Uganda Certificate of Education
TOPICAL REVISION QUESTIONS SET 6
OLEVEL PHYSICS
Paper 1
Topic: Fluids At Rest & In Motion

NAME: _____ **STREAM:** _____

INSTRUCTIONS:

Answer all questions in this paper.

Mathematical tables, side rulers and silent non-programmable calculators may be used.

These values of physical quantities may be useful to you.

Acceleration due to gravity	=	10 m s^{-2}
Specific heat capacity of water	=	$4200 \text{ J kg}^{-1} \text{ K}^{-1}$

*Answer **all** questions in this section.*

Question 1:
Which of the following determines whether a body will float in a liquid?

    A.   Weight of the body.
    B.   Volume of the body.
    C.   Surface area of the body.
    D.   Average density of the body.

Question 2:
In a river, turbulent flow occurs
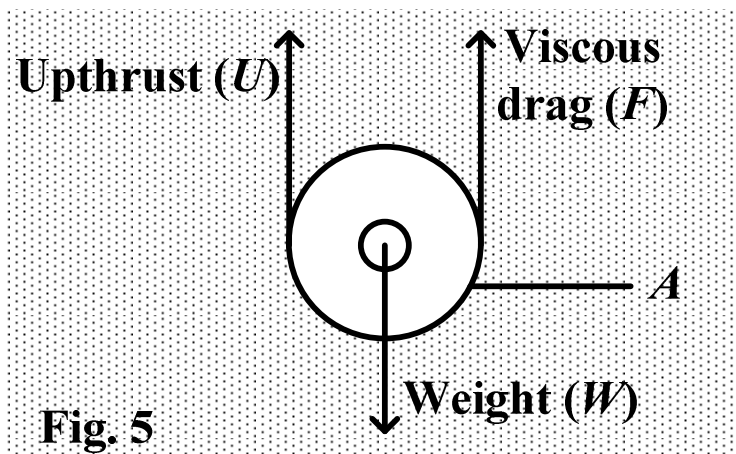(i).   at the water falls.
(ii).   where there is a narrow opening.
(iii).   where the river is wide and deep.

    A.   (i) only.
    B.   (iii) only.
    C.   (ii) and (iii) only.
    D.   (i) and (ii) only.

Question 3:
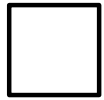Figure 5 shows forces U, F and W acting on a body A, falling freely in a fluid.

Fig. 5

The body moves with a steady velocity when
    A. $F + W = U$

B. $U - F = W$
C. $U + W = F$
D. $U + F = W$

Question 4:
An aircraft is able to experience a lift in air because,
(i).   it can adjust the shape of the wings to create less pressure above the wings.
(ii).   it can adjust the shape of its wings to create less pressure below the wings.
(ii).   it can adjust the shape of its wings to reduce its apparent weight in air.

    A.   (i) only.
    B.   (ii) only.
    C.   (i) and (iii) only.
    D.   (ii) and (iii) only.
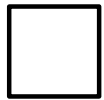
Question 5:
A hollow glass sphere of mass 60 g floats in water such that two-thirds of its volume is under water of density 1g cm^{-3}. Find the volume, in cm^3, of the sphere
    A.   20
    B.   40
    C.   60
    D.   90
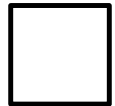
Question 6:
Turbulent flow of a fluid in a pipe may be caused by
(i).   making the pipe narrow
(ii).   laying the pipe steeply
(iii). making the fluid to flow slowly and uniformly.

    A.   (i) only
    B.   (i) and (ii) only
    C.   (i) and (ii) only
    D.   (i), (ii) and (iii).
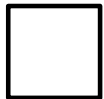
Question 7:
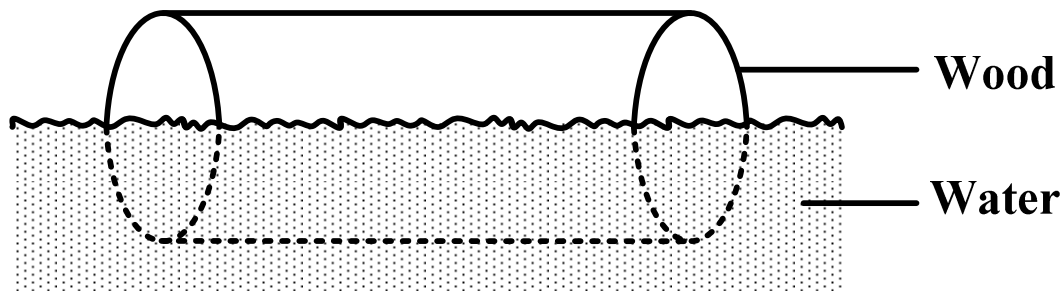
Fig. 2

Figure 2 shows a block of wood of volume 40 cm^3 floating in water with only half of its volume submerged. If the density of water is 1000 kg m^{-3}, determine the mass of the wood under water.

A. 40×1000 kg

B. 20×1000 kg

C. $40 \times 10^{-6} \times 500$ kg

D. $20 \times 10^{-6} \times 500$ kg

Question 8:

A cork held under water rises to the surface when released because the upthrust it is

A. greater than the weight.

B. less than the weight.

C. equal to the weight.

D. equal to the weight of water displaced.

Question 9:

A solid, Q, sinks deeper in liquid, N, than in liquid, M, because the

A. Up thrust on the solid is greater in liquid N than in M.

B. Density of liquid M is greater than that of N

C. Density of liquid N is greater than that of M.

D. Surface tension of liquid N is less than that of M.

Question 10:

An object thrown from an airplane reaches a constant velocity known as terminal velocity because the

A. weight of the body at a given place does not vary.

B. some of the up thrust and the viscous force will be equal to the weight of the body.

C. some of the up thrust and the viscous force on the body is constant.

D. up thrust experienced by the body is constant.

Question 11:
Which one of the following is true about a hydrometer?
(i). it measures density of a liquid
(ii). its sensitivity is improved by narrowing its stem
(iii). its reading increases upwards on the stem
(iv). its buoyancy is provided by the large bulb.

A. (i), (ii) and (iii)

B. (ii) (iii) and (iv)

C. (i) (ii) and (iv)

D. (ii) and (iv) only.

Question 12:
When a spherical ball falls through a column of oil with a steady velocity, the total

A. downward force is greater than total upward force.

B. upward force is greater than total downward force.

C. upward force is equal total downward force.

D. upward force is zero.

Question 13:
A balloon is filled with hydrogen and released in the open air. It will rise

A. to a certain height and then float

B. to a certain height and then drop

C. to a certain height and then burst

D. indefinitely

Question 14:
An air bubble is introduced at the bottom of a jar containing mercury.
Which one of the following explains what will happen to the bubble? It will

A. Be pressed by the mercury column above and will burst.

B. Rise to the surface of the mercury while decreasing in size.

C. Rise to the surface of the mercury while increasing in size.
D. Remain in constant motion within the mercury.

Question 15:

A uniform tube with a narrowed middle part has three identical manometers attached to it as in the figure bellows
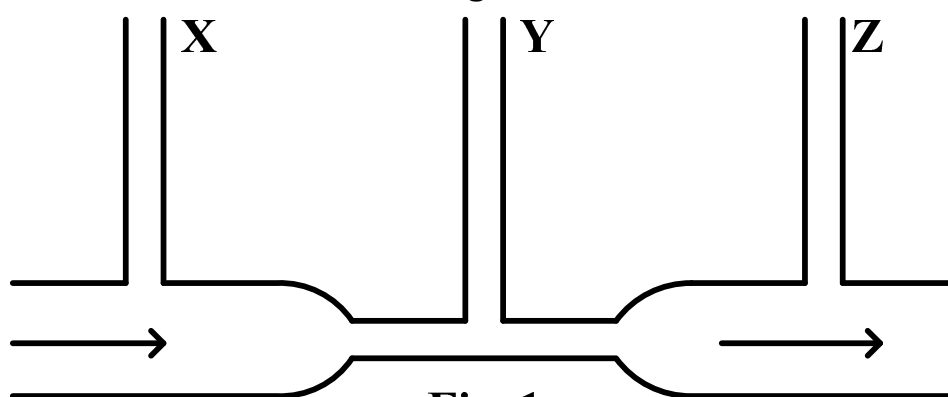
Fig. 1

If a steady flow of a liquid is maintained in the direction indicated by the arrows, the height of the liquid will be
A. greatest in X
B. greatest in Y
C. greatest in Z
D. equal in X, Y and Z

Question 16:

When a balloon filled with hydrogen is released into the air on a calm day, it
A. rises to definite height when the pressure inside and outside are equalized
B. rises until the pressure inside reduces to zero
C. rises for a while and then bursts
D. comes to the ground and darts around.

Question 17:

When a metal sphere is dropped in a viscous fluid, it eventually attains a steady velocity called
A. turbulence velocity
B. terminal velocity
C. viscous velocity
D. streamline velocity

Question 18:

A piece of wood of volume 0.2 m^3 and density 600 kg m^{-3} is placed in a liquid of density 800 kg m^{-3}. The fraction of the wood submerged is:

- A.   0.15
- B.   0.25
- C.   0.75
- D.   1.33

SECTION B: (52 Marks)
*Answer **all** questions in this section.*

Question 19:

(a).   What is meant by **upthrust**?   [1]

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(b).   An iron block of mass 3.2×10^3 kg and volume 0.6 m^3 is totally immersed in a liquid of density $1.56 \times 10^3 \text{ kg m}^{-3}$. Find the weight of the block in

(i).   air.   [1]

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(ii).   the liquid.   [2]

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Question 20:

(a).   State **one** application of Archimede's principle.   [1]

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(b).   A piece of iron weighs 175 g in air and 153 g in water. Find the density of the iron.   [3]

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Question 21:

(a). (i). What is meant by **terminal velocity**? [1]

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(ii). State a factor that affects terminal velocity of a body falling in a fluid. [1]

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(b). A ball bearing is released at the surface of a viscous liquid and allowed to sink through the liquid. Draw a velocity-time graph for the motion of the ball bearing. [2]

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Question 22:

(a). What is meant by mass of a body? [1]

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(b). (i). A body whose weight in air is 52 N experiences an up thrust of 12 N in a fluid. Find its apparent weight. [2]

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(ii). What happens to the weight of the body at a much higher altitude? [1]

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Question 23:

(a). State **Archimedes' principle**. [1]

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(b). A solid weighs 25.00 g in air and 19.0 g when submerged in water. Find the density of the material of the solid. [3]

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Question 24:
(a). State the principle of flotation? [1]

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(b). A cube of edge 0.1 m floats in a liquid of density 1200 kg m^{-3} with $\frac{1}{3}$ of it submerged, find the density of the material of the cube. [3]

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Question 25:
(a). State two factors which affect terminal velocity. [2]

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(b). Explain briefly how a person is able to drink using a straw. [2]

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Question 26:
(a). Define **density**. [1]

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(b). A balloon is filled with hydrogen and sealed. Explain what happens when the balloon is released in air. [3]

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Question 27:
(a). State Archimedes' principle.

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(b). A rubber balloon of mass 5×10^{-3} kg is inflated with Hydrogen and held stationary by means of a string. If the volume of the inflated balloon is 5×10^{-3} m^3, calculate the tension in the string.
(density of Hydrogen $= 0.080$ kg m^{-3}, density of air $= 1.150$ kg m^{-3})

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Question 28:
A solid of volume 10^{-4} m^3 floats in water (of density 10^3 kg m^{-3}) with $\frac{3}{5}$ of its volume submerged
(a). Find the mass of the solid.
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(b). If the solid floats in another liquid with $\frac{4}{5}$ of its volume submerged. What is the density of the liquid?
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Question 29:
(a). State Archimedes principle
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(b). A glass block weighs 25 N in air. When wholly immersed in water, the block weighs 15 N. Calculate
　　(i). the up thrust on the block.
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　　(ii). The density of the glass in kg m^{-3}
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Question 30:
A balloon filled with 50 m^3 of hydrogen weighs 40 kg. The balloon is held in place by rope fixed to the ground. If the density of air is 1.2 kg m^{-3}, find
(a).   the upthrust on the balloon
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(b).   the force needed to hold the balloon in place.
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Question 31:
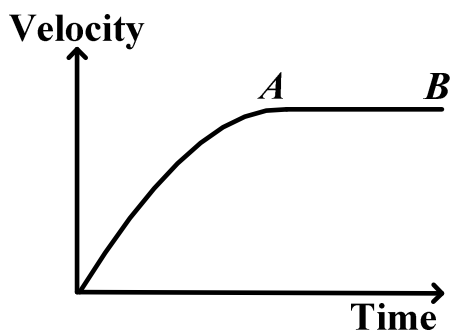
The above velocity –time graph represents the motion of a small sphere dropped centrally down a tall column of a liquid.
(a).   Name forces which act on the sphere and state their directions.   [3]
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(b).   What happens to the sphere between A and B.   [2]
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END