ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

Second Term Examination – 2018

Class : 9

Sub :Physical Science
DURATION:2 Hrs30Mins

F.M.: 75

DATE:30.07.2018

GROUP –A

1. Answer the following questions (Multiple Choice Questions)   (1x10=10)

(1.1)Alcohol and water mixture can be separated by:
  (a)Distillation   (b)Filtration
  (c) Fractional distillation   (d) Sedimentation

(1.2) $NaHSO_4$ is an example of:
  (a) Acid salt   (b) Normal salt
  (c) Basic salt   (d) None of the above

(1.3) Defination of force is obtained from Newton's:
  (a)First law of motion   (b) Second law of motion
  (c)Law of gravitation   (d) Third law of motion

(1.4) Momentum is the product of mass and:
(a)force   (b) time
(c) velocity   (d) speed

(1.5)   Isotones are atoms with same number of:
(a)Neutrons   (b) Protons
(c)Electron   (d) Mass number

(1.6) A body which comes back to its original state after the deforming force is removed is known as:
(a)Perfectly elastic   (b)Perfectly plastic
(c) Rigid body   (d) Partially elastic

(1.7) Mass number in $_{12}Mg^{24}$ is:
(a)12   (b) 36
(c)24.   (d)10

(1.8)Formula mass unit of H_2O is:
(a)33   (b) 17
(c)10   (d) 18

(1.9) SI unit of thrust:
(a) Pascal   (b)Newton
(c) Farad   (d)Angstorm.

(1.10)Instrument used to measure atmospheric pressure:
(a)Barometer   (b) Lactometer
(c) Manometer   (d) Galvanometer

Group B

2)Very short Answer typeQuestions: ARKS = 1 X 22=22

2.1 What is fractional distillation?

2.2 What is the unit of Luminous intensity in S.I. unit?

2.3 Does power depend on the total amount of work done?

2.4 What is the volume of 72 g of water at STP?

2.5 Is work a scalar or a vector quantity?

2.6 What is terminal velocity?

2.7 Mention two components obtained during the fractional distillation of petroleum?

2.8 Define pH scale.

2.9 What do you mean by balanced force?

2.10 Action and reaction forces act on .... body.

2.11 What is acid rain?

2.12 What is the path a body when it is in uniform motion?

2.13 Relative density of silver is 10.5. Find the density of silver.

2.14 What is greater, **1Kg wt.** or **1N**? And By what extent?

2.15 Define a normal salt.

2.16 Mention the name of the factors that affect surface tension of a liquid.

2.17 What is an indicator?

2.18 What are antacids?

2.19 What is meant by energy quanta?

2.20 Define neutralisation.

2.21 Draw the electronic configuration of Mg^{2+}

2.22 Which one is more acidic between two solutions having pH values 4 and 5 respectively?

GROUP C

Answer all the questions   [2x9=18]

3.1 What do the terms absolute rest and absolute motion mean? Do they really exist? State reasons for your answer.

3.2 Why should a person lean back before he descends from a moving vehicle?

3.3 Derive pressure at a point inside liquid at rest.

3.4 A solid weighs 150 g in air and 120 g in water. Calculate its volume and density.

3.5 Explain why an iron nail sinks in water but a huge ship made of iron floats.

3.6 On what factors does the value of modulus of elasticity depend.

3.7 Density of a certain liquid is 1.2 g/cc. Calculate the mass of 200 cc of such liquid.

3.8 What is an acid-base indicator?

3.9 How will you get salt from sea water?

GROUP- D

4 . Long Answer question (any 5)   (5X5=25)

1. What is Buoyancy ? State the law of floatation. On what factors does the value of modulus of elasticity depends ?   (1+2+2)

2. Why sometime we take antacid ? What are the two types of antacids. Also mention one example for each type of antacids. $(2+2+\frac{1}{2}+\frac{1}{2})$

3. What is potential energy ? State its S.I. unit. Derive a mathematical expression for potential energy of a body expression for potential energy of a body expression of mass for 'm' raised to a certain height 'h' above the ground .   (1+1+3)

4. If a constant force acts on a body. prove that power of the body is directly proportional to its velocity ?

A heavy body and a light body have equal kinetic energy, which of them possesses greater momentum State with reason.   (3+1+1)

5. Explain 5 safety measures for acid or alkali burns. and also if acid or alkali is swallowed.   (1+1+1+1+1)

                                                                (3+2)

6. How does a siphon work ? Explain with a neat diagram ?

FOR GOD AND COUNTRY

Sub:Physical Science   **Class:IX**   F.M:75

Date:30.7.2018   Duration:2hours 30 minutes

GROUP –A

(1.1)Alcohol and water mixture can be separated by: Ans: (c) Fractional distillation

(1.2) $NaHSO_4$ is an example of: Ans: (a) Acid salt

(1.3) Defination of force is obtained from Newton's: Ans: (a)First law of motion

(1.4) Momentum is the product of mass and: Ans: (c) velocity

(1.5)   Isotones are atoms with same number of: Ans: (a)Neutrons

(1.6) A body which comes back to its original state after the deforming force is removed is known as: Ans: (a)Perfectly elastic

(1.7) Mass number in $_{12}Mg^{24}$ is: Ans: (c)24.

(1.8)Formula mass unit of H_2O is: (Ans : (d) 18

(1.9) SI unit of thrust: Ans: (b)Newton

(1.10)Instrument used to measure atmospheric pressure: Ans:(a)Barometer

GROUP – B

2.1   Heating mixture of two substances with moderate difference of boiling points with subsequent cooling when the higher boiling liquid condenses and hence separated.

2.2   Candela.

2.3   Power is the rate of doing work, so it depends on work done.

2.4   72g of water is = 4 mole water. So the volume of 72g water is = 4x22.4 lit = 97.6 lit.

2.5   Scalar.

2.6   The maximum constant velocity attained by a body in a viscous medium when the downward force is equal and opposite to the sum of buoyant force and the viscous dragging force.

2.7   Benzene and Phenol.

2.8   The negative log of hydrogen ion concentration in molarity is called pH and the variation of pH from '0' to '14' in water is defined as the pH scale.

2.9   When the forces act on a body such a way that, the net force becomes zero, then it is said that the body is undergoing balanced force.

2.10   different

2.11   When the pH of rain water is less than 5.6, it is called acid rain.

2.12   straight line.

2.13 $10.5g/cc$ or $10.5 \times 10^3 kg/m^3$.

2.14   1kg-wt is greater than 1N by 8.8N.

2.1.5   A salt that doesn't contain dissociable H^+ or OH^- ions, is known as normal salt.

2.16   a) temperature b) impurities.

2.17   Red.

2.18   A drug neutralises the effect of excess acid accumulation inside stomach.

2.19   The absorption and radiation of energy (heat or light) always takes place in whole multiple of a definite, small quantity of energy. This definite small quantity of energy is called energy quanta.

2.20   When equivalent amount of an acid reacts with equivalent amount of base to form salt and water, it is called neutralization.

2.21 Mg^{2+} has (12-2)=10 electrons; its electronic configuration is: 2,8

2.22   Solution having pH value 4 is more acidic.

GROUP - C

3.1   If we can imagine a reference frame which is actually at rest, and a body be at rest with respect to that reference frame, then the body can be considered at absolute rest. And if it is motion, then it is considered to be in absolute motion.

No absolute rest and absolute motion does not really exist. This is because a body seems to be at rest with respect to one neighbouring fixed object but the same body may appear to be in motion with respect to some other fixed neighbouring object. Nothing in the universe is actually at rest so the concept of absolute rest and absolute motion is meaningless.

3.2   As long as a person remains inside the moving vehicle his whole body moves with the speed of the vehicle. As soon as he descends on ground his feet suddenly come to stop but the upper part of his body still possesses forward speed due to inertia of motion. If he has no support to grab he stumbles on the ground. But if he leans back a bit beforehand it makes up the short span he moves through forward when he descends and ultimately he remains erect. This practice saves one from stumbling down when he unwisely alights from a moving vehicle.

3.3   Let a vessel contain some liquid of density d. P is a point within the liquid. Around P the area A is considered. This area A is considered as the base of an imaginary cylinder whose height h extends upto the surface of the liquid. So the weight of the liquid contained in this imaginary cylinder is the thrust on the area A.

Volume of the liquid contained in the imaginary cylinder = Ah.

Mass of the liquid in the imaginary cylinder = volume x density = Ahd

Acceleration due to gravity be g

Weight of the liquid in the imaginary cylinder = Ahdg

Thrust on the area A = Ahdg

Pressure = Thrust/ Area = Ahdg/A = hdg

Thus, pressure at a point inside a liquid = depth of the point x density of the liquid x acceleration due to gravity.

3.4   Loss of weight = (150-120) g = 30g.

Thus the weight of the liquid displaced = 30g.

Let the density of water be taken as 1 g/cc

So the volume of the water displaced = 30 x 1 cc = 30 cc.

Therefore, the volume of the solid = volume of the liquid displaced = 30 cc

3.5   The upward buoyant force on the iron nail is equal to the weight of the water the nail displaces. But since the nail is of small volume, it displaces small quantity of water. So, the buoyant force is too small to balance the weight of the nail acting downward, hence the nail sinks. But the ship displaces a huge quantity of water due to the bulged shape of its lower part. The upward buoyant force, equal to the weight of this displaced water, is enormous and can easily balance the weight of the ship. So the ship floats.

3.6   Modulus of elasticity depends on: a) nature of the body   b) temperature of the surroundings.

3.7   The required mass = volume x density = 1.2 g/cc x 200 cc = 240 g

3.8   It is a substance which changes to a characteristic colour in the presence of a particular concentration of ions such as H^+ and OH^- ions.

3.9   We can get salt from seawater by the process of distillation. One of the components, salt, is a soluble solid. This process recovers both components.

(a)In this process the mixture is taken in a distillating flask with a Leibig's condenser. At the other end of the condenser is placed a receiver to collect the distillate.

(b)When the flask is heated the vapours of the solvent pass through the condenser. They are cooled, condensed into a liquid and collected as a distillate in the receiver.

(c)The solid component forms the residue in the flask.

GROUP D

4.
1.   The upward force acting on a body when partially or fully immersed in liquid or gas is called buoyancy.
Law of flotation- When a body floats in a liquid at rest, the weight of the body acting vertically downward at its

centre of gravity equals The weight of the liquid displaced by the submerged part of the body acting vertically upward at

its centre of buoyancy.

Modulus of elasticity depends on: a) nature of the body   b) temperature of the surroundings.

2.

Sometimes due to nature of foodstuff and due to diseases, the excess secretion of acid occurs and it causes

disturbance in the digestion. So we take antacid, which regulates the acidity and pH Level in stomach.

Two types of antacids- i) systemic-soluble in water – soluble in water

ii) non systematic –not soluble in water

e.g. i) sodium bicarbonate   ii) Magnesium hydroxide or gel of pure aluminum hydroxide.

Ans - It is the mechanical work obtained when it undergoes a change of position or a change of shape
$$E = mgh$$
S.I unit is joule.
A body of mass m is at rest above the ground at a height h.
Change of its mechanical energies-
i) Just before it falls – the body has the potential energy $= mgh$
since it is at rest, its kinetic energy $= 0$.
Total energy $= mgh + 0 = mgh$
ii) the body descends through a distance x , x less than h.
 Height of the body above ground $= h - x$ therefore P.E $= mg (h-x)$
P.E thus decreases by mgx while it acquires velocity v
   $v^2 = u^2 + 2as$. $u = 0, a = g, s = x$
   $v^2 = 2gx$, K.E $= \frac{1}{2} mv^2 = \frac{1}{2} m(2gx)^2 = mgx$ .therefore total energy $= mg(h-x) + mgx = mgh$.
iii) The body is just above the ground before touching- h is zero.so P.E is negligible. The body possesses only K.E.
Total energy $= mgh$.
iv) When body touches the ground, $h = 0$ so P.E. $= 0$ and K.E. $= 0$
   The energy dissipates in environment as heat energy and sound energy.

4. Ans : P = W/t =F x d / t =F x d/t = F x v

Power = force x velocity

The heavier body will have more momentum due to more mass.

5 5 safety measures for acid or alkali burns are:

Ans : 1. Wash the place with plenty of water and then with sodium bicarbonate and again wash with water.

2.for alkali burns , wash with water then 1% of acetic acid and again water.

3.acid in eye –wash with water number of times and then 1% of sodium bicarbonate solution.

4.If acid is swallowed- take plenty of drinking water and then dilute solution of milk of magnesia.

5.For alkali –take plenty of water followed by lemon juice.In all these cases medical attention is necessary.

6. Siphon is a device used to transfer a liquid from a vessel to somewhere without moving the vessel or without a pump. Let the Vessel contains a liquid of density d. The liquid is to be transferred from a vessel to another for which a tube is filled with same Liquid with shorter limb is dipped in vessel A and longer in vessel B .

At the base atmospheric pressure p transmits upwards according to Pascal's law. weight of the column =AX($h_1$dg) acts downwards.Net pressure = p – $h_1$dg

At the base of longer limb pressure = p – $h_2$dg

P –$h_1$dg is greater than p-$h_2$dg .so h_2 should be greater than h_1 .