

SECTION A
(Answer all questions)

Question 1

- a. i) Define measurement.
ii) Which are the parameters used to express the result of a physical quantity? (2)
- b. Differentiate between fundamental units and derived units (two points). (2)
- c. i) Name the S.I unit of length.
ii) Give a multiple unit of length and how is the multiple unit mentioned related to its S.I unit? (2)
- d. i) Define pressure.
ii) Is it a vector or a scalar quantity? (2)
- e. i) State Pascal's law of transmission of pressure.
ii) Calculate the pressure due to a water column of height 150m.
(Take $g = 9.8\text{m/s}^2$ and density of water= 1000 kg/m^3 . (2)

Question 2

- a. i) State Archimedes' principle.
ii) A metal solid cylinder tied to a thread is hanging from the hook of a spring balance. What change is observed in the reading of the spring balance when the cylinder is gradually immersed into water contained in a jar? (2)
- b. The relative density of a substance is 1.02. Find its density in
i) C.G.S. unit
ii) S.I unit (2)
- c. Give reason for a balloon filled with hydrogen
i) rises to a certain height.
ii) stops rising further after reaching a certain height. (2)
- d. A wooden block floats in water with two-third of its volume submerged.
i) Calculate the density of wood.
ii) When the same block is placed in oil, three quarter of its volume is immersed in oil. Calculate the density of oil. (2)
- e. How is upthrust related to the
i) volume of the body submerged in a liquid?

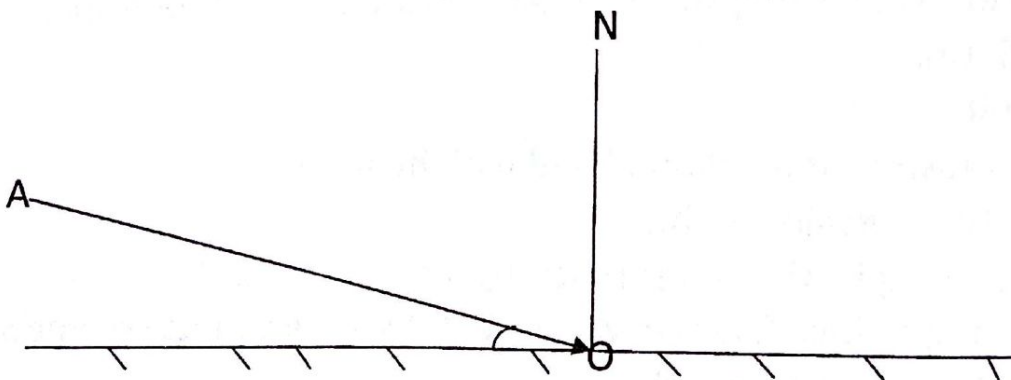
ii) density of the liquid?

Question 3

- a. Differentiate between heat and temperature definition wise and unit wise
- b. i) What do you mean by degradation of energy?
ii) State one advantage of using nuclear energy.
- c. i) Define magnetic induction.
ii) State one limitation of natural magnet.
- d. i) Can two magnetic field lines intersect each other?
ii) Give reason for the answer.
- e. State the positions of neutral points when a magnet is placed with its north pole
 - i) pointing towards geographic north.
 - ii) pointing towards geographic south.

Question 4

- a. State the laws of reflection.
- b. i) Name the mirror which always form a virtual image.
ii) How is the size of the image related to the size of the object?
- c. i) At what maximum distance from a concave mirror, the image can be obtained?
ii) What will be the location of the object for the above?
- d. i) The focal length of a convex mirror is 40cm. A point source of light is kept at distance 40cm from the mirror. Find the maximum distance of image from the mirror.
- e. Figure below shows an incident ray AO and the normal ON on a plane mi



- i) Draw the reflected ray.
- ii) What is the angle between the incident ray and the reflected ray?

SECTION B
(Answer all questions)

Question 5

- a i) State one advantage of an aneroid barometer over a simple barometer.
ii) Give a reason for the use of mercury as a barometric liquid.
iii) How does the atmospheric pressure change with altitude? (3)
- b. Two cylindrical vessels fitted with pistons A and B of area of cross section 8 cm^2 and 320 cm^2 respectively, are joined at their bottom by a tube and they are completely filled with water. When a mass of 4kg is placed on piston A, find
i) the pressure on piston A.
ii) the pressure on piston B.
iii) the thrust on piston B. (3)
- c. i) How does the liquid pressure on a diver change if
a. the diver moves to a greater depth?
b. the diver moves horizontally?
ii) Explain why a gas bubble released at the bottom of a lake grows in size as it rises to the surface of the lake. (4)

Question 6

- a. A light ray is incident normally on a plane mirror.
i) What is the angle of incidence?
ii) What is the angle of reflection?
iii) Draw a diagram to show this. (3)
- b. i) Name the spherical mirror which is used as a rear-view mirror.
ii) Give a reason for using the mirror mentioned by you in part (i)
iii) Find the radius of curvature of a concave mirror, if its focal length is 15 cm. (3)
- c. Draw a diagram to show the principle of a concave mirror, when used as a shaving mirror. (4)

Question 7

- a. i) Is 'speed' a fundamental quantity or a derived quantity.
ii) Define the quantity answered in part (i).
iii) Give another example for the same kind of quantity answered in part (i). (3)
- b. i) Define magnetic field line.

- ii) Write two properties of magnetic field lines.
- c. i) What are neutral points?
- ii) State two ways to increase the strength of an electromagnet.

Question 8

- a. A body of mass 70kg, when completely immersed in water, displaces $20,000 \text{ cm}^3$ of water. Find
 - i) the weight of the body in water.
 - ii) the density of the material of the body in SI unit.
 - iii) the relative density of the material of the body.
 - b. i) Name a device which is used to convert solar energy directly into electricity
 - ii) Name the material used for making the above mentioned device.
 - iii) How can the efficiency of the above mentioned device in part (i) be increased?
- c. i) What is anomalous expansion of water?
 - ii) At what temperature, is the density of water maximum?
 - iii) Draw a graph to show the variation of volume of a given mass of water when heated from 0°C to 10°C .