

Second Term Evaluation - 2025

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Grade

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Subject

Chemistry I

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2 Hrs

Time

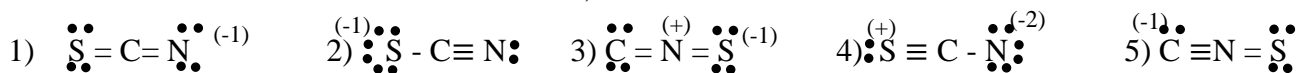
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Name**

- 4) $D < C < A < B$
- 5) $C < D < A < B$

- (7) The correct order of the shapes of IO_2F_2^+ , SFNO , ClF_3O , BrF_3O_2 are
- 1) tetrahedral, trigonal pyramidal, octahedral, square pyramidal
 - 2) tetrahedral, trigonal planar, distorted tetrahedral, trigonal bipyramidal
 - 3) square pyramidal, trigonal pyramidal, pentagonal bipyramidal, trigonal bipyramidal
 - 4) square pyramidal, trigonal planar, octahedral, trigonal bipyramidal
 - 5) see-saw, trigonal planar, octahedral, distorted tetrahedral

- (8) The correct stable Lewis structure for SCN^- is,



- (9) The increasing order of first ionization energy is,

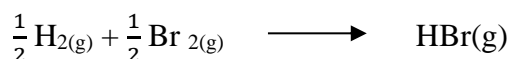
(A) He (B) Na (C) Li (D) Be (E) B

- 1) $\text{B} < \text{C} < \text{E} < \text{D} < \text{A}$
- 2) $\text{C} < \text{B} < \text{D} < \text{E} < \text{A}$
- 3) $\text{C} < \text{B} < \text{D} < \text{A} < \text{E}$
- 4) $\text{E} < \text{C} < \text{D} < \text{B} < \text{A}$
- 5) $\text{E} < \text{B} < \text{C} < \text{D} < \text{A}$

- (10) The element that have the highest ability to gain first electron is,

- 1) C
- 2) N
- 3) Be
- 4) S
- 5) F

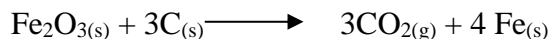
- (11) The bond energies of $\text{H}-\text{H}$, $\text{Br}-\text{Br}$, $\text{H}-\text{Br}$ are 435, 181, 364 kJ mol^{-1} respectively.



The enthalpy change of the reaction is (kJ mol^{-1})

- 1) +112
- 2) +56
- 3) -56
- 4) -112
- 5) -252

- (12) Pure Fe is obtained by heating hematite (Fe_2O_3) with C. The balanced equation is,



A mass of 3.2 g of $\text{Fe}_2\text{O}_{3(\text{s})}$ and 0.6 g of C were mixed and heated vigorously. The maximum amount of Fe(s) can be obtained is,

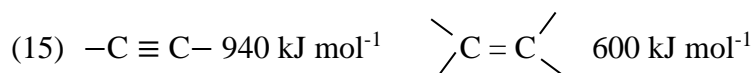
- 1) 1.12 g
- 2) 2.24 g
- 3) 1.68 g
- 4) 3.73 g
- 5) 0.93 g

- (13) Consider $\text{H}_2\text{C}_2\text{O}_{4(\text{aq})}$ and KMnO_4 reaction, in presence of dil H_2SO_4 . The stoichiometric ratio of between each compound is,

	$\text{KMnO}_{4(\text{aq})}$	$\text{H}_2\text{C}_2\text{O}_{4(\text{aq})}$	$\text{H}^+_{(\text{aq})}$
1)	2	5	3
2)	2	5	6
3)	2	4	6
4)	2	5	8
5)	2	5	16

- (14) In the reaction of AlCl_3 with NH_3 , the spatial arrangement around Al changes to

- 1) Trigonal pyramidal to tetrahedral
- 2) Tetrahedral to trigonal bipyramidal
- 3) Trigonal planar to tetrahedral
- 4) Linear to angular
- 5) Trigonal pyramidal to distorted tetrahedral.



The bond energy of $\begin{array}{c} | \\ -C - C- \\ | \end{array}$ in kJ mol^{-1} is,

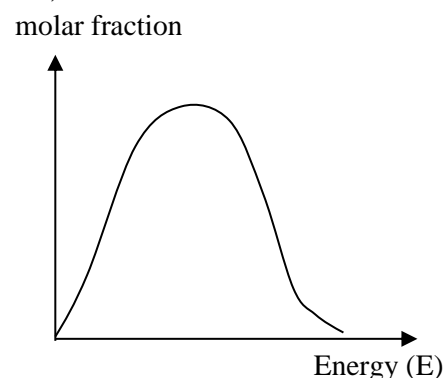
- 1) 280 2) 320 3) 330 4) 380 5) 400

- (16) When reactants A and B were mixed in a beaker, the temperature of the system increases with a spontaneous reaction. ΔG , ΔH and ΔS values can be,

	ΔG	ΔH	ΔS
1)	(+)	(+)	(+)
2)	(-)	(+)	(+)
3)	(-)	(-)	(-)
4)	(+)	(-)	(+)
5)	(+)	(+)	(-)

- (17) The kinetic energy distribution of a certain gas in a container in given temperature is given below. If the number of molecules in the system is doubled, the graph changes as,

	Area under the curve	position of maximum point
1)	Not Changed	Not Changed
2)	Increases	Not Changed
3)	doubled	Above to the initial situation
4)	Increased	Shift to right
5)	Increased	Shift to left



- (18) The percentage purity of commercial CH_3COOH sample is 30% and the density is 1.2 g cm^{-3} . 50 cm^3 volume of, 10 mol dm^{-3} KOH solution which is diluted up to 300 cm^3 is used to neutralize 20 cm^3 of CH_3COOH solution, The burette reading is (cm^3)

- 1) 12 2) 20 3) 30 4) 36 5) 72

- (19) CH_3OH converts HCOOH in acidic oxidation. The oxidation number of C changes from.

- 1) 0 to (+4) 2) (-2) to (+2) 3) (-1) to (+3) 4) (-2) to (+3) 5) (-4) to (+4)

- (20) The gas composition of atmospheric air is 80% N_2 and 20% O_2 . The mean molar mass of atmosphere is,

- 1) 28.8 2) 30 3) 29.6 4) 29 5) 31

- (21) The amphoteric compound is,

- 1) NaOH 2) P_2O_5 3) Al_2O_3 4) K_2SO_4 5) $\text{CH}_3\text{-COOH}$

- (22) The number of possible resonance structures in NO_2^+ is,

- 1) 1 2) 2 3) 3 4) 4 5) 5

- (23) A volume of 100 cm^3 of 1 mol dm^{-3} NaOH solution was diluted up until the volume is doubled. 1 mol dm^{-3} H_2SO_4 was added to the solution up to 250 cm^3 total volume. The final H^+ concentration of the solution is,

- 1) 0.2 mol dm^{-3} 2) 0.24 mol dm^{-3} 3) 0.25 mol dm^{-3} 4) 0.26 mol dm^{-3} 5) $0.233 \text{ mol dm}^{-3}$

(24) H^+ concentration of the solution prepared by mixing HCl , HNO_3 and H_2SO_4 volumes of solution below.

(40 cm^3 of 0.3 $mol\ dm^{-3}$, 30 cm^3 of 0.2 $mol\ dm^{-3}$ and 30 cm^3 of 0.1 $mol\ dm^{-3}$ respectively)

- 1) 0.20 2) 0.24 3) 0.25 4) 0.26 5) 0.233

(25) A, B, C are non consecutive elements in the same short period. D, E and F are oxides of above elements. The reactivity of D, E, F with H_2O , dil $HCl_{(aq)}$ and dil $NaOH_{(aq)}$ are given below.

	$H_2O_{(l)}$	dil HCl	dil $NaOH$
D	not react	react	react
E	react	react	not react
F	not react	not react	react

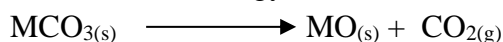
The order of three element in the period is,

- 1) A, B, C 2) B, A, C 3) C, A, B 4) B, C, A 5) C, B, A

(26) The gas molecules of ideal gas A move at mean speed V at $27^\circ C$. The temperature, that mean speed become $2V$ is ($^\circ C$)

- 1) 54 2) 427 3) 600 4) 927 5) 1200

(27) The standard Gibbs free energy for below reaction at 500 K and 1000 K is given below.,



T K ΔG° ($kJ\ mol^{-1}$)

500 -62.6

1000 -88.6

The standard entropy changes of reaction is,

- 1) 532 2) 266 3) 53.2 4) 26.6 5) 32.2

(28) When 2.3 g of C_2H_5OH is completely combusted, the emitted heat energy increases the temperature of 600 g of water from $27^\circ C$ to $35^\circ C$. The specific heat capacity of water is $4200\ J\ kg^{-1}\ K^{-1}$. The standard combustion enthalpy of C_2H_5OH is (in $kJ\ mol^{-1}$) (C = 12, O = 16, H = 1),

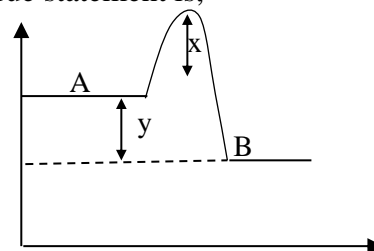
- 1) 241.2 2) 403 3) 4032 4) 120.6 5) 603.0

(29) When m_1 g $NaCl$, m_2 g $BaCl_2$, m_3 g $AlCl_3$ are dissolved in 100 cm^3 volume of water and 25 cm^3 of that solution was added in to excess $AgNO_3$. The obtained mass of $AgCl_{(s)}$ was m_4 g. If the molar masses of $NaCl$, $BaCl_2$, $AlCl_3$ and $AgCl$ are M_1 , M_2 , M_3 , M_4 respectively, the value of m_4 is,

- 1) $\left(\frac{m_1}{M_1} + \frac{m_2}{M_2} + \frac{m_3}{M_3}\right)$ 2) $\left(\frac{m_1}{M_1} + \frac{m_2}{M_2} + \frac{m_3}{M_3}\right) \times \frac{25}{100} \times M_4$
 3) $\left(\frac{m_1}{M_1} + \frac{m_2 \times 2}{M_2} + \frac{m_3}{M_3} \times 3\right)$ 4) $\left(\frac{m_1}{M_1} + \frac{m_2 \times 2}{M_2} + \frac{m_3 \times 3}{M_3}\right) M_4$
 5) $\left(\frac{m_1}{M_1} + \frac{m_2 \times 2}{M_2} + \frac{m_3 \times 3}{M_3}\right) \frac{25}{100} \times M_4$

(30) The energy diagramme for $A_{(g)} \longrightarrow B_{(g)}$ is given below. The true statement is,

- 1) The activation energy of forward reaction is Y.
 2) The enthalpy change of this reaction is $\Delta H > 0$.
 3) The most stable compound is B among A and B.
 4) The enthalpy change of the reaction is X.
 5) The activation energy of $B \longrightarrow A$ is X.



- To answer to the questions from (30) to (40), follow the guideline given in the table below.

1	2	3	4	5
a, b are correct	b, c are correct	c, d are correct	a, d are correct	Any other choice are correct

(31) The exothermic reaction/reactions is / are,

- $\text{CaCO}_{3(s)} \longrightarrow \text{CaO}_{(s)} + \text{CO}_{2(g)}$
- $\text{Cl}_{(g)}^- + e \longrightarrow \text{Cl}_{(g)}^{2-}$
- $\text{NaOH}_{(s)} \xrightarrow{\text{H}_2\text{O}_{(l)}} \text{NaOH}_{(aq)}$
- $\text{Na}^+_{(g)} + \text{Cl}^-_{(g)} \longrightarrow \text{NaCl}_{(s)}$

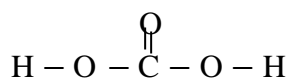
(32) The true statement/statements of lattice is/are,

- The most strong lattice is non- polar molecular lattice.
- Graphite has atomic lattice although it conduct electricity.
- Diamond has a 3D lattice.
- The strength of ionic lattice depends on polarity and polarizability.

(33) The true statment / statements on square root velocity of an ideal gas is/are.

- directly proportional to absolute temperature.
- Inversly proportional to molar mass
- Inversly proportional to volume of the system.
- Directly proportional to pressure of the system.

(34) True statement/ statements on given molecule is are,



- all O atoms are in a same plane.
- C atom has sp^3 hybridization.
- The bond angle around O, bonded with C is 104° .
- The O atom bonded with C and H is angular.

(35) Which of those chemical relationship/ relationships are correct?

- $2 \times \Delta H_{neu}^\circ (\text{HCl}_{(aq)}) = \Delta H_{neu}^\circ (\text{H}_2\text{SO}_{4(aq)})$
- $\Delta H_D^\circ (\text{Cl}_{2(g)}) = 2 \times \Delta H_f^\circ (\text{Cl}_{(g)})$
- $\Delta H_s^\circ (\text{Na}_{(s)}) = \Delta H_f^\circ (\text{Na}_{(g)})$
- $\Delta H_c^\circ (\text{C}_{(s)}) = \Delta H_{(f)}^\circ (\text{CO}_{2(g)})$

(36) The line/ lines in visible range in H emission spectrum is /are?

- $n = 2 \longrightarrow n = 1$
- $n = 5 \longrightarrow n = 2$
- $n = 3 \longrightarrow n = 2$
- $n = 3 \longrightarrow n = 1$

(37) $\text{N}_2\text{H}_6\text{O}_{(aq)} + \text{IO}_3^-_{(aq)} + 2\text{H}^+_{(aq)} + \text{Cl}^-_{(aq)} \longrightarrow \text{N}_{2(g)} + \text{ICl}_{(aq)} + 4\text{H}_2\text{O}_{(l)}$

Consider above reaction

- The oxidation state of IO_3^- changes from +5 to +1
- The oxidation state of $\text{N}_2\text{H}_6\text{O}$ changes from -2 to 0
- The oxidation state of Cl^- changes from -1 to +1
- I in IO_3^- is oxidized in this reaction.

(38) The iso electronic species to CO_3^{2-} is/are,



(39) The element form nitride in heating in the air is,

a. K

b. Ca

c. Li

d. Al

(40) The element with $(4, 0, 0, +\frac{1}{2})$ as set of quantum numbers for the last electron is,

a. Ga

b. Cu

c. Ca

d. Fe^{3+}

• **Instructions for (41) – (50.)**

- **In question Nos. 41 to 50 two statements are given in respect of each question. From the table given below, select the response out of the responses (1), (2), (3), (4) and (5) that best fits the two statements and mark appropriately on your answer sheet.**

Response	First statement	Second statement
(1)	True	True and correctly explain the first statement
(2)	True	True, but does not explain the first statement correctly.
(3)	True	False
(4)	False	True
(5)	False	False

	First Statement	Second Statement
(41)	The boiling point of H_2O is higher than HF	The most strong dipole dipole interaction is H bond.
(42)	The molecular speed distribution of a certain gas takes same shape at constant temperature.	Although the speed of a gas molecule in gaseous system changes with the time in the constant temperature, the mean speed distribution of the system remains same.
(43)	Molarity, molality and mole fraction are also terms of concentration of a mixture.	The terms used to express the composition is called terms of concentration.
(44)	H can be oxidized but can be not reduced.	H_2 oxidized in to HCl, when reacts with Cl_2
(45)	The molar neutralization enthalpy NaOH doesn't depend on acid used.	NaOH is completely ionized since it is a strong base.
(46)	If the temperature and pressure are constant, ideal and real gases have equal number of moles in equal volumes.	In standard pressure and temperature, the molar volume of any real or ideal gas is 22.4 dm^3
(47)	O-O bond lengths of O_3 are equal	In the stable structure of O_3 , two double bonds exists between O-O.

