COMMON QUARTERLY EXAMINATION - SEPTEMBER 2019

Standard - 11

Reg. No. ☐☐☐☐☐☐

PART - III - CHEMISTRY

Time Allowed: 2.30 Hours

Maximum Marks: 70

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. **www.kalviexpress.in**

PART - I

Note: i) Answer all the questions.

15×1=15

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

1) Which one of the following represents 180g of water?
   a) 5 moles of water
   b) 6.022×10^{24} molecules of water
   c) $180 \times 6.022 \times 10^{23}$ molecules of water
   d) 90 moles of water

2) Which of the following compounds has/have percentage of carbon same as that in ethylene (C_2H_4)?
   a) Propene   b) Ethyne   c) Benzene   d) Ethane

3) Match the following:
   A. $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$ -   1. Heisenberg's uncertainty principle
   B. $1s < 2s < 2p < 3s < 3p$ -   2. Hund's Rule
   C. $n = 1 \; \ell = 1 \; m = 0 \; s = \pm\frac{1}{2}$ -   3. Aufbau principle
   D. $\Delta x . \Delta p \geq h/4\pi$ -   4. Pauli's exclusion principle

	A	B	C	D		A	B	C	D
a)	2	3	4	1	b)	2	1	4	3
c)	3	1	2	4	d)	3	2	1	4

4) How many electrons in an atom with atomic number 30 can have $(n+\ell) = 4$?
   a) 5   b) 6   c) 7   d) 8

5) A certain third period element has the following successive values of ionization energies in $K.J. \, mol^{-1}$

IE_1	IE_2	IE_3	IE_4	IE_5
786	580	3230	4360	16100

   the element is

   a) Carbon   b) Nitrogen   c) Aluminium   d) Silicon

6) Which of the following order of ionic radii is

    a) $H^- > H^+ > H$ b) $Na^+ > F^- > O^{2-}$

    c) $F > O^{2-} > Na^+$ d) None of these

7) The cause of permanent hardness of water is due to

    a) $Ca(HCO_3)_2$ b) $Mg(HCO_3)_2$

    c) $CaCl_2$ d) $MgCO_3$

8) Water is a

    a) Basic oxide   b) Acidic oxide

    c) Amphoteric oxide   d) None of these

9) The suspension of slaked lime in water is known as

    a) Lime water   b) Quick lime

    c) Milk of lime   d) Aqueous solution of slaked lime

10) The alkali metal used in devising photo electric cell is

    a) Caesium   b) Lithium   c) Sodium   d) Magnesium

11) If the temperature and volume of an ideal gas is increased by twice its value, the initial pressure P becomes

    a) 4P   b) 2P   c) P   d) 3P

12) Equal moles of hydrogen and oxygen gases are placed in a container with a pin hole through which both can escape. What fraction of oxygen escapes in the time required for one half of the hydrogen to escape?

    a) $\frac{3}{8}$ b) $\frac{1}{2}$ c) $\frac{1}{8}$ d) $\frac{1}{4}$

13) An ideal gas expands from the volume of $1 \times 10^{-3} \ m^3$ to $1 \times 10^{-2} \ m^3$ at 300K against a constant pressure at $1 \times 10^5 \ Nm^{-2}$, the work done is

    a) −900J   b) 900KJ   c) 270KJ   d) −900KJ

14) Which of the following is not a thermodynamic function?

    a) Internal energy   b) Enthalpy

    c) Entropy   d) Frictional energy

15) **Assertion** : Alkali metals act as good reducing agents.

    Reason : Alkali metals have higher ionization energies.

    a) Assertion is true but Reason is false.

    b) Both Assertion and Reason are true.

    c) Assertion is false but Reason is true.

    d) Both Assertion and Reason are false.

PART - II

Answer any six questions and Question No. 24 is compulsory: 6×2=12

16) Define Equivalent mass.

17) Give the electronic configuration of Mn^{2+} and Cr^{3+} ions.

18) Compare the fist ionization energies of Carbon and Boron and give reason.

19) Mention the uses of heavy water.

20) Why sodium hydroxide is much more water soluble than sodium chloride?

21) State Dalton's law of partial pressure.

22) What is the density of N_2 gas at 227ºC and 5 atm pressure?
(R–0.0821 L.atm.K^{-1} mol^{-1})

23) State third law of thermodynamics.

24) Calculate the no of moles of Ethane required to produce 44g of $CO_{2(g)}$ after combustion.

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PART - III

Answer any six questions and Question No. 33 is compulsory: **6×3=18**

25) $X_2+3Y_2 \rightarrow 2XY_3$ In this reaction 2 moles of X_2 and 4.5 moles of Y_2 react to give products. Which is the limiting agent and calculate the no. of moles of X_2, Y_2 and XY_3 in the reaction mixture?

26) Explain briefly the time independent Schrodinger wave equation.

27) What are iso electronic ions? Give examples.

28) Write short notes on Ortho and Para hydrogen.

29) How is plaster of paris prepared? Give one use.

30) Why do alkali metals give different colours when heated in bunsen flame?

31) Derive the relationship between C_p and C_v for an ideal gas.

32) State Hess's law of constant heart summation.

33) A gas contained in a cylinder fitted with a frictionless piston expands against a constant external pressure of 1 atm from a volume of 5 litre to a volume of 10 litres. In doing so it absorbs 400J of thermal energy from its surroundings. Determine the change in internal energy of system.

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PART - IV

Answer all the questions.   **5×5=25**

34) a) i) Calculate the oxidation states of oxygen in H_2O_2 and KO_2.

ii) Derive De-Broglie equation.

(OR)

b) i) Calculate the total number of radial nodes and angular nodes present in 4d and 5f orbitals.

       ii) Write the descending order of electron releasing tendencies of the Zn, Cu and Ag metals. Arrange the metals Zn, Cu and Ag in the descending order of their electron releasing tendency.

35) a) i) State Modern periodic law.

       ii) Define effective nuclear charge. Arrange s, p, d and f orbitals in the decending order of their effective nuclear charge.

(OR) www.kalviexpress.in

     b) i) Explain diagonal relationship.

       ii) NH_3 has exceptionaly high melting and boiling point as compared to those of hydrides of remaining elements of 15th group? Explain.

36) a) i) Explain the exchange reaction of Deuterium.

   ii) Write notes on interstitial hydrides.

(OR)

     b) i) Write briefly the biological importance of Calcium.

       ii) Write Graham's diffusion law.

37) a) i) It takes 192 sec for an unknown gas to diffuse through a porous vessel and 84 sec for N_2 gas to effuse at the same temperature and pressure. What is the molar mass of the unknown gas?

       ii) Define compressibility factor Z.

(OR)

     b) i) State Zeroth law of thermodynamics.

       ii) Write Kelvin plank statement of second law of thermodynamics.

38) a) i) Calculate the empirical and molecular formula of the compound containing 80% Carbon, 20% Hydrogen. If the molecular mass of the compound is 30 then determine the molecular formula.

       ii) Balance the following equation by using oxidation number method.

$$Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO_2 + H_2O$$
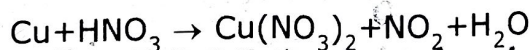
(OR) www.kalviexpress.in

     b) Calculate the lattice energy of formation of NaCl from the following data:

$Na_{(s)} + \frac{1}{2}Cl_{2(g)} \rightarrow NaCl_{(s)}$ $\Delta H_f = -411.3$ KJ.mol^{-1}

Heat of sublimation of $Na_{(s)}$ =   108.7 KJ.mol^{-1}

Ionisation energy of $Na_{(g)}$ =   495.0 KJ.mol^{-1}

Dissociation energy of $Cl_{2(g)}$ =   244 KJ.mol^{-1}

Electron affinity of $Cl_{(g)}$ =   −349.0 KJ.mol^{-1}

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