A

COMMON HALF YEARLY EXAMINATION - 2023

Standard XI   Reg.No. ☐☐☐☐☐☐

CHEMISTRY

Time : 3.00 hrs   Part - I   Marks : 70

I. Choose the correct answer: 15 × 1 = 15

1. Which of the following is / are true with respect to Carbon-12?
   a) relative atomic mass is 12 u
   b) oxidation number of carbon is +4 in all its compounds
   c) 1 mole of Carbon-12 contain 6.022×10^{22} carbon atoms.
   d) all of these

2. The maximum number of electrons in a subshell is given by the expression
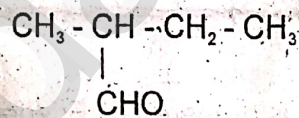   a) $2n^2$ b) $2L+1$ c) $4L+2$ d) none of these

3. The value of universal gas constant depends upon
   a) temperature of the gas   b) volume of the gas
   c) number of moles of the gas   d) units of pressure and volume

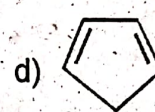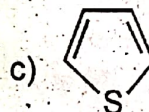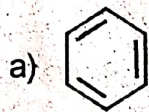4. The intensive property among the quantities below is
   a) mass   b) volume   c) enthalpy.   d) $\dfrac{mass}{volume}$

5. The IUPAC name of the compound is
$$CH_3 - CH - CH_2 - CH_3$$
$$|$$
$$CHO$$
   a) 3 methyl butanol   b) 2 methyl butanal
   c) 2 methyl butanol   d) 3 methyl butanal.

6. Which one of the following is non aromatic?
   a)   b)   c)   d)

7. The value of Δn_g for the reaction $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$
   a) 1   b) 0   c) 2   d) 3

8. The oxidation number of S in H_2SO_4
   a) +1   b) +6   c) +4   d) +2

9. Which one of the following gases has the lowest value of Henry's law constant?
   a) N_2 b) He   c) CO_2 d) H_2
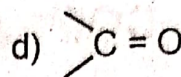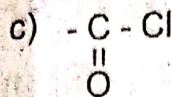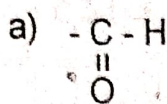
10. The bond order of N_2 molecule
    a) 1   b) 2   c) 3   d) 4

11. In which of the following molecules / ions BF_3, NO_2^-, H_2O the central atom is sp^2 hybridised?
    a) NH_2^- and H_2O b) NO_2^- and H_2O c) BF_3 and NO_2^- d) BF_3 and NH_2^-

12. The functional group of Acid chloride is

a) $-\underset{\underset{O}{\|}}{C}-H$ b) $-COOH$ c) $-\underset{\underset{O}{\|}}{C}-Cl$ d) $\underset{}{>}C=O$

13. Zeolite used to soften hardness of water is, hydrated
    a) sodium aluminium silicate   b) calcium aluminium silicate
    c) zinc aluminium silicate   d) lithium aluminium hydride

14. The name "Blue John" is given to which of the following compounds?
    a) CaH_2 b) CaF_2 c) $Ca_3(PO_4)_2$ d) CaO

15. The electronic configuration of Eu (Atomic no.63), Gd (Atomic no.64) and Tb (Atomic no.65) are
    a) [Xe] $4f^6 5d^1 6s^2$, [Xe] $4f^7 5d^1 6s^2$ and [Xe] $4f^8 5d^1 6s^2$
    b) [Xe] $4f^7 6s^2$, [Xe] $4f^7 5d^1 6s^2$ and [Xe] $4f^9 6s^2$
    c) [Xe] $4f^7 6s^2$, [Xe] $4f^8 6s^2$ and [Xe] $4f^8 5d^1 6s^2$
    d) [Xe] $4f^6 5d^1 6s^2$, [Xe] $4f^7 5d^1 6s^2$ and [Xe] $4f^9 6s^2$

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory)   6 x 2 = 12

16. Define equivalent mass.
17. Write any two uses of plaster of paris.
18. What is modern periodic law.
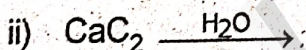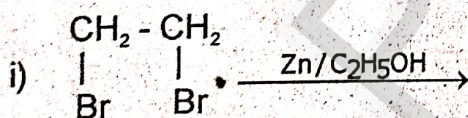19. State Boyle's law.
20. What is inductive effect?
21. Define Smog.
22. How acetophenone is prepared by Friedel Crafts acylation?
23. What is Bond enthalpy?
24. Complete the following :

i) $\underset{Br}{CH_2}-\underset{Br}{CH_2} \xrightarrow{Zn/C_2H_5OH}$

ii) $CaC_2 \xrightarrow{H_2O}$

Part - III

III. Answer any 6 questions. (Q.No.33 is compulsory)   6 x 3 = 18
25. Derive De Broglie equation.
26. Write any three characteristics of Gibbs free energy.
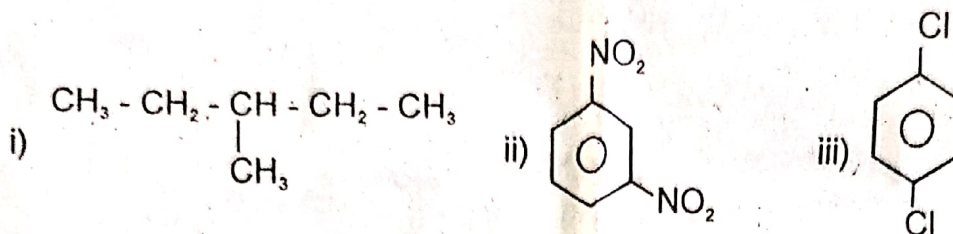27. What is Geometrical isomerism? Give an example.
28. What is Homogeneous equilibrium? Give an example.
29. State Hess's Law.
30. Difference between oxidation and reduction. (any three)

31. What is co-ordinate covalent bond? Give an example.

32. Write the IUPAC name of the following compounds.

i) $CH_3 - CH_2 - CH - CH_2 - CH_3$
                  |
                  CH_3

ii) [benzene ring with NO_2 at top and NO_2 at bottom]

iii) [benzene ring with Cl at top and Cl at bottom]

33. If an automobile engine burns petrol at a temperature of 816°C and if the surrounding temperature is 21°C, calculate its maximum possible efficiency.

Part - IV

IV. Answer all the questions.   5 x 5 = 25

34. a) An acid found in Tamarind on analysis shows the following percentage composition. 32% carbon ; 4% hydrogen ; 64% oxygen. Find the empirical formula of the compound.

(OR)

   b) i) Distinguish between diffusion and effusion.   (3 marks)
      ii) State Zeroth law of thermodynamics. (2 marks)

35. a) Explain Bohr atomic model.

(OR)

   b) i) Define Le-Chatelier's principle.   (2 marks)
      ii) Derive the relation between KP and KC.   (3 marks)

36. a) Describe the classification of organic compounds based on their structure.

(OR)

   b) Write any five uses of Hydrogen.

37. a) Write down the Born-Haber cycle for the formation of NaCl.

(OR)

   b) Discuss the formation of O_2 molecule using MO theory.

38. a) i) What is acid rain?   (2 marks)
      ii) How DDT is prepared? Write any two uses.   (3 marks)

(OR)

   b) Explain the structure of Benzene.

******