Science I, II — Time:- 03 hours

Name / Index No : ..... — Grade 11

Note: · ***A**nswer **all** Question*
· *In each of the Question 1 to 40**,** pick one of the alternatives (1), (2), (3), (4) which you consider is correct or most appropriate.*

(01) The standard international unit of measuring amount of substance is

1. Kg 2. mole 3. $moldm^{-3}$ 4. kg^{-3}

(02) Metallic element that exist in cell wall is

1. Cu 2. Fe 3. Sn 4. Ca

(03) false statement about the orbits that revolve electron of an atom is

1. These orbits are considered as energy levels.
2. There are maximum number of electrons in each energy level.
3. All energy levels of an atom is completely filled with maximum number of electrons
4. When moved away from the nucleus, the gap between energy levels gradually reduced and energy of the atom is increasing.

(04) An example for homogeneous mixture is ,

1. Brass 2. Rock 3. Graphite 4. Paint

(05) The instance where that transmitted energy by transverse wave is,

1. Vibrations occurs in ocean
2. Earth quack
3. Sound produced by a violin
4. The wave transmitted through the string due to the vibration of the string of a guitar

(06) A,B,C statements are related about the element sulphur.

a) When heated burn with a blue flame and emitting a gas with pungent semll
b) exist in both crystalline and amorphous states
c) Properly dissolved in solvent CS_2.

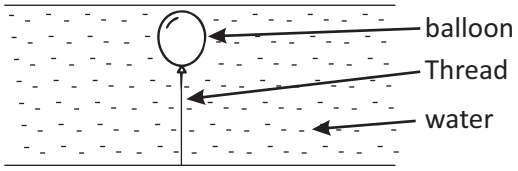
The correct statment is "

1. A and B 2. B and C 3. A and C 4. A, B and C

(07) X is the element that has a higher electro negativity of a particular period. This element fused with an element called M that makes an amphoteric oxide. The formula of compound formed between X and M is

1. XM 2. XM_3 3. MX_3 4. M_3X_3

(08) The given diagram is denoting an instance where keeping an inflated balloon in water.



The most correct statement is

1. This balloon is consisted with a water soluble gas
2. The density of the air in balloon is less than density of ordinary air
3. The weight of displaced water by the balloon is greater than the weight of the balloon
4 The weight of displaced water by the balloon is less than the weight of the balloon

(09) Given below are physical properties of few substances called AB and C

substance	Electrical conductivity		
	solid	liquid	gas
A	✓	✓	✓
B	✗	✗	✗
C	✗	✓	✓

The most correct statement out of A, B and C is

1. A is metal Mercury
2. B is an ionic compound.
3. C is a metal.
4. Data is not enough to get the answer.

(10) The false statement about distance, displacement, velocity and acceleration is

1. distance is depending on starting point , ending point and the length of the path
2. Displacement is depending on starting and ending point of the path.
3. Direction of the velocity is depending on the direction of the displacement
4. Direction of the acceleration depends on the direction of the unbalanced force

(11) The incorrect statement about element $^{40}_{20}Ca$ is ?

1. The atomic number of Ca is 20
2. The mass number of Ca is 40
3. The electronic configuration of Ca 2"8"8"2'
4. The amount of neutron of Ca is 40

(12) An object rested on an inclined plane. If not exerted another forces except weight and friction, select the false statement

1. Static frictional force is exerted between the object and the inclined plane
2. Any frictional force is not exerted between the object and the inclined plane
3. Limiting frictional force is exerted between the object and the inclined plane
4. Static frictional force is exerted between the object and the inclined plane

(13) The incorrect relation ship between organ and its function is

1. Cell wall ⟶ Maintaining shape of the plant cell
2. Cell membrane ⟶ controlling substance that diffused into the cell
3. Nucleus ⟶ controlling the biological activities
4. Ribosomes ⟶ Transporting proteins

(14) When 72 N unbalanced force is applied on an object it acquired $6ms^{-2}$ acceleration. The mass of the object would be

1. 432 kg
2. 12 kg
3. 120 kg
4. 120 N

(15) Object with 5 kg moved with velocity V and gained 360 j kinetic energy. The velocity of the object is

1. 12 ms^{-1}
2. 72 ms^{-1}
3. 144 ms^{-1}
4. 1800 ms^{-1}

(16) An object with 2 kg traveled with 20 ms^{-1} uniformed velocity decelerated and rested at the end of 2 s. The deceleration of the object is

1. $\left(\frac{20-0}{2}\right) ms^{-1}$
2. $\left(\frac{2x20}{2}\right) ms^{-1}$
1. $\left(\frac{2}{20-0}\right) ms^{-1}$
1. $\left(\frac{2}{2x20}\right) ms^{-1}$

(17) The unit used, when expressing the composition of a mixture is

1. n/n
2. v/v
3. m/m
4. m/v

(18) Which is the following has the property of liquid pressure as used in the principle of liquid pressure machines?

1. Changing pressure according to the density
2. Changing pressure according to the height of the liquid
3. Changing pressure according the force exerted on the piston
4. All the above

(19) The function of a catalyst is

1. Increasing amount of reactants expenditure with unit time
2. Reacting chemically with the reactants
3. Changing physical state of reactants
4. All the above

(20) A ball with mass 20 g vertically threw upwards with the initial velocity of 20 ms^{-1}. The maximum height displaced by the object is $(g = 10ms^{-2})$

1. $\frac{100}{2 \times 10}$ m
2. $\frac{2 \times 10}{100}$ m
3. $\frac{1}{2}$ x 20 x 100 m
4. $\frac{2}{1000}$ x 20 x 100 m

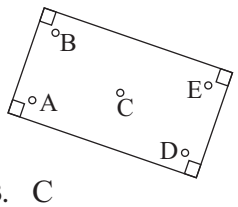
(21) The correct order of the instruments that used to measure electric current, potential difference and resistance is

1. galvanometer, voltmeter, ohmmeter
2. ammeter, voltmeter, ohmmeter
3. voltmeter, ammeter, ohmmeter
4. ohmmeter, ammeter, voltmeter

(22) A simple permanent tissue is

1. Apical meristem
2. Parenchyma
3. Xylem
4. Phloem

(23) The center of gravity of the given metallic rectangle is



1. A
2. B
3. C
4. D

(24) Which of the following is not an instance that applicable of resultant of linear forces

1. Dragging fish net by several fishermen
2. Dragging few railway compartment by a train engine
3. Tying a rope in a piece of log and dragging it by two people
4. Pulling a train with compartments by two power engines

(25) The instance cannot be explained by Newton's third law is

1. Floatation of an object on water surface
2. Hanging on a tree's nut
3. Generation of fiction between road and tire when driving a car
4. A spacecraft flying at constant velocity in the space

(26) The false statement about a water molecule is

1. Water molecule has a conical shape
2. Oxygen atom of water molecule has slight negative charge
3. Hydrogen atoms of water molecules have slight positive charge
4. Inter molecular bonds formed between oxygen atom and hydrogens atoms of a water molecule

(27) In which time period eyebrows and eyelashes have developed in human foetus

1. In 5 months
2. in 6 months
3. in 7 months
4. in 9 months

(28) The acid produce another gas except hydrogen gas due to reaction with Mg is

1. Dilute HCl acid
2. Dilute H_2SO_4
3. Concentrated HCl
4. Concentrated HNO_3

(29) The metal that extracted by exposed to water current by considering their density is

1. Mg
2. Cu
3. Au
4. Al

(30) Not a physical property of hydrogen gas is

1. Lighter than the air
2. Colourless
3. Ouderless
4. Denser than water

(31) The false statement about the closed circuit that consisted with a dry cell is

1. The current flows through the circuit is flowing through the cell
2. There is a resistance value in the cell
3. The standard current flows from positive to negative terminal of the cell
4. Free electrons flow from negative to positive terminal of the cell

(32) The isotopes of oxygen in water that needs for photosynthesis is

1. ${}^{16}_{8}O$
2. ${}^{17}_{8}O$
3. ${}^{18}_{8}O$
4. ${}^{15}_{8}O$

(33) The next step of recrystallization due to separating pure substance from warm saturated solution that consisted with some impurities is

1. Filtering solution
2. Adding more solvent
3. Cooling the solution
4. Heating the solution

(34) The technique that use to separate essential oil is

1. Solvent extraction
2. Steam distillation
3. Compressing under suitable pressure
4. Crystallization

(35) Crude oil is a mixture of many hydrocarbon components. When refining crude oil,

1. Components with lower boiling points are separated from the upper levels of the tower.
2. The temperature is appropriately controlled at different level
3. Components with high boiling points are (bitumen) deposited at the bottom of the tower.
4. All the above statements are correct

(36) A property of pure sodium chloride crystal is

1. Hygroscopic
2. Not hygroscopic
3. Having impurities
4. Having bitter taste

(37) The technique can be used to separate and identitfy several additives of a toffies is

1. Simple distillation
2. Chromatography
3. Solvent extraction
4. Recrystalization

(38) The false statement about viruses is

1. Having living and non-living features
2. Does not have cellular organization
3. Can be observed through the electron microscope
4. Any virus can reproduce in any living cell

(39) The device that generate micro wave of micro oven is

1. Deuteron
2. Microton
3. Magnetron
4. Wave oscillator

(40) The disease only spread in reproductive organ is

1. Syphilis
2. Gonorrhoea
3. Herpes
4. AIDS

Part II

Instruction:
- Write your answer in neat hand writing
- Answer **four** questions in **Part A**, in the space provided.
- Of the five questions in **Part B** answer **three** questions only
- After answering, tie Part A and the answer script of Part B together and hand over.

Part A

(01) Most of the components in natural environment exist as mixtures

a Rocks
b Air
c Sea water
d Well water
e Crude oil
f Sugar cane juice

01. Write 2 types of pure substances

1. ..... 2. .....

02. Write an example for each pure substance

1. ..... 2. .....

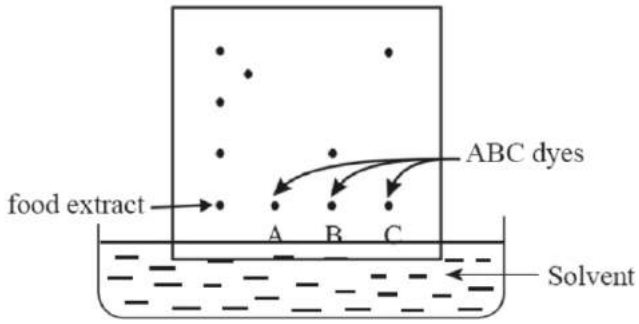
03. Given below are some physical properties of components in two rocks. Write a suitable method to separate components of such rocks

1. Having particles with different size .....
2. Having particles with different densities .....
3. Having particles with and without magnetic properties .....

04. Write the technique and principle that used to separated components of the above mixtures

Mixture	Technique	Principle
a		
b		
c		
d		
e		
f		

05. The following diagram illustrates a method used to examine whether the dyes A, B and C are present in a food extract.



(I) What is the name of this method ? .....

(ii) According to this result, what dyes of A, B and C could be present in the food sample ?

.....

(iii) Except the identification of dyes in food stuffs, state another use of the above method.

.....

(02) Photosynthesis is the main biological process that take place in biosphere which are essential for the stability of it

01. What is the source that provide energy needed for photosynthesis?

.....

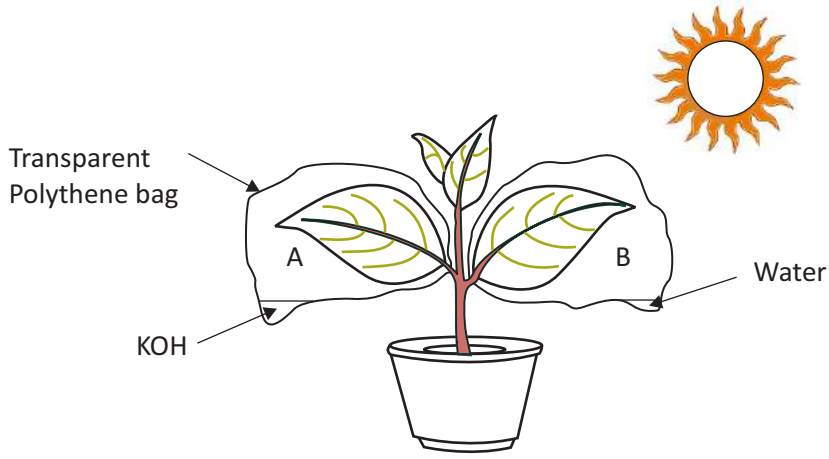
02. How do you call to the range of electro-magnetic spectrum included in the above energy?

.....

03. What is the name of electromagnetic wave that make harm to process of photosynthesis?

.....

04. The figure indicates an apparatus set up by a student for an experiment conducted with regard to factor needed for photosynthesis



The plant in setup A and B should be kept in dark for 48 hours before the experiment. After that put some crystals into the setup A and allow to exposed to fully sunlight.

1. Write the given factor and controlled factor in set up A and B

Factor is given to setup A Factor is controlled in setup A

....

....

Factor is given to setup B Factor is controlled in setup B

....

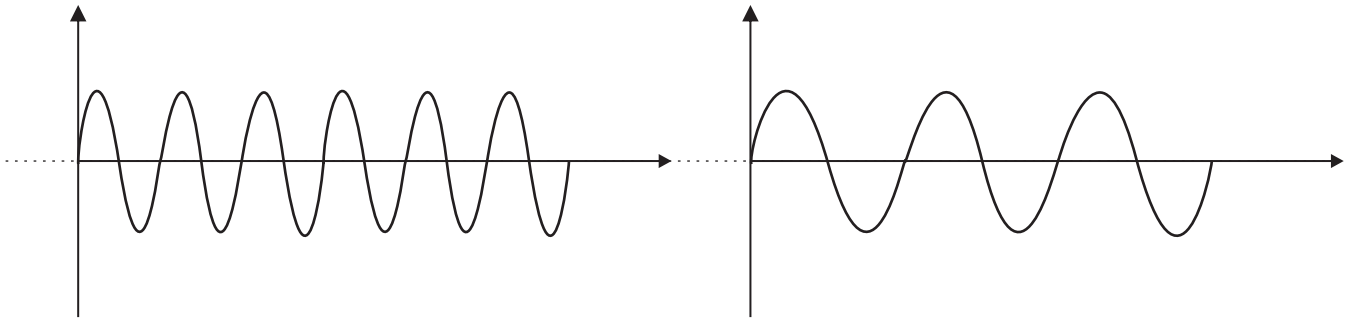
....

2. Write 2 observations when did the starch test for leaves that separated from the setup A and B

A : .....

B : .....

(03) Given below are few waves



Wave A Wave B

i. Compare the give features of waves A and B

Frequency : .....

Wave length : .....

ii. Write different features of wave A and B

.....

iii. What is the wave length of a wave with 8×10^{18} Hz frequency, when propagate 3×10^{8} ms^{-1} velocity

.....

iv. Write 2 features of electro-magnetic waves

1. .....

2. .....

v. Write the name of waves used for given instances

1. Destroying cancer cells - .....
2. Used in long distance communications - .....
3. RADAR systems - .....
4. SONAR - .....
5. Cooking food - .....

(04) Tissues are taking part to make plant body.

01. What are the two types of plant tissues

1. .....
2. .....

02. Write the main feature of given tissues

1. Parenchyma - .....
2. Collenchyma - .....
3. Sclerenchya - .....

03. Write the main function of xylem tissue

.....

04. Write the main function of phloem tissue

.....

05. Write 2 types of cells can be seen in both xylem and phloem tissues

1. .....
2. .....

06. Write the name of simple permanent tissue which adapted to perform given functions

1. Food storage - .....
2. Photosynthesis - .....
3. Mechanical strength - .....
4. Store water - .....
5. Protection - .....

07. Write the name of tissue that has given features

1. Deposited more cellulose at the corners of the cell - .....
2. Available more intercellular air spaces - .....
3. Consisted with 75 % of death cells - .....
4. Having secondary cell wall - .....

Part B

5) (A) Classification of living organisms makes the study of them easier. Based on the features of living organisms, they are classified as plants, animals and micro-organisms.

(i) Algae, a group of micro-organisms show characteristics in common with those of plants. State such a common characteristic.

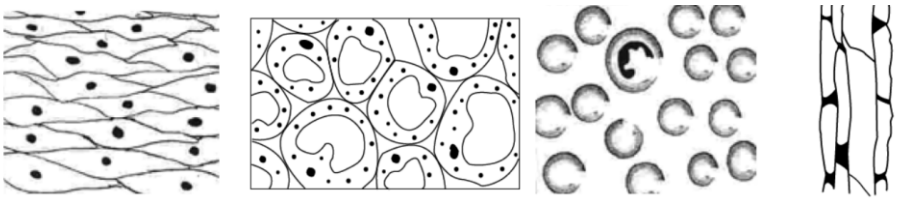
(ii) State two differences between bacteria and fungi.

(iii) What difference can be seen between the flowers of monocotyledonous and dicotyledonous plants?

(iv) If a student who observed a cycas plant, grouped it under the monocotyledonous plants, state a probable reason for his grouping?

(v) Is the student's conclusion correct? Give reasons for your answer.

B) Some plants and animal tissues are illustrated below



(ii) Of the above tissues, name an animal tissue with elongated cells and a vascular tissue.

(iii) State,

(*a*) a similarity ; and

(*b*) a difference

between the tissue A and a cardiac muscle tissue.

(iv) Select and write from the above diagrams, the tissues with more than one type of cells.

(v) Selecting only the plant tissues from the tissues given, construct a dichotomous key.

(vi) State **two** structural differences that can be seen between plant and animal cells.

6) The periodic table is a way of classifying elements. Shown here is a diagram which represent the position of some elements in the periodic table. The English letters shown here are not the standard symbols of these elements. Using only these symbols and base on the facts related to the positions of these elements in the periodic table answer the questions given below.

			P				Q
R	S	T				U	V
W	X						

I. Write the period number and group number of the element W.

ii. What is the letter that denoted a noble gas?

iii. Write 2 elements belong to the same group.

iv. Write number of energy levels and electrons are in outermost shell of element P.

v. Write the chemical formula of the compound formed between elements S and U.

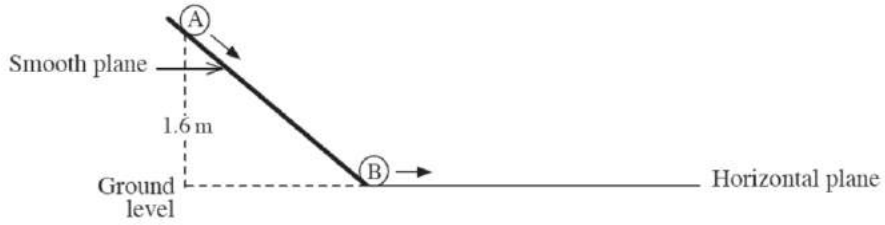
vi. Write a special feature of aqueous solution which formed compound between P and U.

vii. Find the relative molecular mass of Na_2SO_4. (Na = 23, S=32, O = 16)

viii. What is the mass of Na_2SO_4 included in 0.5 mol?

ix. What is an isotope? write an example for isotope.

7) (A) A and B are two similar balls. A ball kept at position shown in the figure is released from rest. Then A moves down along a smooth plane and collide with B. Then B moves some distance along horizontal plane and stops. (Gravitational acceleration is 10 m s^{-2})



(I) What is the energy stored in A ball when it is at rest in the position shown?

(ii) When A ball collide with B ball, 50% of energy of A is transferred to B. Accordingly what is the initial velocity of B?

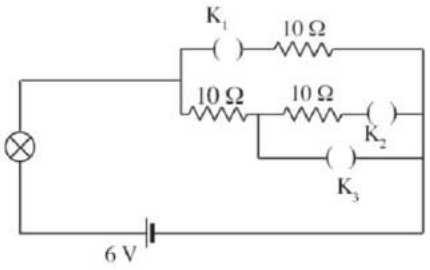
(iii) Draw a rough velocity – time graph for the motion of A ball from the moment of releasing until collide with B ball.

(iv) State a change that can be done in the plane to increase the velocity at which A ball collide with B ball.

(v) Explain why B ball stop after moving along horizontal plane.

(vi) State a change that can be done to the plane surface to make B ball travel a greater distance along it.

(B) Following is a circuit se t up to investigate the variation of combined resistance when resistors are contend in series and parallel. (Consider Bulb has no resistance.)



Situation I – K_1 and K_3 closed, K_2 open an d brightness of bulb is observed.

Situation II – K_1 and K_3 open, K_2 closed brightness of bulb is observed.

(i) In Situation I

(a) What is the equivalent resistance of the system?

(b) Find the currant flow through a resistor.

(ii) In which situation the bulb lights with the highest brightness (I or II)?

(iii) What is the reason for changing brightness in such a way?

8) (A) Reproduction is an important biological Phenomenon for the continuation of plant species. The two methods by which plants reproduce are asexual method and sexual method.

(i) Mention a main difference between sexual an d asexual reproduction. (1 Mark)

(ii) Name one method of artificial vegetative propagation. (1 Mark)

(iii) Name an organ w hich helps natural vegetative propagation in each of the following plants.

(a) Bread fruit

(b) Ginger (2 Marks)

(iv) In some plants, flowers are adapted to both self pollinatio n and cross pollination.

(a) Explain the differences between self pollination and cross pollination. (2 Marks)

(b) Mention two adaptations of plants to av oid self pollination. (2 Marks)

(c) Draw the diagram of a pollen grain and name the parts of it. (2 Marks)

(B) (i) There are 46 chromosomes in a mother cell of a certain species of organism.

(a) After the above cell undergoes meiosis, how many chromosomes will each daughter cell receives.

(b) Ab ove daughter cells received from meiosis then undergo mitosis and form new daughter cells. How many chromosomes will one new daughter cell receives?

(ii) Write two features of a pair of homologous chromosomes.

(iii) The gene for round seeds is R and the gene for wrinkled seeds is r, write down the genotype or genotypes of the following instances.

(a) Organism with homozygous genes

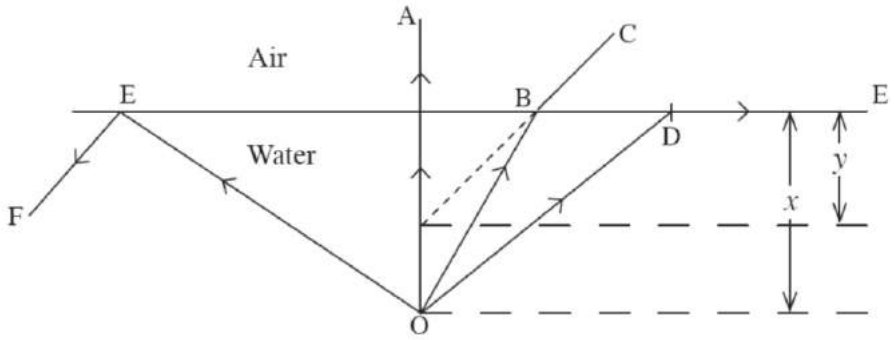
(b) Organism with heterozygous genes

(iv) According to an experimental result, green and yellow colo ur pods were obtained fro m flowers by crossing two pure bred pea plants. All the pods obtained from the first generation (F1) were in green colour. The second generation (F2) prod uced green and yellow coloured pods in the proportion 3:1.

(a) Mention the phenotype of pure bred pea plants used in the above experiment.

(b) Mention the genotype ratio of F2 generation (off spring)?

9) (A) Paths of Several rays emitted by a source in water at a depth it x is shown below



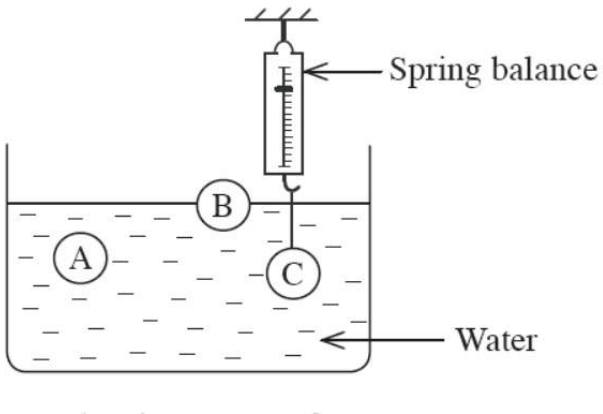
(I) Path of ray OB has changed when entering air from water. What is the name of this phenomena?

(ii) What is the name given for angle at incidence in situation D?

(iii) Object is seen at a depth y from water surface when observed from C. Write an expression for the refractive index of water using x and y.

(iv) Object is not seen when observed from E. Why is that?

(B) Weight of objects A, B and C are respectively 50 N, 60 N , 70 N .They are in a water beaker as shown below.



(I) Which object has the same density as water?

(ii) From which objects volume of water equal to volume of object is displaced when kept in the water beaker?

(iii) Name the vertical forces acting on the object B when floating on water.

(iv) What is the weight of volume of water displaced by B?

(v) Volumes of A and C are equal. Accordingly what can be the reading of the spring balance?

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