

Reg. No.

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Time : 3.00 hrs.

Half-Yearly Common Examination - 2019

Max. Marks : 70

CHEMISTRY

Instructions : 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately. 2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

Note : Draw diagrams and write equations wherever necessary.

PART - I

Note : (i) Answer all the questions.

15 x 1 = 15

(ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

- The empirical formula of glucose is
a) CH_2O b) CHO c) CH_2O_2 d) CH_3O_2
- The effective nuclear charge decreases with increase in.....quantum number.
a) Principal b) Azimuthal c) Magnetic d) Spin
- What would be the IUPAC name for an element with atomic number 111?
a) Ununillium b) Unununium c) Ununbium d) Ununtrium
- Water gas is : a) $\text{H}_2\text{O(g)}$ b) $\text{CO} + \text{H}_2\text{O}$ c) $\text{CO} + \text{H}_2$ d) $\text{CO} + \text{N}_2$
- Match the flame colours of the alkali and alkaline earth metal salts in the Bunsen Burner :
p) Sodium (1) Lilac
q) Calcium (2) Yellow
r) Barium (3) Brick red
s) Potassium (4) Apple green
a) p-2, q-3, r-4, s-1 b) p-3, q-4, r-1, s-2 c) p-4, q-1, r-2, s-3 d) p-1, q-2, r-3, s-4
- Assertion : Critical temperature of CO_2 is 304 K, it can be liquified above 304 K.
Reason : For a given mass of gas, volume is directly proportional to pressure at constant temperature.
a) Both assertion and reason are true and 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
- A process in which the pressure of the system remains constant during its change from initial to final state is known as : a) Isochoric process b) Isothermal process c) Cyclic process d) Isobaric process
- In a chemical equilibrium, the rate constant for the forward reaction is 2.5×10^2 and the equilibrium constant is 50. The rate constant for the reverse reaction is :
a) 11.5 b) 5 c) 2×10^2 d) 1×10^{-3}
- Which one of the following is incorrect for ideal solution?
a) $\Delta H_{\text{mix}} = 0$ b) $\Delta U_{\text{mix}} = 0$ c) $\Delta P = P_{\text{observed}} - P_{\text{calculated by Raoult's Law}} = 0$ d) $\Delta G_{\text{mix}} = 0$
- Shape of BrF_3 is a) Planar triangular b) Pyramidal c) T shaped d) Circular
- The simplest Ketone is
a) $\text{CH}_3 - \text{CH}_2 - \text{CO} - \text{CH}_3$ b) $\text{CH}_3 - \text{CO} - \text{CH}_3$ c) $\text{CH}_3 - \text{O} - \text{CH}_3$ d) $\text{CH}_3 - \text{COO} - \text{CH}_3$
- Write the decreasing order of +I effect.
a) $-\text{CH}_3 > -\text{CH}_2 > -\text{C}(\text{CH}_3)_2 > -\text{CH}(\text{CH}_3)$ b) $-\text{CH}_3 > -\text{CH}_2\text{CH}_3 > -\text{CH}(\text{CH}_3)_2 > -\text{C}(\text{CH}_3)_3$
c) $-\text{C}(\text{CH}_3)_3 > -\text{CH}(\text{CH}_3)_2 > -\text{CH}_2\text{CH}_3 > -\text{CH}_3$ d) $-\text{CH}(\text{CH}_3)_2 > -\text{CH}_2\text{CH}_3 > -\text{C}(\text{CH}_3)_3 > -\text{CH}_3$
-  is the bond line formula for :
a) 1 methyl 1 butane b) 2 methyl butane c) 1 methyl propane d) 2 methyl propane
- The name of $\text{C}_2\text{F}_3\text{Cl}_3$ is :
a) Freon - 112 b) Freon - 113 c) Freon - 114 d) Freon - 115
- Release of oxides of nitrogen and hydrocarbons into the atmosphere by motor vehicles is prevented by using : a) grit chamber b) scrubbers c) trickling filters d) catalytic convertors

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17,

period : IE increases

group : IE decreases

Reason

radius decreases in period

radius increases in

PART - II

Note : Answer any six of the following questions. Question no.24 is compulsory.

16. State Aufbau Principle.
17. How does the ionisation energy vary across a period and down a group?
18. Give the uses of Plaster of Paris.
19. Write the First Law of Thermodynamics.
20. Derive K_c value for dissociation of PCl_5 .
21. What are homologous series?
22. How is toluene prepared from benzene in the presence of anhydrous AlCl_3 ? Name the reagent and write the equation.
23. Why is ozone considered as earth's protective umbrella?
24. Draw the Lewis dot structure for nitric acid.

PART - III

Note : Answer any six of the following questions. Question no.33 is compulsory.

25. Write the differences between Oxidation and Reduction.
26. Give the postulates of Bohr's atomic model.
27. List the characteristic of internal energy.
28. State Henry's law.
29. Define Bond Order.
30. Identify the possible isomerism exhibited by $\text{C}_2\text{H}_6\text{O}$ with examples.
31. Write the electrophilic substitution reaction of benzene.
32. Convert chlorobenzene to : (i) Phenol (ii) Aniline
33. Calculate the effective nuclear charge of 4s electron in potassium.

PART - IV

Note : Answer all the questions.

34. a) (i) What is combination reaction? Give an example. (ii) State Modern Periodic Law.
b) (i) Energy of an electron in Hydrogen atom in ground state is -13.6 eV . What is the energy of an electron in the second excited state?
(ii) Write the mathematical expression for Gibb's free energy.
35. a) What are hydrides? Write the different types of hydrides with an example for each.
b) (i) How is washing soda prepared by Solvay process?
(ii) What are the conditions necessary for the spontaneity of a process?
36. a) (i) Derive Ideal gas equation. (ii) Why is chemical equilibrium considered dynamic in nature?
b) (i) Write K_p and K_c for the following reaction : $2\text{H}_2\text{O}(\text{g}) + 2\text{Cl}_2(\text{g}) \rightleftharpoons 4\text{HCl}(\text{g}) + \text{O}_2(\text{g})$
(ii) Define the term solubility and what are the factors that influence solubility?
37. a) (i) Write the characteristic of organic compound.
(ii) Write the IUPAC Name/Molecular formula for the first four members of alcohol. **(OR)**
b) (i) Give an example for Benzenoid compound and a non benzenoid compound.
(ii) Explain Inductive effect with suitable examples.
38. (i) Discuss the formation of Nitrogen molecule using Molecular Orbital Theory?
(ii) Write the structure and use of gamma-xylene. **(OR)**
b) (i) Name the reaction used to test primary amine? Write the complete balanced equation for the reaction.
(ii) Write the harmful effects of acid rain.