SUBJECT: CHEMISTRY

MARKS: 70 CLASS : XI JULY MONTHLY EXAM-2021 TIME : 3HRS

I. CHOOSE THE CORRECT ANSWER. 15X1=15

1. The number of water molecules in a drop of water weighing 0.018 g is
(a) 6.022 × 1026 (b) 6.022 × 1023 (c) 6.022 × 1020 (d) 9.9 × 1022

2. Which of the following contain same number of carbon atoms as in 6 g of C-12.
(a) 7.5 g ethane (b) 8 g methane (c) both (a) and (b) (d) none of these

3. The equivalent mass of a trivalent metal element is 9 g eq-1 the molar mass of its anhydrous oxide is
(a) 102 g (b) 27 g (c) 270 g (d) 78 g

4. 40 ml of methane is completely burnt using 80 ml of oxygen at room temperature. The volume of gas left after cooling to room temperature is
(a) 40 ml CO2 gas (b) 40 ml CO2 gas and 80 ml H2O gas
(c) 60 ml CO2 gas and 60 ml H2O gas (d) 120 ml CO2 gas

5. Carbon forms two oxides, namely carbon monoxide and carbon dioxide. The equivalent mass of which element remains constant?
(a) Carbon (b) oxygen (c) both carbon and oxygen (d) neither carbon nor oxygen

6. Assertion : Two mole of glucose contains 12.044 × 1023 molecules of glucose
Reason : Total number of entities present in one mole of any substance is equal to 6.02 × 1022
(a) both assertion and reason are true and the reason is the correct explanation of assertion
(b) both assertion and reason are true but reason is not the correct explanation of assertion
(c) assertion is true but reason is false
(d) both assertion and reason are false

7. When 6.3 g of sodium bicarbonate is added to 30 g of acetic acid solution, the residual solution is found to weigh 33 g. The number of moles of carbon dioxide released in the reaction is
(a) 3 (b) 0.75 (c) 0.075 (d) 0.3

8. Which one of the following is used as a standard for atomic mass.
(a) 6C12 (b) 7C12 (c) 6C13 (d) 6C14

9. Rate of diffusion of a gas is
a) directly proportional to its density
b) directly proportional to its molecular weight
c) directly proportional to its square root of its molecular weight
d) inversely proportional to the square root of its molecular weight

10. When an ideal gas undergoes unrestrained expansion, no cooling occurs because the molecules
a) are above inversion temperature
b) exert no attractive forces on each other
c) do work equal to the loss in kinetic energy
d) collide without loss of energy

11. The value of the gas constant R is
a) 0.082 dm3 atm. b) 0.987 cal mol-1 K-1
c) 8.3 J mol-1K-1 d) 8 erg mol-1K-1

12. Maximum deviation from ideal gas is expected from
a) CH4 (g) b) NH3 (g) c) H2 (g) d) N2 (g)

13. If temperature and volume of an ideal gas is increased to twice its values, the initial pressure P becomes
a) 4P b) 2P c) P d) 3P

14. In a closed room of 1000 m3 a perfume bottle is opened up. The room develops a smell. This is due to which property of gases?
a) Viscosity b) Density c) Diffusion d) None
15. Use of hot air balloon in sports and meteorological observation is an application of
a) Boyle's law b) Newton's law c) Kelvin's law d) Brown's law

II. ANSWER THE FOLLOWING QUESTIONS: 6X2=12
(Q.No: 24 is compulsory)
16. What is the empirical formula of the following ?
i) Fructose ($C_6H_{12}O_6$) found in honey.
ii) Caffeine ($C_8H_{10}N_4O_2$) a substance found in tea and coffee.
17. What is limiting and excess reagent?
18. Define equivalent mass.
19. State Boyle's law & Charles law.
20. Aerosol cans carry clear warning of heating of the can. Why?
21. Write the Van der Waals equation for a real gas. Explain the correction term for pressure and volume
22. Can a Van der Waals gas with a=0 be liquefied? explain.
23. When ammonia combines with HCl, NH_4Cl is formed as white dense fumes. Why do more fumes appear near HCl?
24. The density of carbon dioxide is equal to 1.965 kgm-3 at 273 K and 1 atm pressure. Calculate the molar mass of CO_2.
III. ANSWER THE FOLLOWING QUESTIONS: 6X3=18
(Q.No: 33 is compulsory)
25. Distinguish between oxidation and reduction.
26. How many moles of ethane is required to produce 44 g of CO_2 (g) after combustion.
27. What is the difference between molecular mass and molar mass? Calculate the molecular mass and molar mass for carbon monoxide.
28. Distinguish between diffusion and effusion.
29. Which of the following gases would you expect to deviate from ideal behaviour under conditions of low temperature F_2, Cl_2 or Br_2 ? Explain.
30. What are ideal gases? In what way real gases differ from ideal gases.
31. A sample of gas at 15 °C at 1 atm. has a volume of 2.58 dm3. When the temperature is raised to 38 °C at 1 atm does the volume of the gas increase? If so, calculate the final volume.
32. Explain the following observations
a) Aerated water bottles are kept under water during summer
b) Liquid ammonia bottle is cooled before opening the seal
c) The tyre of an automobile is inflated to slightly lesser pressure in summer than in winter
33. An unkownown gas diffusediffused at a rate of 0.5 time that of nitrogen at the same temperature and pressure. Calculate the molar mass of the unknown gas.

IV. ANSWER THE FOLLOWING QUESTIONS: 5X5=25
34. a) Calculate the empirical and molecular formula of a compound containing 76.6% carbon, 6.38 % hydrogen and rest oxygen its vapour density is 47.
(OR)
b) A Compound on analysis gave Na = 14.31% S = 9.97% H= 6.22% and O= 69.5% calculate the molecular formula of the compound, if all the hydrogen in the compound is present in combination with oxygen as water of crystallization. (molecular mass of the compound is 322).
35. a) Balance the following equations by ion electron method.
$C_2O_4^{2-} + Cr_2O_7^{2-} \rightarrow Cr^{3+} + CO_2$ (in acid medium)
(OR)

b) Balance the following equations by ion electron method.

$Zn + NO_3^- \rightarrow Zn^{2+} + NO$ (in acid medium)

36. a) Balance the following equations by oxidation number method

$K_2Cr_2O_7 + KI + H_2SO_4 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + I_2 + H_2O$

(OR)

b) Balance the following equations by oxidation number method

$Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO_2 + H_2O$

37. a) Derive the values of critical constants in terms of van der Waals constants.

(OR)

b) Write the van der waalWaals equation for a real gas. Explain the correction term for prssessure and volume.

38. a) i) What is the Joule-Thomson effect & Inversion temperature?

ii) What is Dalton's law of partial pressure and its application?

(OR)

b) i) What is Compressibility factor? What is the importance of compressibility of gases?

ii) An athlete in a kinesiology research study has his lung volume of 7.05 dm^3 during a deep inhalation. At this volume the lungs contain 0.312 mole of air. During exhalation the volume of his lung decreases to 2.35 dm^3. How many moles of air does the athlete exhale during exhalation?

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