## JGi JAIN COLLEGE v v puram

$1^{\text {st }}$ PUC MOCK Paper - Jan. 2024

Course: I PUC
Subject: Chemistry
Max. Marks: 70
Duration: 3:15 hour

## PART A

I. Select the correct option from the given choices:
$1 \times 15=15$

1. The number of significant figures in Avagadro number is.
a) 1
b) 2
c) 3
d) 4
2. The isoelectronic pair of Ne is
a) $\mathrm{Na}^{+}$
b) $\mathrm{Cr}^{2+}$
c) $\mathrm{Fe}^{2+}$
d) $\mathrm{Zn}^{2+}$
3. The atomic number of Unniloctium is
a) 108
b) 107
c) 101
d) 109
4. The number of lone pair and bond pair of electrons present in ammonia is
a) 1,2
b) 1,3
c) 2,2
d) 2,1
5. The type of chemical interaction present in ice is
a) hydrogen bonding
b) dispersion force
c) dipole-dipole force
d) electrostatic force
6. During the conversion of water into vapour state $\Delta \mathrm{S}$
a) decreases
b) increases
c) remains constant
d) none of these
7. Which of the following is an extensive property?
a) $\Delta \mathrm{H}$
b) temperatue
c) density
d) viscosity
8. The conjugate acid pair of $\mathrm{H}_{2} \mathrm{SO}_{4}^{-}$is
a) $\mathrm{SO}_{4}{ }^{2-}$
b) $\mathrm{H}_{2} \mathrm{SO}_{4}$
c) $\mathrm{H}_{2} \mathrm{SO}_{3}$
d) $\mathrm{SO}_{3}{ }^{2-}$
9. Concentration of $\mathrm{H}^{+}$ion in the given solution is $10^{-5} \mathrm{M}$. The pH of the solution is
a) 1
b) 3
c) 5
d) 7
10. An increase in oxidation number of an element in a given substance is called
a) oxidation
b) redox
c) reduction
d) disproportionation
11. Identify the reducing agent in $\mathrm{Zn}+\mathrm{Cu}^{2+} \rightarrow \mathrm{Zn}^{2+}+\mathrm{Cu}$
a) Zn
b) $\mathrm{Zn}^{2+}$
c) Cu
d) $\mathrm{Cu}^{2+}$
12. The number of sigma and pi bonds present in benzene is
a) 3,12
b) 6,3
c) 12,3
d) 6,12
13. Two liquids with less difference in boiling point is separated by
a) simple distillation
b) steam distillastion
c) fractional distillation
d) separating funnel
14. The reagent used to convert bromoethane to ethene is
a) $\mathrm{H}_{2}-\mathrm{Pd} / \mathrm{BaSO}_{4}$
b) $\mathrm{Li} /$ liq $\mathrm{NH}_{3}$
c) aq KOH
d) alc KOH
15. Propanone and propanal are $\qquad$ isomers
a) chain
b) position
c) functional
d) geometrical
II. Fill in the blanks by choosing the appropriate word from those given in the brackets:
[Benzene,2-methyl butane , $\mathrm{sp}^{2}$,zero , $1.6 \times 10^{-4}$ ]
16. 0.00016 can be expressed in scientific notation as $\qquad$
17. $\qquad$ is the type of hybridization of boron in $\mathrm{BCl}_{3}$.
18. Standard enthalpy of formation of an element is $\qquad$ .
19. The IUPAC name of isopentane is $\qquad$ .
20. The product formed when acetylene gas is passed through red hot iron is $\qquad$ .

## PART B

III. Answer any four of the following. Each question carries two marks.
$2 \times 4=8$
21. What amount of oxygen is liberated when 120 g of potassium chlorate undergoes thermal decomposition?
22. Write the relation between Kc and Kp . Give an example where $\mathrm{Kc}=\mathrm{Kp}$.
23. Write the molecular orbital configuration of $\mathrm{O}_{2}$.
24. Illustrate Hess's law with an example.
25. Write the electronic configuration of iron and copper.
26. Explain Friedel Craft's acylation of benzene.
27. Using suitable example explain hydrogenation of alkyne.
28. Calculate the oxidation number of Manganese in potassium permanganate.

## PART C

IV. Answer any four of the following. Each question carries three marks
29. a) Write the general outer electronic configuration of d-block elements
b) How does atomic radius vary across the period and down the group?
30. a) Write the Lewis dot structure of carbonate ion and sulphuric acid.
b) Give an example of a molecule which exhibits intramolecular hydrogen bonding.
31. Explain the formation of methane molecule based on hybridization.
32. Explain the formation of $\mathrm{H}_{2} \mathrm{O}$ molecule based on VSEPR theory.
33. Balance the redox reaction by half reaction method in basic medium
$\mathrm{I}^{-}(\mathrm{aq})+\mathrm{MnO}_{4}^{-}(\mathrm{aq}) \rightarrow \mathrm{MnO}_{2}(\mathrm{~s})+\mathrm{I}_{2}$
34. a) Calculate the wave number and frequency of a light wave with wave length 5800A
b) Define threshold frequency.
35. Mention any three postulates of Dalton's atomic theory.
36. Give any three differences between BMO and ABMO

## PART-D

V. Answer any four of the following. Each question carries five marks.
37. a) Calculate the molecular formula of a compound containing $4.07 \%$ hydrogen, $24.47 \%$ carbon and rest is chlorine, if molar mass of a compound is $98.96 \mathrm{~g} / \mathrm{mol}$.
b) Convert $27^{\circ} \mathrm{C}$ to degree Fahrenheit.
38. a) Explain emission spectrum of hydrogen and write the equation to calculate the wave number of spectral lines formed.
b) State Aufbau's principle.
39. a) Explain the formation of Nitrogen molecule based on MOT.
b) Write all possible values of 1 and $m$ if $n=2$.
40. a) Derive Ostwald dilution law for a weak acid .
b) What are buffer solutions? Give an example of basic buffer.
41. a) How do you determine internal energy change by Bomb calorimeter?
b) Mention two criterias for a process to be spontaneous.
42. a) Calculate the standard Enthalpy of formation of benzene. Given that enthalpy of combustion of carbon and hydrogen are $-393.5 \mathrm{kJmol}^{-1}$ and $-285.83 \mathrm{kJmol}^{-1}$ respectively.
b) State first law of thermodynamics and give its mathematical form.
43. a) What are homogeneous and heterogeneous equilibria? Give an example.
b) For a reaction $2 \mathrm{NOCl} \leftrightarrow 2 \mathrm{NO}+\mathrm{Cl}_{2}, \mathrm{Kc}$ is $3.75 \times 10^{-6}$ at 1069 K . Calculate Kp for the reaction
44. a) Explain the effect of temperature and pressure on equilibrium for the formation of ammonia in Haber's process.
b) Calculate the pH of 0.001 M KOH solution assuming it to undergo complete ionization at 25 C . (3+2)
VI. Answer any two of the following. Each question carries five marks
45. a) Write the principle and calculation involved in the estimation of nitrogen present in organic compound by Kjeldahl's method.
b) What is position isomerism? Give an example
46. a) Explain the mechanism of chlorination of methane.
b) Give any two differences between inductive and mesomeric effect.
47. a) Explain the formation of ethane by Kolbe's electrolysis method.
b) Give equation for the following conversions:
i) propene to 2-bromopropane
ii) benzene to chlorobenzene

