Quiz Questions — olympiad2026

Q1.

Quiz Fill In The Blanks Questions

Assume that you are using a heating coil of 100 W power in your room in winter (temperature of room is 273 K). To increase the temperature of the room by 30 K, you need to run the coil for _____ minutes. Assume your room as a perfect closed system; volume of room is 10 m^3; the room has only O_2 and N_2 gases. Use the following values, density of air is 1.16 $kg.m^{-3}$; universal gas constant, R is 8 $J.mol^{-1}.K^{-1}$; average molar mass of air in the room is 29 $g.mol^{-1}$.

Correct Answer: Lower Limit: 39.98 Upper Limit: 40.02

Score: 4 **Negative Score:** 0

Q2.

Quiz Fill In The Blanks Questions

At 500 K, the equilibrium constant K_p for the reaction below is 1660.

If we start with 1 mole of $N_2O_4\,(g)$ at 500 K in a 1 litre container, the number of moles of $NO_2\,(g)$ at equilibrium is _____ (rounded to two decimal places). Assume: N_2O_4 and NO_2 behave as ideal gases at 500 K.

Use ideal gas constant R = 0.083 $bar.L.mol^{-1}.K^{-1}$ and √35 = 5.92, if required.

Correct Answer: Lower Limit: 1.82 Upper Limit: 1.86

Score: 4 **Negative Score:** 0

Q3.

Quiz Fill In The Blanks Questions

All the carbon dioxide released upon the complete combustion of 156 g of benzene, is reacted with CH_3MgBr for preparing acetic acid. The amount of acetic acid obtained is _____ g.
[given that the atomic masses (in amu) are: C 12; O 16; H 1]

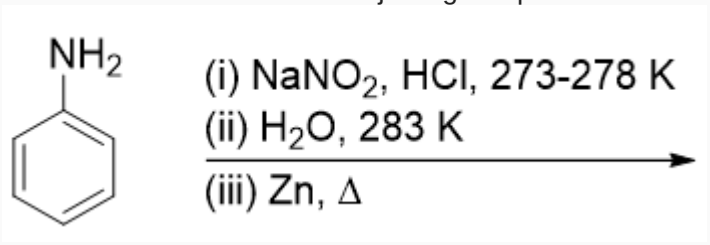
Correct Answer: Lower Limit: 719 Upper Limit: 721

Score: 4 **Negative Score:** 0

Q4.

Quiz Fill In The Blanks Questions

The molecular mass of the major organic product of the following reaction sequence is _____.



[given that the atomic masses (in amu) are: C 12; O 16; N 14; Cl 35.5; H 1]

Correct Answer: Lower Limit: 77 Upper Limit: 79

Score: 4 **Negative Score:** 0

Q5.

Quiz Fill In The Blanks Questions

Consider the following complexes: $[MnCl_6]^{3-}$, $[MnBr_4]^{2-}$, $[FeF_6]^{3-}$, $[Co(C_2O_4)_3]^{3-}$, $[CoF_6]^{3-}$
(Atomic numbers: Mn = 25, Fe = 26, Co= 27)
The total sum of the number of unpaired electrons present in all these complexes is _____.

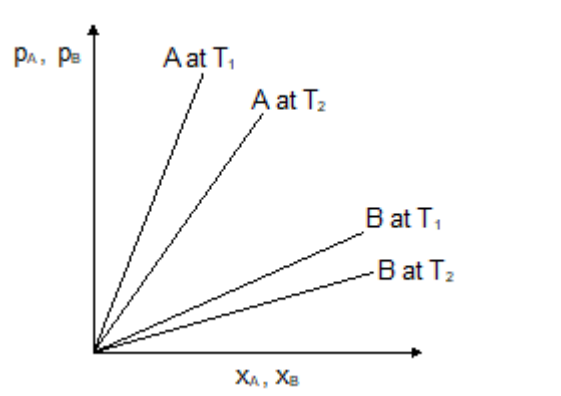
Correct Answer: Lower Limit: 17.99 Upper Limit: 18.01

Score: 4 **Negative Score:** 0

Q6.

Quiz Multichoice Questions

The graph below shows the partial pressures (p_A, p_B) of two pure gases A and B above their respective solutions in water at two different temperatures T_1 and T_2, as a function of their respective mole fractions (X_A, X_B) in the solution. If one of the gases is oxygen and the other is nitrogen, then, the correct statement(s) is(are)



1. The Henry's constant of A is greater than that of B. **(correct)**

2. A is more soluble in water than B.

3. The temperature T_1 is greater than temperature T_2. **(correct)**

4. A is oxygen and B is nitrogen.

Score: 4 **Negative Score:** 1

Q7.

Quiz Multichoice Single Answer Questions

If an enzyme specifically cleaves β-1,4-glycosidic linkages, which of the following carbohydrates are cleaved by this enzyme?

1. Starch

2. Cellulose **(correct)**

3. Lactose

4. Sucrose

Score: 4 **Negative Score:** 1

Q8.

Quiz Multichoice Questions

The **CORRECT** statement(s) about lanthanoid elements or their compounds is (are)
(Atomic numbers: La = 57, Ce = 58, Eu= 63, Gd = 64, Yb = 70]

1. La^{3+} and Yb^{2+} are diamagnetic in nature. **(correct)**

2. Eu and Yb exhibit both +2 and +3 oxidation states. **(correct)**

3. Eu has lower third ionization enthalpy than Gd.

4. Ceric ammonium nitrate is a strong oxidant. **(correct)**

Score: 4 **Negative Score:** 1

Q9.

Quiz Multichoice Questions

One mole of a complex with the molecular formula $Cr(H_2O)_5ClBr_2$ gave a Van't Hoff factor of 2 in water. Assume complete dissociation of the complex in water. What is/ are the correct structural formula of this complex?

1. $[Cr(H_2O)_5Cl]Br_2$

2. $[Cr(H_2O)_4ClBr]Br•H_2O$ **(correct)**

3. $[Cr(H_2O)_4Br_2]Cl•H_2O$ **(correct)**

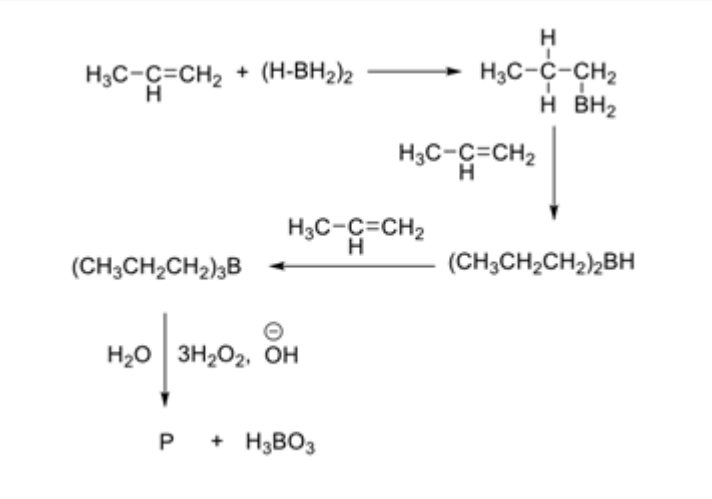
4. $[Cr(H_2O)_6Br]BrCl$

Score: 4 **Negative Score:** 1

Q10.

Quiz Multichoice Questions

1.0 mmol of diborane (B_2H_6) reacts with an excess of propene as shown in the scheme below. Determine which of the following statements(s) is (are) correct.



Atomic mass (amu): C = 12.0, H = 1.0, O = 16.0, B = 10.0.

1. The reaction produces 6.0 mmol of product P. **(correct)**

2. The molar mass of product P is 60.0 $g.mol^{-1}$. **(correct)**

3. The amount of product P obtained is 360.0 mg. **(correct)**

4. 1.0 mmol of boric acid (H_3BO_3) is formed as a byproduct.

Score: 4 **Negative Score:** 1

Q11.

Quiz Multichoice Questions

List I gives reactions, list II gives products and list III gives some observations about the reactions/ products. Match each entries in list I to appropriate entries in list II and list III and choose the correct options.

List I	List II	List III
(W) Reaction of aniline with chloroform and KOH.	**(i)** C_6H_5COONa and CO_2	**(P)** Orange coloration/dye
(X) Electrophilic aromatic substitution of a weak electrophile on an activated phenoxide ring at pH 9.	**(ii)** C_6H_5NC	**(Q)** Brisk effervescence
(Y) Reaction between a benzoic acid and sodium bicarbonate.	**(iii)** CHI_3	**(R)** Foul, pungent odor
(Z) Base catalysed iodination of methyl ketone.	**(iv)** *p*-$HOC_6H_4N{=}NC_6H_5$	**(S)** Yellow precipitate

Which of the following option(s) represents the correct set of matches?

1. **W**-(ii)-(R); **X**-(iv)-(P); **(correct)**

2. **Y**-(i)-(Q); **Z**-(iii)-(S) **(correct)**

3. **X** -(ii)-(P); **Y**-(iii)-(Q);

4. **Y**-(iv)-(S); **Z**-(iii)-(Q)

Score: 4 **Negative Score:** 1

Q12.

Quiz Multichoice Single Answer Questions

The pair of ions, in which both are paramagnetic and have a bond order of one, is/ are

1. B_2^{2+} and F_2^{2+}

2. $O_2^{2+}$and C_2^{2-}

3. Li_2^{2-} and N_2^{2+}

4. Be_2^{2-} and C_2^{2+} **(correct)**

Score: 4 **Negative Score:** 1

Q13.

Quiz Multichoice Single Answer Questions

The metallic character of the elements Mg, K, Ge, and Be follows the order of

1. Ge < Be < Mg < K **(correct)**

2. Ge < K< Mg < Be

3. K < Be < Mg < Ge

4. Be < Ge < Mg < K

Score: 4 **Negative Score:** 1

Q14.

Quiz Multichoice Single Answer Questions

$CaCl_2$ salt is added to water to lower the freezing temperature. The maximum decrease in freezing temperature that can be achieved using $CaCl_2$ is 27.9 degrees. Assume complete dissociation of $CaCl_2$ in water. The solubility of $CaCl_2$ in water in terms of grams of $CaCl_2$ in 100 ml of water is closest to
Use the following information:
The cryoscopic constant of water is 1.86 $K.kg.mol^{-1}$ and its density is 1.00 $g.ml^{-1}$.
Atomic masses in $g.mol^{-1}$: Ca : 40.0 ; Cl: 35.5

1. 39.5

2. 55.5 **(correct)**

3. 11.1

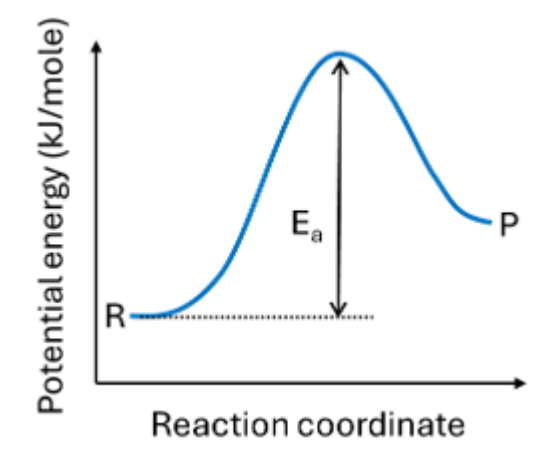
4. 111.0

Score: 4 **Negative Score:** 1

Q15.

Quiz Multichoice Single Answer Questions

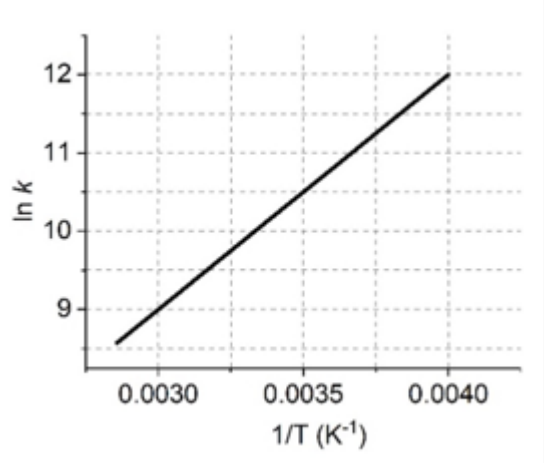
Consider a chemical reaction in which the reactant (R) is converted to product (P). The potential energy versus reaction coordinate plot for this reaction is shown in the figure below. The activation energy, $\mathbf{E_a}$, for this reaction is 2.49 kJ.mol^{-1}.



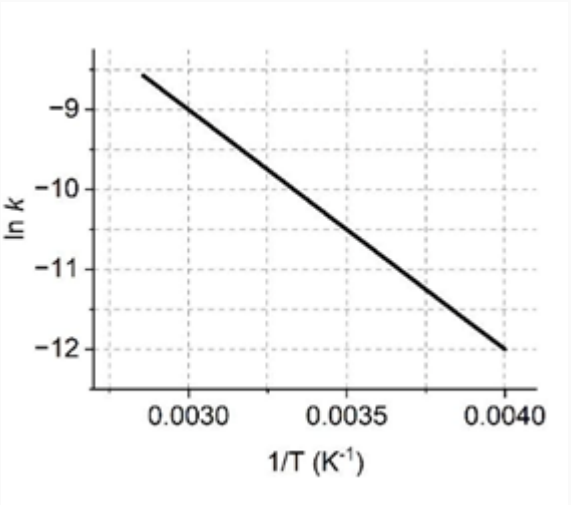
If k is rate constant and T is temperature, the plot below that best illustrates the relation between $ln\ k$ and $1/T$ is

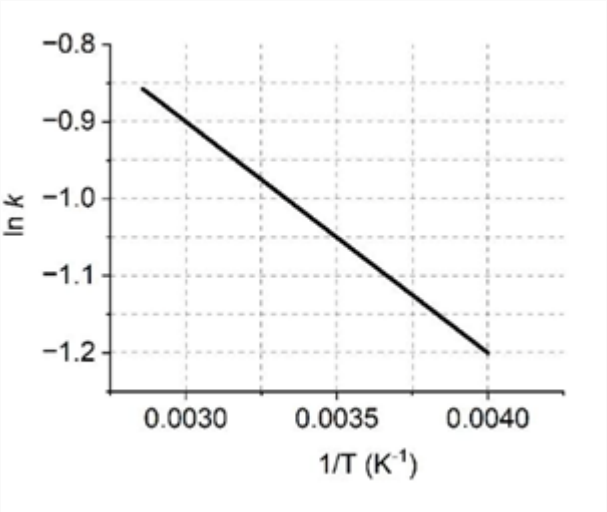
(Use universal gas constant, R = 8.3 J.K^{-1}.mol^{-1})

1.

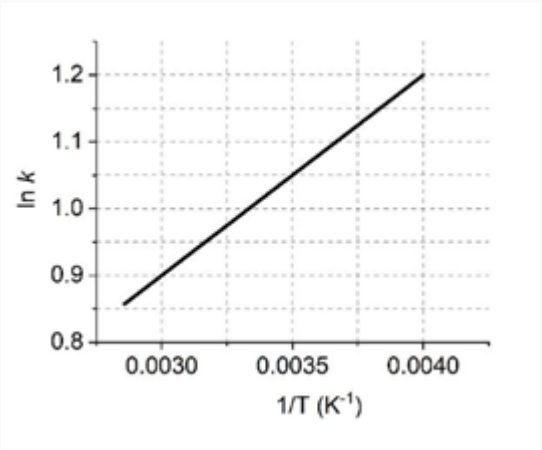


2.



3. 

(correct)

4. 

Score: 4 **Negative Score:** 1