CBSE · CLASS 10 · SCIENCE

CBSE Class 10 Science Important Questions 2027

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Chemical Reactions and Equations

1. Exothermic vs endothermic classification

Asked 3× · Board 2025, Board 2026, Sample 2025 · 1 marks

$C_6H_{12}O_6(aq) + 6O_2(g) \rightarrow 6CO_2(g) + 6H_2O(l)$. The above reaction is an example of - (A) Displacement Reaction (B) Endothermic Reaction (C) Exothermic Reaction (D) Neutralisation Reaction

2. Name reaction type with justification

Asked 2× · Board 2024, Sample 2025 · 2 marks

Identify the type of each of the following reactions stating the reason for your answers. A. $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$ + heat B. $Pb(NO_3)_2 + 2KI \rightarrow PbI_2$(down-arrow) + $2KNO_3$

3. Find coefficients to balance equation

Asked 2× · Board 2023, Sample 2025 · 1 marks

Identify 'p', 'q' and 'r' in the following balanced reaction: p $Pb(NO_3)_2$(s) --Heat--> q PbO(s) + r $NO_2(g) + O_2(g)$ A. 2,2,4 B. 2,4,2 C. 2,4,4 D. 4,2,2

4. Gas ratio in electrolysis of water

Asked 2× · Board 2025, Board 2026 · 1 marks

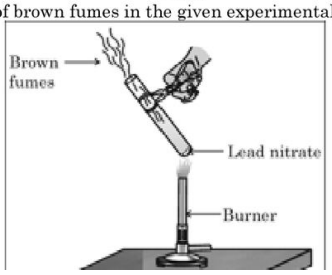
The volume ratio of hydrogen and oxygen gases liberated during electrolysis of water is (A) 1 : 1 (B) 2 : 1 (C) 4 : 1 (D) 1 : 2

5. Identify a decomposition reaction

Asked 2× · Board 2023, Board 2024 · 1 marks

The emission of brown fumes in the given experimental set-up is due to (a) thermal decomposition of lead nitrate which produces brown fumes of nitrogen dioxide. (b) thermal decomposition of lead nitrate which produces brown fumes of lead oxide. (c) oxidation of lead nitrate forming lead oxide and nitrogen dioxide. (d) oxidation of lead nitrate forming lead oxide and oxygen. [Set-up shows lead nitrate being heated over a burner, giving off brown fumes.]

2. The emission of brown fumes in the given experimental set-up is due to 1



6. Identify oxidised/reduced species or agents

Asked 2× · Board 2023, Board 2024 · 1/3 marks

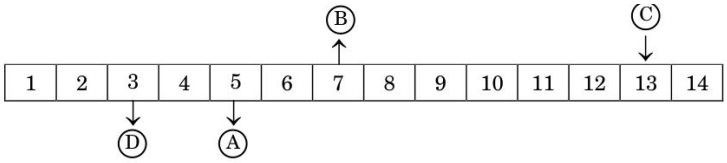
MnO_2 + 4HCl -> $MnCl_2$ + $2H_2O$ + Cl_2. The reaction given above is a redox reaction because in this case: (a) MnO_2 is oxidised and HCl is reduced. (b) HCl is oxidised. (c) MnO_2 is reduced. (d) MnO_2 is reduced and HCl is oxidised.

Acids, Bases and Salts

7. Interpret/rank solutions by pH value

Asked 3× · Board 2025, Board 2026, Sample 2026 · 1 marks

The following table shows the pH values of four solutions A, B, C and D on a pH scale (see figure: pH scale 1-14 with B at 7, C at 13, D at 3, A at 5). The solutions A, B, C and D respectively are of a : (A) Strong acid, weak acid, neutral, strong base (B) Weak acid, neutral, weak base, strong base (C) Weak acid, neutral, strong base, weak base (D) Weak acid, neutral, strong base, strong acid



8. Deduce acid/base nature from indicator/litmus

Asked 2× · Board 2026, Sample 2025 · 1 marks

An aqueous solution turns red litmus blue. Excess addition of which of the following solution would reverse the change? (A) Sodium hydroxide (B) Hydrochloric acid (C) Baking soda (D) Slaked lime

9. Electrolysis of brine: products/process

Asked 2× · Board 2025, Sample 2025 · 1/2 marks

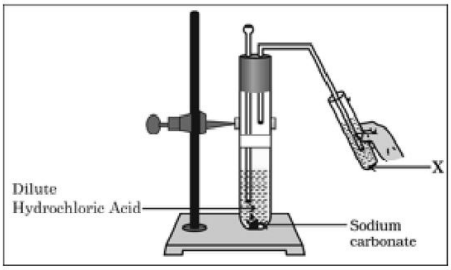
[Case: Seawater contains many dissolved salts; common salt is separated from these, deposits of solid rock salt (brown due to impurities) are mined like coal, and common salt is an important raw material for chemicals of daily use.] Write balanced chemical equations to show the products formed during electrolysis of brine.

10. CO2 in lime water: milky then colourless

Asked 2× · Board 2023, Sample 2026 · 1 marks

In the experimental setup given below, it is observed that on passing the gas produced in the reaction in the solution 'X' the solution 'X' first turns milky and then colourless. The option that justifies the above stated observation is that 'X' is aqueous calcium hydroxide and (a) it turns milky due to carbon dioxide gas liberated in the reaction and after sometime it becomes colourless due to formation of calcium carbonate. (b) it turns milky due to formation of calcium carbonate and on passing excess of carbon dioxide it becomes colourless due to formation of calcium hydrogen carbonate which is soluble in water. (c) it turns milky due to passing of carbon dioxide through it. It turns colourless as on further passing carbon dioxide, sodium hydrogen carbonate is formed which is soluble in water. (d) the carbon dioxide liberated during the reaction turns lime water milky due to formation of calcium hydrogen carbonate and after some time it turns colourless due to formation of calcium carbonate which is soluble in water. [Setup shows dilute hydrochloric acid and sodium carbonate in a test tube, the evolved gas passed into solution 'X'.]

gas produced in the reaction in the solution 'X' the solution 'X' first turns milky and then colourless. 1



11. Baking soda to washing soda from uses

Asked 2× · Board 2025, Board 2026 · 2 marks

(a) A compound 'A' is used in soda-lime fire-extinguisher and decomposes on heating to form compound 'B'. Compound 'B' is used for removing permanent hardness of water. Identify 'A' and 'B'. (b) Write chemical formula of Plaster of Paris. At what temperature gypsum is heated to obtain Plaster of Paris?

12. Apply pH to everyday life / acid strength

Asked 2× · Board 2023, Board 2024 · 3 marks

(i) The pH of a sample of tomato juice is 4.6. How is this juice likely to be in taste? Give reason to justify your answer. (ii) How do we differentiate between a strong acid and a weak base in terms of ion-formation in aqueous solutions? (iii) The acid rain can make the survival of aquatic animals difficult. How?

Metals and Non-metals

13. Write metal-extraction reactions from ores

Asked 3× · Board 2026, Sample 2025 · 3 marks

(i) Which method will be used to convert each of them to their respective metal oxides? (a) Carbonate ore (b) Sulphide ore. (ii) Write a chemical reaction to illustrate the use of aluminium for joining cracked railway tracks. (iii) During extraction of metals, electrolytic refining is used to obtain pure metals. Which material will be used as anode and cathode for the refining of copper metal by this process?

14. Displacement when metal dipped in salt solution

Asked 3× · Board 2023, Board 2024, Sample 2026 · 1/2 marks

An iron nail is added to each of the two test tubes 'P' and 'Q' containing aqueous copper (II) sulphate, and aqueous silver nitrate respectively. Which of the following observation is correct? A. In test tube 'P' iron nail is coated with a blue coating and in test tube 'Q' there is no reaction. B. Iron nail is coated with a brown coating in test tube 'P' and silver coating in test tube 'Q'. C. There is no reaction in either of the test tubes 'P' or 'Q'. D. There is no reaction in test tube 'P' but a silver coating on iron nail is seen in test tube 'Q'.

15. Identify amphoteric oxides

Asked 3× · Board 2023, Board 2024, Sample 2026 · 1 marks

Four statements about the reactions of oxides with dilute hydrochloric acid and aqueous sodium hydroxide are listed. I. Aluminium oxide reacts with both dilute hydrochloric acid and aqueous sodium hydroxide. II. Calcium oxide reacts with dilute hydrochloric acid and aqueous sodium hydroxide. III. Zinc oxide reacts with both dilute hydrochloric acid and aqueous sodium hydroxide. IV. Sulphur dioxide does not react with either dilute hydrochloric acid or aqueous sodium hydroxide. Which statements are correct? A. I and II B. I and III C. II and IV D. III and IV

16. Electrolytic extraction of reactive metals

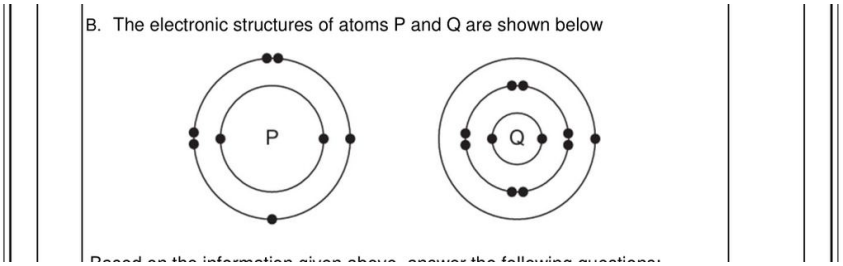
Asked 2× · Board 2025, Sample 2026 · 1/3 marks

An element 'X' is stored in kerosene, and cannot be extracted from its ore using a reducing agent. 'X' forms an ionic compound on reaction with chlorine. (i) Can we store 'X' in water? Give reason to support your answer. (ii) Identify element 'X'. Name the process used and write the equation for extraction of 'X' from its ore.

17. Ionic compound formation from electronic structures

Asked 2× · Board 2025, Sample 2026 · 1/5 marks

The electronic structures of atoms P and Q are shown in the given figure. Based on the information given above, answer the following questions: (a) If P and Q combine to form a compound, what type of bond is formed between them? (b) Give the chemical formula of the compound formed. (c) The compound so formed is dissolved in water. Is the resultant solution acidic or basic in nature? Justify your answer. (d) Write the chemical equation for the reaction between 'Q' and ethanol. (e) What will be the formula of the compound formed when 'P' undergoes bonding with carbon?



18. Metal reactivity with cold water

Asked 2× · Board 2025, Board 2026 · 1/3 marks

Which one of the following metals does not react with cold water? (A) Sodium (B) Potassium (C) Calcium (D) Magnesium

19. Metal + oxygen gives which oxide

Asked 2× · Board 2023, Board 2025 · 1 marks

The products formed when Aluminium and Magnesium are burnt in the presence of air respectively are : (A) Al_3O_4 and MgO_2 (B) Al_2O_3 and MgO (C) Al_3O_4 and MgO (D) Al_2O_3 and MgO_2

Carbon and its Compounds

20. Ethanol identification and dehydration/reactions

Asked 3× · Board 2023, Board 2024, Board 2025 · 5 marks

(i) A carbon compound X is a good solvent. On reaction with sodium, X forms two products Y and Z. Z is used to convert vegetable oil into vegetable ghee. Identify and name X, Y and Z. Also write the equation of reaction of X with sodium to justify your answer. (ii) Write chemical equation to show what happens when ethanol: (I) burns in oxygen/air. (II) is heated at 443 K in excess conc. H_2SO_4. (III) reacts with acidified potassium dichromate.

21. Micelle/cleansing action and soap vs detergent

Asked 2× · Board 2023, Sample 2025 · 5 marks

Attempt either option A or B. B. (i) 'A' & 'B' are sodium salts of long-chain carboxylic acid and long chain Sulphonic acid respectively. Which one of A or B will you prefer as a cleansing agent while using underground water (hand pump water)? Give the reason for your answer. (ii) Elaborate on the process of cleansing action. Illustrate micelle with the help of labelled diagram. (iii) Write the chemical equation of the preparation of soap from an ester CH_3COOCH_3. What is the name of this process?

22. Name structures and write reactions incl. esterification

Asked 2× · Board 2025, Board 2026 · 5 marks

(i) How would you name the following: I. CH_3-CH_2-C(=O)H (i.e. CH_3-CH_2-CHO); II. CH_3-C≡CH. (ii) When ethanol reacts with ethanoic acid in the presence of conc. H_2SO_4, a substance with sweet smell is produced. Answer the following: I. State the class of compounds to which the sweet smelling compounds belong. II. Write the chemical equation for the reaction. (iii) Why soaps do not produce foam with hard water?

23. Homologous series and melting/boiling trend

Asked 2× · Board 2024, Board 2026 · 5 marks

(i) Carbon cannot form C^{4+} cation and C^{4-} anion. Explain. (ii) Define homologous series of carbon compounds. Why are the melting and boiling points of C_4H_{10} higher than C_3H_8 or C_2H_6? (iii) What happens when ethanol is heated with acidified potassium dichromate?

24. Physical properties of covalent compounds

Asked 2× · Board 2022, Board 2024 · 1/2 marks

Carbon compounds: (i) are good conductors of electricity. (ii) are bad conductors of electricity. (iii) have strong forces of attraction between their molecules. (iv) have weak forces of attraction between their molecules. The correct statements are: (a) (i) and (ii) (b) (ii) and (iii) (c) (ii) and (iv) (d) (i) and (iii)

Life Processes

25. Aerobic vs anaerobic glucose breakdown (products/sites/ATP)

Asked 4× · Board 2023, Board 2025, Sample 2025, Sample 2026 · 1/2 marks

Which of the following options indicates the products formed after breakdown of the glucose in our muscle cells when there is lack of oxygen? A. Ethanol + carbon dioxide + Energy B. Lactic acid + Energy C. Lactic acid + carbon monoxide + Energy D. Carbon dioxide + Water + Energy

26. Mechanism of water transport (soil to leaves)

Asked 2× · Sample 2025, Sample 2026 · 2/3 marks

Explain the mechanism by which the water is transported in plants.

27. Photosynthesis steps and desert-plant adaptation

Asked 3× · Board 2023, Board 2025, Sample 2025 · 2/3 marks

[Case: Maintenance functions require energy from food prepared by autotrophs.] State in proper sequence the events that occur in synthesis of food by desert plants.

28. Heart chamber that pumps oxygenated blood

Asked 2× · Board 2026, Sample 2025 · 1 marks

In human beings the oxygen rich blood is pumped out to the body by: (A) contraction of right atrium (B) relaxation of left ventricle (C) contraction of right ventricle (D) contraction of left ventricle

29. Role of digestive substances/enzymes

Asked 2× · Board 2024, Sample 2025 · 2 marks

Attempt either option A or B. B. Explain the role of the following enzymes in the process of digestion of food in humans: (i) Salivary amylase (ii) Pepsin (iii) Trypsin (iv) Lipase

30. Balanced equation and events of photosynthesis

Asked 2× · Board 2025, Board 2026 · 1/5 marks

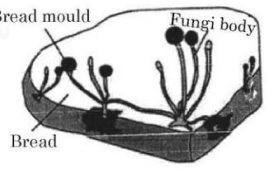
(a) Draw a labelled diagram showing open and closed stomatal pore. (b) List the main events that occur during the process of photo-synthesis. (c) Write a balanced chemical equation showing photo-synthesis in plants.

31. Saprophytic (extracellular) nutrition identification

Asked 2× · Board 2023, Board 2026 · 1 marks

Observe the given figure and select the statement that correctly states how these fungi obtain nutrition. (A) By eating the bread on which it is growing. (B) By using nutrients from the bread to prepare their own food. (C) By breaking down the nutrients of bread outside the body and then absorbing them. (D) By allowing other organisms to grow on the bread and then consuming them.

1. Observe the given figure and select the statement that correctly states how these fungi obtain nutrition. 1



32. Nephron structure and function

Asked 2× · Board 2023, Board 2026 · 2/5 marks

(a) Draw a well-labelled diagram of nephron and label atleast 4 of its parts. (b) Write the role of capillary cluster inside Bowman's capsule. (c) What is meant by selective reabsorption?

33. Blood clotting to prevent blood loss

Asked 2× · Board 2023, Board 2025 · 1/2 marks

Besides minimising the loss of blood, why is it essential to plug any leak in a blood vessel ? Name the component of blood which helps in this process and state how this component performs this function.

Control and Coordination

34. Brain parts and their functions

Asked 3× · Board 2026, Sample 2025, Sample 2026 · 1 marks

Following are the statements about the different parts of the brain. Select the correct statements. (i) The thinking part of the brain is the forebrain. (ii) Centres for smell, hearing, memory, sight are located in forebrain. (iii) Salivation, vomiting, blood pressure are controlled by medulla in the hind brain. (iv) Cerebellum does not control the posture and balance of the body. (A) (i), (ii) and (iii) (B) (ii), (iii) and (iv) (C) (i), (ii) and (iv) (D) (i), (iii) and (iv)

35. Auxin and phototropic bending of shoots

Asked 3× · Board 2025, Board 2026, Sample 2025 · 1/2 marks

[case context] Plants show movements in response to environmental stimuli regulated by plant hormones. What role does auxin play in the growth of plants?

36. Differentiate nastic (sensitive-plant) movement from tropic movement

Asked 3× · Board 2024, Board 2025, Board 2026 · 2/3 marks

[case context] Plants show movements in response to environmental stimuli regulated by plant hormones. Differentiate between movement shown by the sensitive plant and tropic movement by plants (Two points).

37. Neuron structure and impulse transmission

Asked 2× · Board 2024, Sample 2026 · 1/3 marks

Draw and explain how the nerve cells help in transmission of impulses?

38. Insulin, blood sugar regulation and diabetes

Asked 2× · Board 2023, Sample 2026 · 1/2 marks

The blood glucose level in a patient was very high. It may be due to inadequate secretion of: A. growth hormone from pituitary gland B. oestrogen from ovary C. insulin from pituitary gland D. insulin from pancreas

39. Define reflex action and show the reflex arc

Asked 2× · Board 2024, Board 2026 · 2/3 marks

Sunil unconsciously touched the hot iron rod and immediately withdrew his hand. Which type of action is involved? Also define this action. Draw a flow chart to show the path followed for this action.

How do Organisms Reproduce

40. Vegetative propagation of banana and variation

Asked 2× · Sample 2025, Sample 2026 · 5 marks

Puneet wanted to grow banana plants. (i) Based on your knowledge on plant reproduction should he opt for seeds or any alternate method of reproduction? Justify your answer. (ii) Offsprings of a banana plant usually show very little variation. What causes variation and are variations good or bad? Justify.

41. Draw/describe Hydra budding or Rhizopus spore formation

Asked 2× · Board 2024, Board 2025 · 2/5 marks

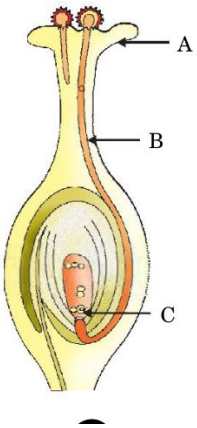
Draw labelled diagrams to show different stages of budding in Hydra.

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42. Differentiate self vs cross pollination (with flower parts/diagram)

Asked 2× · Board 2023, Board 2025 · 5 marks

(i) Differentiate between self-pollination and cross-pollination. (ii) Identify A, B and C in the diagram given below (a diagram of a flower/pistil showing pollen germination and the ovule - see figure) and write one function of each.



43. Functions of reproductive organs

Asked 2× · Board 2022, Board 2025 · 3/5 marks

(i) Write the functions of the following parts of human female reproductive system: (I) Ovary (II) Fallopian tube (III) Uterus. (ii) State briefly two contraceptive methods used by human males.

44. Identify organism by asexual mode + example

Asked 2× · Board 2022, Board 2024 · 1/2 marks

In which of the following organisms, multiple fission is a means of asexual reproduction? (a) Yeast (b) Leishmania (c) Paramoecium (d) Plasmodium

Heredity

45. Dihybrid cross F1/F2 combinations and ratio

Asked 4× · Board 2023, Board 2024, Board 2025, Board 2026 · 1/2 marks

Two pea plants, one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds were crossed with each other which produced F_1 progeny that have only round yellow (RrYy) seeds. When F_1 plants are self-pollinated, the F_2 progeny will have which new combination of characters, as compared to the parents: (i) Round, yellow (ii) Round, green (iii) Wrinkled, yellow (iv) Wrinkled, green. Correct options are: (A) (i) and (ii) (B) (i) and (iv) (C) (ii) and (iv) (D) (i) and (iii)

46. Construct a monohybrid cross and show F1/F2 ratios

Asked 3× · Board 2023, Board 2026, Sample 2025 · 2/3 marks

Study the given table and answer the following questions: [Parents: A pea plant with red flowers was crossed with a pea plant with white flowers. | F_1: 30 seeds were sown and all bore plants with red flowers. | F_2: 44 seeds were sown, 33 plants bore red flowers and 11 plants bore white flowers.] (a) Depict the information given in the table in the form of a cross. (b) Deduce the F_2 phenotypic ratio / F_2 ratio showing external look as well as genotypic/genetic makeup, ratio.

47. Environmental (non-genetic) sex determination

Asked 2× · Board 2022, Sample 2025 · 1/2 marks

In snails individuals can begin life as male and depending on environmental conditions they can become female as they grow. This is because A. male snails have dominant genetic makeup. B. female snails have dominant genetic makeup. C. expression of sex chromosomes can change in a snail's life time. D. sex is not genetically determined in snails.

48. Correct statements about genes/chromosomes

Asked 2× · Board 2023, Board 2024 · 1 marks

Chromosomes: (i) carry hereditary information from parents to the next generation. (ii) are thread like structures located inside the nucleus of an animal cell. (iii) always exist in pairs in human reproductive cells. (iv) are involved in the process of cell division. The correct statements are: (a) (i) and (ii) (b) (iii) and (iv) (c) (i), (ii) and (iv) (d) (i) and (iv)

49. Sex determined by father / at fertilisation

Asked 2× · Board 2023, Board 2024 · 1 marks

Consider the following statements: (i) The sex of a child is determined by what it inherits from the mother. (ii) The sex of a child is determined by what it inherits from the father. (iii) The probability of having a male child is more than that of a female child. (iv) The sex of a child is determined at the time of fertilisation when male and female gametes fuse to form a zygote. The correct statements are: (a) (i) and (iii) (b) (ii) and (iv) (c) (iii) and (iv) (d) (i), (iii) and (iv)

50. Differentiate dominant vs recessive traits

Asked 2× · Board 2023, Board 2024 · 1 marks

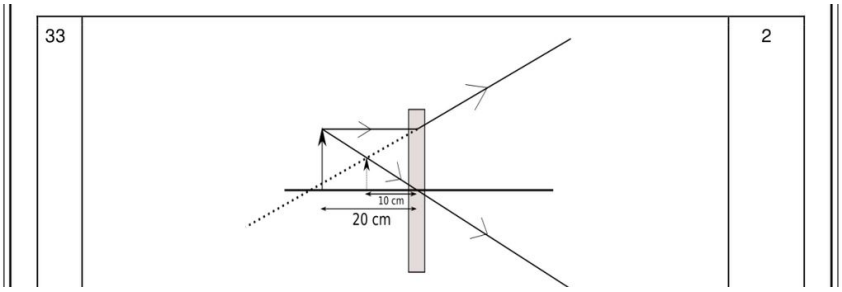
[case context: Mendel's experiments on inheritance in garden pea.] Write one difference between dominant and recessive trait.

Light - Reflection and Refraction

51. Solve lens formula/magnification for the unknown

Asked 4× · Board 2025, Sample 2026 · 2 marks

The given figure shows the formation of an image with an optical instrument (shown schematically as a rectangle); an upright object forms an image with the distances 10 cm and 20 cm marked. A. Identify the optical instrument (shown schematically as a rectangle) in the image. B. What type of image is formed in this case? C. Based on the measurements given in the image, calculate the focal length of the instrument. (For visually impaired students: A. Under what conditions can a convex lens form a virtual image? B. Why does a piece of paper catch fire if we allow sunlight to pass through a convex lens onto the paper?)



52. Image nature for concave vs convex mirror (MCQ)

Asked 2× · Board 2025, Sample 2026 · 1 marks

Arnav was making notes and he wrote down the following statements from his understanding of reflection from curved surfaces. I. Concave mirrors can produce both real and virtual images depending on the position of the object. II. Convex mirrors always produce real, inverted images regardless of the object's position. III. In both concave and convex mirrors, the image location can be determined using the mirror formula 1/f = 1/v + 1/u where f is the focal length, v is the image distance, and u is the object distance. Choose from the following the correct option that lists the correct statements about reflection from curved surfaces. A. I and II B. I, II and III C. II and III D. I and III

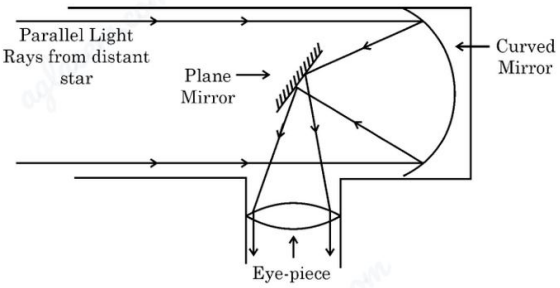
53. Nature of image of star in reflecting telescope

Asked 2× · Board 2026, Sample 2025 · 1 marks

[case context] A ray diagram shows image formation by a reflecting telescope, which uses large precisely-shaped curved mirrors (and a plane mirror) to gather and focus incoming light to a focal point where the image is formed for observation at the eye-piece. What kind of image of a star is seen by the observer in the eye-piece?

AB in the above situation.

38.



The above ray diagram is to show image formation by a reflecting telescope. Reflecting telescope revolutionized our way of looking into the

54. Type of mirror in reflecting telescope

Asked 2× · Board 2026, Sample 2025 · 1 marks

[case context] A ray diagram shows image formation by a reflecting telescope that uses large curved mirrors to gather and focus light. What kind of mirror is used in this reflecting telescope?

55. Optical device at telescope eyepiece

Asked 2× · Board 2026, Sample 2025 · 2 marks

[case context] A reflecting telescope uses curved mirrors and a plane mirror to form an image at the eye-piece. Explain with the reason, what kind of optical device (type of lens or mirror) is used at the eye-piece.

56. Role of plane mirror in reflecting telescope

Asked 2× · Board 2026, Sample 2025 · 2 marks

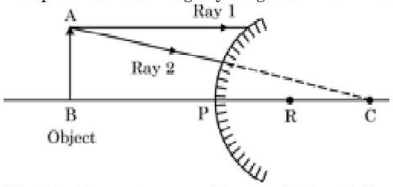
[case context] A reflecting telescope uses curved mirrors and a plane mirror to form an image. OR alternative for (c): What is the role of plane mirror in image formation by this telescope?

57. Draw/complete ray diagram and describe mirror image

Asked 3× · Board 2023, Board 2025 · 2/3 marks

(a) Complete the following ray diagram to show the formation of image. [Diagram shows a concave mirror with an object AB standing on the principal axis beyond the centre of curvature C; pole P, focus (between P and R) and R marked; Ray 1 from A travels parallel to the principal axis, Ray 2 from A passes towards the mirror.] (b) Mention the nature, position and size of the image formed in this case. (c) State the sign of the image distance in this case using the Cartesian sign convention.

30. (a) Complete the following ray diagram to show the formation of image : 3



(b) Mention the nature, position and size of the image formed in this case.

58. Mirror formula numerical (find unknown)

Asked 3× · Board 2023, Board 2024 · 2 marks

An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position of the image formed by the mirror.

The Human Eye and the Colourful World

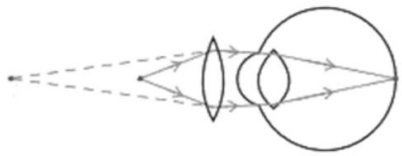
59. Identify a vision defect and show its correction

Asked 4× · Board 2023, Board 2024, Sample 2025, Sample 2026 · 2/3 marks

The given figure shows a corrective measure for a particular defect of vision. (i) Identify the defect of vision and state what kind of lens is used to correct this deficiency. (ii) Draw and label a ray diagram that shows the defect of vision in the above case before correction. (For visually impaired students: (i) What is dispersion of light? (ii) Explain the condition under which dispersion happens? (iii) Give one reason that causes presbyopia.)

the same cross-sectional area.

35 3



The above image shows a corrective measure for a particular defect of vision.
(i) Identify the defect of vision and state what kind of lens is used to correct this deficiency.
(ii) Draw and label a ray diagram that shows the defect of vision in the above

60. Explain scattering / atmospheric optical phenomena

Asked 2× · Board 2023, Sample 2026 · 1/3 marks

Choose the correct option from the below which explains the reason for us to perceive the day sky as blue. A. As sunlight passes through the atmosphere, shorter wavelengths, such as blue are scattered more than other colors. B. The sky appears blue because all colors are scattered equally, but blue light is stronger and more visible to the human eye. C. The blue color of the sky is due to longer wavelengths like red and orange scattering more than shorter wavelengths, making blue stand out more. D. The atmosphere contains blue-colored particles that give the sky its blue appearance.

61. Prism dispersion: ray path / emergent colours

Asked 2× · Board 2023, Sample 2025 · 1/2 marks

White light is incident on a glass prism; ray x enters and two emergent rays A (upper) and B (lower) leave the prism. Choose the correct option for the colour of rays for A and B. A. Ray A Blue, Ray B Red B. Ray A Green, Ray B Yellow C. Ray A Red, Ray B Violet D. Ray A Violet, Ray B Indigo



62. Presbyopia from ciliary-weakening description (MCQ)

Asked 2× · Board 2025, Board 2026 · 1 marks

The vision defect which arises due to gradual weakening of the ciliary muscles and diminishing flexibility of eye lens is: (A) Myopia (B) Hypermetropia (C) Presbyopia (D) Myopia and hypermetropia both

63. Identify eye part by its function (MCQ)

Asked 2× · Board 2024, Board 2026 · 1 marks

The pair of eye parts responsible for admitting different amount of light in to the eyes is (A) Iris and pupil (B) Ciliary muscles and pupil (C) Retina and Iris (D) Ciliary muscles and cornea

64. Rainbow formation

Asked 2× · Board 2024, Board 2026 · 1/3 marks

Explain the phenomenon of rainbow formation in the sky. Draw the labelled ray diagram in support of your explanation.

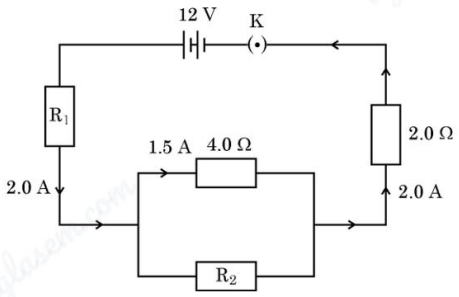
Electricity

65. Calculate unknown resistances/currents/PD in a circuit

Asked 4× · Board 2025, Board 2026, Sample 2025 · 3/5 marks

(i) The given electric circuit is a part of an electrical device. Use the information given in the electric circuit diagram to calculate: (I) Potential difference across the ends of resistor R_2. (II) Value of resistor R_2. (III) Value of resistor R_1. [Circuit data: 12 V source with key K; branch with R_1; a 4.0 Ohm resistor carrying 1.5 A; resistor R_2 in parallel; a 2.0 Ohm resistor; total line current 2.0 A.] (ii) Write the factors on which resistance of a conductor depends and derive the formula for resistance of a given conductor.

39. (A) {}



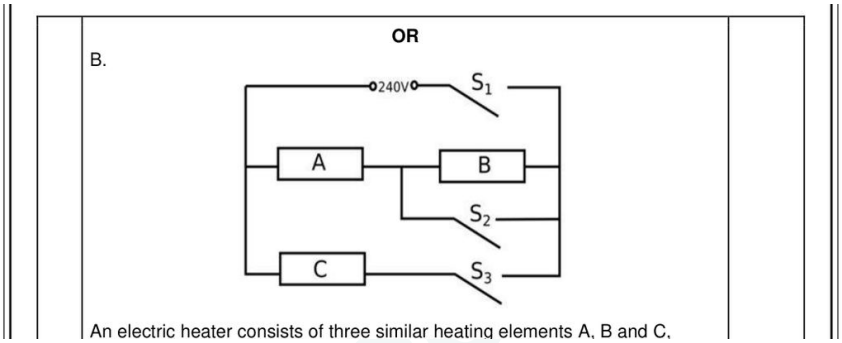
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(i) The given electric circuit is a part of an electrical device.

66. Appliance power numerical (find I/P/R from rating)

Asked 4× · Board 2023, Board 2024, Board 2026, Sample 2026 · 5 marks

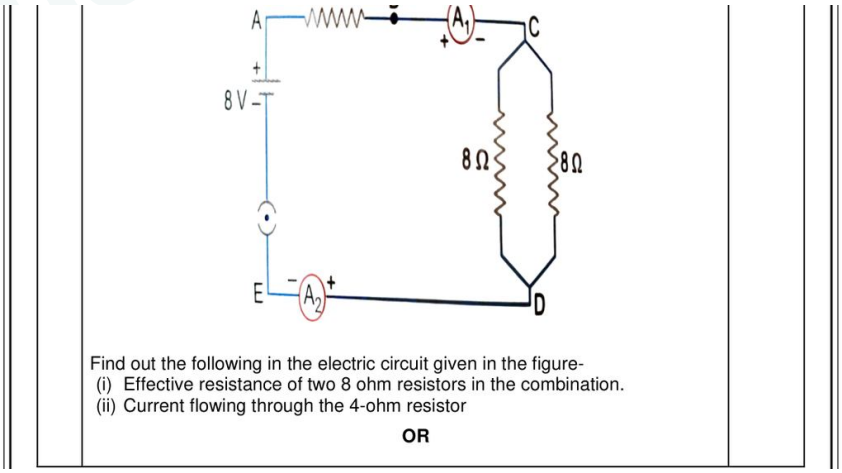
An electric heater consists of three similar heating elements A, B and C, connected as shown in the figure (with switches S_1, S_2 and S_3 and a 240 V supply). Each heating element is rated as 1.2 kW, 240 V and has constant resistance. The circuit is connected to a 240 V supply. (i) Calculate the resistance of one heating element. (ii) Calculate the current in each resistor when only S_1 and S_3 are closed. (iii) Calculate the power dissipated across A when S_1, S_2 and S_3 are closed. (For visually impaired students: A. (i) Explain why in household circuits only the fuse is connected in series with all the rest of the appliances but all appliances are connected in parallel to each other. (ii) A 1500 W heater and a 500 W fan are connected in parallel to a 220 V supply with a 10 A fuse; (a) calculate the total current drawn and (b) determine whether the 10 A fuse will blow. OR B. Two resistors R_1=6 ohm and R_2=12 ohm are connected in parallel to a 24 V battery for 5 minutes; (i) calculate the total heat generated and (ii) if each resistor is rated 100 W, determine whether it is safe.)



67. Equivalent resistance & current of a resistor network

Asked 3× · Board 2022, Sample 2026 · 2/3 marks

Find out the following in the electric circuit given in the figure (an 8 V cell in series with a 4 ohm resistor and ammeter A_1, connected to two 8 ohm resistors joined in parallel between points C and D, with ammeter A_2 in the return path): (i) Effective resistance of two 8 ohm resistors in the combination. (ii) Current flowing through the 4-ohm resistor.



68. State R=rhoL/A relation and derive/define resistivity

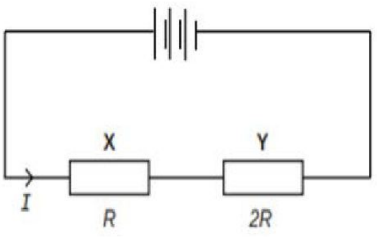
Asked 3× · Board 2024, Board 2025, Sample 2025 · 3/5 marks

(a) Write the relationship between resistivity and resistance of a cylindrical conductor of length l and area of cross-section A. Hence derive the SI unit of resistivity. (b) Why are alloys used in electrical heating devices ?

69. Ratio of resistance/power: series vs parallel

Asked 2× · Board 2023, Sample 2025 · 1/2 marks

Attempt either option A or B. B. The given figure shows two resistors X (R) and Y (2R) connected in series to a battery. The power dissipated for this combination is P_1. When these resistors are connected in parallel to the same battery then the power dissipated is given by P_2. Find out the ratio P_1/P_2.



The above figure shows two resistors X and Y connected in series to a battery. The power dissipated for this combination is P_1. When these resistors

70. Current rating / fuse suitability from appliance power

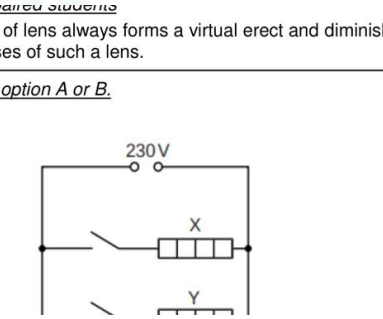
Asked 2× · Board 2025, Board 2026 · 1/2 marks

A fuse in electric circuit is rated 4 A. Can it be used with an electric heater of rating 2 kW, 200 V? Explain your answer.

71. Total current for appliances in parallel

Asked 2× · Board 2022, Sample 2025 · 2/3 marks

Attempt either option A or B. A. The electric circuit (given figure) in a clothes dryer contains two heaters X and Y in parallel connected to a 230 V power supply. When both switches are closed, the current in X is 3.5 A. Analyse the circuit and answer: (i) Calculate the power developed in heater X. (ii) If the resistance of X is double that of Y calculate the current in heater Y.



72. Rearrange/combine resistors for a required resistance

Asked 2× · Board 2024, Board 2025 · 2 marks

A wire of resistance R is cut into three equal parts. If these three parts are then joined in parallel, calculate the total resistance of the combination so formed.

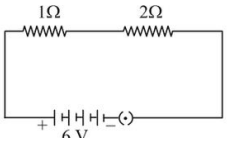
73. Heat/power dissipated in a resistor

Asked 2× · Board 2022, Board 2024 · 2/3 marks

In the given circuit calculate the power consumed in watts in the resistor of 2 ohm: [circuit diagram shows a 1 ohm resistor and a 2 ohm resistor in series with a 6 V battery]

OR

(B) In the given circuit calculate the power consumed in watts in the resistor of 2 Ω : **2**

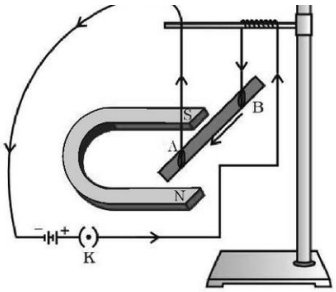


Magnetic Effects of Electric Current

74. Fleming's Left Hand Rule for force on a conductor

Asked 4× · Board 2022, Board 2023, Board 2024, Board 2026 · 2/3 marks

On the basis of the given circuit arrangement, answer the following questions: (a) What happens to the rod AB when the key K is closed and why? (b) Name and state the rule that determines this behaviour of the rod AB in the above situation.



31/4/1 *Page 27 of 32* *P.T.O.*

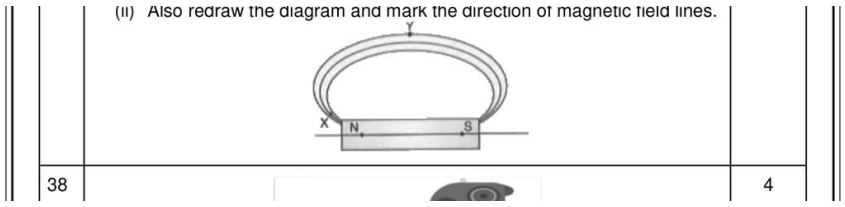
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75. Interpret field strength/direction around wire/loop

Asked 2× · Sample 2025, Sample 2026 · 3 marks

Magnetic field lines are shown in the given diagram (field lines around a current loop with points X and Y marked, near a magnet labelled N-S). A student makes a statement that the magnetic field at X is stronger than at Y. (i) Explain with reason if the student's claim is correct. (ii) Also redraw the diagram and mark the direction of magnetic field lines.

(ii) Also redraw the diagram and mark the direction of magnetic field lines.



76. Draw magnetic field pattern of a bar magnet (and solenoid)

Asked 4× · Board 2022, Board 2023 · 1/2/3 marks

(i) Draw the pattern of magnetic field lines of (1) a current carrying solenoid (2) a bar magnet. (ii) List two distinguishing features between the two fields.

77. Magnetic field lines do not intersect (reason)

Asked 3× · Board 2022, Board 2024, Board 2025 · 1/2 marks

Assertion (A): No two magnetic field lines are found to cross each other. Reason (R): The compass needle cannot point towards two directions at the point of intersection of two magnetic field lines. Select the correct answer: (A) Both A and R are true and R is the correct explanation of A. (B) Both A and R are true, but R is not the correct explanation of A. (C) A is true, but R is false. (D) A is false, but R is true.

78. Increasing magnetic field strength of coil/electromagnet

Asked 2× · Board 2023, Board 2026 · 1/2 marks

How is an electromagnet made? Write any two ways by which the strength of electromagnet can be increased.

79. Solenoid magnetic field pattern (draw/identify)

Asked 2× · Board 2022, Board 2024 · 1/2 marks

The pattern of the magnetic field produced inside a current carrying solenoid is: [four field-pattern diagrams labelled (a), (b), (c), (d) are given as the options]

(a) (b) (c) (d)

Our Environment

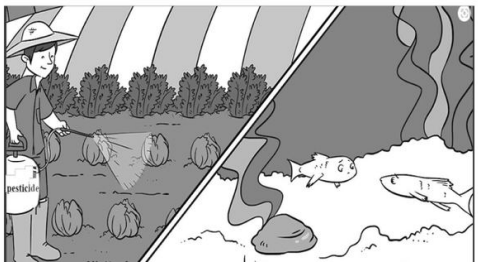
80. Biomagnification up trophic levels

Asked 5× · Board 2023, Board 2024, Board 2026, Sample 2025, Sample 2026 · 1/2 marks

The given cartoon addresses a growing concern (a farmer spraying pesticide on a cabbage farm, with the pesticide accumulating along a food chain up to fish). What impact will the process shown in the image have on Humans if they occupy the last trophic level? Explain.

B. You are given 2 fuse wires A and B with current ratings 2A and 5A respectively. Justify with reason which of the two would you use with a 1000W, 220V room heater?

26 The cartoon below addresses a growing concern: 2



81. Energy flow / 10% law

Asked 3× · Board 2025, Board 2026, Sample 2025 · 1/2 marks

Explain why food chains generally consist of three or four steps.

82. Eco-friendly vs harmful human activity (MCQ)

Asked 2× · Board 2026, Sample 2026 · 1 marks

Given below are some of the statements regarding our environment: (i) Change in our life-styles have resulted in greater amounts of waste material generation. (ii) Changes in attitude have resulted in use of more disposable things. (iii) Changes in packaging has resulted in much of our waste becoming non-biodegradable. (iv) Organic farming. Which amongst these is not leading to any damage of environment? (A) (i), (ii), (iii) (B) (iv) (C) (i) and (iii) (D) (ii) and (iv)

83. Construct a food chain / food web

Asked 2× · Board 2023, Sample 2026 · 2/3 marks

About 100 acres of forest land was declared as Natural reserve park. The following organisms were predominant in the Natural reserve park: rabbit, frog, grass, fish, fox, water insects, zebra, peacock, snake, trees, bird, owl, insects, tiger, vulture, duck. Create a food web comprising two separate food chains with different producers by using the above data.

84. Effect of removing a trophic level

Asked 2× · Board 2024, Sample 2025 · 1/3 marks

Assertion (A): If the lions are removed from a food chain it will not affect the food chain, however if the plants are removed from a food chain it will disturb the ecosystem. Reason (R): Plants are producers who can make food using sunlight, while lions are consumers. [Options: 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]

85. Identify valid/invalid food chain (MCQ)

Asked 2× · Board 2024, Board 2025 · 1 marks

Which of the following groups do not constitute a food chain ? (i) Wolf, rabbit, grass, lion (ii) Plankton, man, grasshopper, fish (iii) Hawk, grass, snake, grasshopper, frog (iv) Grass, snake, wolf, tiger (A) (i) and (iv) (B) (i) and (iii) (C) (ii) and (iii) (D) (ii) and (iv)

86. Ozone: formation, function and depletion (descriptive)

Asked 2× · Board 2022, Board 2024 · 2/3 marks

A gas 'X' which is a deadly poison is found at the higher levels of atmosphere and performs an essential function. Name the gas and write the function performed by this gas in the atmosphere. Which chemical is linked to the decrease in the level of this gas? What measures have been taken by an international organization to check the depletion of the layer containing this gas?

87. Natural vs artificial ecosystems and their maintenance

Asked 2× · Board 2022, Board 2023 · 2/3 marks

(i) Why does a kitchen garden called an artificial ecosystem while a forest is considered to be a natural ecosystem? (ii) While designing an artificial ecosystem at home, write any two things to be kept in mind to convert it into a self-sustaining system. Give reason to justify your answer.