St. Mary's Convent Inter College , Prayagraj

First Terminal Examination 2024

Time: 2hrs | **Class – 9** | **M.M :80**

Physics

Name ..... **Roll No**..... **Date**.....

SECTION A [ALL QUESTIONS ARE COMPULSORY]

Question 1

(A) Choose the correct alternative for each of the following questions given below: [15]

i. Which of the following is not a fundamental unit:
   a) metre b) litre
   c) kilogram d) second

ii. The velocity-time graph of a body in motion is a straight line inclined to the time axis. The correct statement is :
   a) Velocity is uniform
   b) Acceleration is uniform
   c) Both velocity and acceleration are uniform
   d) Neither velocity nor acceleration is uniform.

iii. Density of water is maximum at :
   a) 0^0C b) 100^0C
   c) 4^0C d) 10^0C

iv. A vector quantity is :
   a) Work b) Pressure
   c) Distance d) velocity

v. The least count of vernier calipers is :
   a) 1 cm b) 0.001 cm
   c) 0.1 cm d) 0.01 cm

vi. 1 J equal to :
   a) 0.24 cal b) 4.18 cal
   c) 1 cal d) 1 kcal

vii. The length of seconds' pendulum is nearly
   a) 0.5 m b) 9.8 m
   c) 1.0 m d) 2.0 m

viii. The correct equation of motion is
   a) v = u + aS b) v = ut + a
   c) S = ut +1/2 at d) v = u + at

ix. The .....magnetism acquired by a magnetic material when its is kept near a magnetic field is called.....magnetism
   a) Temporary, induced b) Permanent, induced
   c) Temporary, permanent d) None of the above

x. SONAR makes use of
   a) Infrasonic sound b) Ultrasound
   c) Ordinary sound d) light

xi. The force required to produce an acceleration of 5 m/s^2 in a body of mass 2 kg is
   a) 2.5 N b) 10 N
   c) 20 N d) 25 N

xii. The green house gas is
   a) Oxygen b) Nitrogen
   c) Chlorine d) Carbon dioxide

xiii. The correct statement is
   a) Sound and light both require medium for propagation
   b) Sound can travel in vacuum, but light can not
   c) Sound needs medium, but light does not need medium for its propagation
   d) Sound and light both can travel through vacuum

xiv. **Assertion (A)**: two bar magnets attract when they are brought near to each other with the same pole.
Reason (R): unlike poles attract each other
   a) Both A and R are true.
   b) Both A and R are false.
   c) A is false but R is true.
   d) A is true but R is false.

xv. If a body is moving with a uniform retardation, then its acceleration will be
   a) Positive
   b) Negative
   c) Zero
   d) $5m/s^2$

Question 2

i. Complete the following sentences by choosing the correct answers from the bracket. [6]
   a) Time period of a simple pendulum becomes .....[half/double/four times], if its length becomes one-fourth.
   b) .....is the correct equation of motion retarding motion [$v = u + at$/ $v^2 = u^2 - 2aS$/ $S = ut + at^2/2$.]
   c) .....can be used to make electromagnet [steel/copper/soft iron]
   d) Out of the following measuring .....measures accurately.[vernier caliper/ metre scale/screw gauge] instruments
   e) Particles of the medium vibrate.....[parallel/perpendicular/both the direction] in the longitudinal wave.
   f) .....has less inertia[toy car/truck/motor cycle]

ii. Name two substances other than water which contracts on heating. [2]

iii. Deep pond water has its top layer frozen during winter. State the expected temperature of water [2]
   a) Just in contact with ice.
   b) At the bottom of the pond

Question 3

i. What is seconds' pendulum? A simple pendulum completes 40 oscillations in one minute. Find its [3]
   a) Frequency
   b) Time period.

ii. Draw a displacement-time graph of a wave and mark on it the amplitude of the wave by letter 'a' and wavelength 'λ'. [2]

iii. Select the waves of the frequencies which will not be audible to human beings 15Hz, 250 Hz, 100 Hz, 30,000 Hz. [2]

iv. An empty truck and a loaded truck are moving with the same velocity v. On applying brakes, which truck will strop first and why? [2]

v. What will be the magnitude and direction of the reaction force acting on a coin of 10 gm lying on the surface of the floor? [Take $g = 980\ cm/sec^2$] [2]

vi. Can two magnetic field lines intersect? Give reasons for your answer. [2]

vii. What is the approximate diameter of the orbit of earth around the Sun in [2]
   a) AU
   b) In SI unit.

SECTION B [ATTEMPT ANY FOUR QUESTIONS]

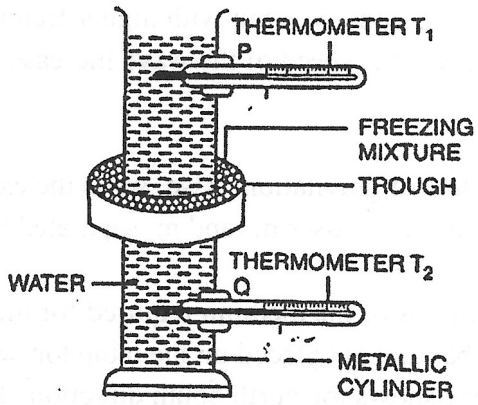
Question 4

a) Differentiate between distance and displacement. [3]

b) Derive graphically for a uniformly accelerated motion the following equation of motion: [3]

$$S = ut + \frac{1}{2}at^2$$

c) The diagram below shows Hope's Experimental set up. The temperature in the metallic cylinder is at 10^0C. The trough is packed with a freezing mixture of ice and salt. [2+2]



i. Which of the two thermometer shows rapid fall in temperature initially T_1 or T_2 and why?

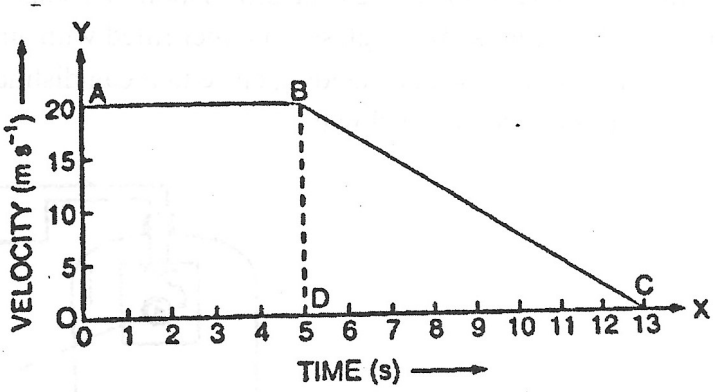
ii. After some time when ice is formed:

1. Will it sink to the bottom of the metallic cylinder?
2. What does it tell about the density of ice in relation to density of water at the bottom?

Question 5

a) State any two properties of magnetic field lines. Give any one evidence which points towards the existence of the Earth's magnetic field. [3]

b) A car travels with a uniform velocity of 20 m/s for 5 sec. the brakes is then applied and the car is uniformly retarded. It comes to rest in further 8 sec as shown in graph below: [3]

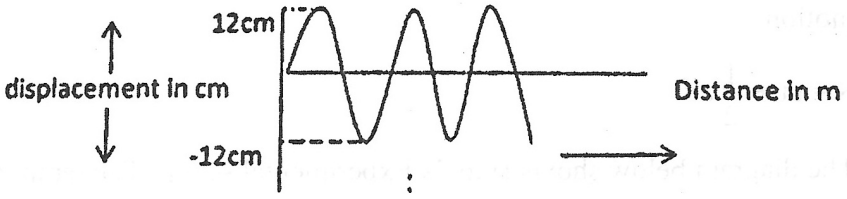


i. Find the distance travelled in first 5 sec.

ii. The distance travelled after the brakes are applied

iii. Acceleration during the first 5 sec and last 8 sec.

c) The figure shows the snapshot of a sound wave in a certain medium at a certain instant [4]



i. What is the amplitude of the wave?

ii. If the velocity of the wave is 4 m/s, calculate the wavelength of the wave if its frequency is 20 Hz.

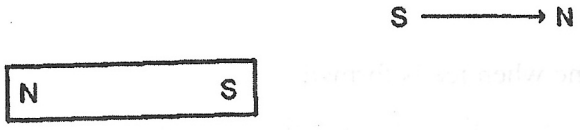
iii. If a wave of same type but with higher frequency is passed in the given medium, will the speed of the wave increases, decreases or remain the same?

Question 6

a) State Newton's law of gravitation. Also, write the expression for gravitational force between two bodies of masses m_1 and m_2 separated by a distance of r between them. [3]

b) State three conditions of the medium required for the propagation of wave. [3]

c) Figure shows a bar magnet placed on the table top with its north pole pointing towards south. The arrows shows the north-south direction. There are no other magnets or magnetic material nearby. [4]



i. Insert two magnetic field lines on the either side of the magnet using arrow head to show the direction of each field.

ii. Indicate by the crosses, the likely positions of the neutral points.

iii. What is the magnitude of the magnetic field at each neutral point? Give a reason for your answer.

Question 7

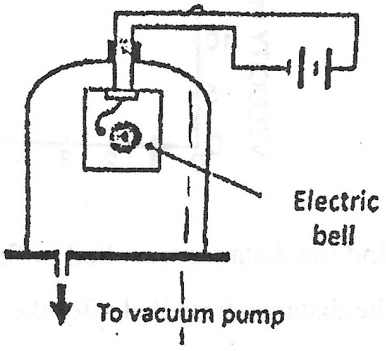
a) [3]

i. What is the main source of energy on earth?

ii. Though tidal energy is a clean source of energy, it is not a major source of energy. Why?

iii. What is the energy transformation in a solar cell?

b) The figure shows a glass container filled with air and having an electric bell kept inside it. A person standing close to it can distinctly hear the bell. Now the air inside is removed slowly. [3]



i. Will the person be able to hear the bell after the air in the container is completely removed? Why?

ii. How does the speed of the sound get affected when there is an increase in moisture in the air?

c) What do you understand by anomalous expansion of water? A given mass of water is cooled from 10^0 C to 0^0 C. State the volume changes observed. Represent these changes on a volume-temperature graph. [4]

Question 8

a) Differentiate between heat and temperature. [3]

b) The weight of the body on earth is 98N, where acceleration due to gravity is 9.8m/s^2. What will be its [3]

i. Mass

ii. Weight on the moon where acceleration due to gravity is 1.6m/s^2.

c) State Newton's 2nd law of motion. Two balls of masses m and 2m are in the motion with velocities v and 2v respectively. Compare their [4]

i. Inertia

ii. Their momentum

Question 9

a) What is an ultrasound? State two properties of ultrasound that makes it useful to us.[3]

b) [3]

i. A soft iron when brought close to a magnet is attracted towards it. Name the phenomenon.

ii. An iron piece is converted into a magnet by passing current through a wire wound around it. Name the magnet.

iii. State any one use of magnet given in (ii).

c) A car acquires a velocity of 72 km/h in 10 sec starting from rest. Calculate: [4]

i. The acceleration

ii. Velocity after 20 sec.

iii. Distance travelled in 10 sec.

iv. Draw a v-t graph for a body moving with uniform acceleration

xxxx