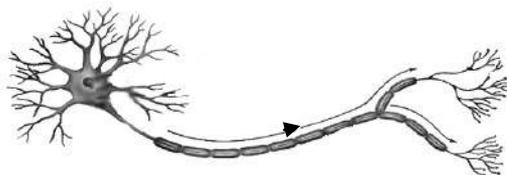


- Answer all the questions.
- Select the correct or the most appropriate answer (1-4) for the questions from 1 to 40.
- Put (x) in the relevant circle

1. Which one of following gases accounts for the lowest percentage of the Earth's atmosphere?
1) N_2 2) CO_2 3) O_2 4) Ar
2. Which one of the following gases is a supporter of combustion?
1) O_2 2) CO_2 3) H_2 4) N_2
3. The non-living part of a plant cell is
1) Mitochondrion 2) Nucleus 3) Ribosome 4) Cell wall
4. Electron configuration of an element is 2, 8, 1. The most stable ion of this element could be
1) +1 2) +2 3) -1 4) -2
5. Select the correct statement regarding meiosis and mitosis
1) Mitosis does not take place when forming gametes.
2) The number of chromosomes is not changed in meiosis.
3) Both meiosis and mitosis take place when forming gametes.
4) Meiosis can take place randomly in cell division.

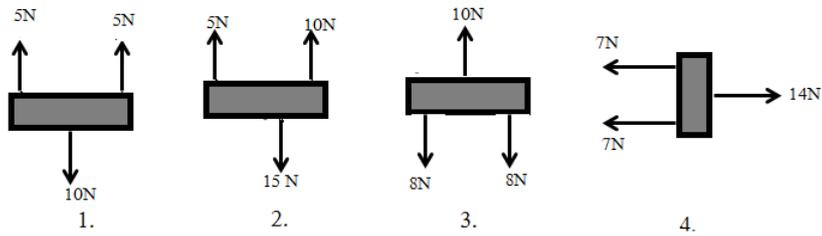
6.



The diagram above shows a neuron of the vertebrate nervous tissue. Select the correct statement with regard to this tissue.

- 1) It is a sensory neuron relaying nerve impulses from sensory organs to the central nervous system.
- 2) It is an Intermediate neuron and completely packed in the central nervous system.
- 3) It is a motor neuron relaying impulses from sensory organs to the central nervous system.
- 4) It is a motor neuron relaying impulses from the central nervous system to effectors.

7. Which of the following system of forces does not show equilibrium?



8. Which of the following options contains a strong acid and a weak base respectively?

- 1) Citric acid, Ammonium Hydroxide
- 2) Hydrochloric acid and Potassium Hydroxide
- 3) Formic acid, Sodium hydroxide
- 4) Sulfuric acid and Ammonium hydroxide

9. The vitamin that helps to produce components requiring for blood clotting is

- 1) Vitamin A 2) Vitamin B 3) Vitamin K 4) Vitamin E

10. The pair of substances used in the laboratory to produce carbon dioxide gas is

- 1) Zn and HCl
- 2) CaCO_3 and HCl
- 3) Mg and HCl
- 4) Cu and $\text{Ca}(\text{HCO}_3)_2$

11. Select the specific feature of all the organisms of Kingdom Archea

- 1) Indestructible by antibiotics.
- 2) Not having an organized nucleus.
- 3) Being Eukaryotic.
- 4) Not being autotrophic.

12. Which of the following is not a feature of covalent compounds?

- 1) Existing in solid state at room temperature.
- 2) Conducting electricity through their aqueous solutions.
- 3) Having comparatively low melting points and boiling points.
- 4) Conducting electricity when fused.

13. A flexible rubber tube is fixed to a tap. When the tap is opened, the tube is seen moving to the opposite direction of the ejecting water. Which of the following law describes this incident?

- 1) Newton's third law
- 2) Newton's second law
- 3) Newton's first law
- 4) Archimedes' Law

14. Which pair of chemicals can be used to identify proteins?

- 1) Sodium hydroxide and Copper Sulphate
- 2) Iodine and cobalt chloride
- 3) Water and Iodine
- 4) Benedicts solution and Sulfuric acid

15. According to the Newton's second law,

- 1) The acceleration of an object is directly proportional to its mass.
- 2) The acceleration of an object is inversely proportional to the force acting on it.
- 3) Although the force applied affects the acceleration of an object, the mass doesn't
- 4) The acceleration of an object is directly proportional to the force applied and is inversely proportional to its mass.

16. A certain group of living beings possesses the following features.

- Chitinous cell wall.
- Being Eukaryotic.
- Decomposing the organic matter.

The above group may be,

- 1) bacteria 2) fungi 3) cyanobacteria 4) algae

17. Resultant force means,

- 1) the sum of all the forces acting on the object.
- 2) the single force which produces an equivalent effect produced by several forces on an object.
- 3) the sum of all the forces acting in the same direction.
- 4) the sum of all the horizontal and vertical forces acting on an object.

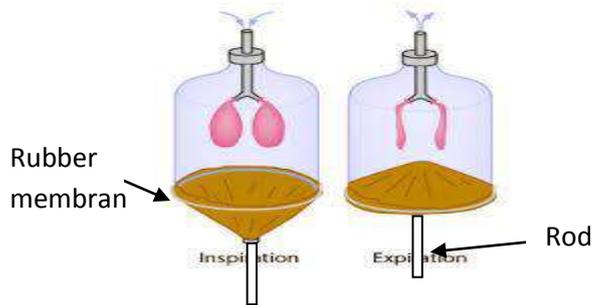
18. In a blood test of an individual, it is detected that 100cm^3 of blood contains 100 mg of glucose. The relative molecular mass of glucose is 180. The number of moles of glucose present in 100cm^3 of his blood is,

- 1) $\frac{1}{180} \times \frac{100}{1000}$ 2) $180 \times \frac{100}{1000}$ 3) $180 \times \frac{1000}{100}$ 4) $\frac{1000}{180} \times 100$

19. The Calcitonic hormone which reduces the Calcium level of blood is produced in the

- 1) pancreas 2) pituitary 3) thyroid gland 4) adrenal gland

20. The following diagram shows an apparatus which is designed to demonstrate the action of inhaling and exhaling. When the rubber membrane is pulled downward using the stick attached to it,



- 1) the balloon inflates because the air pressure inside the bottle becomes lower than that of the atmosphere.
- 2) the balloon inflates because the air pressure inside the bottle is increased by increasing its volume.
- 3) the balloon inflates because the pressure inside the bottle decreases and that of atmosphere decreases even more.
- 4) the balloon inflates because the volume inside the bottle decreases and that of air increases.

21.



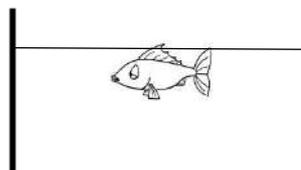
The mass of the man and the boat which is shown in the above diagram is 120kg. If the kinetic energy of the man and the boat is 6000 J, the speed of the boat is

- 1) 1.2 ms^{-1}
- 2) 7.1 ms^{-1}
- 3) 10 ms^{-1}
- 4) 12 ms^{-1}

22. A solution of volume 250 cm^3 is prepared by mixing 25 cm^3 of pure Ethyl alcohol with distilled water. What is the volume fraction of Ethyl alcohol in this solution? (Assume that no volume change occurs when mixing.)

- 1) 1) 0.01
- 2) 0.1
- 3) 0.2
- 4) 0.5

23. The mass of the fish shown in the diagram is 2kg. This fish is floating in fresh water without making any motion in its fins.



The up thrust acted on the fish by fresh water is,

- 1) 30N
- 2) 10N
- 3) 20 N
- 4) 4N

24. Consider the following instances of extraction.

- a) Extraction of sugar from a sugar cane juice solution.
- b) Extraction of pure salt from impure salt.
- c) Extraction of water insoluble Iodine into an organic layer.

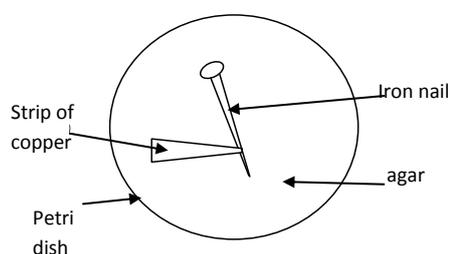
Which of the following option contains the extraction methods that are appropriate to each of the instances stated above respectively?

	a) Extraction method	b) Extraction method	c) Extraction method
1	Recrystallization	Crystallization	Solvent extraction
2	Crystallization	Recrystallization	Solvent extraction
3	Solvent extraction	Crystallization	Recrystallization
4	Crystallization	Solvent extraction	Recrystallization

25. Having listening to a song of Pandit Dr. W.D. Amaradeva, a student decided that the song was sung by some other person. The property of sound that helped the student to decide so is,

- 1) pitch
- 2) quality of sound
- 3) loudness
- 4) pitch and loudness

26. Following is a setup designed to investigate rusting of iron. The Petri dish contains agar medium with phenolphthalein and Potassium ferricyanide. An iron nail connected to a small strip of Copper is dipped in it. Given below are some observations expected in this activity.



- a) Blue colour develops near the iron nail and pink colour develops near the Copper plate.
- b) Iron is reduced and Copper is oxidized.
- c) If Zinc is used instead of Copper, pink colour can be observed around the iron nail.

Of these observations

- 1) only a and b are true.
- 2) only b and c only are true.
- 3) only a and c are true.
- 4) all a, b and c are true.

27. Consider the following statements about the bio-chemical reactions.

- a) Enzymes catalyze bio-chemical reactions.
- b) Amylase in saliva converts starch into maltose.
- c) Proteins contribute in producing the enzymes.

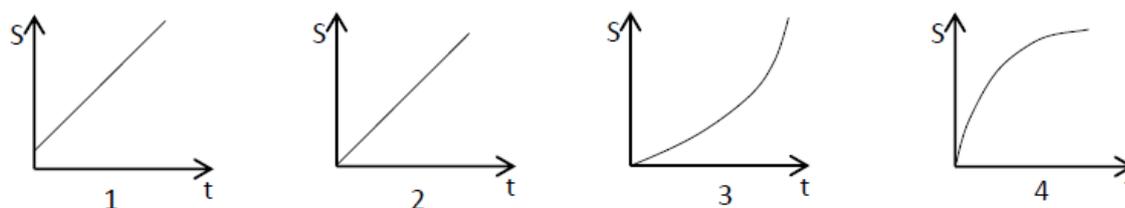
Of these statements,

- 1) only a and b are true.
- 2) only a and c are true
- 3) only b and c are true.
- 4) all a, b and c are true.

28. Compounds are of four types according to the nature of the molecule and the components they contain. Which one of the following options contains the correctly classified compounds into the four types?

Organic		Inorganic	
Polar	Non-polar	Polar	Non-polar
1	Benzene	Alcohol	Carbondisulphide
2	Benzene	Alcohol	Ammonia
3	Alcohol	Benzene	Carbondisulphide
4	Alcohol	Benzene	Carbondisulphide

29. The last compartment is detached from a train when it is travelling in a straight horizontal railway track at constant velocity. Which one of the following graphs best represents the variation of the displacement of the detached compartment with time?



30. The decomposition reaction of CaCO_3 is given below.



The mass of CO_2 produced by decomposition of 50g of CaCO_3 is,

- 1) 22g
- 2) 44g
- 3) 55g
- 4) 88g

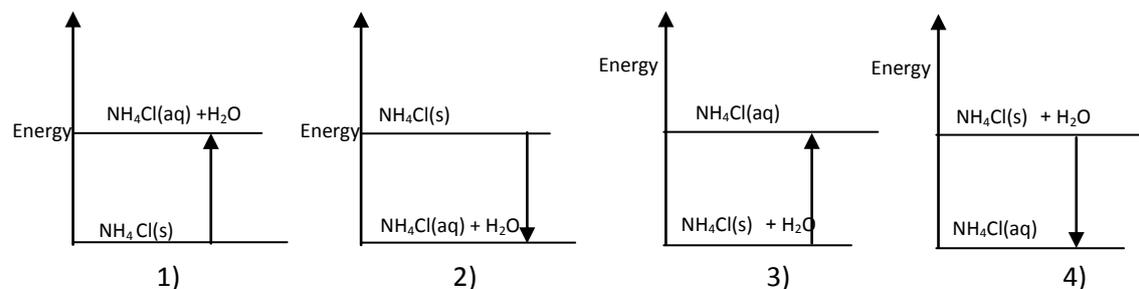
31) Following steps were followed in artificial pollination of passion-fruit-flowers.

- Depositing the pollens of a mature flower on the stigma of the same flower.
- Depositing the pollens of a mature flower on the stigma of some other mature flower.
- Depositing pollens of a mature flower on the stigma of a mature flower in another passion fruit plant.

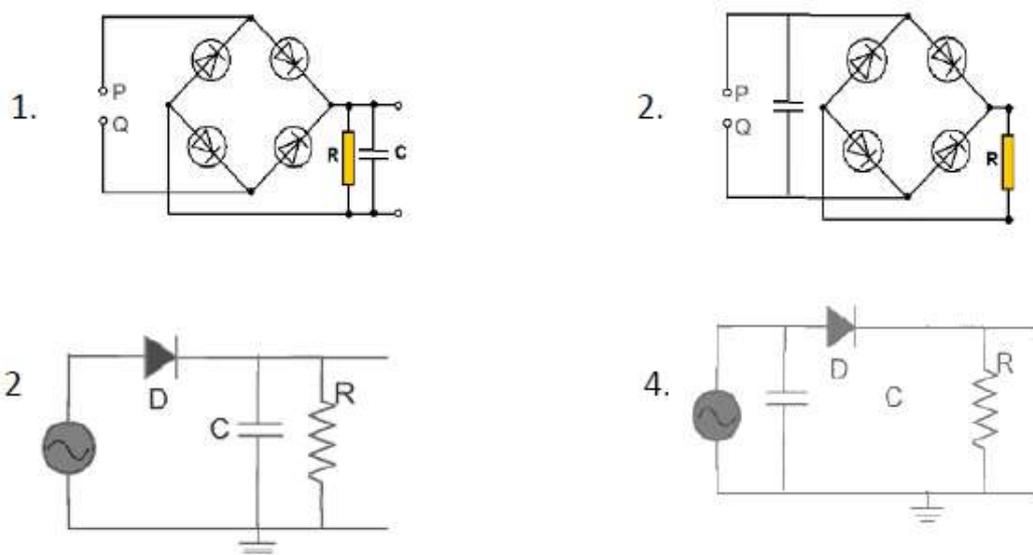
A successful fruit production can be observed in,

- a and b instances
- b and c instances
- a and c instances
- all a, b and c instances.

32. The graph that correctly represents the energy change relevant to the dissolving of NH_4Cl crystals in water is



33. The correct circuit which shows the full wave rectification and smoothing is



34. The pair of ion with similar electronic configuration to Al^{3+}

- S^{2-} and N^{3-}
- N^{3-} and P^{4+}
- Mg^{2+} and N^{3-}
- N^{3-} and Cl^{-1}

35. Which of the following is a type of mechanical energy?

- 1) kinetic energy 2) electrical energy 3) magnetic energy 4) light energy

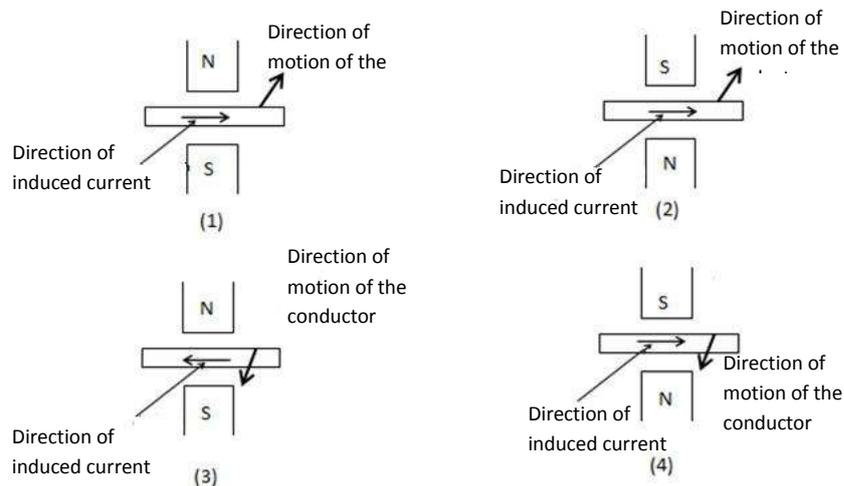
36. Select the incorrect statement.

1. Around the 6th week, the embryonic membranes begin to develop.
2. Exchange of blood doesn't take place through the umbilical cord, but transferring of nutrients, passing of waste materials, exchange of gasses take place.
3. Fertilization (fusing of a sperm and an ovum) takes place inside the uterus.
4. When progesterone level increases secretive phase commences.

37. Which of the following is a characteristic of a mechanical transverse wave?

1. Particles of medium vibrate perpendicular to the direction of the wave.
2. Particles of medium vibrate parallel to the direction of the wave.
3. The velocity of the waves is $3 \times 10^8 \text{ m s}^{-1}$.
4. No medium is necessary for the transmission of waves.

38. Given below is a diagram that shows a conductor moving in a magnetic field. Which diagram shows the correct direction of induced current?



39. Which one of the following disease is categorized as non communicable?

- 1) Malaria 2) Diabetes 3) Dysentery 4) Bird flue

40. The reason behind the life-threatening effect of agro chemicals and heavy metals on man,

- (a) soon after they are released to the environment, they enter the body through the respiratory system and the skin.
- (b) because of hair dyes and other chemicals used in beauty culture.
- (c) since man being a top level dependent, entry of agrochemicals into human body is more probable through food chains.

Of these, the most appropriate statement is

1. only a and b 2. only b and c 3. only a and c 4. All a, b, and c

G.C.E O/L-2016 New Syllabus

Revision Science (No:2)

- This paper consists of two parts A and B.
- Part A is the structured paper. Write the answers in the space provided.
- From the part B, select only three out of five questions and answer.

(1) (A) The water collected after washing rice was kept in an open space for one day. A student noticed the presence a large number of dead mosquitoes on the water. He decided to check whether this water contains a mosquito attractant or a mosquitocide.

i) If you were the student planning to investigate this scientific problem, write a hypothesis you would test here.

.....

ii) In experimentation, what is the necessity for having a control experiment?

.....

iii) When you test your hypothesis, what is the main difference between the experiment and the control experiment?

.....

iv) Write down two similarities between the experiment and the control experiment.

.....

.....

v) Write two strategies that you can adopt to confirm the above conclusion.

.....

.....

(B) Chena cultivation was considered as not eco-friendly in the past. However some practices seen in Chena cultivation are accepted now as eco-friendly methods under the sustainable development and environmental management criteria.

i) Write two characteristics prevalent in Chena cultivation to confirm the new acceptance.

.....

.....

ii) Write two interactions between a Chena cultivation and a adjoining forest.

.....

.....

iii) Write a cause for the less extent of soil erosion associated with Chena cultivation.

.....

iv) Write down a main difference seen in flowing materials in a natural forest and a Chena cultivation.

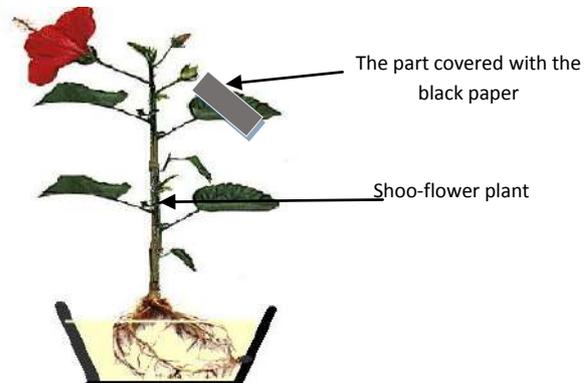
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v) The value of the food mileage is less when consuming food produced by Chena cultivation than consuming food bought from the market. State a fact in favor of this.

.....
.....

2) (A) The set-up given below is arranged to test the hypothesis "light is essential for photosynthesis"



i) Write down one living characteristic seen in plants.

.....

ii) Describe the steps you follow to remove the starch from leaves before the experiment.

.....

iii) Starch is a natural polymer. Name the monomer of starch.

.....

iv) After boiling in water, green leaves are heated again in alcohol to remove chlorophyll. What is the necessity of a water bath in this experiment?

.....

(B) During growth and reproduction of plants, new cells are formed.

i) What is the mode of cell division occurring in plants when increasing their height?

.....

ii) Mention whether the plant given above is monocotyledonous or dicotyledonous.

.....

iii) Write down an observation that you used to give the answer in (ii) above.

.....

iv) In the scientific nomenclature for plants, shoo plant is termed as (*Hibiscus rosasinensis*). Write down separately the two taxonomical levels that the each part of this name belongs to.

1..... 2

v) The sexual reproductive structure of the plant is the flower. What are the two types of gametes present in it?

.....

(C) Recombinant DNA technology is applied in modern farming.

i) Write down two characteristics that have been introduced to wheat plants using this technology.

.....

ii) Write one strategy applied in this method to receive new genotypes.

.....

03) (A) 5 g of NaOH was dissolved in water to prepare 1 dm³ of NaOH solution.

i) Express the composition of this solution using the data given above.

.....

ii) Write down factors that affect the solubility of NaOH in water.

.....

iii) Which type of thermo chemical process is this?

iv) .

a. Name the technique applied in getting solid crystals again from this NaOH solution.

.....

b. What is the main industry where this technique is applied?

.....

(B) NaOH is a 'strong base'

i) Explain the term 'strong base'.

.....

ii) State another strong base

.....

iii) What is known as metal corrosion?

.....

(C)

i) According to the origin, which type of polymer is 'polythene'?

.....

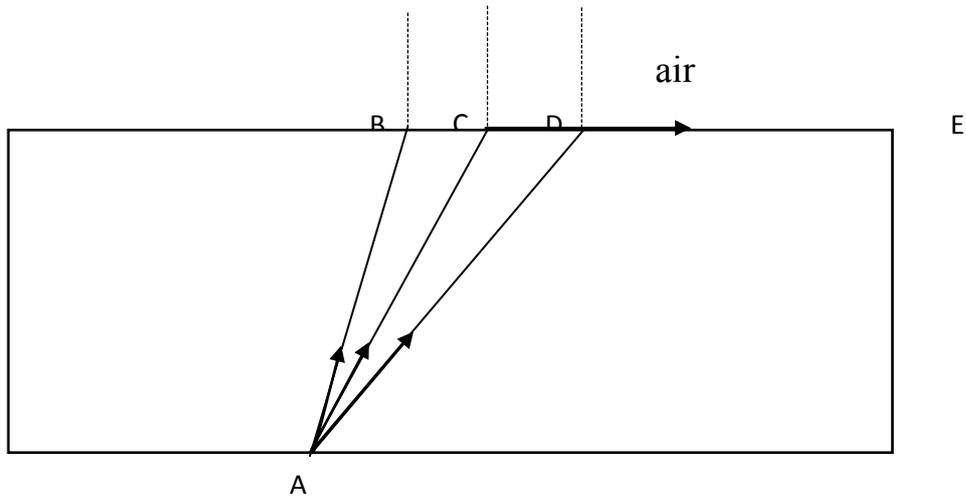
ii) Write one similarity and a dissimilarity between Methane and Ethane.

.....

.....

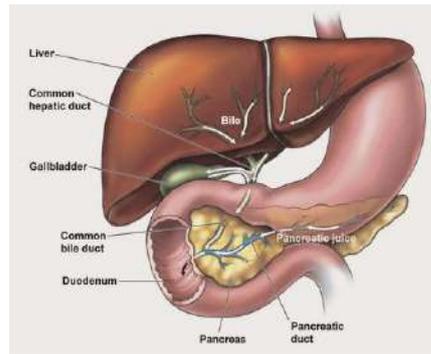
04.

- A. The figure below shows an instance where refraction of light is studied. AB, AC and AD are three incident rays inside the block of glass. The ray AC traces the face CE after refraction.



- i) State the Snell's law of refraction of light.
.....
.....
- ii) Complete the paths of the rays AB and AD after refraction in the figure.
- iii) What is the special name used to refer to the angle of incident of the ray AC as per its path after refraction?
.....
- iv) What is the name referring to the phenomenon that light undergoes when the angle of incident exceeds the angle discussed in (iii) above?
.....
- v) Give an instance where the phenomenon in (iv) above is made use of?
.....
- B. Both heat and light received from the sun are electromagnetic waves.
- i) Write down two common properties of electromagnetic waves.
.....
.....
- ii) What are the other two modes of transferring heat in addition to the mode stated in (i) above.
1..... 2.....
- iii) Give an instance of transferring heat by each of the mode mentioned above.
.....
.....
- iv) X rays and Y rays are electromagnetic waves. Write down a use of each type.
X.....
Y.....

05. A. Given below is a diagram that shows a part of the human digestive system.



- i) What is the organ that produces bile requiring for emulsification of lipids?
- ii) State an enzyme secreted by the pancreas for digestion of protein. Write down the end product of protein digestion.
- iii) State two important compounds found in the human body in which proteins become a component.

B. Blood transports end products of food digestion and other substances.

- i) Write two properties of blood that contribute for transporting substances.
- ii) What is the main function performed by the internal lining of the last part of the small intestine.
- iii) State the two sub systems connected to the nervous system controlling the movements of the digestive system.

C. Two different living processes take place in the two instances shown in the figures below.

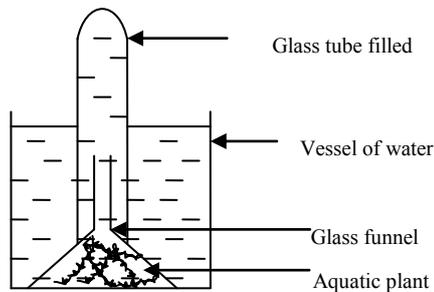


Figure A

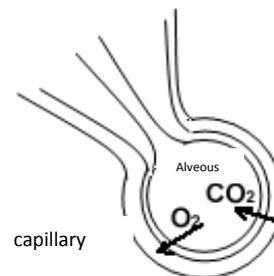


Figure B

- i) Name the process that releases oxygen shown in figure A and state how you identify this gas.
- ii) What is the method by which the gaseous exchange takes place in alveoli?
- iii) State main product of the process shown in figure A and the three elements it contains.
- iv) To which process occurring in living cells is the product in (iii) above contributed?

D. Transportation of substances takes place even in plants.

- i) What are the main tissues that contribute to the transporting substances in plants?
- ii) State a type of living cells and a type of non living cells containing in tissues mentioned in (i) above.

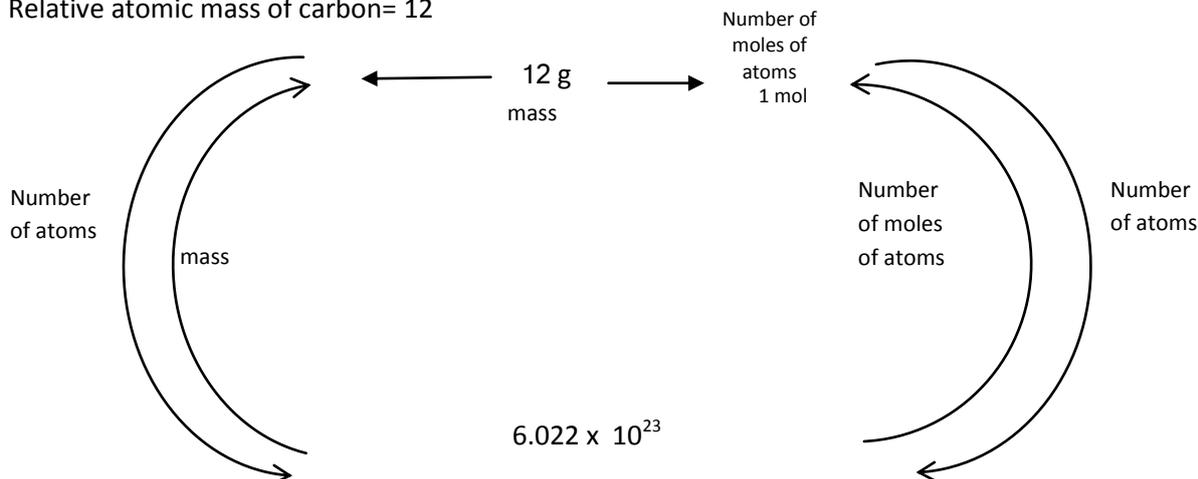
(A) An apparatus used to prepare a sample of a gas is shown in the diagram given below.

- i) What is the gas named as "P" which is expected to be prepared with the aid of this apparatus?
- ii) Name "Q" and "R".
- iii) State a material that can be used for "Y".
- iv) Write the balanced chemical equation relevant to the above gas preparation.

B) Information regarding a few elements is given below.

- The atomic number of the element P is 12.
 - Number of electrons in a neutral atom of the element Q is 17.
 - A neutral atom of the element R has 8 neutrons and its mass number is 16
 - Mass number of the element "S" is 1 and its atoms have no neutrons
- i) What is the type of the chemical bond formed by the reaction between P and Q?
 - ii) Write a special feature of the compounds with the type of bond you mentioned in I above.
 - iii) What is the type of bond formed between R and S?
 - iv) Draw a diagram to represent the type of bond formed between R and S?

C) A few pieces of information given by the teacher about the carbon-12 Isotope are given below.
Relative atomic mass of carbon= 12



Fill in the blanks of the following table with the aid of the above information related to carbon Isotope.

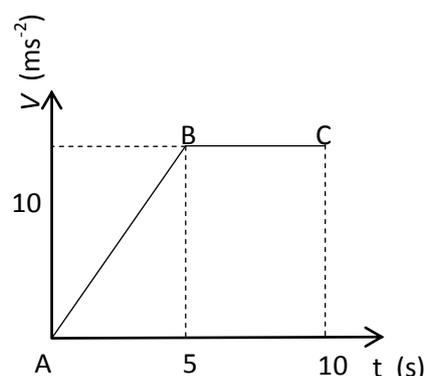
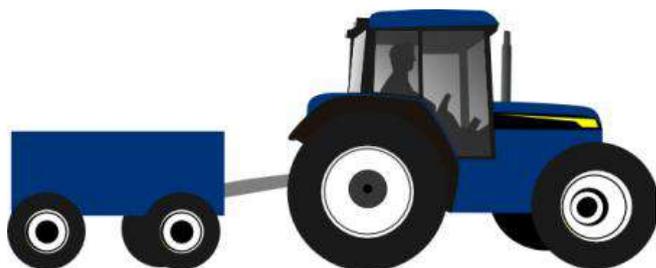
Mass of carbon	Number of moles of carbon	Number of molecules
6 g	(i).....	$\frac{6.022 \times 10^{23}}{2}$
(ii)	2 mol	1.2044×10^{24}
1 g	0.083 mol	(iii)
(iv)	1 mol	(v)
9 g	(vi).....	$\frac{6.022 \times 10^{23}}{12} \times 9$

D) Given below are the first ionization energies of few elements.

Element	He	Li	N	Na	F
First ionization energy	2372 kJ	519 kJ	1406 kJ	495 kJ	1682 kJ

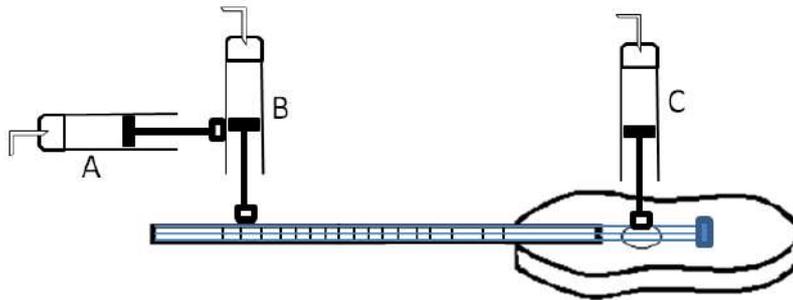
- What is the reason for helium having higher first ionization energy than the other elements?
- What is the group of the periodic table that contains the elements with maximum first ionization energy?
- How does the electronegativity of elements vary when moving from left to right along a period of the periodic table?

7. A) The diagram below shows a tractor that pulls a trailer and the velocity-time graph relevant to its motion.

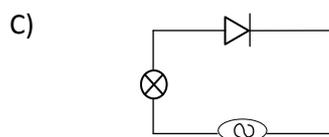


- Describe the motion of the tractor represented by the AB and BC sections of the graph.
- Draw the displacement- time graph relevant to the velocity- time graph given above.
- The resultant force acting on the trailer is 1000 N. If the mass of the trailer is 6000 kg, what is its acceleration?
- The frictional force acting on the trailer at the instance mentioned in (III) above is 350 N. Calculate the force exerted on the trailer by the tractor.

B) Following diagram shows a robotic arm playing a guitar. The piston C plucks the strings, and the pistons A and B press the strings onto the fingerboard to play the desired musical notes.



- i) Which piston/ pistons is/are required to change the pitch?
- ii) What is the scientific principle behind the action of pistons?
- iii) The length of the guitar string is 60 cm. The force exerted by the piston A on the piston B is 10 N. Calculate the amount of work done to move the piston B along the whole length of the string.



- i) Name the component "X" shown in the circuit diagram above and state its function.
- ii) State a disadvantage entailed due to the use of "X" above.
- iii) In order to avoid the disadvantage you stated in (ii) above, draw the diagram of suitable circuit to replace X including the required component/ components.

8) The diagram given below depicts a person riding a bicycle on a wire in a circus performance. The person is engaged in warm up exercises before performing. That increased his rate of respiration.



- i) Explain the mechanism of inhalation during the respiration.
- ii) Glucose is oxidized during respiration and the necessary glucose is obtained by the digestion of disaccharides like maltose and sucrose. Mention separately the enzyme that contributes in digesting each of these two disaccharides.
- iii) When the concentration of glucose in the blood stream falls, which hormone raises it back to its optimum level? Name the gland that secretes this hormone.
- iv) State two ways that blood contributes to the continuation of cellular respiration process.

B) Rate of respiration and many other involuntary actions are controlled by the autonomous nervous system.

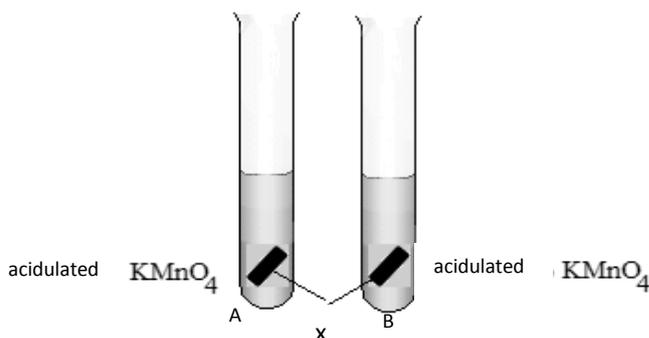
- i) Which part of the system stated in B above is responsible for increasing the rate of respiration?
- ii) Write two other activities controlled by this system in addition to the one mentioned above.
- iii) Write down a nitrogenous excretory product of man and state the main organ responsible for removing it.

C) Mass of the performer is 50 kg and that of the bicycle is 20 kg. If he rides the bicycle on the wire with a velocity of 2 m s^{-1} ($g = 10 \text{ m s}^{-2}$),

- i) calculate the total momentum of the performer and bicycle.
- ii) calculate the gravitation potential energy of the performer with respect to the ground when he stands 3 m above the ground level.
- iii) In a certain instance of his performance, he manages to produce static equilibrium in the system at the middle of the wire. State the 2 forces the wire exerts on the bicycle in the same direction.
- iv) State two forces acting in the opposite direction according to the Newton's 3rd law of motion.
- v) Write down two conditions that two forces need to meet for them to produce equilibrium.

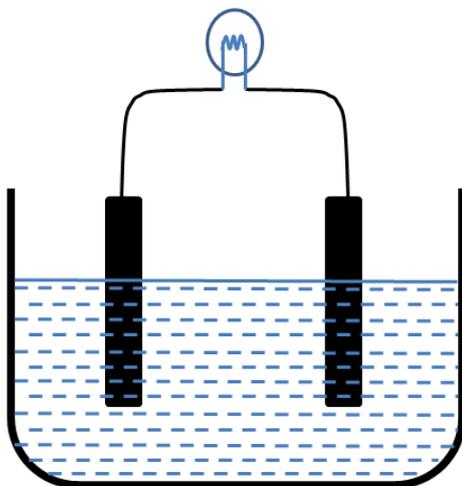
9. A) K, Na, [t], Mg, Al, Zn, [x], Sn, Pb, H, [y], Hg, Ag, Pt, [z] Given here is the activity series of metals. The symbols indicated within the cages are not standard ones.

- i) Name the relevant metals indicated by the letters "t", "x", "y" and "z".
- ii) What method should be used to extract the metal indicated by "y" of the series?
- iii) State the raw materials used to extract the metal indicated by "y".



- iv) A and B test tubes contains acidulated KMnO_4 solutions. Test tube "A" is immersed in a vessel filled with hot water and "B" is immersed in a vessel filled with cold water. Write down the relevant observations.

B) Given below is the diagram of a simple cell.



- i) What is the electrolyte used in the simple cell?
- ii) State the direction of the flow of conventional current of the simple cell shown above.
- iii) Write the reaction taking place at the anode of the above cell.
- iv) State whether the cathodic reaction of this cell is an oxidation or reduction.

C) A student decided to measure the atmospheric pressure at the top of a tall building. He placed an aneroid barometer on the top of the building (see figure) and made the observations later.



- i) Name another instrument used to measure the atmospheric pressure.
- ii) Calculate the atmospheric pressure at the top of the building in pascal (Density of mercury is 13600 kg m^{-3} , $g = 10 \text{ m s}^{-2}$)
- iii) State the atmospheric pressure at sea level in Hg cm
- iv) Explain the way of varying the atmospheric pressure with the altitude.

Answers

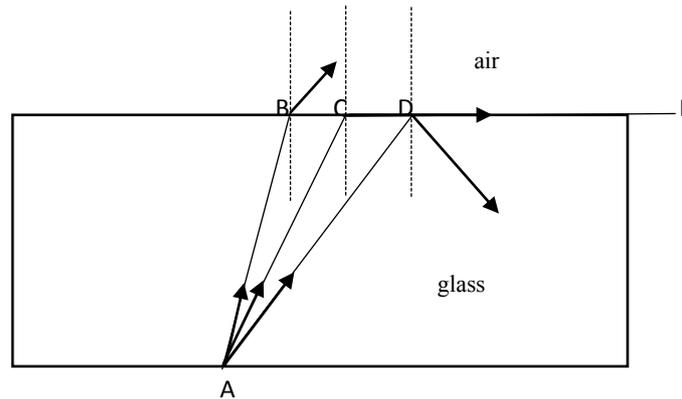
Multiple choice

1.	2	11.	1	21.	3	31.	4
2.	1	12.	3	22.	2	32.	3
3.	4	13.	1	23.	3	33.	1
4.	1	14.	1	24.	2	34.	3
5.	3	15.	4	25.	2	35.	1
6.	4	16.	2	26.	3	36.	3
7.	3	17.	2	27.	4	37.	1
8.	1	18.	1	28.	3	38.	2
9.	3	19.	3	29.	4	39.	2
10.	2	20.	1	30.	1	40.	4

1. A.
- i. Water collected after washing rice is an attractant of mosquitoes / water collected after washing rice is not an attractant of mosquitoes/water collected after washing rice is a mosquitocide / water collected after washing rice is not a mosquitocide 1 mark
 - ii. To avoid the incorrect conclusions due to various effects during the experiment 1 mark
 - iii. Only the factor that is under investigation 1 mark
 - iv. Taking water after washing rice and pure water into equal containers / keeping under equal environmental conditions/inserting equal number of mosquitoes into similar chambers / getting information from the main experiment and the control experiment during an equal period of time 2 marks
 - v. repeating the experiment / increasing the number of samples used/ conducting the experiment under different environmental conditions 2 marks
- B)
- i. Multi crop cultivation / natural biological control / competition among crops / minimum soil erosion/ minimum environmental pollution 2 marks
 - ii. Birds and pests in the forest (food chains) / maintenance of the environmental humidity / cycling of matter 2 marks

- iii. Non over turning of the soil / emergence of plants with different heights in the cultivation 1 mark
- iv. Flow of matter in a natural forest takes place in a cyclic manner , but it does not happen in the Chena cultivation due to the removal of matter 2 marks
- v. Reducing the production cost of food in direct consumption/ additional expenditure when transporting food to the market 1 mark
2. A.
- i. Growth / producing flowers/ production of new plants (reproduction) 1 mark
- ii. Keeping two days / 48 hours in dark 1 mark
- iii. Glucose 1 mark
- iv. To prevent alcohol from catching fire / to provide heat equally 1 mark
- B.
- i. Mitosis 1 mark
- ii. Dicotyledonous plants 1 mark
- iii. Formation of branches / presence of a tap root/ pentamerous flowers 2 marks
- iv. Genus (Name) Specific epithet(Name) 1 mark
- v. Pollen grain ovule 2 marks
- C)
- i) Vitamins/ pest resistance/higher yield 2 marks
- ii) Inserting DNA/combining DNA parts 1 mark
3. A)
- i) NaOH composition = m/v (mass of NaOH/ volume of solution) 1 mark
 $=5g/1 \text{ dm}^3=5 \text{ g dm}^{-3}$ 1 mark
- ii) Temperature/ nature of solvent/nature of solution/physical nature of the substance 2 marks
- iii) Exothermic 1 mark
- iv) a. crystallization
 b. salt production/industry
- B)
- i) Liberation OH^- ions into an aqueous medium 1 mark
- ii) For a base such as KOH, $\text{Ca}(\text{OH})_2$ 1 mark
- iii) Oxidation of metallic atoms 2 marks
- C)
- i) For an artificial polymer 1 mark
- ii) Ethene contains a $\text{C}=\text{C}$ bond but no carbon-carbon bonds in Methane
 Both Ethane and methane have 4 $\text{C}-\text{H}$ bonds/or 4 H atoms 2 marks
4. A)
- i) When light enters from one transparent medium to another at a glancing angle, the ratio of the sin of the angle of incidence to the sin of the angle of refraction is a constant for the two transparent media. 1 mark

ii)



2 marks

iii) Critical angle

1 mark

iv) Total internal reflection

1 mark

v) Fiber optics/prism binoculars/cameras

2 mark

B)

i) Reflection/refraction/the same speed in vacuum/transmission of energy/ not deviated by external magnetic field or electric fields etc.....

2 marks

ii) Conduction convection

2 marks

iii) Conduction-transmission of heat through solids

1 mark

Convection - transmission of heat through liquids or gases

1 mark

iv) X-rays- detection of fractures in bones and metals

1 mark

Y-rays- destruction of cancer cells/sterilizing surgical instruments and food

1 mark

5. A)

i) Liver

1 mark

ii) Trypsine amino acids

2 mark

iii) Enzymes/ hormones/ antibodies/blood protein

2 mark

B)

i) Ability to flow(fluidity)/ solvent property

2 marks

ii) Absorption of the end products of digestion

1 mark

iii) Sympathetic and parasympathetic

2 marks

C)

i) Photosynthesis

1 mark

ii) Inserting a glowing splinter into the tube containing the gas

1 mark

iii) Diffusion

1 mark

iv) Glucose

1 mark

v) C,H.O

1 mark

vi) For cellular respiration

1 mark

D)

i) Xylem and phloem

2 marks

i) Living cells-parenchyma/sieve tubes/ companion cells

1 mark

ii) Non living cells-xylem tubes/tracheids/phloem sclerenchyma

1 mark

6. A)

i) Hydrogen

1 mark

- ii) Q-Thistle funnel R-Gas jar 2 marks
- iii) HCl/H₂SO₄ (an acid) 1 mark
- iv) $2\text{HCl} + \text{Zn} \rightarrow \text{ZnCl}_2 + \text{H}_2$ / $\text{H}_2\text{SO}_4 + \text{Zn} \rightarrow \text{ZnCl}_2 + \text{H}_2$ 2 marks

B)

- i) Ionic 1 mark
- ii) Conducting electricity when fused or dissolved in water/high melting points/solid crystals 1 mark
- iii) Covalent 1 mark
- iv) Relevant cross-dot diagram 2 marks

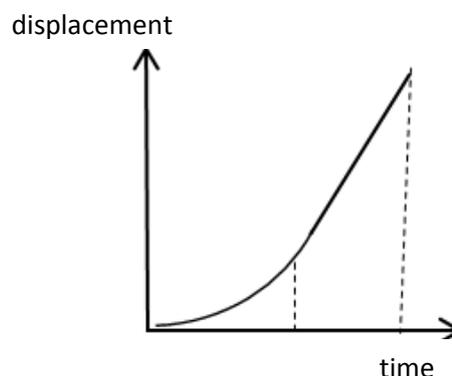
C)

- i) $\frac{1}{2}$ mol 1 mark
- ii) 24 g 1 mark
- iii) $6.022 \times 10^{23}/12$ 1 mark
- iv) 12 g 1 mark
- v) 6.022×10^{23} 1 mark
- vi) 0.75 1 mark

- D. 1. Electrons are located close close to the nucleus/ present in group VIII 1 mark
- ii. Group VIII 1 mark
- iii. Electronegativity gradually increases 1 mark

7. A)

- i) A to B – Uniform acceleration 1 mark
- B to C – Uniform velocity 1 mark
- ii)



2 marks

- iii) $F = ma$
- $1000 = 6000 \times a$
- $a = 0.66 \text{ ms}^{-2}$ 2 marks
- iv) $1000 + 700 = 1700 \text{ N}$ 2 marks

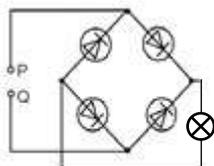
B)

- i) Piston C 2 marks
- ii) Principle of pressure compression of fluids 2 marks
- iii) $10 \text{ N} \times 60 / 100 \text{ m} = 6 \text{ J}$ 2 marks

C)

- i) Rectifier diode 1 mark
- Making the current to flow into only one direction 1 mark
- ii) Less brightness in the light emitted by the bulb 2 marks

iii)



2 marks

8. A)

- i) Contraction of intercostal muscles , pushing the thoracic cavity forward and upwards, contraction of the muscles of the diaphragm, increasing the volume of the thoracic cavity, decreasing the pressure inside it and entering atmospheric air into the lungs 2 marks
- ii) Maltose, sucrose 2 marks
- iii) Glucagon, pancreas 1 mark
- iv) Provide glucose, provide oxygen, removal of carbon dioxide and water 2 marks

B.

- i) Sympathetic nervous system 1 mark
- ii) Control of the action of the smooth muscles (Give marks for any relevant activity) 1 mark
- iii) Urea , uric acid , creatinine 1 mark

C.

- i) $70 \text{ kg} \times 2 = 140 \text{ kg ms}^{-1}$ 2 marks
- ii) $70 \times 10 \times 2 = 1400 \text{ J}$ 2 marks
- iii) Vertical forces exerted by the wire on the wheels 2 marks
- iv) The force exerted by a wheel on the wire and the force exerted by the wire on a wheel the force exerted by the cyclist on the bicycle and the force exerted by the bicycle on the cyclist 2 marks
- v) Acting in same line , equal in magnitudes , acting in opposite directions 2 marks

9. A)

- i) $X = \text{Ca}$, $Y = \text{Fe}$, $Z = \text{Cu}$, $Q = \text{Au}$ 1x 4= 4 marks
- ii) Reducing method 1 mark
- iii) Lime stone, cork, hematite 2 marks
- iv) KMnO_4 solution in A becomes colourless in short period of time 1 mark
 KMnO solution in B becomes colourless in long period of time 1 mark

B)

- i) DilH_2SO_4 / any dilute acid 1 mark
- ii) Anode to cathode / Cu to Zn 1 mark
- iii) $\text{Zn} \rightarrow \text{Zn}^{2+} + 2e^-$ (for balanced equation) 2 marks
- iv) Oxidation reaction 1 mark

C.

- i) Mercury barometer 1 mark
- ii) pressure = $740 \times 13600 \times 10 / 1000 = 100640 \text{ Pa}$ 2 marks
- iii) 76 cm Hg 1 mark
- iv) Pressure decreases with the increasing of the altitude
Pressure increases when decreasing the altitude 2 marks

