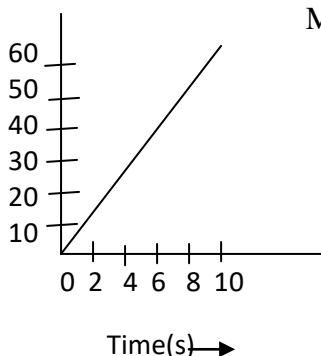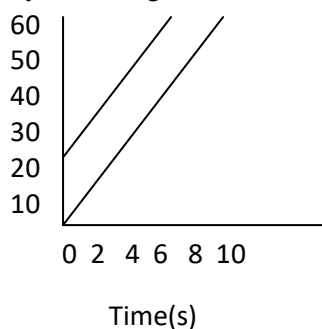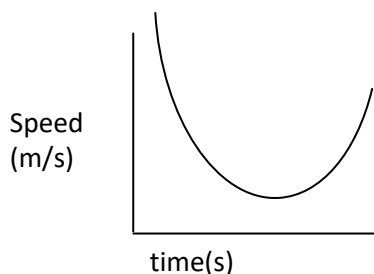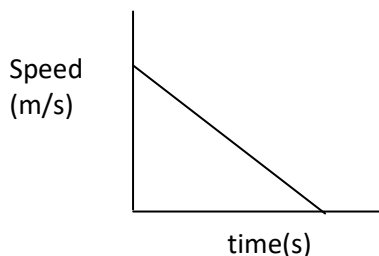# CLASS- IX
PHYSICS
HOTS Questions (2017—18)

1.

Make a velocity-time graph from the following displacement-time graph:

2. A bridge is 500m long. A 100m long train crosses the bridge at a speed of 30m/s. Find the time taken by train to cross it.

3. Study following distance-time graph and compare the velocity of the two objects.

4. What do the speed- time graphs shown here indicate?

5. Why mass is called the measure of inertia?

6. Athletes in pole jump events fall on cushioned surface and not on floor. Why?

7. Does Newton's third law apply to a system where bodies do not actually touch each other?

8. Using second law of motion, derive the relation between force and acceleration. A bullet of 10g strikes a sand bag at a speed of 1200m/s and gets embedded after travelling 5cm. Calculate (i) the resistive force exerted by sand on the bullet. (ii) the time taken by bullet to come to rest.

9. If the engine of a car provides an acceleration of $2 m/s^2$ to start it from rest then assuming the mass to be roughly 1000kg. Calculate (i) force provided by the engine. (ii) Velocity after 10s. (iii) Time after which the car comes to rest if the engine is turned off after 15 secs. (take frictional force as 15N)

10. A particle weighs 120N on the surface of the earth. At what height above the earth's surface will its weight be 30N? Radius of earth = 6400km.

11. Ishita noted down the following observations in her notebook.
    (i)Weight of the stone in air=280 g-wt.
    (ii) Weight of the stone in water=240 g-wt.
    (iii) Weight of the stone in salty water=190 g-wt.
    Find the relative density of salty water.

12. A machine makes a man move with high velocity of 30 m/s. Determine the total mechanical energy of the man weighing 60 kg, if he is on a height of 50 m at this speed.(take $g=10 m/s^2$)

13. Ocean waves of time period of 0.01s have a speed of 15m/s. Calculate the wavelength of these waves. Find the distance between a crest and adjoining trough.

14. A nail was gently touched by the hammer and then was hit harder.
    (i)When will be the sound created louder?
    (ii)Which characteristic of sound here is responsible for change in sound?
    (iii)Give the SI unit of loudness.

15. (i)Define relative density. Give its mathematical form.
    (ii)The mass of an iron cube having an edge length 1.5cm is 50g.Find its density.
    (iii)The volume of a 250 g sealed tin is 400 cubic cm. Find the density of the tin in g/cc. State, if the object would sink or float in water.