SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

ATOMS AND MOLECULES

Class 09 - Science

Time Allowed: 3 hours **Maximum Marks: 105**

Section A

1. Which of the following are chemical changes? **[1]**

   a) Melting of ice
   b) The cooking of vegetables.
   c) Freezing of water
   d) Drying of wet clothes in sun light

2. Metanil yellow, an adulterant used in Arhar dal is basically: **[1]**

   a) a dye
   b) an acid
   c) a detergent
   d) a base

3. Which of the following are physical changes? **[1]**

   i. Decaying of wood
   ii. Burning of wood
   iii. Sawing of wood
   iv. Hammering of a nail into a piece of wood

   a) (i) and (iv)
   b) (iii) and (iv)
   c) (ii) and (iii)
   d) (i) and (ii)

4. Which of the following are physical changes? **[1]**

   i. Melting of iron metal
   ii. Rusting of iron
   iii. Bending of an iron rod
   iv. Drawing a wire of iron metal

   a) (i), (ii) and (iii)
   b) (ii), (iii) and (iv)
   c) (i), (ii) and (iv)
   d) (i), (iii) and (iv)

5. The substance which does not form a true solution in water is: **[1]**

   a) alum
   b) egg albumin
   c) common salt
   d) sugar

6. Which of the following solutions has the highest mass by mass percentage? **[1]**

   a) 20 g of sodium carbonate in 90 g of water
   b) 15 g of sugar in 160 g of water
   c) 10 g of sodium chloride in 200 g of water
   d) 60 g of potassium permanganate in 200 g of water

7. What happens on adding dilute HCl to a mixture of iron filling and sulphur powder? **[1]**

a. H_2S is formed.

b. A colourless and odourless gas is formed.

c. A greenish solution appears.

d. FeS is formed.

a) (a), (b) and (c) are correct

b) (b) and (c) are correct

c) All of these

d) (a) and (b) are correct

8. A student added only two drops of iodine to a rice extract in test tube 'A'. Another student added a little rice extract to iodine solution in test tube 'B'. They would then observe: **[1]**

a) no change of colour in any test tube

b) a change of colour to blue-black in both tubes 'A' and 'B'

c) a change of colour to blue-black in test tube 'B' but not in test tube 'A'

d) a change of colour to blue-black in test tube 'A' but not in test tube 'B'

9. Which type of solution is formed when sand and water are mixed thoroughly and then kept undisturbed for some time? **[1]**

a) True solution

b) Mixture

c) Colloidal

d) Suspension

10. To prepare a colloidal solution of starch, we should: **[1]**

a) add the thin paste of starch to hot water with stirring

b) add starch powder to cold water and boil

c) add the starch powder to boiling water and cool

d) heat starch, add it to cold water and then bring it to boil

11. Which one of the following will form a translucent solution in water? **[1]**

a) Soil

b) Sand

c) Starch

d) Sugar

12. A change is said to be a physical change when **[1]**

a) No energy change occurs

b) All statements are correct

c) The change can be easily reversed

d) No new substances are formed

13. Which one of the following will result in the formation of a mixture? **[1]**

a) Breaking of ice cubes into small pieces

b) Adding sodium metal to water

c) Agitating a detergent with water in a washing machine

d) Crushing of a marble tile into small particles

14. Boiling points of a few gases are given below: **[1]**

Gas	W	X	Y	Z
Boiling point (^{0}C)	-152	-246	-196	-183

If liquid mixture of these gases is fractionally distilled, the order of gases distilling out from first to last is

a) Z, X, Y, W

b) X, Y, Z, W

c) W, X, Y, Z

d) Y, X, Z, W

15. Fermentation of grapes is an example of **[1]**

a) Redox reaction

b) Reversible change

c) Chemical change

d) Physical change

16. The components of the compound can be separated by using: **[1]**

a) chemical method

b) physical method

c) can be separated by using any method.

d) cannot be separated by using any method.

17. Which one is a physical change? **[1]**

a) Mixing $BaSO_4$ + NaCl

b) Mixing NH_3 and HCl

c) Burning magnesium in air

d) Adding NaCl to water

18. To prepare iron sulphide, by heating a mixture of iron filings and sulphur powder, we should use a: **[1]**

a) copper dish

b) china dish

c) watch glass

d) petri dish

19. Arun has prepared 0.01% (by mass) solution of sodium chloride in water. Which of the following correctly represents the composition of the solutions? **[1]**

a) 1.00g of NaCl + 100g of water

b) 0.10 g of NaCl + 99.90g of water

c) 0.01g of NaCl + 99.99g of water

d) 0.11g of NaCl + 100g of water

20. Rusting of an article made up of iron is called **[1]**

a) corrosion and it is a physical as well as chemical change

b) dissolution and it is a physical

c) dissolution and it is a chemical change

d) corrosion and it is a chemical change

21. **Assertion (A):** An unknown substance A on thermal decomposition produces B and C. **[1]**

Reason (R): Unknown substance A is an element because compounds and mixtures do not decompose.

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.

22. **Assertion (A):** Pragya tested the solubility of 3 different substances at different temperatures. She noted at 313K 62g of potassium Nitrate dissolved in 100g of water. **[1]**

Reason (R): To produce a saturated solution of potassium nitrate in 50g of water of potassium nitrate needed.

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.

23. **Assertion (A):** The gas obtained by Group I is hydrogen, It is not advised to do the combustion test for hydrogen. **[1]**

Reason (R): The material obtained by Group I is a mixture of the two substances. The substances given are the elements: iron and sulphur.

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.

24. Two substances, A and B were made to react to form a third substance, A_2B according to the following reaction **[1]**

$2A + B \rightarrow A_2B$. Which of the following statements concerning this reaction are incorrect?

i. The product A_2B shows the properties of substances A and B

ii. The product will always have a fixed composition

iii. The product so formed cannot be classified as a compound

iv. The product so formed is an element

a) (i), (ii) and (iii),

b) (i), (iii) and (iv)

c) (iii) and (iv)

d) (ii), (iii) and (iv)

25. Which of the following is correct about the true solution? **[1]**

A. Its composition is fixed.

B. It has a variable composition.

C. Its components can be separated by filtration.

D. It is homogeneous and transparent.

a) A, B and D

b) All of these

c) B and D

d) A and D

26. Out of the following, the only incorrect statement is: **[1]**

A. in a colloidal system, the dispersion medium is always in the liquid state.

B. no residue is left on the filter paper when a colloidal solution is filtrated off

C. in a colloidal system dispersion medium is a gas.

D. the colloidal system is a heterogeneous mixture.

a) (C)

b) (A)

c) (D)

d) (B)

27. Which of the following statements are incorrect **[1]**

a. The properties of a compound are different from its constituents elements

b. A mixture is homogenous but a compound is heterogeneous

c. Formation of a compound is a chemical change

d. Formation of a mixture is a chemical change

a) (b) and (d)

b) (a), (b) and (c)

c) All of these

d) (a) and (b)

28. Which of the following statements are true for pure substances? **[1]**

i. Pure substances contain only one kind of particles

ii. Pure substances may be compounds or mixtures

iii. Pure substances have the same composition throughout

iv. Pure substances can be exemplified by all elements other than nickel

a) (i) and (iii)

b) (iii) and (iv)

c) (ii) and (iii)
d) (i) and (ii)

29. Which of the following is correct about solubility- **[1]**

A. It increases with increase in temperature

B. Mass of solute dissolution in 100 units of solvent

C. The Solubility of common salt in water in 46g at 20^{o} C

D. It decreases with decrease in temperature

a) A, C and D
b) A, B and D
c) All of these
d) A, B and C

30. Which of the following is correct about solubility: **[1]**

A. It increases with increase in temperature

B. Mass of solute dissolution in 100 units of solvent

C. The solubility of common salt in water in 46g at 20^{o}C

D. It decreases with decrease in temperature

a) (B) and (C)
b) (A), (B) and (D)
c) (A) and (B)
d) (A), (B), (C) and (D)

31. Find the incorrect statement **[1]**

a) The purity of compounds can be tested by determining their melting points.
b) The mixture can be called as a single substance.
c) Cesium and gallium are liquids above 30^{o}C.
d) No energy changes occur when the constituent of air tried to be mixed.

32. Which of the following is correct about the true solution? **[1]**

A. Its composition is fixed

B. It has a variable composition

C. Its components can be separated by filtration

D. It is homogeneous & transparent

a) (A), (B), (C) and (D)
b) (A) and (B)
c) (B) and (D)
d) (A), (B) and (C)

33. Which of the following statement is incorrect **[1]**

A. The properties of a compound are different from its constituents elements

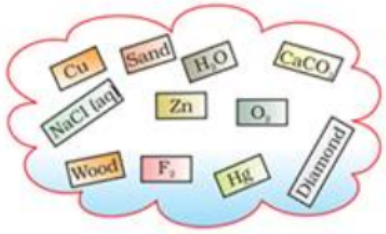
B. A mixture is homogenous but a compound is heterogeneous

C. Formation of a compound is a chemical change

D. Formation of a mixture is a chemical change

a) (A), (B), (C) and (D)
b) B and D
c) C and D
d) A, B and D

34. Classify the substances given in Fig. into elements and compounds: **[1]**



35. Explain the Saturated solution. **[1]**
36. Name two metals which are both malleable and ductile. **[1]**
37. A shining thick liquid is often used in glass thermometers. Name it. **[1]**
38. Fog and cloud are both colloidal in nature. How do they differ? **[1]**
39. Is fresh air which we breathe in, a pure substance in terms of science? **[1]**
40. Define solubility. **[1]**
41. What is meant by a substance? **[1]**
42. What is mass percentage of a solution? **[1]**
43. What is the nature the solution formed by mixing mustard oil and water? **[1]**
44. A hard substance when bent produces a tinkling sound. Predict its nature. **[1]**
45. A saturated solution becomes unsaturated on heating. Why is it so? **[1]**

Section B

46. A solution contains 30 g of glucose, 20 g of sugar in 500 mL of water. Calculate the mass percent of glucose and sugar (density of water = 1 g /mL). **[2]**
47. A solution contains 35 g of common salt in 300 g of water. Calculate the concentration of the solution. **[2]**
48. 0.5 g of salt is dissolved in 25 g of water. Calculate the percentage amount of the salt in the solution. **[2]**
49. To make a saturated solution, 36 g of sodium chloride is dissolved in 100 g of water at 293 K. Find its concentration at this temperature. **[2]**
50. A solution of H_2SO_4 is labeled 40 percent. The density of the solution is 1.3gm/l. What is the concentration of the solution in percentage (m/v)? **[2]**
51. A solution contains 5 ml of alcohol mixed with 75 ml of water. Calculate the concentration of the solution in terms of volume percent. **[2]**
52. A solution of urea in water contains 16 grams of it in 120 grams of solution. Find out the mass percentage of urea in solution. **[2]**
53. 4 g of a solute are dissolved in 40 g of water to form a saturated solution at 25^oC. Calculate the solubility of the solute. **[2]**
54. Calculate the mass of sodium sulphate required to prepare its 20% (mass per cent) solution in 100 g of water. **[2]**
55. A saturated solution of salt has been prepared in water at 25^oC. On completely evaporating 25 gram of this solution, 5 gram of salt was recovered. Calculate the amount of salt that was dissolved in 1000 gram of water while preparing this solution. What is the solubility of this salt at 25^oC? **[2]**
56. How are a sol, a solution and a suspension different from each other? **[2]**
57. What is the effect of temperature on solubility of :(a) Solids in liquids.(b) Gases in liquids. **[2]**
58. Explain how does soap help in cleaning dirty clothes? **[2]**
59. Define solute, solvent and solution. **[2]**
60. On heating calcium carbonate gets converted into calcium oxide and carbon dioxide. **[2]**

    i. Is this a physical or a chemical change?

ii. Can you prepare one acidic and one basic solution by using the products formed in the above process? If so, write the chemical equation involved.

61. What is a colloid? What are the various properties of colloids? **[2]**

62. A candle seems to lose its weight on burning. Explain this fact. **[2]**

63. Sucrose (sugar) crystals obtained from sugarcane and beetroot are mixed together. Will it be a pure substance or a mixture? Give reasons for the same. **[2]**

64. Which of the following are chemical changes? **[2]**

a. Growth of a plant
b. Rusting of iron
c. Mixing of iron filings and sand
d. Cooking of food
e. Digestion of food
f. Freezing of water
g. Burning of a candle

65. Colloidal solution show Tyndall effect but true solutions do not. Discuss. **[2]**

66. 'The Seawater can be classified as homogeneous as well as a heterogeneous mixture.' Comment. **[2]**

67. A solution has been prepared by mixing 5.6 mL of alcohol with 75 mL of water. Calculate the percentage (by volume) of alcohol in the solution. **[2]**

68. Give one test to show that brass is a mixture and not a compound. **[2]**

69. A diamond knife is quite often used for cutting glass. Why? **[2]**

70. What are the favorable qualities given to gold when it is alloyed with copper or silver for the purpose of making ornaments? **[2]**

71. Sodium chloride contains two elements, but it is still a pure substance. Give reason. **[2]**

72. Explain the Colloid. **[2]**

73. An element is sonorous and highly ductile. Under which category would you classify this element? What other characteristics do you expect the element to possess? **[2]**

74. Explain why particles of a colloidal solution do not settle down when left undisturbed, while in the case of a suspension they do. **[2]**

75. Classify the following as physical or chemical properties: **[2]**

i. The composition of a sample of steel is 98% iron, 1.5% carbon and 0.5% other elements.
ii. Zinc dissolves in hydrochloric acid with the evolution of hydrogen gas.
iii. Metallic sodium is soft enough to be cut with a knife.
iv. Most metal oxides form alkalis on interacting with water.