STD: 9   **M.M. : 80**
DATE: **Duration: 90Minutes**

Answer to this paper must be written on the paper provided separately.
You will NOT be allowed to write during the first 15 minutes.
This time is to be spend in reading the question paper.
This time given at the head of this paper is the time allowed for writing the answer.

This paper is divided into 2 Sections. Section-I (40 marks) and Section-II (40 marks).
Section-I is compulsory and in Section-II, 4 questions are to be attempted out of 6 questions. The intended marks for questions or parts of questions are given inbrackets[]

SECTION I (40 Marks)
(Attempts all the questions)

Question 1

a) What is backlash error ? Why is it caused ?   [2]

b) Differentiate between instantaneous speed and average speed   [2]

c) A truck changes its velocity from 10m/s to 25m/s in 5s. Find the acceleration and the distance
    travelled by the truck during this time .   [2]

d) Why does a person fall when he jumps out from a moving train ?   [2]

e) Name the SI unit of force and define it.   [2]

Question 2

a) What is the importance of the law of gravitation ?   [2]

b) The weight of a body on earth is 98 N where acceleration due to gravity is 9.8m/s2. What will be
its mass and weight on the moon where acceleration due to gravity is $1.6m/s^2$?   [2]

c)Why do sea divers need special protective suit ?   [2]

d) Give two reasons why water is not a suitable barometric liquid?   [2]

e) At sea level, the atmospheric pressure is 76cm of Hg.If air pressure falls by 10mm ofHg   [2]
   per 120m of ascent,what is the height of a mountain where the barometer reads 70cm Hg ?

Question 3

a) A body weighs 200gf in air and 190gf when completely immersed in water.Calculate :

1.   the loss in weight of the body in water

2.   the upthrust on the body   [2]

b) Define upthrust. What is the cause of upthrust ?   [2]

   c) A piece of ice floating in a glass of water melts , but the level of water in the glass does   [2]
       not change. Give reason.

d) Differentiate between density and relative density of a substance.   [2]

e) What is a hydrometer ? Name the principle on which it works.   [2]

Question 4

a) State two applications of thermal expansion. [2]

b) What is a green house ? How does the air inside it remain warm ? [2]

c) The temperature of two bodies differ by 10C. How much will they differ on Fahrenheit scale. [2]

d) What causes the rise in atmospheric temperature ? [2]

e) What is the pressure exerted by 75 cm vertical column of mercury of density
13600kg/m^3 in SI units? (take g 9.8m/s^2) [2]

SECTION II (40 Marks)
(Answer any *four* questions from this section)

Question 5

a) A 250m long concrete bridge is subjected to a change of temperature 0f 40°C between winter and summer. Calculate the change in length. [α for concrete = 12 x 10^{-6}/°C [3]

b) A block of ice of R.D 0.915 floats in seawater of R.D 1.025. What fraction of the volume of ice will be exposed above the water ? [3]

c) State and explain the four effects of global warming. [4]

Question 6

a) A cyclist starts from rest and moves with a uniform acceleration to reach a maximum velocity of 4m/s in ½ minute She moves with this constant speed for 5 minutes,then brakes and comes to rest in 10s. Draw the velocity – time graph. From the graph find the initial acceleration and deceleration after braking. [3]

b) A metal cube of side 5cm and density 9.9g/cm^3 is suspended by a thread and is immersed [3] completely in a liquid of density 1.1g/cm^3.Find the tension in the thread

c) Draw a labelled diagram of an acid battery hydrometer and explain how it indicates whether a car battery needs recharging ? [4]

Question 7

a) A stone is dropped into a well and it hits the surface of water after 2s . What is the depth of the well? With what velocity does it hit the water ? (g = 9.8m/s^2) [3]

b)What is an altimeter? State its principle. How is its scale calibrated. [4]

c) A cricket ball of mass 100 g moving with a speed of 30m/s is brought to rest by a player in 0.03s.
Find   1. the change in momentum of the ball
       2. the average force applied by the player. [3]

Question 8

a)The volume of a balloon is 1000m^3. It is filled with helium of density 0.18 kg/m^3. What maxjmum load can it lift ? Density of air is 1.29 kg/m^3. [3]

b) The length of the stem of a hydrometer is 10cm and volume of the stem is 10cm^3.While floating in pure water it sinks to the 5cm mark.The mass of the hydrometer is200 g .What will be the density of the liquid in which the hydrometer sinks to the top of the stem? [3]

c) Distinguish between heat and temperature. [4]

Question 9

a) The volume of a lquid is 830m^3 at 30°C and it is 850m^3 at 90°C .Find the coefficient of volume expansion of the liquid.   [3]

 b) Describe two methods to detect the presence of heat radiation.   [4]

c) When a thermometer is tsken from the melting ice to a warm liquid ,the temperature rises to two fifth of the distance between the lower and the upper fixed points. Find the temperature of the liquid in °C and in K   [3]

Question 10

a) The area of cross section of press plunger of a hydraulic press is 4m^2. Its required to overcome a resistive load of 400kgf on it. Calculate the force required on the pump plunger if the area of cross section of the pump plunger is 0.01m^2.   [3]

b) State the laws of liquid pressure.   [4]

   c) A stone is dropped freely trom the top of a tower and it reaches the ground in 4s. Taking
       g = 10m/s^2 , calculate the height of the tower.   [3]