



CHEMISTRY

BOOKS - MTG CHEMISTRY (BENGALI ENGLISH)

QUESTION PAPER 2019

Chemistry Category I

1. In the equilibrium $H_2 + I_2 \rightleftharpoons 2HI$, if at a given temperature the concentrations of the

reactants are increased, the value of the equilibrium constant, K_c . will

A. Increase

B. Decrease

C. Remain the same

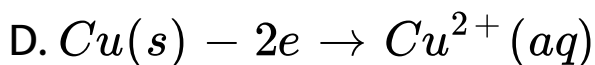
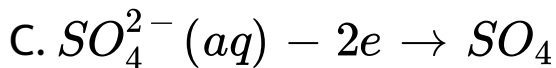
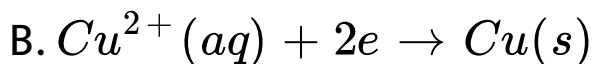
D. Cannot be predicted with certainty

Answer:



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2. If electrolysis of aqueous $CuSO_4$ solution is carried out using Cu-electrodes, the reaction taking place at the anode is:



Answer:



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3. Which one of the following electronic arrangements is absurd ?

A. $n=3, l=1, m=-1$

B. $n=3, l=0, m=0$

C. $n=2, l=0, m=-1$

D. $n=2, l=1, m=0$

Answer:



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4. The quantity $h\nu / k_B$ corresponds to

A. Wavelength

B. Velocity

C. Temperature

D. Angular momentum

Answer:



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5. In the crystalline solid $MSO_4 \cdot nH_2O$ of molar mass 250 gmol^{-1} , the percentage of anhydrous salt is 64 by weight. The value of n is

A. 2

B. 3

C. 5

D. 7

Answer:



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6. At S.T.P. the volume of 7.5 g of a gas is 5.6 L.

The gas is:

A. NO

B. N_2O

C. CO

D. CO_2

Answer:



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7. The half - life period of ${}_{53}\text{I}^{125}$ is 60 days. The radioactivity after 180 days will be

A. 25 %

B. 12.5 %

C. 33.3 %

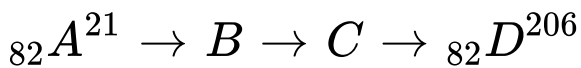
D. 3.0 %

Answer:



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8. Consider the radioactive disintegration:



The sequence of emission can be:

A. β, β, β

B. α, α, β

C. β, β, γ

D. β, β, α

Answer:



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9. The second Ionisation Energy of the following-elements follows the order:

A. $Zn > Cd < Hg$

B. $Zn > Cd > Hg$

C. $Cd > Hg > Zn$

D. $Zn < Cd < Hg$

Answer:



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10. The melting points of (i) $BeCl_2$ (ii) $CaCl_2$ and (iii) $HgCl_2$ follows the order

A. $I < ii < iii$

B. $iii < I < ii$

C. $I < iii < ii$

D. $ii < I < iii$

Answer:



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11. Which of these species will have non-zero magnetic moment ?



Answer:



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12. The first electron affinity of C, N and O will be of the order

A. $C < N < O$

B. $N < C < O$

C. $C < O < N$

D. $O < N < C$

Answer:



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13. The H - N - H angle in ammonia is 107.6° , while the H - P - H angle in phosphine is 93.5° . Relative to phosphine, the p-character of the lone pair on ammonia is expected to be:

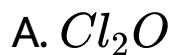
- A. Less
- B. More
- C. Same
- D. Cannot be predicted

Answer:



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14. The reactive species in chlorine bleach is:



Answer:



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15. The conductivity measurement of a coordination compound of Cobalt (III) shows that it dissociates into 3 ions in solution. The compound is:

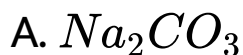
- A. Hexaamminecobalt(III) chloride
- B. Pentaamminesulphatocobalt(III) chloride
- C. Pentaamminechloridocobalt(III) sulphate
- D. Pentaamminechloridocobalt(IV) chloride

Answer:



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16. In the Bayer's process, the leaching of alumina is done by using:

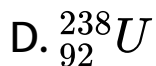
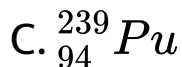
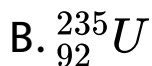
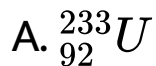


Answer:



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17. Which atomic species cannot be used as a nuclear fuel ?

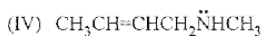
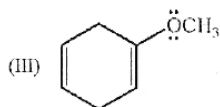
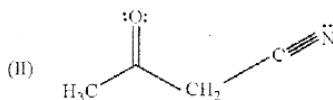
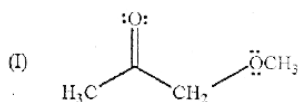


Answer:



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18. The molecule/molecules that has/have delocalised lone pair(s) of electrons is/are:



A. I, II and III

B. I, II and IV

C. I and III

D. only III

Answer:



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19. The conformations of n-butane, commonly known as eclipsed, gauche and anti-conformations can be interconverted by:

A. rotation around C-H bond of a methyl group

B. rotation around C-H bond of a methylene group

C. rotation around C1-C2 linkage

D. rotation around C2-C3 linkage

Answer:



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20. The correct order of the addition reaction rates of halogen acids with ethylene is:

A. hydrogen chloride \gt hydrogen bromide
 \gt hydrogen iodide

B. hydrogen iodide \gt hydrogen bromide \gt
hydrogen chloride

C. hydrogen bromide > hydrogen chloride

> hydrogen iodide

D. hydrogen iodide > hydrogen chloride >

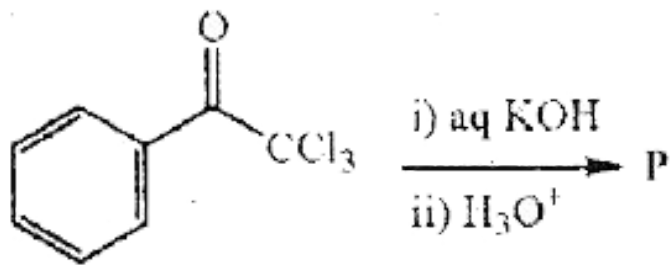
hydrogen bromide

Answer:

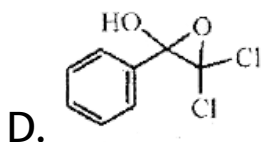
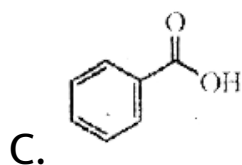
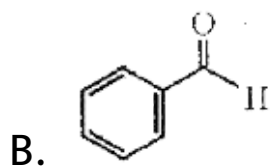
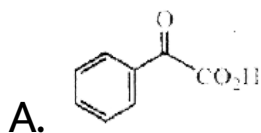


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21. One of the products of the following reaction is P.



Structure of P is

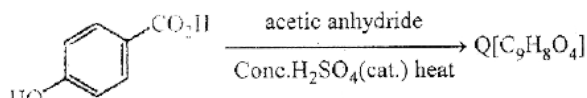


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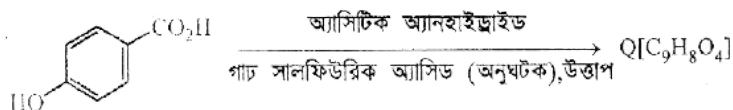


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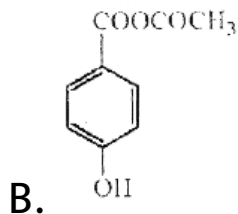
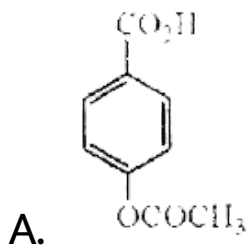
22. For the reaction below, the product is Q.

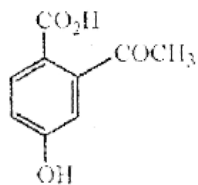


নিম্নলিখিত বিক্রিয়াটিতে Q উৎপন্ন হল।

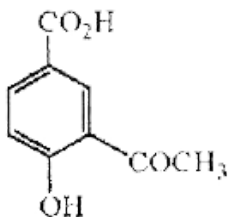


The compound Q is:





C.



D.

Answer:



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23. Cyclopentanol on reaction with NaH followed by CS_2 and CH_3I produces a/an

A. ketone

B. alkene

C. ether

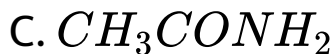
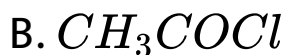
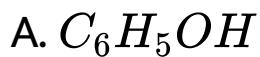
D. xanthate

Answer:



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24. The compound, which evolves carbon dioxide on treatment with aqueous solution of sodium bicarbonate at 25°C, is:



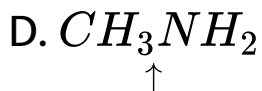
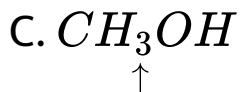
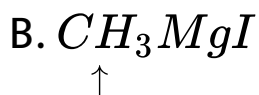
Answer:



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25. The indicated atom is not a nucleophilic site

in:



Answer:



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26. The charge carried by 1 millimole of M^{n+} ions is 193 coulombs. The value of n is:

A. 1

B. 2

C. 3

D. 4

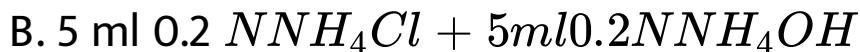
Answer:



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27. Which of the following mixtures will have the lowest pH at 298 K ?

A.

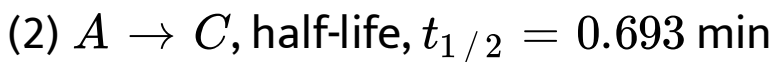


Answer:



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28. Consider the following two first order reactions occurring at 298 K with same initial concentration of a:



Choose the correct option:

A. Reaction (1) is faster than Reaction (2).

B. Reaction (1) is slower than Reaction (2).

C. Both reactions proceed at the same rate.

D. Since two different products are formed, rates can not be compared.

Answer:



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29. For the equilibrium $\text{H}_2\text{O}(\text{l})$

A. $\Delta G = 0, \Delta H < 0, \Delta S < 0$

B. $\Delta G < 0, \Delta H > 0, \Delta S > 0$

C. $\Delta > 0, \Delta H = 0, \Delta S > 0$

D. $\Delta G = 0$, $\Delta H > 0$, $\Delta S > 0$

Answer:



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30. For a van der Waal's gas, the term $\frac{ab}{v^2}$

represents some

A. Pressure

B. Energy

C. Critical density

D. Molar mass

Answer:



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Chemistry Category Ii

1. At constant pressure, the heat of formation of a compound is not dependent on temperature, when

A. $\Delta C_p = 0$

B. $\Delta C_v = 0$

C. $\Delta C_p > 0$

D. $\Delta C_p < 0$

Answer:



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2. A copper coin was electroplated with Zn and then heated at high temperature until there is a change in colour. What will be the resulting colour ?

A. White

B. Black

C. Silver

D. Golden

Answer:

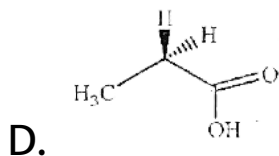
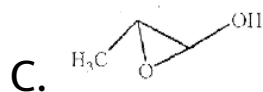
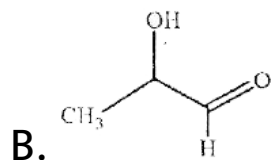


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3. Oxidation of allyl alcohol with a peracid gives a compound of molecular formula $C_3H_6O_2$,

which contains an asymmetric carbon atom.

The structure of the compound is:



Answer:



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4. The total number of isomeric linear dipeptides which can be synthesized from racemic alanine is:

A. 1

B. 2

C. 3

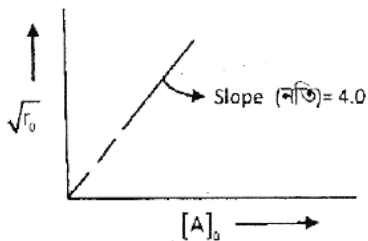
D. 4

Answer:



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5. The kinetic study of a reaction like $vA \rightarrow P$ at 300 K provides the following curve, where concentration is taken in mol dm^{-3} and time in min.



r_0 : Initial rate
 $[A_0]$: Initial concentration of A
 r_0 : প্রারম্ভিক বেগ
 $[A_0]$: A- এর প্রারম্ভিক গাঢ়ত্ব

Identify the correct order (n) and rate constant (k):

A. $n = 0, k = 4.0 \text{ mol dm}^{-3} \text{ min}^{-1}$

B. $n = 1/2, k = 2.0 \text{ mol}^{1/2} \text{ dm}^{-3/2} \text{ min}^{-1}$

$$C. n = 1, k = 8.0 \text{ min}^{-1}$$

$$D. n = 2, k = 16.0 \text{ dm}^3 \text{ mol}^{-1} \text{ min}^{-1}$$

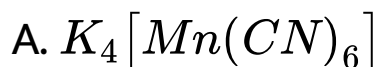
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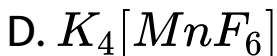
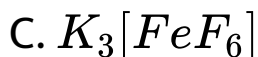
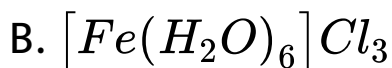


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Chemistry Category Iii

1. Compounds with spin-only magnetic moment equivalent to five unpaired electrons are:



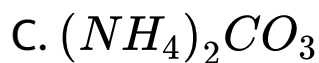


Answer:



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2. Which of the following chemicals may be used to identify three unlabelled beakers containing cone. NaOH, cone. H_2SO_4 and water ?

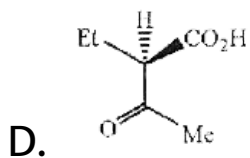
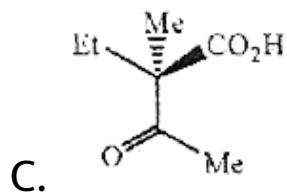
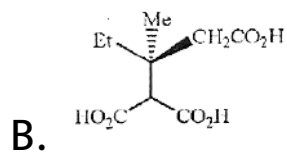
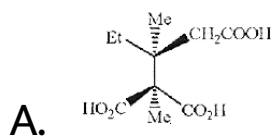


Answer:



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3. The compound(s), capable of producing achiral compound on heating at 100°C is/are :

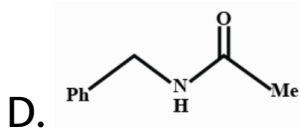
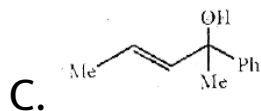
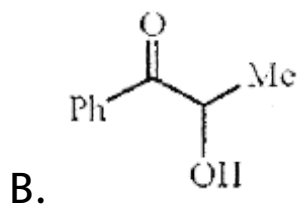
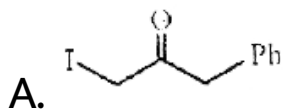


Answer:



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4. Halo-form reaction with I_2 and KOH will be responded by,



Answer:



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5. Identify the correct statement(s) :

A. The oxidation number of Cr in CrO_5 is +6.

B. $\Delta H > \Delta U$ for the reaction $N_2O_4(g) \rightarrow 2NO_2(g)$, provided both gases behave ideally.

C. pH of 0.1 N H_2SO_4 is less than of 0.1 N HCl at $25^\circ C$

D. $\frac{RT}{F} = 0.0591$ volt at $25^\circ C$.

Answer:



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