INSPIRATION PUBLIC SCHOOL
UNIT TEST- I (2025-26)
CLASS: XI
PHYSICS (SUBJECT CODE-042)

Time – 01 hour | M.M. : 20

SECTION A: MCQS QUESTION

Q1- Which of the following pairs has the same dimensions? (1)

A. Force and pressure
B. Torque and work
C. Momentum and energy
D. Impulse and power

Q2- Which physical quantity has the dimensions of $[M^0 L^0 T^{-1}]$? (1)

A. Velocity
B. Frequency
C. Time
D. Acceleration

Q3- A particle starts from rest and moves with uniform acceleration. What is the ratio of distances covered in the 2nd second and the 3rd second? (1)

A. 5:7
B. 3:5
C. 7:5
D. 1:2

Q4- SI unit of gravitational potential is: (1)

A. J
B. J/kg
C. N·m
D. N/kg

SECTION B: ASSERTION & REASONING QUESTION

Q5- *Assertion (A): The displacement of an object can be zero even if it has travelled a certain distance.*
Reason (R): Displacement is a vector quantity that depends on the initial and final positions of the objects. (1)
Options:

A. *Both A and R are true, and R is the correct explanation of A*
B. *Both A and R are true, but R is not the correct explanation of A*
C. *A is true but R is false*
D. *A is false but R is true*

Q6- *Assertion (A): A physical quantity with the dimensional formula* $[ML^{-1}T^{-2}]$ *can represent energy density.*
Reason (R): Energy density is defined as energy per unit volume, and its dimensional formula can be derived from the formula for energy divided by volume. (1)

SECTION C: CASE-BASED QUESTION

Q7- A police van is chasing thief's car with a speed of 30 km/hr, Fires a bullet at a thief's car speeding away in the same direction with the speed of 192 km/hr. If the muzzle speed of bullet is 150m/s, with what speed does the bullet hit the thief's car ? (2)

Q8- A car covers a distance of 100 m in 5 s, starting from rest under uniform acceleration. Find the acceleration. (2)

Q9- The velocity v of a particle is given by: $v = a t^2 + bt + c$. Find the dimensions of a, b, and c. (2)

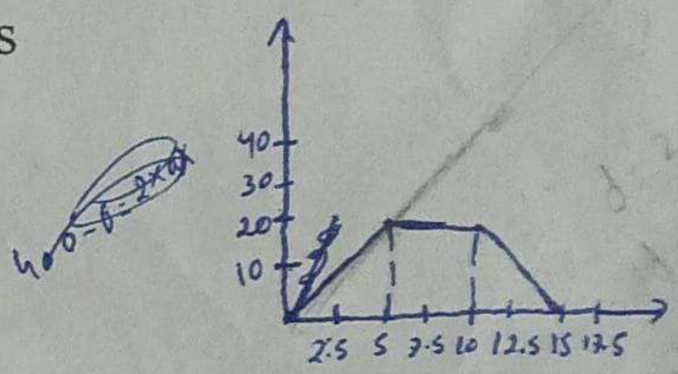
Q10- A train attains a velocity of 30 m/s in 10 s under uniform acceleration. (3)

a. What is its acceleration?
b. How much distance does it cover?
c. What is the average velocity?

SECTION E: GRAPH-BASED QUESTION – MOTION IN ONE DIMENSION

Q11- *A body moves with the following pattern:* (5)

0–5 s: accelerates uniformly from 0 to 20 m/s
5–10 s: constant velocity at 20 m/s
10–15 s: decelerates uniformly to 0



a. Find the total distance covered.
b. Find the acceleration in the first 5 s.
c. Find the retardation in the last 5 s.
d. Draw the displacement-time graph.
e. State whether the motion is uniform or non-uniform, and explain.