

SUMMATIVE ASSESSMENT –I (2011)
SCIENCE -SC1 QP 470011
Class – IX (Physics)

Time allowed: 1 hour

Maximum Marks: 30

General Instructions:

- (i) The question paper comprises of two sections, A and B. You are to attempt both the sections.
- (ii) All questions are compulsory.
- (iii) There is no overall choice. However, internal choice has been provided in all the five questions of five marks category. Only one option in such questions is to be attempted.
- (iv) All questions of section A and all questions of section B are to be attempted separately.
- (v) Questions 1 to 3 in section A are one mark questions. These are to be answered in one word or in one sentence.
- (vi) Questions 4 to 7 in section A are two marks questions. These are to be answered in about 30 words each.
- (vii) Questions 8 to 19 in section A are three marks questions. These are to be answered in about 50 words each.
- (viii) Questions 20 to 24 in section A are five marks questions. These are to be answered in about 70 words each.
- (ix) Questions 25 to 42 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to select one most appropriate response out of the four provided to you.

Section A

2. Why is glass or chinaware packed with straw ?

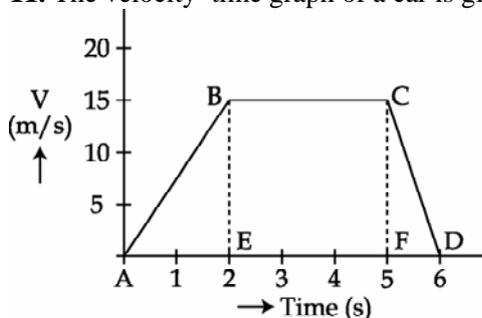
5. State universal law of gravitation. Express it mathematically

10. (a) What is acceleration ? Write its unit.

(b) Draw velocity-time graph, when an object has

(i) uniformly accelerated velocity. (ii) uniformly retarded velocity.

11. The velocity–time graph of a car is given below. The car weighs 1000 kg.



(i) What is the distance travelled by the car in the first 2 seconds ?

(ii) What is the braking force at the end of 5 seconds to bring the car to a stop within one second?

12. Prove that if a body is thrown vertically upward, the time of ascent is equal to the time of descent.

13. A man throws a ball of mass 0.5 kg vertically upward with a velocity of 25 m/s. Find :

(a) the initial momentum of the ball

(b) momentum of the ball at the half way mark of the maximum height (given $g=10 \text{ m/s}^2$)

14. Calculate the force of gravitation between the earth and the sun. [Given that the mass of the earth= $6 \times 10^{24} \text{ kg}$, mass of the sun= $2 \times 10^{30} \text{ kg}$, average distance between the two is $1.5 \times 10^{11} \text{ m}$ and $G=6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$].

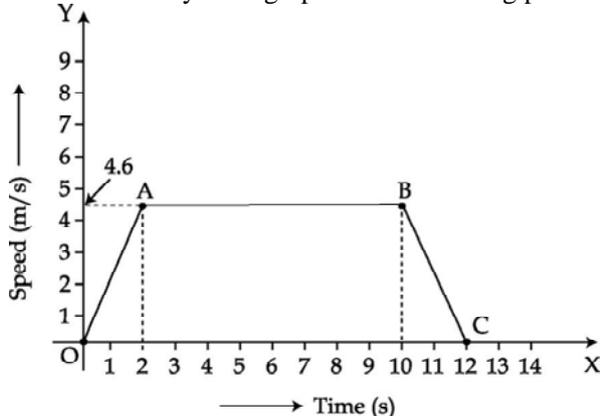
22. (a) How much momentum will an object of mass 10 kg transfer to the floor, if it falls from a height of 0.8 m ? ($g=10 \text{ m/s}^2$)

(b) Explain why is it difficult for a fireman to hold a hose, which ejects large amount of water at a high velocity.

OR

(a) State Newton's second law of motion. Apply this law to obtain the unit of force and define it. (b) State the Law of Conservation of Momentum. Apply this law to explain the recoil of a gun, when a shell is fired from it.

23. The velocity-time graph of an ascending passenger lift is as in the figure shown below.



(i) Identify the kind of motion of lift represented by lines OA and BC.

(ii) Calculate the acceleration of the lift :

(a) During the first two seconds.

(b) Between the 3rd and 10th second.

(c) During the last two seconds.

OR

(a) Draw velocity –time graph for the following cases:

(i) When the object is at rest

(ii) When the object is thrown vertically upwards

(b) A motorcyclist riding motorcycle A who is traveling at 36 km/h applies the brakes and stops the motorcycle in 10s. Another motorcyclist of motorcycle B who is traveling at

18 km/h applies the brakes and stops the motorcycle in 20s. Plot speed-time graph for the two motorcycles. Which of the two motorcycles traveled farther before it come to a stop ?

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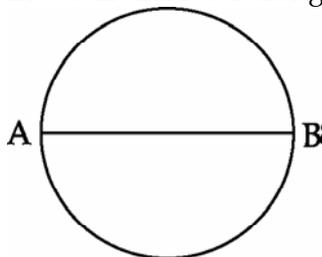
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Section A

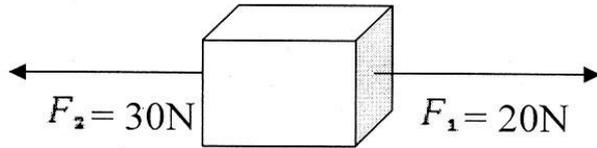
2. In a high jump athletic event the athletes are made to fall on a cushioned bed. Why ?
5. The earth attracts the moon. Does the moon also attract the earth ? If it does, why does the earth not move towards the moon ?
10. A circular track has a circumference of 1570 m with AB as one of its diameter. A scooterist moves from A to B along the circular path with a uniform speed of 5 m/s. Find the :



- (a) distance covered by the scooterist,
- (b) displacement of the scooterist (Given $\pi=3.14$),

(c) time taken by the scooterist in reaching from A to B.

11. Two forces F_1 and F_2 are acting on an object as shown in the figure.



(i) What is the net force acting in the object ?

(ii) What is the direction of the net force acting on the object ?

(iii) If the mass of body is 10 kg what will be the acceleration produced in it ?

12. A ball is thrown vertically upwards and reaches a maximum height in 3 seconds. Find :

(a) The velocity with which it was thrown upwards.

(b) the maximum height attained by the ball.

13. (a) Mention any two examples which can be explained on the basis of third law of motion.

(b) A hammer of mass 500 g moving at 50m/s, strikes a nail. The nail stops the hammer in a very short time of 0.01s. What is the force of the nail on the hammer ?

14. An imaginary planet has a mass 5 times and radius 3 times that of earth. What is the acceleration due to gravity on the planet, if the acceleration due to gravity on earth is 10 m/s^2 ?

22. (a) State Newton's 1st and 3rd law of motion.

(b) A car of mass 1800 kg moving with a speed of 10 m/s is brought to rest after a covering a distance of 50 m. Calculate the force acting on the car.

OR

(a) State Newton's second law of motion. How this law can be used to measure force acting on an object ?

(b) From a rifle of mass 4 kg a bullet of mass 50 g is fired horizontally with an initial velocity of 40 m/s. Calculate the initial recoil velocity of the rifle.

23. An object starts linear motion with a velocity ' u ' and under uniform acceleration ' a ' it acquires a velocity ' v ' in time ' t '. Draw its velocity time graph. From this graph obtain the following equations.

(a) $v = u + at$

(b) $s = ut + \frac{1}{2}at^2$

OR

(a) Draw the shape of velocity-time graph of a uniformly accelerated motion of a body.

(b) Derive the velocity-position equation of motion ($v^2 - u^2 = 2aS$) graphically (with the help of a velocity-time graph)

SUMMATIVE ASSESSMENT –I (2011)
SCIENCE-SC1 QP 470017
Class – IX (Physics)

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- (ix) Questions 25 to 42 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to select one most appropriate response out of the four provided to you.

Section A

- 2.** In a high jump athletic event the athletes are made to fall on a cushioned bed. Why ?
- 5.** Differentiate between (one difference in each case)
 - (a) g and G
 - (b) Mass and weight
- 10.** Define acceleration. A car accelerates from 5 m/s to 15 m/s in 10 seconds. Calculate the acceleration and, the distance covered by the car during this time interval.
- 11.** (a) Define the term 'Inertia'. Name the physical quantity which is its measure.
 - (b) Why do you fall in the forward direction when a moving bus brakes to a stop and fall

backwards when it accelerates from rest ?

12. Two stones A and B are dropped from a multistoried building. A is dropped from 100 m and after some time B is dropped from 50 m height. Both of them reach the earth at the same time. Will they have equal velocity while reaching the ground ? Calculate and find out the answer (take $g = 10 \text{ m/s}^2$)

13. What is force ? What are the effects of force ? When is a force said to be an unbalanced force?

14. An imaginary planet has a mass 5 times and radius 3 times that of earth. What is the acceleration due to gravity on the planet, if the acceleration due to gravity on earth is 10 m/s^2 ?

22. (a) If the mass of a body is doubled, what happens to its acceleration when acted upon by the same force ? Justify your answer.

(b) It is easier to stop a tennis ball than a cricket ball moving with the same speed. Why ?

(c) A girl of mass 40 kg jumps with a horizontal velocity of 5 m/s on to a stationary cart with frictionless wheels. The mass of the cart is 10 kg. Find her velocity as the cart starts moving.

Assume that there is no external unbalanced force working in the horizontal direction.

OR

(a) What happens to a person travelling in a bus when the bus takes a sharp turn ? Give reason.

(b) A cricketer moves his hands backwards on catching a fast moving ball. Why ?

(c) A bullet of mass 0.02 kg is fired by a gun of mass 20 kg. If the speed of the bullet is 150 m/s, calculate the recoil speed of the gun ?

23. A body moves with a velocity of 2 m/s for 5 s, then its velocity increases uniformly to 10 m/s in next 5 s. Thereafter its velocity begins to decrease at a uniform rate until it comes to rest after 5 s.

(a) Plot a velocity - time graph for the motion of the body.

(b) From the graph find the total distance covered by the body after 2 s and 12 s.

OR

Two chalk pieces are thrown vertically upwards simultaneously with their initial velocities u_1 and u_2 respectively. Prove that the heights reached by the chalk pieces would be in the ratio of their initial velocities (Take upward acceleration to be $-g$ and downward acceleration to be $+g$)

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Section A

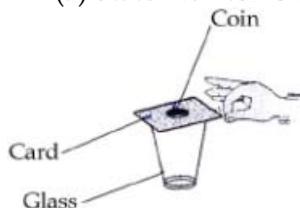
2. Apart from changing the magnitude of velocity of an object (or) changing the direction of motion of an object what other changes can force bring on an object ?

5. Mass of an object is 40 kg, what is its weight on the earth ? (Take $g=10 \text{ m/s}^2$)

10. A car travels from stop A to stop B with a speed of 30 km/h and then returns back to A with a speed of 50 km/h. Find :

- (i) Displacement of the car.
- (ii) Distance traveled by the car.
- (iii) Average speed of the car.

11. (a) State Newton's first law of motion.



(b) In the above experimental set-up, a student gives the card a sharp, fast horizontal flick with a finger.

(i) What will happen to the coin ?

(ii) State reason for your answer.

12. A ball is thrown vertically upwards with a velocity 'u'. Calculate the velocity with which it falls to the earth again.

13.



Look at the diagram above and answer the following questions :

(a) When a force is applied through the free end of the spring balance A, the reading on the spring balance A is 15 gwt. What will be the reading of spring balance B ?

(b) Write reasons for your answer.

(c) Name the force which balance A exerts on balance B and the force of balance B on balance A.

14. (a) Define acceleration due to gravity.

(b) A stone is released from the top of a tower of height 19.6 m. Calculate its final velocity just before touching the ground. (take $g = 9.8 \text{ m/s}^2$)

22. (a) State Newton's Third Law of Motion. Illustrate it with one example.

(b) A revolver of mass 500 g, fires a bullet of mass 10 g with a speed of 100 m/s. Find :

(i) Momentum of the bullet

(ii) Initial momentum of 'revolver and bullet' as a system

(iii) Recoil velocity of the revolver

OR

(a) Define momentum of a body and write its SI units.

(b) State Law of conservation of momentum.

(c) A bullet of mass 'm' is fired with a velocity 'v' from a gun of mass 'M'. Find recoil velocity of the gun.

23. An object starts linear motion with a velocity 'u' and under uniform acceleration 'a' it acquires a velocity 'v' in time 't'. Draw its velocity time graph. From this graph obtain the following equations.

(a) $v = u + at$

(b) $s = ut + \frac{1}{2}at^2$

OR

(a) Draw the shape of velocity-time graph of a uniformly accelerated motion of a body.

(b) Derive the velocity-position equation of motion ($v^2 - u^2 = 2aS$) graphically (with the help of a velocity-time graph)

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Section A

- 2.** An unbalanced force is acting on an object. List the possible effects that will be caused in the motion of object.
- 5.** Write the S.I. unit of G. Why is gravitational constant (G) known as universal constant ?
- 10.** An object is moving with uniform speed in a circle of radius r. Calculate the distance and displacement :
 - (a) When it complete half the circle
 - (b) When it completes full circle
 - (c) What type of motion does the object possess ? (Justify your answer)
- 11.** What happens when we accidentally step on a peel of banana ? Explain with reference to Newton's law of motion.
- 12.** Give three points of differences between mass and weight.
- 13.** (a) State the unit of force and define it.
 - (b) A stone is dropped from the edge of a 4.9 m high roof. Find out the following :
 - (i) Time taken to fall 4.9m ?
 - (ii) Velocity just before it reaches the ground.

(iii) What is its acceleration after 1 s and 2 s from start ?

14. (a) State Universal law of Gravitation.

(b) If the moon attracts the earth, why does the earth not move towards the moon ?

22. (a) Derive an expression to prove the law of conservation of momentum.

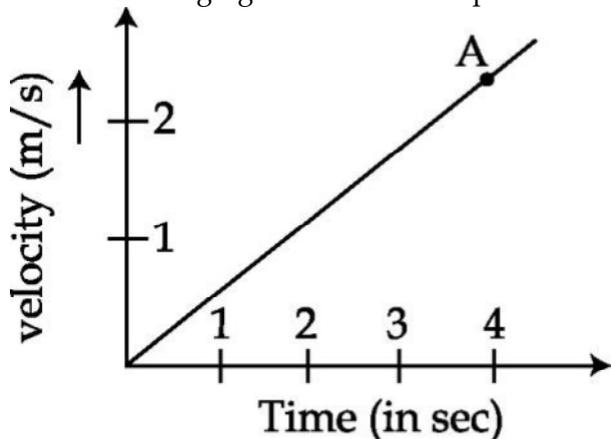
(b) Why does a karate expert suddenly reduce the speed of his hand while striking a slab of ice ? Explain with reference to Newton's law of motion.

OR

(a) State Newton's first law of motion.

(b) A scooter is moving with an initial velocity of 90km/hr and it takes 10s to stop it, after the brakes are applied. Calculate the force exerted by the brakes on the scooter if its mass along with the rider is 200 kg. What would be the force if the mass is halved ?

23. The velocity time graph of a particle of mass 50 gm moving in a definite direction is shown in the following figure. Answer the questions based on this figure :



(a) What is the velocity of the particle at point 'A'.

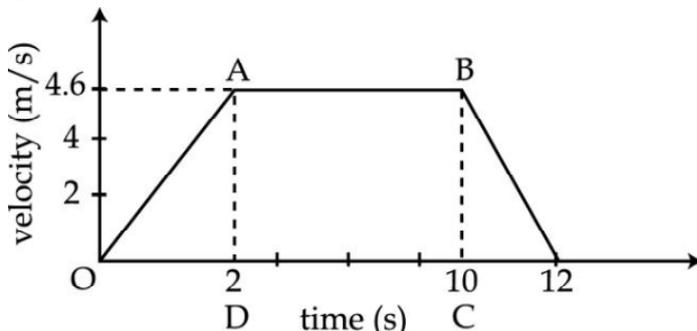
(b) Find the momentum of the particle, at time $t=4$ s.

(c) What does the slope of graph represent ?

(d) Calculate the distance travelled in 4 seconds.

OR

Study the velocity - time graph of an ascending passenger lift in the figure shown below. What is the acceleration of the lift :



(a) During the first two seconds.

(b) between second and tenth second.

(c) during the last two seconds.

(d) Which physical quantity is measured by area under the quadrilateral ABCD ? Calculate it.