SET-A

GWPS02A

G - W CLASSES, GONDIA

NEAR GIRI HOSPITAL, VIVEKANAND COLONY GONDIA

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SUB - SCIENCE (086) **TIME: 3 HOURS**

MAX. MARKS: 80 **CLASS X**

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
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.

SECTION-A

1. During intense physical activity, when there is a lack of sufficient oxygen, the muscle cells in the human body convert pyruvate into which substance?
(a) Ethanol and Carbon dioxide (b) Lactic acid and Energy
(c) Acetic acid and Energy (d) Carbon dioxide and Water

2. The tendrils of a pea plant coil around a support structure, allowing the plant to climb. This directional growth in response to touch is known as:
(a) Phototropism (b) Geotropism
(c) Chemotropism (d) Thigmotropism

3. In the human female reproductive system, what is the primary role of the uterus?
(a) To produce the female gamete, the ovum.
(b) To serve as the site where fertilization takes place.
(c) To host the implantation and development of the embryo.
(d) To secrete the hormone progesterone.

4. A genetic cross between two pea plants produces offspring in which approximately 50% are tall and 50% are dwarf. What are the most probable genotypes of the parent plants? (T = Tall, t = dwarf)
(a) TT × tt (b) Tt × Tt
(c) Tt × tt (d) TT × Tt

5. What is the term for the position an organism occupies in a food chain, such as producer, primary consumer, or secondary consumer?
(a) Niche (b) Trophic level
(c) Habitat (d) Population

6. Consider the following statements about excretion in plants :
(i) Oxygen, a byproduct of photosynthesis, can be considered a waste product that is released.
(ii) Plants get rid of excess water through the process of transpiration.
(iii) Some plant wastes are stored in cellular vacuoles or in tissues like old xylem as resins and

gums.

(iv) Unlike animals, plants do not possess specialized excretory organs. Which of the above statements are correct?

(a) (i) and (ii) only
(b) (iii) and (iv) only
(c) (i), (ii), and (iii) only
(d) All are correct.

7. What is the microscopic junction between the axon terminal of one neuron and the dendrite of another, across which nerve impulses are transmitted?

(a) Synapse
(b) Reflex arc
(c) Myelin sheath
(d) Effector

8. **Assertion (A) :** Wind pollination is less likely to occur in plants with large, brightly coloured flowers.

Reason (R) : Large, colourful petals are adaptations to attract insect pollinators, not for wind dispersal of pollen.

(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.

9. **Assertion(a) :** The inner wall of the stomach is protected from the action of its own acidic secretions.

Reason (R) : The stomach's inner lining is coated with a thick layer of mucus.

(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.

10. The pH of the digestive tract changes from alkaline in the mouth to highly acidic in the stomach and back to alkaline in the small intestine. How do digestive enzymes manage to function effectively despite these drastic changes?

11. A. What is the role of haemoglobin in the blood? Where is it found?

OR

B. How is the small intestine designed to maximize the absorption of digested food?

12. Suggest any four personal habits or practices you would adopt to contribute towards the effective management of waste in your neighborhood.

13. Give one example of a plant hormone that is a growth promoter and one that is a growth inhibitor. State one key function of each.

14. **Differentiate between homologous and analogous organs. Which of the two provides better evidence of a common ancestry?**

15. A. What is this coiled tubule called? What is its primary function?

OR

B. Describe the first step of urine formation that occurs in the glomerulus and Bowman's capsule.
C. What happens to the useful substances, such as glucose and amino acids, that are part of the initial filtrate? Name this process.

16. A. (i) What is fission as a mode of reproduction?
(ii) Differentiate between binary fission and multiple fission, giving one example for each.
(iii) Draw a series of diagrams to show binary fission in Amoeba.

OR

B. (i) What is puberty? List two changes that occur specifically in boys during this phase.
(ii) What is the consequence if the fallopian tubes in a woman are blocked?
(iii) State the function of the uterus in the human female reproductive system.

SECTION-B

17. The reaction between an aqueous solution of silver nitrate and sodium chloride, which forms a white precipitate of silver chloride, is an example of a :
(a) Combination reaction
(b) Decomposition reaction
(c) Double displacement reaction
(d) Displacement reaction

18. A few drops of phenolphthalein indicator are added to a solution of sodium hydroxide. The colour of the solution will change to :
(a) Red
(b) Pink
(c) Blue
(d) Remain colourless

19. Which of the following metals is the best conductor of electricity?
(a) Gold
(b) Silver
(c) Copper
(d) Aluminium

20. Alkynes are a series of unsaturated hydrocarbons. What is the general formula for the alkyne series?
(a) $C_n\ _{2n+2}$
(b) $C_n H_{2n}$
(c) $C_n H_{2n-2}$
(d) $C_n H_{2n-1}$

21. Hard water contains dissolved salts of calcium and magnesium, which makes it difficult to lather. Which of the following salts is used to remove the permanent hardness of water?
(a) Sodium Chloride (NaCl)
(b) Sodium Carbonate (Na_2CO_3)
(c) Sodium Bicarbonate ($NaHCO_3$)
(d) Sodium Sulphate (Na_2SO_4)

22. Which of the following metals is highly reactive and must be stored under kerosene to prevent it from reacting vigorously with air and moisture?
(a) Iron
(b) Copper
(c) Sodium
(d) Gold

23. Cellular respiration is the process by which living cells break down glucose to produce energy. This process is considered an exothermic reaction because :
(a) Energy is absorbed from the surroundings.
(b) Energy is released during the reaction.
(c) The reaction requires light energy to occur.
(d) The products have more energy than the reactants.

24. **Assertion (A) :** Carbon forms a vast number of compounds, more than any other element.
Reason (R) : Carbon exhibits the property of catenation (self-linking) and has a valency of four (tetra- valency).
(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.

25. Give a scientific reason for each of the following statements :
(a) Platinum, gold, and silver are used to make jewellery.
(b) Sodium and potassium are stored under oil.

26. Attempt either option A or B.
(A) (i) What is the saponification reaction?
(ii) Write a general chemical equation for the preparation of soap using this reaction.

OR

(B) Differentiate between saturated and unsaturated hydrocarbons. Give one example for each category.

27. A shiny brown-coloured element ‘X’ when heated in the air becomes black in colour.
(a) Identify the element ‘X’ and the black-coloured compound formed
(b) Write a balanced chemical equation for the reaction.
(c) How can this black compound be converted back into the original element ‘X’? Write the relevant chemical equation.

28. Tooth decay begins when the pH in the mouth falls below 5.5.
(a) Explain why the pH in the mouth falls after a person eats sugary foods.
(b) How does this drop in pH lead to damage of the tooth enamel, even though it is the hardest substance in the body?
(c) Why are people advised to use toothpaste to prevent tooth decay? What is the general chemical nature of toothpaste?

OR

(d) A milkman adds a very small amount of baking soda to fresh milk.

(i) Why does this shift the pH of the fresh milk from 6 to slightly alkaline?

(ii) Why does this milk then take a longer time to set as curd?

29. Attempt either option A or B.

(A) An organic compound 'A' is widely used as a preservative in pickles and has the molecular formula $C_2H_4O_2$.

(a) Identify 'A' and draw its electron-dot structure.

(b) This compound reacts with absolute ethanol in the presence of an acid catalyst to form a sweet- smelling compound 'B'. Identify 'B'.

(c) Write the chemical equation for the formation of 'B'.

(d) How can compound 'A' be obtained back from compound 'B'? Name the reaction.

OR

(B) (a) What is hydrogenation? State its main industrial application.

(b) Give the IUPAC name for the next homologue of : (i) Ethanol (CH_3CH_2OH) (ii) Ethanoic acid (CH_3COOH)

(c) Explain why methane burns with a clean, blue flame whereas camphor burns with a yellow, sooty flame.

SECTION-C

30. A student is experimenting with a convex mirror and makes the following statements about the images formed:

I. The image is always formed behind the mirror.

II. The image is always virtual and erect.

III. The image is always magnified.

Choose from the following the correct option that lists the correct statements.

(a) I and II
(b) I and III
(c) I, II and III
(d) II and III

31. Which of the following phenomena explains why an object submerged in water appears to be raised?

(a) Total internal reflection
(b) Reflection
(c) Scattering
(d) Refraction

32. **Assertion (A) :** Myopia can be corrected by using a concave lens.

Reason (R) : A concave lens converges the light rays before they reach the eye lens, causing the image to form on the retina.

(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.

33. Find the focal length of a lens of power –2 D.

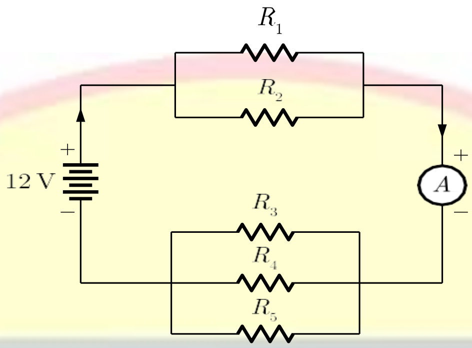
A. Show the relation between power and focal length.

B. State the type of lens.

C. Give one use of such a lens.

34. Attempt either option A or B

A If in figure A, $R_1 = 10\ \Omega$, $R_2 = 40\ \Omega$, $R_3 = 30\ \Omega$, $R_4 = 20\ \Omega$, $R_5 = 60\ \Omega$ and a 12 V battery are connected to the arrangement, calculate :



(a) Total resistance in the circuit and

(b) Total current flowing in the circuit.

OR

B. A torch bulb is rated 5.0 V and 500 mA. Calculate

(i) its power,

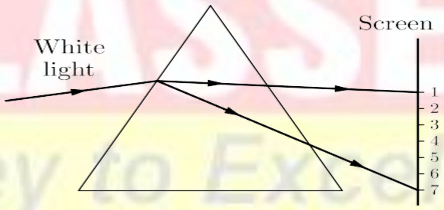
(ii) resistance when it is lighted for four hours.

35. A beam of white light falling on a glass prism gets split up into seven colours. A student makes the statement :

(a) The colour at positions marked 1 and 3 are similar to the colour of 'turmeric' and the colour of 'chilli powder' respectively. Is the above statement correct or incorrect ? Justify.

(b) Which two positions correspond to the colour of solution of copper sulphate and signal used to move the vehicles ?

(c) Light of colour of chilli powder bends the most while the light of colour of brinjal bends the

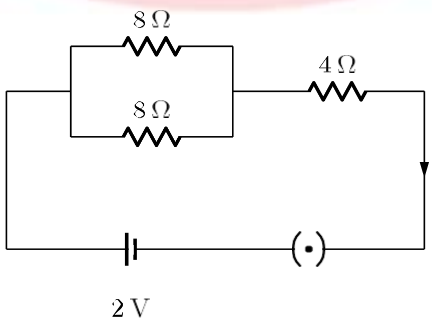


least. Is the statement correct ? Justify.

36. Study the given electric circuit and calculate :

(i) the current flowing through the 4 Ω resister and

(ii) potential difference across the combination of two resistor of 8 Ω each.



37. A student claims that the twinkling of stars is due to atmospheric refraction.

(i) Is this true?

(ii) Explain.

38. Study the following table for a convex lens for different positions of object and answer the following questions:

Position of object	**Position of image**	**Relative size of image**
At infinity	At focus F_2	Highly diminished point sized
Beyond $2F_1$	Between F_2 and $2F_2$	Diminished
At $2F_1$	At $2F_2$	Same size
Between F_1 and $2F_1$	Beyond $2F_2$	Enlarged
At focus F_1	At infinity	Infinitely large or highly enlarged
Between focus F_1 and optical centre O	On the same side of the lens as the object	Enlarged

(i) What is the nature of the image, if an object is placed at infinity ?

(ii) Identify the nature of the image for which the object is between focus and optical centre. Attempt either subpart C or D.

(iii) What is position of image, when object is place at focus ($f1$) ?

OR

(iv) What is the focal length of a lens for an object placed 50 cm from the lens producing virtual image at a distance of 10 cm in front of the lens.

39. Attempt either option A or B.

A. (i) What is an electromagnet? List any two uses.

(ii) Draw a labelled diagram to show how an electromagnet is made.

(iii) State the purpose of soft iron core used in making an electromagnet.

(iv) List two ways of increasing the strength of an electromagnet, if the material of the electromagnet is fixed

OR

B. (i) Write Joule's law of heating.

(ii) Compute the heat generated while transferring 96000 coulomb of charge in two hours through a potential difference of 40V.