



PHYSICS

BOOKS - VGS BRILLIANT PHYSICS (TELUGU ENGLISH)

FLOATING BODIES

Conceptual Understanding

1. A small bottle weights 20 g when empty and

22 g when filled with water When it is filled

with oil it weights 21.76 g. What is the density

of oil ?



Wood, iron, rubber, plastic, glass, cork, air, coal, ice, wax, paper, milk, kerosene, groundnut oil,

soap.

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Experimentation And Field Investigation

1. What is the relative density of wood ?

2. How can you find relatve density of a liquid ?



Communication Through Drawing Model Making

1. Make a lactometer with ball point refill. What

would you do to make the refill stand vertically straight ?



2. Draw the diagram of a mercury barmeter.



Appreciation And Aesthetic Sense Values

1. How can you appreciate the technology of making ships float, using the material which sink in water ?



2. Write a note on Pascal's discovery in helping

to make hydraulic jacks.

3. Write a note on Archimedes discovery of

force of buoyancy.

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Application To Daily Life Concern To Biodiversity

1. Where do you observe Archimedes principle

in daily life ? Geve two examples.

2. Where do you observe Pascal's principle in

daily life ? Given few examples.



1. The volume of 50 g of a substance is $20cm^3$. If the density of water is $1g/cm^3$, will the substance sink or float when placed on the surface of water will be the mats of water dispaced by the substance ?



4. Air brakes in automobiles work Pascal's principle. What about air brakes ? Collect the information about the working process of air brakes.

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Think Discuss

1. Let us suppose you have two blocks and you

do not know what material they are made of.

The volume of one block is $30cm^3$ while the other is $60cm^3$. The second block is heavier than the first. Based on this information, can you tell which of the two block is denser ?



2. What would happen if Toricelli's experiment

is done on moon ?

3. A vertical glass capillary tube, open at both ends, contains some water. Which of the following shapes may not be taken by the water in the tube ?

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4. Why don't wi use water instead of mercury in Toricelli experiment ? If we are ready to do this experiment, what length tube is needed ?



5. Find the weight of the atmosphere around

the earth (take the radius of earth as 6400km)



6. Why is it easier for you to float in salt water

than in fresh water ?

7. In what direction does the buoyant force on

an object immersed in a liquid act?

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8. Two solid blocks of identical size are submerged in water. One block is iron and theb other is aluminium. Upon which is the buoyant force greater ?

9. A piece of iron when placed on a block of wood, this makes the wood to float lower in the water. If the iron piece is suspended beneath the wood block, would it float at the same depth ? Or lower or higher ?

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Questions Given In The Lesson

1. Does kerosene floats above Water?

2. Draw a diagram of the tube, showing the

results of your activity.

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3. Do objects that have a relative density less

than 1 Sink in water or float on it ?



4. Do the objects that sink in water have a relative density less than 1 or more than 1?

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5. What relation do you find between the relative density of objects and float sinking of the objects ?

6. Which liquid will float on top if groundnut

oil is poured over water ?

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7. A piece of wax floats in water but the same piece of wax sinks in a liquid say liquid 'X'. Will the relative density of liquid. 'X' be less than 1 or greater than 1? How can you say ?

8. If we mix some water in milk, will the relative density of the mixture be less than or more than the relative density of milk ?

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9. If we take bottles of equal volume and pour pure milk in one and milk mixed with water in

the other, which one wil be heavier ?

10. Why is the height of mercury column nearly

76 cm in the tube ?



11. What happens if we replace this cylindrical liquid column with another object which is made up of a material whose density is equal to the density of liquid ?



Worked Out Example

1. What is the effective density of the mixture

of water and milk when

i. they are taken with same masses ?

2. What is the effective density of the mixture

of water and milk when

they are taken with same volumes ?

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Essential Material For Examination Purpose 1 Mark Questions

1. Scientifically what is density ?

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3. What instrument is used to determine the

purity of milk?



6. State Archimedes' principle.

7. State Pascal's principle.

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8. What is the principle involved in working of

hydraulic lift ?



9. In what direction does the buoyant force on

an object immersed in a liquid act ?

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Essential Material For Examination Purpose 2 Mark Questions

1. Define density and give its units.

2. Define relative density.



3. The volume of 50 g. of a substance is $20cm^3$. If the density of water is `1g//cm^(3), will the substance float or sink ?

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4. An iron nall sinks in water. While a large ship

floats on the surface of water. Give reason.



6. A floating boat displaces water weighting 6000 newtons.

What is the buoyant force on the boat ?

A floating boat displaces water weighting
6000 newtons.

What is the weight of the boat ?



8. The volume of 50 g. of a substance is $20cm^3$. If the density of water is $1g. cm^{-3}$, will the substance float or sink ?

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9. Write any two different between density and

relative density.

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Essential Material For Examination Purpose 4 Mark Questions

1. Derive an expression for atmospheric

pressure.

2. What is the atmospheric pressure and how

is it determined using Barometer?

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3. Calculate the pressure at a depthe 'h' in a liquid.



4. Calculate the pressure ant different levels of

depth in fluids.

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5. State Pascal's law and verify it with the help

of an experiment.



6. Write Pascal's law. Draw the diagram of any

device works based as Pascal's law.



7. The volume of a solid of mass 500g is $350cm^3$

What will be the density of this solid ?

8. The volume of a solid of mass 500g is $350cm^3$

What will be the relative density of the solid ?



9. The volume of a solid of mass 500g is $350cm^3$

Will it float or sink in water ?

A.
$$1.0x10^5 Nm^{-2}$$

B.
$$1.0x10^{-5}Nm^{-2}$$

C.
$$1Nm^{-2}$$

D.
$$76 Nm^{-2}$$

Answer: C



2. What instrument is used to determine the

purity of milk?

A. Barometer

B. Hydrometer

C. Potentiometer

D. Lactometer

Answer: D
3. Which of the following law denotes

Buoyancy:

A. Pascal's Law

B. Archimede's Law

C. Boyl's Law

D. Newton's Law

Answer: B

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4. If we mix some water in milk, will the relative density of the mixture be less than or more than the relative density of milk ?

A. The density of the mixture is less than

the density of milk

B. The density of the mixture is more than

the density of milk

C. The volume of the mixture is more than

the volume of milk

D. The volume of the mixture is less than

the volume of milk

Answer: B

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5. Density :
$$\frac{kg}{m^3}$$
 : : relative density :

A.
$$\frac{gm}{cm^3}$$

B. $\frac{N}{m^2}$

C. no units

D. ("pascal")/(m^(3))`

Answer: C

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6. What instrument is used to determine the purity of milk ?

A. Barometer

B. Lactometer

C. Hydrometer

D. Thermometer

Answer: B

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7. Find the odd one out regarding the construction of hydraulic jack

A. Pistons must be frictionless

B. Pistons must be leak proof

C. Pistons must be of same area

D. Fluid inside the jack be incompressible

Answer: C

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Objective Type Questions

1. Define density and give its units.

A. mass/litre

B. mass/volume

C. mass/area

D. mass/cross section

Answer: B

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2. Unit of density

A. kg/cm^3

B. g/m^3

C. kg/m^3

D. m^3/kg

Answer: C

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3. An object floats on the surface of a liquid when

A. the density of the object is more than

the density of liquid

B. the density of the object is less than the

density of the liquid

C. weight of the object is more than the

weight of the liquid

D. weight of the object is less than the

weight of the liquid

Answer: B

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- 4. Define relative density.
 - ${\tt A.}\ Density of the object \, / \, density of water$
 - ${\tt B.}\ Density of water {\it / density of the object}$
 - C. Weight of the object//weight of the water
 - D. Volume of the object//volume of the

water

Answer: A



5. Lactometer works on the principle of

A. density

B. relative density

C. buoyancy

D. volume

Answer: B

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6. The object with relative density greater than

1 water.

A. floats on

B. sinks in

C. suspends in

D. can't say

Answer: D



7. At normal atmospheric pressure the height

of the mercury column in barometer is

A. 76 cm

B. 7.6 cm

C. 76 mm

D. 100 cm

Answer: A

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8. The value of one atmospheric pressure is

A. $1.01 imes 10^3 N/m^2$

B. $1.01 imes 10^4 N/m^2$

C. $1.01 imes 10^6 N/m^2$

D. $1.01 imes 10^5 N/m^2$

Answer: D



9. Unit of atmospheric pressure is

A. Pascal

B. N/m^2

C. A or B

D. None

Answer: C

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10. Any object immeresd in a water experiences an upward force called

A. gravitation

B. buoyancy

C. pressure

D. density

Answer: B

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11. What is the principle involved in working of

hydraulic lift ?

- A. Archimedes principle
- B. buoyancy
- C. Pascal's principle
- D. Air pressure

Answer: C

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12. Mass per unit volume is known as

A. density

B. relative density

C. weight

D. pressure

Answer: A

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13. Unit of densityj in MKS system =

A. g/cm^3

B. kg/m^3

 $C. g/mm^3$

D. kg/km^3

Answer: B



14. Define relative density.

- A. $\frac{\text{density of water}}{\text{density of object}}$ B. $\frac{\text{density of object}}{\text{density of water}}$
- C. density of object $\times density$ of water

D. none of these

Answer: B

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15. Define relative density.

A. weight of the liquid weight of solid
B. weight of the liquid weight of gas
C. weight of the liquid
D. weight of the water weight of the liquid

Answer: C



16. Density :
$$\frac{kg}{m^3}$$
 : : relative density :
A. g/cm^3
B. kg/m^3
C. kg/cm^3
D. No units

Answer: D



17. Lactometer is used to determine the

A. purity of water

B. purity of milk

C. purity of sugar

D. purity of oil

Answer: B

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18. Lactometer works on the principle of

A. density

B. volume

C. relative density

D. pressure

Answer: C

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19. The effective density of a mixture of two liquids of densities ρ_1 and ρ_2 when they are taken with same masses

A.
$$rac{1}{2}(
ho_1+
ho_2)$$

B. $rac{2
ho_1
ho_2}{
ho_1+
ho_2}$
C. $rac{2
ho_1
ho_2}{
ho_1-
ho_2}$
D. $rac{1}{2}(
ho_1-
ho_2)$

Answer: B

20. The effective density of a mixture of two liquids of densities ρ_1 and ρ_2 , when they are taken with same volumes is

A.
$$rac{1}{2}(
ho_1+
ho_2)$$

B. $rac{2
ho_1
ho_2}{
ho_1-
ho_2}$
C. $rac{1}{2}(
ho_1-
ho_2)$
D. $rac{2
ho_1
ho_2}{
ho_1+
ho_2}$

Answer: A

21. Density of any liquid can be determined by

using

A. hydrometer

B. densitometer

C. hygrometer

D. Both A & B

Answer: D

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22. The object with relative density greater

than 1 water.

A. floats

B. sinks

C. both A and B

D. none of these

Answer: B

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23. The upward pressure acting on a body immersed in water is known as

A. tension

B. normal force

C. buoyancy

D. thurst

Answer: C

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24. 1 atmosphere = N/m^2 .

A. $1.01 imes 10^5$

 $\texttt{B.}\,1.01\times10^3$

 $\mathsf{C.}\,1.01 imes10^7$

D. $1.01 imes 10^7$

Answer: A



25. Density of mercury =

A. $13.6g/\mathrm{cc}$

B. $13.6g/m^3$

C. $13.6g/mm^3$

D. $13.6 kg/m^3$

Answer: B



26. Pressure at a depth 'h' in a liquid is

A.
$$P=P_{\circ}+h
ho g$$

B.
$$P=P_{\circ}-h
ho g$$

C.
$$P_\circ = P + h
ho g$$

D.
$$P_\circ = P - h
ho g$$

Answer: A

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27. In a bramah press, force, force acting on

the right piston is

A.
$$F_2=rac{A_1 imes F_1}{A_2}$$

B.
$$F_2=rac{F_1 imes A_2}{A_1}$$

C. $F_2=rac{A_2}{F_1 imes A_1}$
D. $F_2=rac{A_1}{F_1 imes A_2}$

Answer: B



28. When a body is immeresed in a fluid, the

force of buoyancy is equal to the

A. volume of fluid displaced

B. pressure of fluid displaced

C. density of fluid displaced

D. weight of fluid displaced

Answer: D

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29. Principle of buoyancy

A. Archimedes p

B. Pascal

C. Newton

D. Boyle

Answer: A



30. Do objects that have a relative density less

than 1 Sink in water or float on it ?

A. floats in water

B. sinks in water

C. both A and B

D. none of these

Answer: B



31. Hehght of mercury column is

A. 76 m

B. 76 cm

C. 76 mm

D. Both B & C

Answer: D

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32. Atmospheric pressure $P_\circ~=$

A.
$$h\rho g$$

B. $\frac{h\rho}{g}$
C. $\frac{hg}{\rho}$
D. $\frac{\rho g}{r}$

h




33. Which of the following sinks in water ?

A. wooden block

- B. piece of wax
- C. glass marble
- D. plastic ball





34. If we weigh a piece of iron and a piece of wood of same size, iron will weigh more. The reson is

A. denity of iron is less than the density of wood

B. weight of iron is more than the weight of wood

C. area of iron is more than the are of

wood

D. density of iron is more than the density

of wood

Answer: D

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35. Force of buoyancy is equal to the of

the object.

A. apparent loss of volume

- B. apparent loss of density
- C. apparent loss of pressure
- D. apparent loss of weight

Answer: D

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36. Purity of milk can be determined by using

A. Barometer

B. Hydrometer

C. hygrometer

D. Lactometer

Answer: D

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37. Atmospheric pressue can be measured by

using

A. lactometer

B. Hydrometer

C. barometer

D. hygrometer

Answer: C

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38. Kerosene water.

A. floats on

B. sinks in

C. suspends in

D. can't say

Answer: A



39. Ships are made based on the principle of

A. pressure

.

B. volume

C. density

D. buoyancy

Answer: D



40. Hydraulic jacks works on Priciple.

A. Archimedes

B. Pascal

C. Berzelius

D. Boyle

Answer: B

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