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CREATING AND SETTING EXAMPLES FOR FUTURE...

CLASS X : SAMPLE QUESTION PAPER - 2
SUBJECT: SCIENCE (086)

Time Allowed: 3 Hours **Maximum Marks: 80**

General instructions:

1. *This question paper consists of 39 questions in 5 sections.*
2. *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
3. *Section A consists of 16 simple/complex MCQs and 04 objective type questions carrying 1 mark each.*
4. *Section B consists of 6 Very Short questions carrying 02 marks each.*
5. *Section C consists of 7 Short Answer type questions carrying 03 marks each.*
6. *Section D consists of 3 Long Answer type questions carrying 05 marks each.*
7. *Section E consists of 3 source-based/case-based/ passage - based / integrated units of assessment of 04 marks each with sub-parts of the values of 1/2/3 marks.*

SECTION — A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 16.

1. Person suffering from cataract has

(a) elongated eyeball (b) excessive curvature of eye lens

(c) weakened ciliary muscles (d) opaque eye lens

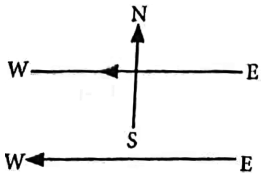
2. Match the column I with column II and select the correct answer by choosing an appropriate option

Column-I		Column-II	
A.	For real image of object	(i)	Concave mirror
B.	For virtual image of real object	(ii)	Convex mirror
C.	For virtual image of virtual object	(iii)	Plane mirror
D.	For real image of virtual object	(iv)	If the object is placed at centre of curvature of concave mirror

(a) A - (i, iv); B - (i, ii, iii); C - (ii); D - (i, ii, iii) (b) A - (i); (B - (i, ii, iii); C - (ii); D - (i, ii)

(c) A - (i); B - (iii); C - (ii); D - (i) (d) A - (i, iii); B - (ii, iii); C - (i, ii); D - (i, iii)

3. A constant current flows in a horizontal wire in the plane of the paper from east to west as shown in the figure. The direction of the magnetic field will be north to south at a point



(a) directly above the wire

(b) directly below the wire

(c) located in the plane of the paper on the north side of the wire

(d) located in the plane of teh paper on the south side of the wire

4. A battery of 3 V is connected to a lamp. When 4 C of charge flows through the lamp, the energy dissipated from the lamp is 10 J. What is the work done by the battery to drive the charge of 4 C around the circuit?
(a) 3 J (b) 4 J (c) 10 J (d) 12 J

5. A ray of light starting from air passes through medium *A* of refractive index 1.50, enters medium *B* of refractive index 1.33 and finally enters medium *C* of refractive index 2.42. If this ray emerges out in air from *C*, then for which of the following pairs of media the bending of light is least?
(a) air-*A* (b) *A*-*B* (c) *B*-*C* (d) *C*-air

6. A freely suspended magnet always rests in geographically north and south direction because
(a) the Earth has two poles
(b) the Earth behaves as a huge magnet
(c) the magnetic north pole of the Earth's magnet is located very close to its south pole
(d) the magnetic south pole of the Earth's magnet is located very close to its south pole.

7. Our heart beats continuously to pump blood to different body organs. Which part of heart receives blood through vena cava?
(a) Left atrium (b) Right atrium (c) Left ventricle (d) Right ventricle

8. Select the incorrect statement regarding the reflex action.
(a) Reflex arc is less efficient and slow for quick responses because it functions without involving thinking.
(b) Sensory receptors in skin receive stimulus and convert it into impulse.
(c) Muscle cells are effector which carry out muscular contraction in response to the initial stimulus.
(d) Inputs from sensory neuron are analysed in CNS and response output is transmitted through motor neuron.

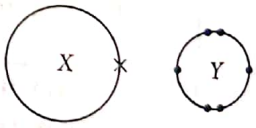
9. Many fully differentiated organisms have ability to give rise to new individual organisms from their body parts. Identify organism which have this ability.
(a) *Planaria* (b) *Spirogyra* (c) *Hydra* (d) All of these

10. On crossing a tall and a short variety of a plant species, the genotypic ratio of different traits that would result in F_2 generation will be
(a) 1 : 2 : 1 (b) 2 : 2 (c) 1 : 3 (d) 3 : 1.

11. In an ecosystem, 10% energy available for transfer from one trophic level to next is in the form of
(a) heat energy (b) light energy (c) chemical energy (d) mechanical energy.

12. Select the mismatched pair.
(a) Crop field – Natural ecosystem (b) Garden – Man-made ecosystem
(c) Temperature – Abiotic factor (d) Grass – Transducer

13. The given diagram shows the valence electrons in atom *X* and atom *Y*.
When element *X* reacts with element *Y*,
(a) a covalent compound of formula *XY* is formed
(b) a covalent compound of formula XY_2 is formed
(c) an ionic compound of formula *XY* is formed
(d) an ionic compound of formula X_2Y is formed.



14. Match column-I with column-II and select the correct option using the given codes.

	Column-I		Column-II
(P)	A metal unreactive towards dilute acids and oxygen	1.	Zinc
(Q)	A metal stored in kerosene	2.	Aluminium
(R)	A metal used for galvanisation	3.	Gold
(S)	A metal used for making foils for wrapping food	4.	Sodium

(a) P - 3, Q - 1, R - 2, S - 4 (b) P - 1, Q - 3, R - 4, S - 2
(c) P - 3, Q - 2, R - 4, S - 1 (d) P - 3, Q - 4, R - 1, S - 2

15. Beakers *A*, *B* and *C* contain zinc sulphate, silver nitrate and iron(II) sulphate solutions respectively. Copper pieces are added to each beaker. Blue colour will appear in case of
(a) beaker *A* (b) beaker *B* (c) beaker *C* (d) all the beakers.

16. Which of the following statements is correct about a substance that has a giant covalent structure?
(a) All of its ions are arranged in a giant three-dimensional lattice.
(b) A large amount of energy is needed to break down the lattice structure.
(c) It conducts electricity in the molten state.
(d) It dissolves in water but is more soluble in organic solvents.

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

17. **Assertion (A) :** Heating element of a heater must have high resistance than connecting wires and high melting point.
Reason (R) : If resistance is high, the electrical conductivity will be less.

18. **Assertion (A) :** A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the magnitude of the current in the wire is increased.
Reason (R) : The strength of a magnetic field at a point near the conductor increases on increasing the current.

19. **Assertion (A) :** Nitrogen and hydrogen combine together to form ammonia.
Reason (R) : It is an exothermic reaction.

20. **Assertion (A) :** Amount of water reabsorbed depends on how much excess water is in the body.
Reason (R) : The basic filtration unit in the kidneys contains a cluster of very thin walled blood capillaries.

SECTION - B

Question No. 21 to 26 are very short answer questions.

21. The urge to urinate can be controlled. Give reason.

22. Excretion is different in multicellular organisms as compared to unicellular organisms. Complete the given table on the basis of this.

S. No.	Types of Organism	Excretory Organ	Mode of Excretion
1.	Unicellular organisms		
2.	Multicellular plants		
3.	Multicellular animals		

23. A. The sex of newborn in humans is determined at the time of fertilisation, much before the time of birth. How is this possible?

OR

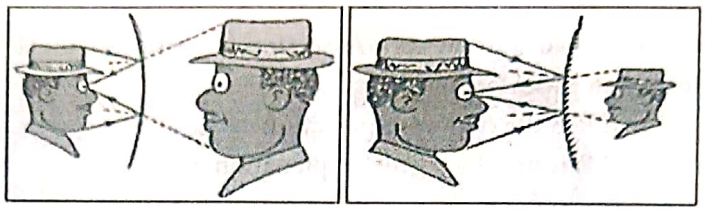
B. Define the following terms :
(i) Genes (ii) Heredity
(iii) Trait (iv) Variations

24. Which part of the plant shows positive geotropism and why ?
Explain the phenomena responsible for movement of a part of the plant in response to light. Name the hormone that controls it.

25. A. Complete and balance the following equations :
(i) $Al + HCl \rightarrow$ (ii) $Mg + HNO_3 \rightarrow$

OR

B. List any two observations when ferrous sulphate is heated in a dry test tube.

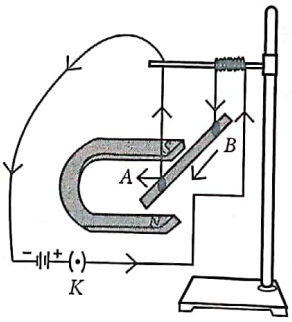
26. 

The above diagram shows image of a man standing in-front of different mirrors. What can you deduce from above image? Explain

SECTION - C

Question No. 27 to 33 are short answer questions.

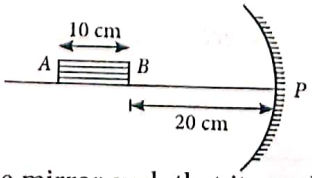
27. A. A student was asked to perform an experiment to study the force on a current carrying conductor in a magnetic field. He took a small aluminium rod *AB*, a strong horseshoe magnet, some connecting wires, a battery and a switch and connected them as shown. He observed that on passing current, the rod gets displaced. On reversing the direction of current, the direction of displacement also gets reversed.



Why does the rod get displaced on passing current through it? State the rule that determines the direction of the force on the conductor *AB*.

B. If the U shaped magnet is held vertically and the aluminium rod is suspended horizontally with its end *B* towards due north, then on passing current through the rod *B* to *A* as shown, in which direction will the rod be displaced?

28. A. (i) A rod *AB* of length 10 cm is placed along the principal axis of a concave mirror having focal length equal to 10 cm as shown in figure. The distance *PB* = 20 cm. What is the length of the image (in cm) of the rod *AB*?



(ii) A ray of light strikes a plane mirror such that its angle of incidence is 30°. What angle does the reflected ray make with the mirror surface?

(iii) Calculate the magnification for above.

OR

B. (i) What is the cause of refraction?

(ii) A ray of light is incident normally at the water-glass interface when it enters a thick glass container filled with water. What will happen to the path of the ray after entering the glass? Give reason.

(iii) The absolute refractive indices of water and glass are 4/3 and 3/2 respectively. If the speed of light in glass is 2×10^8 m/s, find the speed of light in (a) vacuum and (b) water.

29. How do the following substances dissociate to produce ions in their solutions?

(i) Hydrochloric acid (ii) Nitric acid

(iii) Sulphuric acid (iv) Sodium hydroxide

(v) Potassium hydroxide (vi) Magnesium hydroxide

30. An ore on treatment with dilute hydrochloric acid produces brisk effervescence. Name the type of ore with one example. Write only the chemical equations for the reactions involved in the extraction of metal from its ore process.

31. Identify the type of chemical reaction in the following and define each of them :

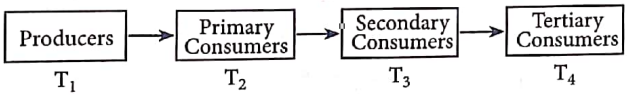
(i) Digestion of food in our body (ii) Rusting of iron

(iii) Heating of manganese dioxide with aluminium powder

32. A. Mendel explained that it is possible that a trait is inherited but not expressed in an organism. Explain.

B. How the traits are being considered either dominant or recessive?

33. Food chain is transfer of food from one organism to another. Food acts as fuel to provide energy to do work. A general food chain is given below. Answer the question that follows :



A. Construct a terrestrial food chain comprising four trophic levels.

B. What will happen if we kill all organisms in one trophic level?

C. Calculate the amount of energy available to the organisms at the fourth trophic level, if the energy available to the organisms at the second trophic level is 2000 J.

SECTION - D

Question No. 34 to 36 are long answer questions.

34. A. (i) Write one application of Fleming's left hand rule.

(ii) The energy of a charged particle moving in a uniform magnetic field does not change. Explain.

(iii) State any three characteristics of magnetic force.

OR

B. (i) What is solenoid?

(ii) Draw the pattern of magnetic field lines of

(a) a current carrying solenoid and

(b) a bar magnet.

(iii) List two distinguishing features between the two fields.

35. A. The members of a family are represented by the general formula C_nH_{2n}.

(i) Name the family and give a test for its confirmation.

(ii) What is the molecular formula and structural formula of the first member of the alkene family?

(iii) Write the molecular formula of lower and higher homologues of an alkene which contains four carbon atoms.

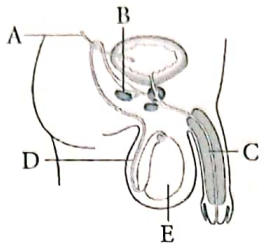
OR

B. (i) Give two differences between soaps and detergents?

(ii) Give the name of the by-product in soap formation. How is it formed?

(iii) Explain the chemical reaction that occurs when saturated hydrocarbon reacts with chlorine? Write chemical equation for it.

36. A. Based on the given diagram answer the questions that follow :



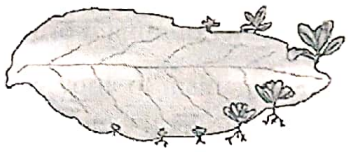
(i) Identify the functions of labelled parts A, B, C and D.

(ii) What is the role of the hormone secreted by E ?

(iii) How reproductive parts B and C help in the process of reproduction?

OR

B. Based on the given diagram answer the questions that follow :



(i) Name the method of reproduction shown by the given figure.

(ii) How does new plant develop by this method?

(iii) What are the advantages of the given method?

(iv) Name any two other methods of this mode of reproduction.

SECTION - E

Question No. 37 to 39 are case-based/data-based questions.

37. Our body needs to remove the wastes that build up from cell activities and from digestion. If these wastes are not removed, then our cells can stop working and we can get very sick. The organs of our excretory system help to release wastes from our body. The excretory system consists of a pair of kidney, a pair of ureters, a urinary bladder and a urethra. Each kidney is made up of nearly one million complex tubular structures called nephrons.

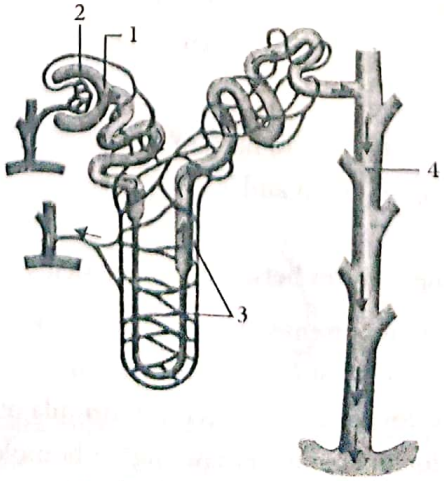


Fig.: Various parts of a nephron

A. Name the blood vessel which carries blood to part 2. Explain how the blood is filtered in part 2.

Attempt either subpart B or C.

B. Write the flow of filter from part 2 to urinary bladder?
If a person is not taking food or beverages for many days, then which component will be less in urine?

OR

C. Name and identify the site of ultrafiltration. Explain how is urine made concentrated?

38. Baking powder produces carbon dioxide on heating, so it is used in cooking to make the batter spongy. Although, baking soda also produces CO_2 on heating, but it is not used in cooking because on heating, baking soda produces sodium carbonate along with carbon dioxide. Sodium carbonate, thus produced, makes the taste bitter. Baking powder is the mixture of baking soda and a mild edible acid. Generally, tartaric acid is mixed with baking soda to make baking powder. When baking powder is heated, $NaHCO_3$ decomposes to give CO_2 which makes bread and cake fluffy. Tartaric acid helps to remove bitter taste due to formation of sodium tartrate.

$$\underset{\text{Baking soda}}{2NaHCO_3} + \underset{\text{Tartaric acid}}{C_4H_6O_6} \longrightarrow \underset{\text{Carbon dioxide}}{2CO_2} + \underset{\text{Water}}{2H_2O} + \underset{\text{Sodium tartrate}}{Na_2C_4H_4O_6}$$

A. When sodium hydrogencarbonate is added to acetic acid, it evolves a gas. Identify the gas evolved and give the chemical test to support your answer. Also write the chemical equation involved.

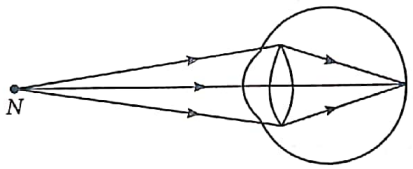
Attempt either subpart B or C.

B. Is sodium hydrogen carbonate soluble in water, what is its effect on litmus paper.

OR

C. Write two uses of sodium hydrogen carbonate.

39.



The nearest point up to which the eye can see clearly is called the near point of the eye.

The most distant object, the eye can see is called the far point of the eye.

The distance between the near point and the far point is called range of vision of the eye. Within the range of vision, there is one point where object placed are most distinctly visible. The distance of this point, from the eye, is called least distance of distinct vision.

A. What is the minimum distance of a book from eyes a student keep to avoid strain to his eyes?

B. A student sitting on the last bench can read the letters written on the blackboard but is not able to read the letters written in his textbook. Which of the following statements is correct?

Attempt either subpart C or D.

C. A person has least distance of distinct vision of 75 cm. What should be the focal length of the lens that is required for him to read a newspaper at a distance of 25 cm?

OR

D. A person with a myopic eye cannot see objects beyond 1.2 m distinctly. What should be the type of the corrective lens used to restore proper vision?