles, respectively. For example, the optical extent is defined as having units of metres multiplied by steradians.

5. B
i. CGS - **centimetre-gram-seconds**

The centimetre–gram–second system of units (abbreviated CGS or cgs) is a variant of the metric system based on the centimetre as the unit of length, the gram as the unit of mass, and the second as the unit of time.

ii. SI - **standard international system**

S.I system (standard international system). In this system, the units of mass, length and time are the same, as that of the M.K.S system. However, it is an enlarged system encompassing all fundamental units.

iii. MKS - **metre-kilogramme-second**

THE M.K.S. (metre-kilogramme-second) system of units is increasingly being. used by electrical engineers, particularly by those concerned with light-current and microwave work. The adoption of this system into the technical communications of physics and electrical engineering varies considerably.

iv. FPS - **foot-pound-second**

The foot-pound-second (fps) system of units is a scheme for measuring dimensional and material quantities. The fundamental units are the foot for length, the pound for weight, and the second for time. The fps system has two variants, known as the American version and the Imperial version.

6. A
Since displacement is always less than or equal to distance but never greater than distance.
Hence, the numerical ratio of displacement to the distance covered is always equal to or less than one.

7. B
Fundamental unit:
The SI unit of a fundamental quantity is called a fundamental unit.
There are 7 fundamental quantities and their fundamental units.
The fundamental quantities are Length, Mass, Time, Electric Current, Thermodynamic Temperature, Luminous Intensity, etc.

8. B
Acceleration Definition:

the act or process of moving faster or happening more quickly: the act or process of accelerating or ability to accelerate

- It is the time rate of change of velocity of a body.
- It is a vector quantity.
- Its SI unit is m/s^2.

The correct explanation for the problem:

When the coin toss, it also has the same velocity as the velocity of the train but during the time, the coin is in the air, the velocity of the train keeps on increasing, and hence it falls behind the passenger.

9. A
Newton, an absolute unit of force in the International System of Units (SI units), abbreviated N. It is defined as that force necessary to provide a mass of one kilogram with an acceleration of one metre per second per second.

10. A
A power level of 1 hp is approximately equivalent to 746 watts (W) or 0.746 kilowatts (kW). To convert from horsepower to watts, multiply by 746.

To convert from watts to horsepower, multiply by 0.00134.