E&G

OLYMPIAD EXPLORER

Workbook for

Nationwide Interactive SCIENCE Olympiad & Other National/International Olympiads/Talent Search Exams.

Also useful for Nationwide Biotechnology Olympiad (NBTO)

Based on CBSE, ICSE, GCSE, State Board Syllabus & NCF (NCERT)

100's of Q's with answers

- Chapterwise Practice Q's
- Revision Q's
- Sample Paper

Class 10

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Based on CBSE, ICSE & GCSE Syllabus & NCF guidelines devised by NCERT

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iii. To study water harvesting system.
iv. To find out about Euro I and Euro II norms for emission from vehicles

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Chapter 1 CHEMICAL REACTIONS & EQUATIONS

Q.1. Black coating on silver ware is an example of
(a) rusting (b) reduction
(c) corrosion (d) photochemical reaction

Q.2. A substance 'X' is used for washing clothes : X is
(a) NaCl (b) $CaCO_3$ (c) Na_2CO_3 (d) $CaOCl_2$

Q.3. When NH_4Cl is dissolved in water, the reaction is
(a) endothermic (b) exothermic
(c) photochemical (d) none of these

Q.4. Which of the following is used in the manufacture of cement?
(a) CaO (b) Na_2O
(c) $Ca(OH)_2$ (d) Calcium carbide

Q.5. Which one of the following is used as explosive?
(a) potassium chloride (b) potassium nitrate
(c) potassium permanganate
(d) potassium chlorate

Q.6. Which of the following is an endothermic process?
(a) burning of coal (b) burning of Magnesium
(c) decomposition of $CaCO_3$
(d) dissolution of NaOH in water

Q.7. $CaCO_3$ can be used for
(a) washing clothes (b) white washing
(c) bleaching (d) baking

Q.8. Which of the following involves a chemical change?
(a) melting of ice (b) vapourization of water
(c) boiling of rice (d) none of these

Q.9. $I^- + Br_2 \longrightarrow I_2 + Br^-$
(a) I^- (b) Br_2 (c) I_2 (d) Br^-

Q.10. The molecular formula of hydrated sodium carbonate contains
(a) $1H_2O$ molecule (b) $5H_2O$ molecules
(c) $8H_2O$ molecules (d) $10H_2O$ molecules

Q.11. In the exothermic reaction, the heat energy is
(a) evolved (b) absorbed
(c) both (a) and (b) (d) none of these

Q.12. The reaction which involves formation of two or more substances by the breaking of a single substance is called

(a) displacement reaction
(b) combination reaction
(c) decomposition reaction
(d) none of these

Q.13. $N_2 + 3H_2 \longrightarrow 2NH_3$ is a
(a) decomposition reaction
(b) displacement reaction
(c) combination reaction
(d) none of these

Q.14. The reaction $H_2O \rightarrow H_2 + 1/2\ O_2$ is an example of
(a) displacement reaction (b) combination reaction
(c) precipitation reaction (d) decomposition reaction

Q.15. In the following chemcial reaction what is the value of *x*?
$MgCO_3 + xHCl \rightarrow MgCl_2 + CO_2 + H_2O$
(a) 2 (b) 3 (c) 1 (d) none of these

Q. 16. $HX + BOH \longrightarrow XB + H_2O$ is a
(a) double decomposition reaction
(b) displacement reaction
(c) neutralization reaction
(d) none of these

Q.17. Tarnishing of silver is an example of
(a) reduction (b) oxidation
(c) both (a) and (b) (d) none of these

Q.18. What does the symbol (↓) represent in a chemcial equation?
(a) solid state (b) gaseous state
(c) solution made in water
(d) precipitate

Q.19. Balancing of chemical equation is based on the law of
(a) conservation of charge
(b) conservation of energy
(c) conservation of mass
(d) none of these

Q.20. Which of the following gas is used as antioxidant in plastic bags containing potato chips?
(a) oxygen (b) nitrogen
(c) carbon monoxide (d) carbon dioxide

Q.21. Fats become rancid due to:
(a) oxidation reaction (b) reduction reaction
(c) decomposition reaction
(d) precipitation reaction

Q.22. Chemical used in the photography is:
(a) silver chloride (b) silver bromide
(c) silver iodide (d) sodium chloride

Q.23. What change would you expect to observe in the reaction when copper spoon is put in $FeSO_4$ solution?
(a) change in colour of copper spoon
(b) colour of the solution becomes blue
(c) no change in colour
(d) none of these

Q.24. Which of the following will change colour when it is left open in sunlight?
(a) $Pb(NO_3)_2$ (b) anhydrous $CuSO_4$
(c) hydrated $CuSO_4$ (d) $BaCl_2$

Q.25. Colour of the fumes of nitrogen dioxide (NO_2) is:
(a) yellow (b) red (c) brown (d) blue

Q.26. What type of ion is given by bases in water?
(a) OH^- (b) H_3O^+ (c) H_2O^+ (d) H^-

Q.27. $M + H_2 \longrightarrow MH_4$, M is getting
(a) reduced (b) oxidized
(c) decomposed (d) none of these

Q.28. Evaporation is
(a) endothermic (b) exothermic
(c) reversible (d) nonspontaneous

Q.29. When electrolysis of water is carried out, the gases liberated are
(a) H_2, Cl_2 (b) Cl_2, O_2 (c) O_2, H_2 (d) O_2, N_2

Q.30. The precipitate formed on mixing $BaCl_2$ & Na_2SO_4 solution. is of
(a) NaCl (b) $BaSO_4$
(c) Na_2SO_4 (d) none of these

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ANSWERS

1. (c)	2. (c)	3. (a)	4. (a)	5. (b)	6. (c)	7. (b)	8. (c)
9. (b)	10. (d)	11. (a)	12. (c)	13. (c)	14. (d)	15. (a)	16. (c)
17. (b)	18. (d)	19. (c)	20. (b)	21. (a)	22. (b)	23. (c)	24. (b)
25. (c)	26. (a)	27. (a)	28. (a)	29. (c)	30. (b)		

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Chapter 2 ACIDS, BASES AND SALTS

Q.1. The pH values of I, II, III, IV solutions are found to be 3, 7, 8, and 10 respectively.
Among the given solutions, which solution has the highest hydrogen ion concentration?
(a) I (b) II (c) III (d) IV

Q.2. If an unknown solution turns blue litmus red, then the pH of the solution is more likely to be
(a) 8 (b) 7 (c) 12 (d) 4

Q.3. .....is used for treating indigestion. Therefore, it is an .....
(a) magnesium hydroxide, antibiotic
(b) magnesium hydroxide, antacid
(c) potassium nitrate, antacid
(d) potassium nitrate, antibiotic

Q.4. Salts of strong acids and strong bases are generally ..... in nature, and salts of strong acids and weak bases are generally ..... in nature respectively.
(a) neutral, basic (b) basic, acidic
(c) neutral, acidic (d) acidic, basic

Q.5. The colour of neutral litmus solution is
(a) red (b) blue (c) purple (d) yellow

Q.6. Which of the following indicators is an olfactory indicator?
(a) methyl orange (b) vanilla
(c) litmus (d) phenolphthalein

Q.7. Which of the following products are produced when sodium hydrogen carbonate reacts with dilute hydrochloric acid?
(a) NaCl,CO_2, and H_2 (b) Na, CCl_4 and H_2O
(c) NaCl, CO_2 and H_2O (d) NaOH, H_2, and CCl_4

Q.8. Metallic oxides are ..... in nature.
(a) neutral (b) acidic
(c) basic (d) amphoteric

Q.9. Which acid is produced in our stomach?
(a) hydrochloric acid (b) sulphuric acid
(c) nitric acid (d) acetic acid

Q.10. Which of the following compounds is used in soda-acid fire extinguishers?
(a) sodium carbonate (b) magnesium carbonate
(c) calcium carbonate (d) sodium hydrogen carbonate

Q.11. Which of the following natural sources contains oxalic acid?
(a) lemon (b) turmeric
(c) tomato (d) tamarind

Q.12. The acid found in an ant sting is
(a) acetic acid (b) citric acid
(c) tartaric acid (d) methanoic acid

Q.13. To relieve pain caused due to acidity, we can take
(a) sour milk (b) lemon juice
(c) orange juice (d) milk of magnesia

Q.14. The concentration of H^+ ions in a solution can be measured using
(a) a pH paper (b) a litmus paper
(c) methyl orange (d) phenolphthalein

Q.15. Which of the following solutions does not conduct electricity?
(a) NaCl solution (b) $Ca(OH)_2$ solution
(c) sucrose solution (c) HCl solution

Q. 16. A strong acid, HA reacts with a weak base, BOH to form a salt, AB. What would be the nature of salt AB?
(a) basic (b) neutral
(c) weakly basic (d) acidic

Q.17. Which of the following salts has the minimum pH value?
(a) $(NH_4)_2SO_4$ (b) $NaHCO_3$
(c) K_2SO_4 (d) NaCl

Q.18. Which of the following salts is basic in nature?
(a) NH_4NO_3 (b) Na_2CO_3
(c) Na_2SO_4 (d) NaCl

Q.19. The chemical formula of washing soda is ..... and its chemical name is ..... .
(a) $CaSO_4 \frac{1}{2} H_2O$, calcium sulphate hemihydrate
(b) Na_2CO_3 $10H_2O$, sodium carbonate decahydrate
(c) $NaHCO_3$, sodium hydrogen carbonate
(d) Na_2CO_3, sodium carbonate

Q.20. Which of the following is acidic?
(a) ZnO (b) Al_2O_3 (c) Na_2O (d) CO_2

Q.21. The gas evolved, when Zn reacts with H_2SO_4 can be used for
(a) reduction (b) oxidation
(c) photosynthesis (d) photography

Q.22. A solution of strong base and weak acid will turn
(a) blue litmus red (b) red litmus blue
(c) no action (d) none of these

Q.23. Which acid prevents disease is called scurvy
(a) citric acid (b) tartaric acid
(c) oxalic acid (d) hydrochloric acid

Q.24. On adding water to a solution of pH 5, its pH will
(a) remain same (b) decreases
(c) increases (d) none of these

Q.25. The product formed, when chlorine gas passes through dry slaked lime is:
(a) $CaOCl_2$ (b) $CaCl_2$ (c) CaOCl (d) CaO

Q.26. Which one of the following is not a basic oxide?
(a) MgO (b) Na_2O (c) SiO_2 (d) CaO

Q.27. Chemical formula for bleaching powder is
(a) Na_2CO_3 (b) $NAHCO_3$
(c) $CaOCl_2$ (d) None of these

Q.28. The equation between an acid and a base is
$XOH + HY \rightarrow XY + H_2O$
Which of the following is the anion part of salt?
(a) X (b) OH (c) Y (d) H

Q.29. If a few drop of phenolphthalein indicator are added to tomato juice, then the colour of the juice will turn
(a) blue (b) pink (c) colourless (d) none of these

Q.30. If 20 ml of acidic solution A is required to neutralize 10 ml of basic solution B. How much of the solution B is required to neutralize 15 ml of solution A?
(a) 15 ml (b) 30 ml (c) 7.5 ml (d) none of these

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ANSWERS

1.	(a)	2.	(d)	3.	(b)	4.	(c)	5.	(c)	6.	(b)	7.	(c)	8.	(c)
9.	(a)	10.	(d)	11.	(c)	12.	(d)	13.	(d)	14.	(a)	15.	(c)	16.	(d)
17.	(a)	18.	(b)	19.	(b)	20.	(d)	21.	(a)	22.	(b)	23.	(a)	24.	(b)
25.	(a)	26.	(c)	27.	(c)	28.	(c)	29.	(c)	30.	(c)				

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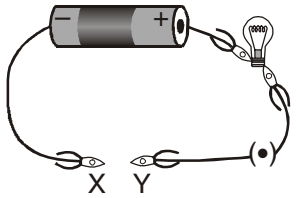
Chapter 3 METALS AND NON-METALS

Q.1. Which of the following statements is correct?
(a) metals are poor conductors of heat
(b) metals are poor conductors of electricity
(c) lead and mercury are good conductors of heat
(d) silver and copper are good conductors of electricity

Q.2. Raju made an electric circuit to test the electrical conductivity of different substances, namely a copper wire, a plastic wire, an eraser, and a candle. He inserted each of these substances in the circuit between terminals X and Y (as shown in the given figure).



The insertion of which of the following substances will make the bulb glow in the given circuit?
(a) a plastic wire (b) a copper wire
(c) an eraser (d) a candle

Q.3. Which of the following statements is correct?
(a) since iodine is lustrous, it is a metal
(b) all existing metals have a high melting point
(c) all metals are solid except mercury, which is a liquid
(d) since sodium and potassium are not hard, they are not meals

Q.4. In which row is a metal not paired with a non-metal?
(a) sodium – chlorine
(b) potassium – carbon
(c) magnesium– potassium
(d) aluminium – silicon

Q.5. Most metals burn in air to form ..... which are ..... in nature.
(a) metal oxides, acidic
(b) metal hydroxides, basic
(c) metal oxides, basic
(d) metal hydroxides, acidic

Q.6. Which of the following oxides is not amphoteric in nature?
(a) sodium oxide (b) ZnO
(c) SnO_2 (d) aluminium oxide

Q.7. In which option is a metal not matched with its reaction condition with oxygen?
(a) sodium – reacts at room temperature
(b) magnesium – burns on heating
(c) zinc – reacts on strong heating
(d) silver – readily burns on strong heating

Q.8. In the process of ..... a thick layer of ..... is deposited over the metal. This makes aluminium resistant to corrosion.
(a) anodizing, $Al(OH)_3$ (b) anodizing, Al_2O_3
(c) galvanization, $Al(OH)_3$ (d) galvanization, Al_2O_3

Q.9. Metals react with water to produce ..... and ..... gas respectively.
(a) metal oxide, oxygen
(b) metal oxide, hydrogen
(c) metal hydroxide, oxygen
(d) metal hydroxide, hydrogen

Q.10. The order of reactivity of Mg, Al, Zn, and Cu with dilute HCl is
(a) Mg < Al > Zn < Cu (b) Mg < Al < Zn < Cu
(c) Mg > Al > Zn > Cu (d) Mg < Al < Zn > Cu

Q.11. Which of the following statements is correct?
(a) a mixture of concentrated HCl and concentrated HNO_3 in the ratio of 3:1 is called aqua regia
(b) a mixture of dilute HCl and dilute HNO_3 in the ratio of 1:3 is called aqua regia
(c) a mixture of concentrated HCl and dilute HNO_3 in the ratio of 1:3 is called aqua regia
(d) a mixture of dilute HCl and concentrated HNO_3 in the ratio of 3:1 is called aqua regia

Q.12. Which of the following elements cannot replace hydrogen from acids to form salt and hydrogen gas?
(a) Mg (b) Cu (c) Zn (d) Fe

Q.13. Which of the following chemical equations correctly represents the reaction of iron with water?
(a) $3Fe_{(s)} + 4H_2O_{(g)} \rightarrow Fe_3O_{4(s)} + 2H_{2(g)}$
(b) $3Fe_{(g)} + 4H_2O_{(l)} \rightarrow Fe_3O_{4(s)} + 4H_{2(g)}$
(c) $Fe_3O_{4(s)} + 4H_{2(g)} \rightarrow 3Fe_{(g)} + 4H_2O_{(l)}$
(d) $Fe_3O_{4(s)} + 4H_{2(g)}\ 3Fe_{(s)} + 4H_2O_{(g)}$

Q.14. The nature of reactions of some metals with aluminium sulphate, copper sulphate, iron sulphate, and mercury nitrate are listed in the given table.

Metal	Nature of reaction			
	Aluminium sulphate	**Copper sulphate**	**Iron sulphate**	**Mercury nitrate**
W	No reaction	Displacement	No reaction	No reaction
X	Displacement	Displacement	No reaction	No reaction
Y	No reaction	No reaction	No reaction	Displacement
Z	No reaction	No reaction	No reaction	No reaction

Which metal in the given table is the most reactive?
(a) W (b) X (c) Y (d) Z

Q.15. Which of the following statements is correct
(a) Ionic compounds have low melting point
(b) Ionic compounds are soft
(c) Ionic compounds are generally insoluble in water
(d) Ionic compounds are bad conductors of electricity in crystalline state

Q. 16. Metals at the ..... of the reactivity series are ..... reactive. They are found in a ..... state.
(a) top, more, combined
(b) top, more, free
(c) bottom, more, combined
(d) bottom, less, combined

Q.17. Manganese dioxide reacts with aluminium to produce manganese and aluminium oxide. The chemical equation involved in the reaction can be represented as:
$3MnO_{2(s)} + 4Al_{(s)} \longrightarrow 3Mn_{(l)} + 2Al_2O_{3(s)} + \text{Heat}$
In the above reaction, ... is oxidized and ..... is reduced. It is an example of an ..... reaction.
(a) MnO_2, Al, exothermic (b) Al, MnO_2, exothermic
(c) MnO_2, Al, endothermic (d) Al, MnO_2, endothermic

Q.18. Which of the following methods is not a method of prevent rusting of iron articles?
(a) application of grease on iron articles
(b) application of paint on iron articles
(c) application of a coating of zinc on iron articles
(d) application of a coating of copper on iron articles

Q.19. Which of the following elements forms an acidic oxide?
(a) sodium (b) copper (c) silicon (d) magnesium

Q.20. Which pair correctly lists the alloys with their compositions?

	Alloy	Composition
(a)	bronze	copper and tin
	solder	lead and tin
(b)	bronze	lead and tin
	solder	copper and tin
(c)	bronze	copper and zinc
	solder	lead and tin
(d)	bronze	copper and tin
	solder	lead and zinc

Q.21. In the process of electrolytic refining of metal M, the anode is ....., the cathode is ....., and the electrolyte is .....

(a) impure M, pure M, metal salt
(b) metal salt, impure M, pure M
(c) metal salt, pure M, impure M
(d) pure M, impure M, metal salt

Q.22. Which table lists the effect of the evolved gas when sulphur is heated is taken on the dry and moist blue litmus papers?

	Dry blue litmus paper	Moist blue litmus paper
(a)	change in colour	change in colour
(b)	change in colour	no change in colour
(c)	no change in colour	change in colour
(d)	no change in colour	no change in colour

Q.23. Which of the following statements is correct?

(a) aluminium metal is not used to make kitchen utensils
(b) sodium, potassium, and lithium can be stored in open air
(c) platinum, gold, and silver are not used for making jewellery
(d) carbonate and sulphide ores are usually converted into oxides

Q.24. The metal that has to be present in an alloy for it to be called an amalgam is

(a) zinc (b) copper (c) sodium (d) mercury

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ANSWERS

1.	(d)	2.	(b)	3.	(c)	4.	(c)	5.	(c)	6.	(a)	7.	(d)	8.	(d)	9.	(b)	10.	(c)	11.	(a)	12.	(b)
13.	(a)	14.	(b)	15.	(d)	16.	(a)	17.	(b)	18.	(d)	19.	(c)	20.	(a)	21.	(a)	22.	(c)	23.	(d)	24.	(d)

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NATIONWIDE INTERACTIVE SCIENCE OLYMPIAD (NISO) SAMPLE PAPER

Total duration : 60 Minutes **Total Marks :** 50

GENERAL I.Q.

1. In the following question, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern and fill in the blank spaces.
121, 225, 361, (.....)
(a) 441 (b) 484 (c) 529 (d) None of the above

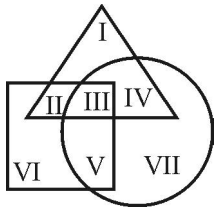
2. In a certain code, COMPUTER is written as RFUVQNPC. How is MEDICINE written in the same code?
(a) EOJDJEFM (b) EOJDEJFM
(c) MFEJDJOE (d) None of the above

3. If '+' means '÷', '–' means '×', '×' means '–' and '÷' means '+' which of the following will be the value of the following expression?
$16 \div 8 - 4 + 2 \times 4 = ?$
(a) 16 (b) 44 (c) 28 (d) None of the above

4. Sudhanshu is as much older than Kokila as he is younger than Praveen. Nitin is as old as Kokila. Which of the following statements is wrong?
(a) Kokila is younger than Praveen
(b) Nitin is younger than Praveen
(c) Sudhanshu is older than Nitin
(d) Praveen is not the oldest

5. A man is facing west. He turns 45° in the clockwise direction and then another 180° in the same direction and then 270° in the anticlockwise direction. Which direction is he facing now?
(a) South (b) North-west
(c) West (d) None of the above

6. The triangle, square and circle shown below respectively represent the urban, hard working and educated people. Which one of the areas marked I-VII is represented by the urban educated people who are not hard working?

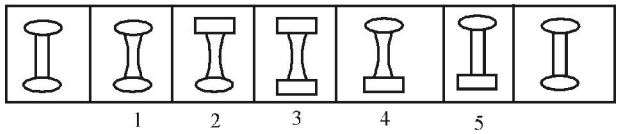


(a) II (b) I (c) IV (d) None of the above

7. In a row of girls, Rita and Monika occupy the ninth place from the right end and tenth place from the left end, respectively. If they interchange their places, Rita and Monika occupy seventeenth place from the right and eighteenth place from the left, respectively. How many girls are there in the row?
(a) 25 (b) 26 (c) 27 (d) None of the above

8. A, B, C, D and E play a game of cards. A says to B, "If you give me three cards, you will have as many as E has and if I give you three cards, you will have as many as D has ," A and B together have 10 cards more than what D and E together have. If B has two cards more than what C has and the total number of cards be 133, how many cards does B have?
(a) 22 (b) 23 (c) 25 (d) None of the above

9. In the following question, there are five numbered figures and two un-numbered figures on the extremes. These seven figures form a series. However, one of the five numbered figures does not fit into the series. The number of that Figure is the answer.



(a) 1 (b) 2 or 3 (c) 4 (d) None of the above

10. Read the following information and answer the question based on it:
Eight friends I, II, III, IV, V, VI, VII and VIII are sitting in a circle facing the centre. II is sitting between VII and IV, VIII is third to the left of II and second to the right of I. III is sitting between I and VII and II and V are not sitting opposite of each other.
Which of the following statements is not correct?
(a) IV & I are sitting opposite of each other.
(b) III is third to the right of IV
(c) V is sitting between VI and IV
(d) I is sitting between III & VI

SCIENCE

11. A virus replicates inside a host cell. The statement is
(a) True (b) False
(c) Data insufficient (d) None of these

12. Which of the following explains why a large cell may not function effectively?
(a) Its volume becomes too large.
(b) Its surface area becomes too large.
(c) Its surface area to volume ratio becomes too large.
(d) Its surface area to volume ratio becomes too small.

13. A glass is partially filled with water. Five ice cubes are placed in the glass, causing the level of the water to reach the rim of the glass. Which of the following statements best explains the increase in water level?
(a) The volume of the submerged ice is equal to the volume of water displaced.
(b) The mass of the water in the glass is less than the mass of the ice.
(c) The weight of the ice is less than the weight of the water in the glass.
(d) The density of the water in the glass is greater than the density of the ice.

14. In one of the steps of the carbon cycle, a person exhales a molecule of carbon dioxide (CO_2) into the atmosphere. Which of the following is most likely to happen next to the atom of carbon in this molecule?
(a) It may be used as part of a sugar in a plant
(b) It may become part of a protein in an animal
(c) It may be consumed as a fossil fuel is burned.
(d) It may be decomposed into carbon and oxygen by a bacterium.

15. The following diagram shows a caterpillar, mold, and a fern.

caterpillar mold fern

What do these organisms have in common?
(a) They are made of cells.
(b) They produce their own food.
(c) They decompose other organisms.
(d) They are disease-causing organisms.

16. Which of the organisms shown below is not correctly labelled with its kingdom?

(a)  Eubacteria (b)  Protista (c)  Plantae (d)  Animalia

17. A single prokaryotic cell can divide several times in an hour. Few eukaryotic cells can divide as quickly. Which of the following statements best explains this difference?
(a) Eukaryotic cells are smaller than prokaryotic cells.
(b) Eukaryotic cells have less DNA than prokaryotic cells.
(c) Eukaryotic cells have more cell walls than prokaryotic cells.
(d) Eukaryotic cells are more structurally complex than prokaryotic cells.

18. In an experiment to find the focal length of a concave mirror a graph is drawn between the magnitudes of u and v. The graph looks like

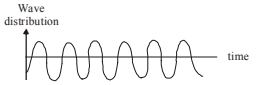
(a)  (b)  (c)  (d) None of these

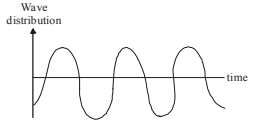
19. A particle is moving with a constant speed along a straight line path. A force is NOT required to:
(a) Increase its speed
(b) Decrease the momentum
(c) Keep it moving with uniform velocity.
(d) None of these

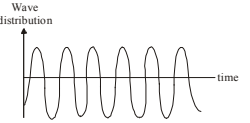
20. Which one of the following is the best strategy for environment-friendly, sustainable development in Indian agriculture?
(a) Mixed cropping, organic manures, nitrogen-fixing plants and pest-resistant crop varieties
(b) Wider popularisation of high-yielding crop varieties, better and more frequent irrigation and increased frequency of aerial sprays of inorganic fertilisers and pesticides
(c) Expansion of cultivable land, increased use of superphosphate, urea and effective biocides
(d) Improved farm implements and machinery, use of potent insecticides to minimise post-harvest grain losses and monoculture cropping practices

21. Which of the following graphs shows the highest pitched loudest sound?

(a) 

(b) 

(c) 

(d) 

22. The diagram below shows a worker using a rope to pull a cart.

The worker's pull on the handle of the cart can best be described as a force having
(a) Magnitude, only
(b) Direction, only
(c) Both magnitude and direction
(d) Neither magnitude nor direction

23. Which graph best represents the motion of a block accelerating uniformly down an inclined plane?

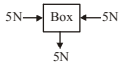
(a) 

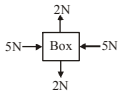
(b) 

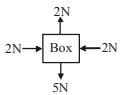
(c) 

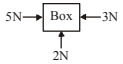
(d) 

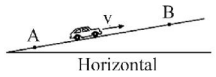
24. A car moves from point *a* to point *b* which are 348 km apart, in 6.0 hours. What is its average speed in km/h?
(a) 0.018 km/h (b) 16 km/h (c) 58 km/h (d) 67 km/h

25. Which diagram represents a box in equilibrium?
(a) 

(b) 

(c) 

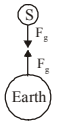
(d) 

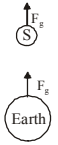
26. A car travels at constant speed *v* up a hill from point *A* to point *B*, as shown in the diagram.


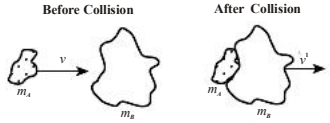
As the car travels from *A* to *B*, its gravitational potential energy
(a) Increases and its kinetic energy decreases
(b) Increases and its kinetic energy remains the same
(c) Remains the same and its kinetic energy decreases
(d) Remains the same and its kinetic energy also remains the same

27. Which diagram best represents the gravitational forces, F_g, between a satellite *S*, and Earth?
(a) 

(b) 

(c) 

(d) 

28. The diagram below represents two masses before and after they collide. Before the collision, mass m_A is moving to the right with speed *v*, and mass m_B is at rest. Upon collision, the two masses stick together.


Which expression represents the speed, *v'*, of the masses after the collision? [Assume no outside forces are acting on m_A or m_B.]

(a) $\frac{m_A + m_B v}{m_A}$ (b) $\frac{m_A v}{m_A + m_B}$

(c) $\frac{m_A + m_B}{m_A v}$ (d) None of these

29. Which graph best represents the relationship between energy and mass when matter is converted into energy?
(a) 

(b) 

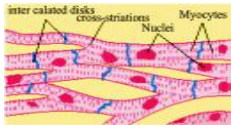
(c) 

(d) 

30. Which human activity will most likely have a *negative* effect on global stability?
(a) Decreasing water pollution levels
(b) Increasing recycling programs
(c) Decreasing habitat destruction
(d) Increasing world population growth

31. Thickening of cell wall without lignification and specialization for mechanical functions are characteristic of
(a) Parenchyma (b) Collenchyma
(c) Sclerenchyma (d) Aerenchyma

32. Which of the following type of epithelium forms the lining of kidney tubules and ducts of salivary glands?
(a) Columnar epithelium (b) Cuboidal epithelium
(c) Squamous epithelium (d) None of these

33. 

The type of muscle shown in the picture given above is
(a) Smooth muscle (b) Striated muscle
(c) Cardiac muscle (d) None of these

34. Which of the following is correctly matched?
(a) Funaria - Angiosperm
(b) Sycon - Coelenterata
(c) Antedon - Echinodermata
(d) None of these

35. Which of the following is a correct statement?
(a) Direction of momentum is same as that of the velocity
(b) Force of friction opposes motion of objects in some specific conditions.
(c) Second law of motion states that to every action, there is an equal and opposite reaction
(d) None of these

36. Under which of the following conditions are you most likely to fall sick?
(a) When you have travelled by bus and train for two days.
(b) When you are living with a friend suffering from measles
(c) When you drink water in your friends glass who is suffering from goitre
(d) None of these

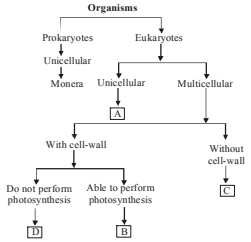
37. Which of the following cell organelles is known as suicide bags.
(a) Mitochondria (b) Golgi apparatus
(c) Lysosomes (d) Endoplasmic reticulum

38. Apiculture refers to
(a) Poultry farming (b) Bee keeping
(c) Fisheries (d) None of these

39. The expression to calculate g is
(a) $R\frac{M}{G^2}$ (b) $G\frac{M}{R^2}$ (c) $G\frac{M^2}{R}$ (d) None of these

40. Atoms of element A and atoms of element B react to form a compound. In the reaction, the radius of each atom of element A is decreased. Which of the following explains this decrease in atomic radius in the reaction?
(a) The atoms of element A lose electrons to atoms of element B.
(b) The atoms of element A gain neutrons from atoms of element B.
(c) Nuclear particles are converted into energy in atoms of element A.
(d) Protons become more densely packed in the nuclei of element A atoms.

Refer the chart to answer the following question 41.

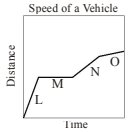


41. The group to be placed in box A, B, C and D are

	A	B	C	D
(a)	Fungi	Animalia	Protista	Plantae
(b)	Protista	Plantae	Animalia	Fungi
(c)	Plantae	Animalia	Protista	Fungi
(d)	None of these			

42. Which illustration best demonstrates compression waves?
(a)  (b) 
(c)  (d) 

43. The graph shows the distance travelled by a vehicle over a certain period of time. Which segment of the graph shows the vehicle moving with the greatest speed?



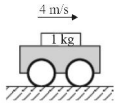
(a) L (b) M (c) N (d) O

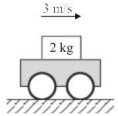
44. Which of the following techniques can be used to obtain a pure sample of copper sulphate from an impure sample
(a) Fractional distillation (b) Sublimation
(c) Crystallisation (d) Chromatography

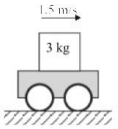
EduSys Interactive Learning Section

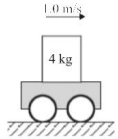
These questions are designed that they can be performed in the class / lab and can be used by the Coordinator Teacher to enhance understanding of basic science concepts.

45. A lab cart is loaded with different masses and moved at various velocities. Which diagram shows the cart mass system with the greatest inertia?

(a) 

(b) 

(c) 

(d) 

Instructions: Questions 46, 47, 48, 49, 50 are about Metal Crown. To answer these questions you may refer to any information given below.

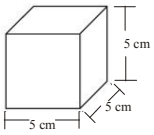
A king gave a jeweler a block of pure metal. He asked the jeweler to make him a crown out of the metal.


Crown


Metal block

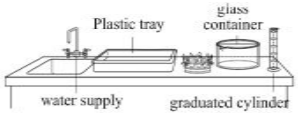
After the jeweler delivered the crown, the king observed it carefully. He thought that the jeweler might have substituted another pure metal or a mixture of metals to make the crown. He weighed the crown, and it had the same mass as the original block, 2400 grams. Still not satisfied, the king asked some scientists to help him find out what the crown was made of. The scientists decided to compare the densities of the crown and a block of metal just like the original block. The density of a substance is the mass of a sample of the substance divided by its volume (density = mass/volume).

The scientists found the volume of the block and computed its density based on its known mass (2400 g). The diagram below shows the dimensions of the block of metal that the scientists measured.



46. What is the density of the block of metal?
(a) 21.4 g / cm^3 (b) 19.2 g /cm^3
(c) 7.1 g/cm^3 (d) None of these

47. The scientists then needed to find the volume of the crown in order to determine its density. The following equipment and materials were available for them to use.



By what method the scientists could find the volume of the crown. Some equipment and materials are shown above.
(a) By apply Newtons law of motion and using above given equipment.
(b) By applying Archemedies law and using all the equipment given above
(c) By applying Pascal's law
(d) None of these

48. The scientists measured the volume of the crown five times. They computed the density for each volume measurement. Their results are shown in the table below.

Trial	Volume of Crown (cm^3)	Density of Crown (g/cm^3)
1	202	11.8
2	200	12.00
3	201	11.94
4	198	12.12
5	199	12.06

Why did the scientists measure the volume five times?
(a) They were not confident of themselves
(b) There can be experimental error. So, measuring it 5 times scientists can calculate the average to know how much error there is.
(c) So, that they takes that measurement as the final result which records for two times.
(d) None of these

49. The table below lists the density for different metals.

Metal	Density(g/cm^3)
Platinum	21.4
Gold	19.3
Silver	10.5
Copper	8.9
Zinc	7.1
Aluminum	2.7

Look at the density you computed for the block of metal. What was the block of metal most likely made of?
(a) Platinum (b) Copper
(c) Zinc (d) None of these

50. The density of the crown was found to be 12.0 g/cm^3. What would you report to the king about what metal or mixture of metals the jeweller used to make the crown?
(a) Aluminium (b) Zinc
(c) Silver (d) None of these

☺ END OF THE EXAM ☺

ANSWERS

1. (c)	**2.** (a)	**3.** (c)	**4.** (d)	**5.** (d)
6. (c)	**7.** (b)	**8.** (c)	**9.** (d)	**10.** (c)
11. (a)	**12.** (c)	**13.** (a)	**14.** (a)	**15.** (a)
16. (c)	**17.** (d)	**18.** (c)	**19.** (c)	**20.** (a)
21. (d)	**22.** (c)	**23.** (d)	**24.** (c)	**25.** (d)
26. (b)	**27.** (c)	**28.** (b)	**29.** (a)	**30.** (d)
31. (b)	**32.** (a)	**33.** (c)	**34.** (c)	**35.** (b)
36. (b)	**37.** (c)	**38.** (b)	**39.** (b)	**40.** (a)
41. (b)	**42.** (b)	**43.** (a)	**44.** (c)	**45.** (d)
46. (b)	**47.** (b)	**48.** (b)	**49.** (d)	**50.** (c)

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