DU PhD in Chemistry

Topic:- DU_J18_PHD_CHEM

1) Which of the following statements about sulfur dioxide is true?

[Question ID = 677]

1. It forms a S-S dimer in condensed phase [Option ID = 2707]
2. Its anhydride of sulfuric acid [Option ID = 2706]
3. Its O-S-O angle is 180^0 [Option ID = 2708]
4. It is a product of the combustion of fossil fuels that contain sulfur [Option ID = 2705]

Correct Answer :-

- It is a product of the combustion of fossil fuels that contain sulfur [Option ID = 2705]

2) Which of the following is a strong acid in pure liquid HF

[Question ID = 683]

1. H_2O [Option ID = 2731]
2. NaF [Option ID = 2729]
3. CH_3COOH [Option ID = 2730]
4. SbF_5 [Option ID = 2732]

Correct Answer :-

- SbF_5 [Option ID = 2732]

3) Each of the following molecules can act as a chelating agent EXCEPT [Question ID = 679]

1. $HC(CH_2CH_2NH_2)_3$ [Option ID = 2716]
2. $CH_3NHCH_2CH_2CH_3$ [Option ID = 2714]
3. $N(CH_2CH_2NH_2)_3$ [Option ID = 2713]
4. $H_2NCH_2CH_2NH_2$ [Option ID = 2715]

Correct Answer :-

- $CH_3NHCH_2CH_2CH_3$ [Option ID = 2714]

4) What is correct about h-index?

[Question ID = 758]

1. Alternative of impact factor [Option ID = 3031]
2. Based on most quoted papers [Option ID = 3030]
3. Quantify scientific productivity [Option ID = 3029]
4. All of these [Option ID = 3032]

Correct Answer :-

- All of these [Option ID = 3032]

5) The hyperfine electron spin resonance (e.s.r.) spectrum of the benzene radical has how many lines? [Question ID = 748]

1. 12 [Option ID = 2992]
2. 7 [Option ID = 2990]
3. 1 [Option ID = 2991]
4. 6 [Option ID = 2989]

Correct Answer :-

- 7 [Option ID = 2990]

6) The energy changes involving the core electrons of an atom or molecule are expressed in which region of the electromagnetic spectrum? [Question ID = 742]

1. Ultraviolet and Visible region [Option ID = 2967]
2. X-ray region [Option ID = 2968]
3. Radiofrequency region [Option ID = 2966]
4. Infra-red region [Option ID = 2965]

Correct Answer :-

- X-ray region [Option ID = 2968]

7) Find out the expected intensity ratio of M and M+1 signal for the Naphthalene molecular ion [Question ID = 726]

1. 99:1.1 [Option ID = 2903]
2. 1.1:99 [Option ID = 2904]
3. 9:01 [Option ID = 2901]
4. 1:9 [Option ID = 2902]

Correct Answer :-

- 9:01 [Option ID = 2901]

8) Cobalt-60 is used in radiation therapy of cancer and can be produced by the bombardment of Cobalt-59 with [Question ID = 692]

1. Alpha particles [Option ID = 2765]
2. Beta particles [Option ID = 2767]
3. Neutrons [Option ID = 2766]
4. Gamma rays [Option ID = 2768]

Correct Answer :-

- Neutrons [Option ID = 2766]

9) The standard emf of galvanic cell involving 3 moles of electrons in its redox reaction is 0.59 V. The equilibrium constant for the reaction of the cell is- [Question ID = 763]

1. 10^{15} [Option ID = 3051]
2. $\frac{10^{30}}{10^{25}}$ [Option ID = 3052]
3. [Option ID = 3049]
4. 10^{20} [Option ID = 3050]

Correct Answer :-

- 10^{30} [Option ID = 3052]

10) A characteristic common to polymers that can be made to conduct electricity such as polyacetylene, polypyrrole is: [Question ID = 685]

1. Conjugation throughout the polymeric chain. [Option ID = 2740]
2. A high degree of cross linking [Option ID = 2738]
3. A very low glass transition temperature [Option ID = 2737]
4. Presence of stereogenic centers of the same configuration [Option ID = 2739]

Correct Answer :-

- Conjugation throughout the polymeric chain. [Option ID = 2740]

11) Impact factor is [Question ID = 768]

1. Ratio between citations and recent citable items publish [Option ID = 3071]
2. All of these [Option ID = 3072]
3. Addition of citations and recent citable items publish [Option ID = 3069]
4. Ratio between recent citable items publish and citations [Option ID = 3070]

Correct Answer :-

- Ratio between recent citable items publish and citations [Option ID = 3070]

12) On the basis of oxidation-reduction potential, which of the following is most likely to occur? [Question ID = 693]

1. $Al(s) + 3NaNO_3(aq) \rightarrow 3Na(s) + Al(NO_3)_3(aq)$ [Option ID = 2770]
2. $Ca(s) + 2NaNO_3(aq) \rightarrow 2Na(s) + Ca(NO_3)_2(aq)$ [Option ID = 2772]
3. $Pb(s) + 2LiNO_3(aq) \rightarrow 2Li(s) + Pb(NO_3)_2(aq)$ [Option ID = 2771]
4. $Zn(s) + 2AgNO_3(aq) \rightarrow 2Ag(s) + Zn(NO_3)_2(aq)$ [Option ID = 2769]

Correct Answer :-

- $Zn(s) + 2AgNO_3(aq) \rightarrow 2Ag(s) + Zn(NO_3)_2(aq)$ [Option ID = 2769]

13) How many diastereoisomers are possible for the compound 2, 4 –diphenylcyclobutane-1, 3 di carboxylic acids. [Question ID = 725]

1. 6 [Option ID = 2899]
2. 5 [Option ID = 2898]
3. 8 [Option ID = 2900]
4. 4 [Option ID = 2897]

Correct Answer :-

- 5 [Option ID = 2898]

14) An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to- [Question ID = 764]

1. increase in ionic mobility of ions [Option ID = 3055]
2. increase in number of ions [Option ID = 3054]
3. 100% ionization of electrolyte at normal dilution [Option ID = 3056]
4. increase in both i.e. number of ions and ionic mobility of ions. [Option ID = 3053]

Correct Answer :-

- increase in ionic mobility of ions [Option ID = 3055]

15) The solid state structures of the principal allotropes of elemental boron are made up of which of the following structural units [Question ID = 699]

1. B_4 terahedra [Option ID = 2796]
2. B_6 octahedra [Option ID = 2795]
3. B_8 cubes [Option ID = 2794]
4. B_{12} icosahedra [Option ID = 2793]

Correct Answer :-

- B_{12} icosahedra [Option ID = 2793]

16) The molecular geometry of thionyl chloride is best described as [Question ID = 688]

1. T-shaped [Option ID = 2752]
2. Tetrahedral [Option ID = 2751]
3. Trigonal pyramidal [Option ID = 2749]
4. Trigonal planar [Option ID = 2750]

Correct Answer :-

- Trigonal pyramidal [Option ID = 2749]

17) In a face-center cubic (FCC) type of crystal lattice, the number of atoms belonging exclusively to each unit cell within the lattice is/are: [Question ID = 754]

1. 2 [Option ID = 3014]
2. 1 [Option ID = 3013]
3. 3 [Option ID = 3015]
4. 4 [Option ID = 3016]

Correct Answer :-

- 4 [Option ID = 3016]

18) Among the following, the weakest oxidizing agent is [Question ID = 675]

1. Mg (s) [Option ID = 2698]
2. I_2 (s) [Option ID = 2699]
3. H^+ (aq) [Option ID = 2700]
4. MnO_4^- (aq) [Option ID = 2697]

Correct Answer :-

- Mg (s) [Option ID = 2698]

---

19) For a polymer, which of the following statement/s is/are true? [Question ID = 759]

1. Weight average molecular weight is almost always higher than the number average molecular weight [Option ID = 3035]
2. Formation of a polypeptide from its monomers (amino acids) is an example of addition polymerization [Option ID = 3034]
3. All of these [Option ID = 3036]
4. Vinyl polymerization is an example of condensation polymerization. [Option ID = 3033]

Correct Answer :-

- Weight average molecular weight is almost always higher than the number average molecular weight [Option ID = 3035]

---

20) Quantum dots are [Question ID = 762]

1. Three dimensional [Option ID = 3048]
2. One dimensional [Option ID = 3046]
3. Two dimensional [Option ID = 3047]
4. Zero dimensional [Option ID = 3045]

Correct Answer :-

- Zero dimensional [Option ID = 3045]

---

21) The unit of rate constant for a third order reaction is: [Question ID = 749]

1. s^{-1} [Option ID = 2993]
2. $mol^{-1}\ dm^3\ s^{-1}$ [Option ID = 2995]
3. $mol^{-2}\ dm^6\ s^{-1}$ [Option ID = 2996]
4. $mol\ dm^{-3}\ s^{-1}$ [Option ID = 2994]

Correct Answer :-

- $mol^{-2}\ dm^6\ s^{-1}$ [Option ID = 2996]

---

22) All the following elements have at least one isotope that is not radioactive EXCEPT [Question ID = 673]

1. Pb [Option ID = 2690]
2. O [Option ID = 2689]
3. Sn [Option ID = 2691]
4. No [Option ID = 2692]

Correct Answer :-

- No [Option ID = 2692]

---

23) The conditions for a species to follow Bose-Einstein statistics are; [Question ID = 736]

1. Particles are indistinguishable, with no restriction on filling up of energy levels [Option ID = 2944]
2. Particles are indistinguishable, with a restriction on filling up of energy levels [Option ID = 2943]
3. Particles are distinguishable, with a restriction on filling up of energy levels [Option ID = 2941]
4. Particles are distinguishable, with no restriction on filling up of energy levels [Option ID = 2942]

Correct Answer :-

- Particles are indistinguishable, with no restriction on filling up of energy levels [Option ID = 2944]

---

24) In the kinetic theory of collisions, the SI unit of collision number, in terms of m (meter) and s (second), is:

[Question ID = 761]

1. $m^{-2}s^{-1}$ [Option ID = 3042]
2. $m^{4}s^{-1}$ [Option ID = 3041]
3. $m^{2}s^{-1}$ [Option ID = 3043]
4. None of these [Option ID = 3044]

Correct Answer :-

- None of these [Option ID = 3044]

25) Correct characteristics of the functional groups of adenine in DNA base pair are [Question ID = 706]

1. Both N(3) and $C(6)NH_2$ are hydrogen bond donors. [Option ID = 2824]
2. N(3) is a hydrogen bond acceptor and $C(6)NH_2$ is a hydrogen bond donor. [Option ID = 2821]
3. Both N(3) and $C(6)NH_2$ are hydrogen bond acceptors [Option ID = 2823]
4. N(1) is a hydrogen bond acceptor and $C(6)NH_2$ is a hydrogen bond donor. [Option ID = 2822]

Correct Answer :-

- N(1) is a hydrogen bond acceptor and $C(6)NH_2$ is a hydrogen bond donor. [Option ID = 2822]

26) The carbon monoxide molecule has an internuclear distance of 1.13 Angstroms. What is the moment of Inertia of this molecule? [Question ID = 740]

1. $21.6 \text{ X } 10^{-47} \text{ kgm}^2$ [Option ID = 2960]
2. $14.5 \text{ X } 10^{-47} \text{ kgm}^2$ [Option ID = 2957]
3. $14.5 \text{ X } 10^{47} \text{ kgm}^2$ [Option ID = 2958]
4. $1.45 \text{ X } 10^{-47} \text{ kgm}^2$ [Option ID = 2959]

Correct Answer :-

- $14.5 \text{ X } 10^{-47} \text{ kgm}^2$ [Option ID = 2957]

27) Which of the following represent/s non-linear optical technique? [Question ID = 744]

1. Second Harmonic generation [Option ID = 2974]
2. Two-photon photoluminescence [Option ID = 2975]
3. Four-wave mixing [Option ID = 2973]
4. All of these [Option ID = 2976]

Correct Answer :-

- All of these [Option ID = 2976]

28) . Which of the following does not affect the intensity of spectral lines of a sample? [Question ID = 743]

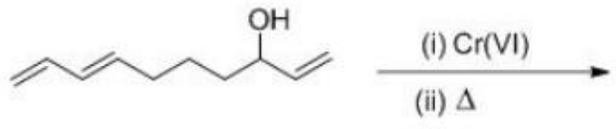
1. Path length of a sample [Option ID = 2972]
2. Population of energy states [Option ID = 2970]
3. Heisenberg's Uncertainty principle [Option ID = 2971]
4. Concentration of a sample [Option ID = 2969]

Correct Answer :-

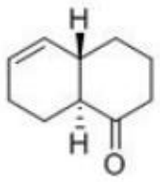
- Heisenberg's Uncertainty principle [Option ID = 2971]

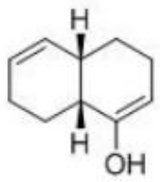
29)

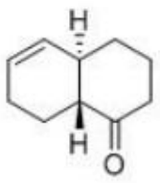
Find out the major product of the following reaction

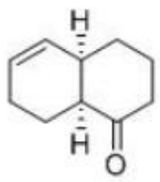


[Question ID = 716]

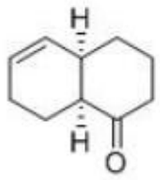
1.  [Option ID = 2862]

2.  [Option ID = 2863]

3.  [Option ID = 2861]

4.  [Option ID = 2864]

Correct Answer :-

-  [Option ID = 2864]

30) Provide the suitable reagents for this conversion:

[Question ID = 712]

1. $NaNO_2 / H_2SO_4 / PCl_3$ [Option ID = 2845]
2. H_2O_2/OH^-, $HNO_3/H_2SO_4/PCl_3$ [Option ID = 2846]
3. $HNO_3/H_2SO_4/POCl_3$ [Option ID = 2848]
4. m-CPBA, $HNO_3/H_2SO_4/PCl_3$ [Option ID = 2847]

Correct Answer :-

- m-CPBA, $HNO_3/H_2SO_4/PCl_3$ [Option ID = 2847]

31) Which of the following complexes does not contain a significant π component in the metal-ligand bonding?

[Question ID = 686]

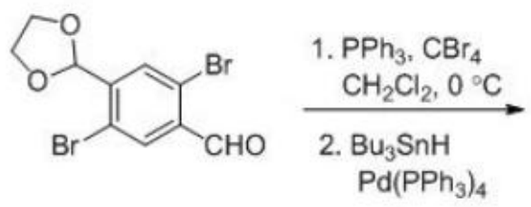
1. $[Co(NH_3)_6]^{3+}$ [Option ID = 2743]
2. $[Cr(\eta\text{-}C_6H_6)]$ [Option ID = 2742]
3. $[Co(CN)_3]^{3-}$ [Option ID = 2741]

4. $[Fe(CO)_5]$ [Option ID = 2744]

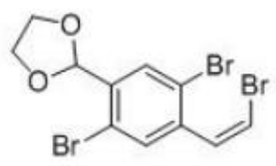
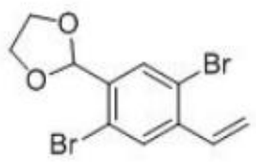
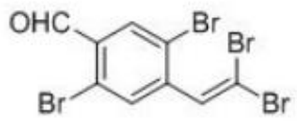
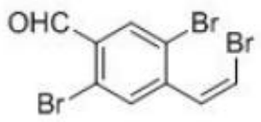
Correct Answer :-

- $[Co(NH_3)_6]^{3+}$ [Option ID = 2743]

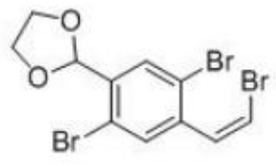
32) The product obtained in the following conversion is:



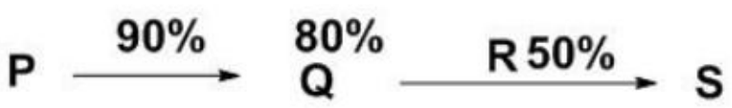
[Question ID = 5633]

1.  [Option ID = 22523]
2.  [Option ID = 22524]
3.  [Option ID = 22526]
4.  [Option ID = 22525]

Correct Answer :-

-  [Option ID = 22523]

33) In the multi-step synthesis given below, the overall yield for the formation of S from P is:



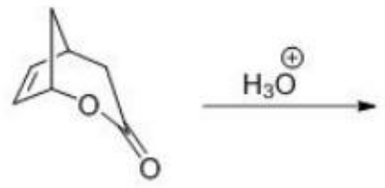
[Question ID = 730]

1. 40 % [Option ID = 2918]
2. 50 % [Option ID = 2920]
3. 72 % [Option ID = 2917]
4. 36 % [Option ID = 2919]

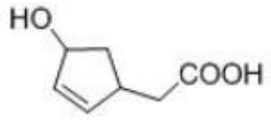
Correct Answer :-

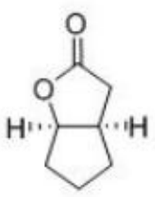
- 36 % [Option ID = 2919]

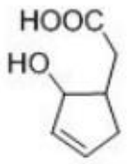
34) The compound formed in the following reaction is:

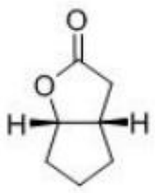


[Question ID = 714]

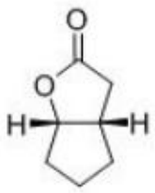
1.  [Option ID = 2856]

2.  [Option ID = 2853]

3.  [Option ID = 2855]

4.  [Option ID = 2854]

Correct Answer :-

-  [Option ID = 2854]

35) A 499 mg sample of $CuSO_4.nH_2O$ is heated to drive off the waters of hydration and then reweighed to give a final mass of 319 mg. Given the sample contains 2.0 mmol of Cu, what is the average number of waters of hydration, n in $CuSO_4.nH_2O$?

[Question ID = 669]

1. 2 [Option ID = 2673]
2. 18 [Option ID = 2676]
3. 5 [Option ID = 2674]
4. 10 [Option ID = 2675]

Correct Answer :-

- 5 [Option ID = 2674]

36) What is the orbital angular momentum quantum number l of the electron that is most easily removed when ground state aluminium is ionized?

[Question ID = 689]

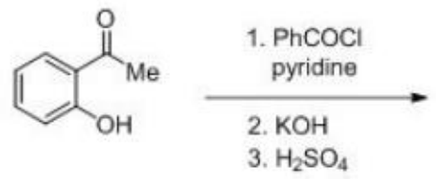
1. 2 [Option ID = 2754]
2. 0 [Option ID = 2756]
3. 1 [Option ID = 2755]

4. 3 [Option ID = 2753]

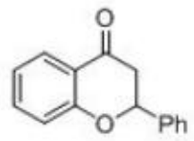
Correct Answer :-

- 1 [Option ID = 2755]

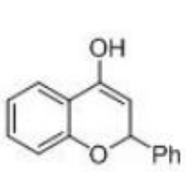
37) The major product obtained in the following reaction is:



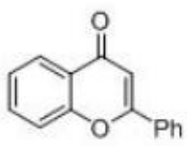
[Question ID = 718]



1. C) [Option ID = 2871]



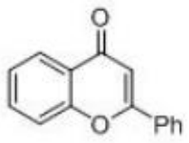
2. B) [Option ID = 2870]



3. A) [Option ID = 2869]

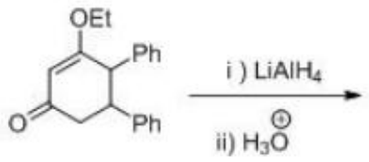
4. D) both (B) and (C) [Option ID = 2872]

Correct Answer :-

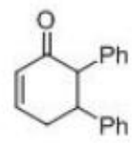


- A) [Option ID = 2869]

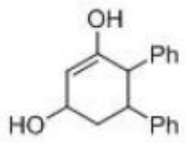
38) Predict the major product:



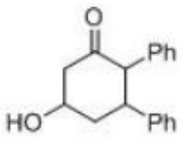
[Question ID = 709]



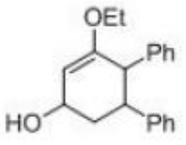
1. [Option ID = 2836]



2. [Option ID = 2833]

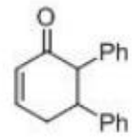


3. [Option ID = 2835]



4. [Option ID = 2834]

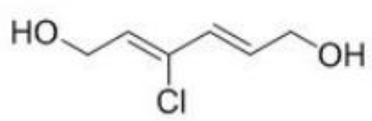
Correct Answer :-



- [Option ID = 2836]

---

39) The IUPAC name of the compound given below is:



[Question ID = 705]

1. (2Z, 4Z)-3-chlorohexa-2, 4-diene-1,6-diol. [Option ID = 2819]
2. (2E, 4E)-3-chlorohexa-2, 4-diene-1,6-diol. [Option ID = 2817]
3. (2Z, 4E)-3-chlorohexa-2, 4-diene-1,6-diol. [Option ID = 2818]
4. (2Z, 4E)-3-chlorohexa-2, 4-diene-1,6-diol. [Option ID = 2820]

Correct Answer :-

- (2Z, 4E)-3-chlorohexa-2, 4-diene-1,6-diol. [Option ID = 2820]

---

40) Which of the following statements about complexes that form between metals M^{n+} and EDTA in aqueous solutions is true?

[Question ID = 680]

1. The presence of other complexing ligands in solution affects the equilibrium concentration of metal-EDTA complexes [Option ID = 2719]
2. Metal-EDTA complexes have an equilibrium concentration independent of pH [Option ID = 2718]
3. Metal-EDTA complexes are often 2:1 in stoichiometry [Option ID = 2717]
4. Metal-EDTA complexes are less stable than the corresponding metal-ammine complexes [Option ID = 2720]

Correct Answer :-

- The presence of other complexing ligands in solution affects the equilibrium concentration of metal-EDTA complexes [Option ID = 2719]

---

41) A 0.600 g sample of pure, weak diprotic acid gives end points at 20.0 mL and 40.0 mL when titrated with 0.100 M NaOH. What is the molar mass of the weak acid?

[Question ID = 671]

1. 150 g [Option ID = 2682]
2. 300 g [Option ID = 2684]
3. 120 g [Option ID = 2681]
4. 180 g [Option ID = 2683]

Correct Answer :-

- 300 g [Option ID = 2684]

---

42) The microwave spectrum of a rigid diatomic molecule shows first three lines at 2.65682 cm^{-1}, 5.31364 cm^{-1}, and 7.97046 cm^{-1}. What is the rotational constant of this molecule?

[Question ID = 756]

1. $1.82118\ cm^{-1}$ [Option ID = 3021]
2. $3.64236\ cm^{-1}$ [Option ID = 3022]
3. $1.32841\ cm^{-1}$ [Option ID = 3024]
4. $0.91059\ cm^{-1}$ [Option ID = 3023]

Correct Answer :-

- $1.32841\ cm^{-1}$ [Option ID = 3024]

---

43) It takes 10 minutes for the concentration of a radioactive species to decay to its $1/4^{th}$ value of its original concentration. What is the rate constant of this radioactive decay reaction?

[Question ID = 750]

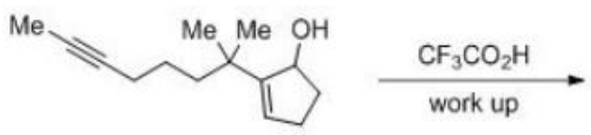
1. $415.8\ s^{-1}$ [Option ID = 2999]
2. $865.8\ s^{-1}$ [Option ID = 3000]
3. $0.00231\ s^{-1}$ [Option ID = 2997]
4. $0.001155\ s^{-1}$ [Option ID = 2998]

Correct Answer :-

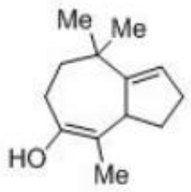
- $0.00231\ s^{-1}$ [Option ID = 2997]

---

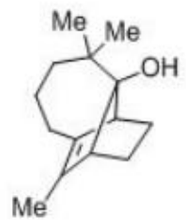
44) The major product in the following reaction is:



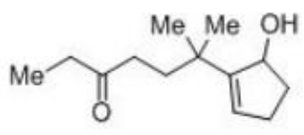
[Question ID = 715]

1. 

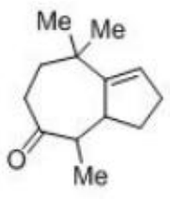
[Option ID = 2857]

2. 

[Option ID = 2860]

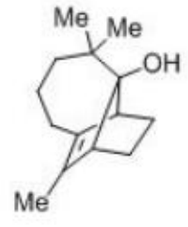
3. 

[Option ID = 2858]

4. 

[Option ID = 2859]

Correct Answer :-

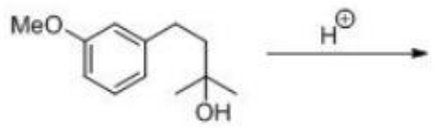
- 

[Option ID = 2860]

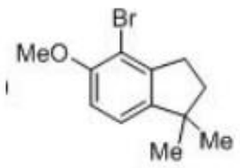
---

45)

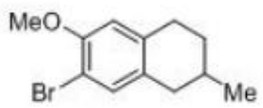
The product obtained in the following reaction is



[Question ID = 719]

1. 

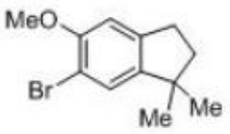
[Option ID = 2873]

2. 

[Option ID = 2876]

3.

[Option ID = 2874]

4. 

[Option ID = 2875]

Correct Answer :-

46) $PbF_2(s)$ which is slightly soluble in water is dissolved in water to form a standard solution in equilibrium with solid PbF_2. Which of the following will cause additional $PbF_2(s)$ to dissolve?

[Question ID = 674]

1. Evaporating some water to decrease the volume of the solution. [Option ID = 2696]
2. Adding solid PbF_2 [Option ID = 2695]
3. Adding $Pb(NO_3)_2$ [Option ID = 2694]
4. Adding HNO_3 [Option ID = 2693]

Correct Answer :-

- Adding HNO_3 [Option ID = 2693]

47) Arrange the following intermediates in the order of decreasing basicity (strongest to weakest):

(i) $H_2C{=}CH^-$ (ii) $CH_3\bar{C}H_2$ (iii) $CH_3CH_2O^-$ (iv) $HC{\equiv}C^-$

[Question ID = 728]

1. iii > ii > i > iv [Option ID = 2910]
2. iii > iv > i > ii [Option ID = 2911]
3. iv > i > ii > iii [Option ID = 2909]
4. ii > i > iv > iii [Option ID = 2912]

Correct Answer :-

- ii > i > iv > iii [Option ID = 2912]

48) For EDTA titrations, the analyte solution and the titrant solution are both buffered at the same pH for which of the following reasons:
I. Conditional formation constant is affected by pH.
II. The fraction of EDTA in the fully deprotonated Y^{4-} form varies with pH.
III. When EDTA is complexed with metal ions, H^+ ions are formed as product.

[Question ID = 697]

1. III only [Option ID = 2788]
2. II only [Option ID = 2787]
3. I only [Option ID = 2785]
4. I, II and III [Option ID = 2786]

Correct Answer :-

- I, II and III [Option ID = 2786]

49) When Fe_2O_3 is dissolved in 6M HNO_3, which iron containing species dominate in the solution?

[Question ID = 700]

1. $Fe(OH)_3$ [Option ID = 2798]
2. $Fe(OH)_4^-$ [Option ID = 2797]
3. $Fe(H_2O)_6^{3+}$ [Option ID = 2800]
4. $Fe(H_2O)_6^{2+}$ [Option ID = 2799]

Correct Answer :-

- $Fe(H_2O)_6^{2+}$ [Option ID = 2799]

50) In CrF_2 (s), the coordination of six F^-, around the Cr is a distorted octahedron with four short and two long Cr-F bonds. Which of the following best explains this observation?

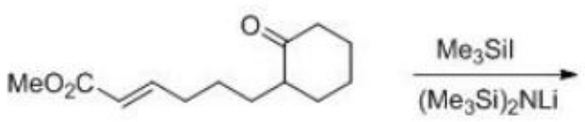
[Question ID = 678]

1. Cr^{2+} has a low cationic charge [Option ID = 2711]
2. F has -1 anionic charge and highly electronegative [Option ID = 2709]
3. Spin-orbit coupling in Cr^{2+} [Option ID = 2712]
4. The Jahn-Teller effect [Option ID = 2710]

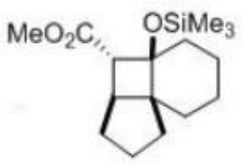
Correct Answer :-

- The Jahn-Teller effect [Option ID = 2710]

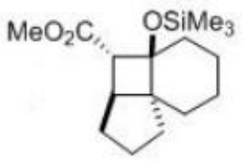
51) The major product formed in the following reaction is:

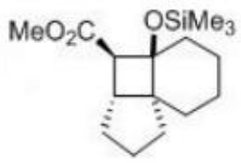


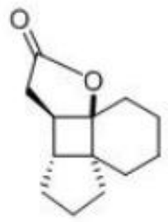
[Question ID = 723]

1. 

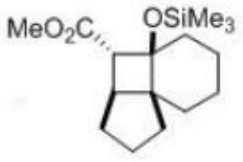
[Option ID = 2889]

2.  [Option ID = 2890]

3.  [Option ID = 2891]

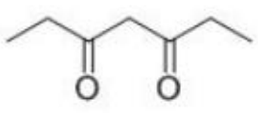
4.  [Option ID = 2892]

Correct Answer :-

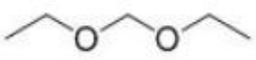
•  [Option ID = 2889]

52) The compound showing the following spectral characteristic is ^{1}H NMR (δ in ppm) : 4.65 (2H, singlet), 3.65 (4H, quartet), 1.25 (6H, triplet); ^{13}C NMR (δ in ppm) = 15, 63,95; DEPT-135 (δ in ppm) : 15 (positive), 63 (negative), 95(negative); DEPT-90 (δ in ppm): 15 (no peak), 63 (no peak), 95 (no peak).

[Question ID = 727]

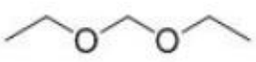
1.  [Option ID = 2907]

2.  [Option ID = 2906]

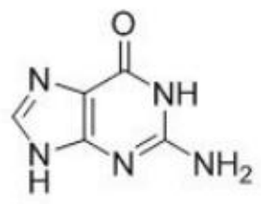
3.  [Option ID = 2905]

4.  [Option ID = 2908]

Correct Answer :-

•  [Option ID = 2905]

53) In low chloride ion concentration, the anticancer drug cis-platin hydrolysis to give a diaqua complex and this binds to DNA *via* adjacent guanine.



The coordinating atom of guanine to Pt(II) is

[Question ID = 707]

1. N9 [Option ID = 2828]
2. N7 [Option ID = 2827]
3. N1 [Option ID = 2825]
4. N3 [Option ID = 2826]

Correct Answer :-

- N7 [Option ID = 2827]

54) The molecular geometry of IF_5 is

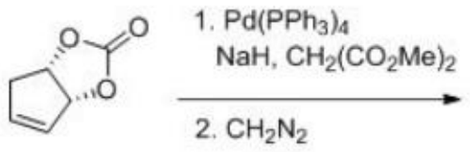
[Question ID = 672]

1. Bicapped prism [Option ID = 2688]
2. Square pyramidal [Option ID = 2686]
3. Trigonal planar [Option ID = 2685]
4. Bent [Option ID = 2687]

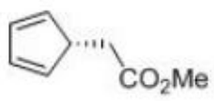
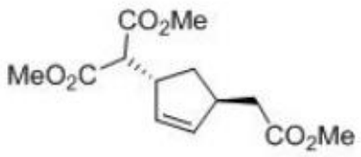
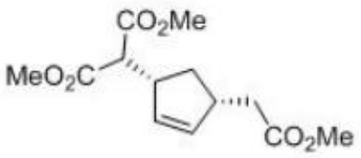
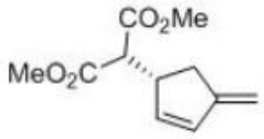
Correct Answer :-

- Square pyramidal [Option ID = 2686]

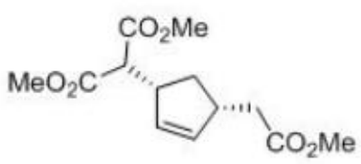
55) What is the principal product of the following reaction?



[Question ID = 704]

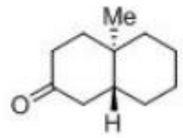
1.  [Option ID = 2816]
2.  [Option ID = 2814]
3.  [Option ID = 2813]
4.  [Option ID = 2815]

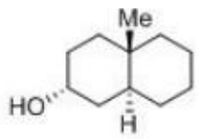
Correct Answer :-

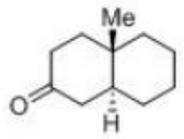
-  [Option ID = 2813]

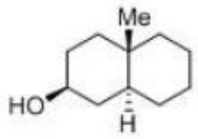
56) The major product of the reaction given below is:

[Question ID = 708]

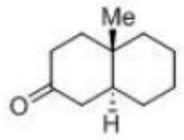
1.  [Option ID = 2829]

2.  [Option ID = 2832]

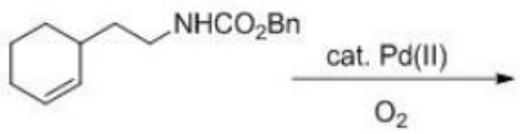
3.  [Option ID = 2831]

4.  [Option ID = 2830]

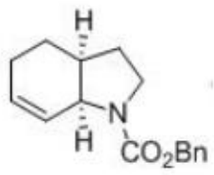
Correct Answer :-

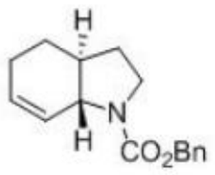
-  [Option ID = 2831]

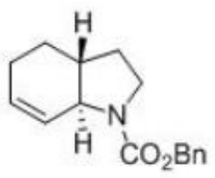
57) The product obtained in the following conversion is:

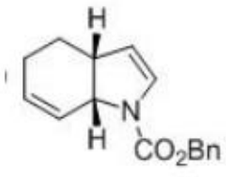


[Question ID = 717]

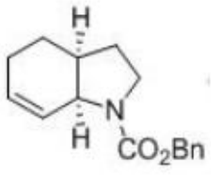
1.  [Option ID = 2866]

2.  [Option ID = 2865]

3.  [Option ID = 2867]

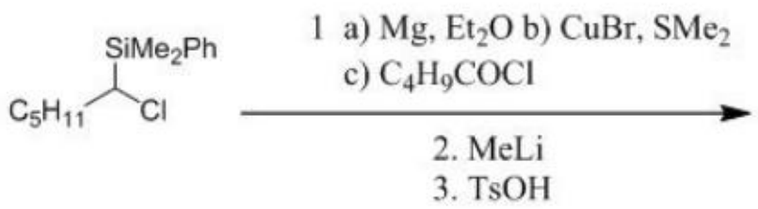
4.  [Option ID = 2868]

Correct Answer :-

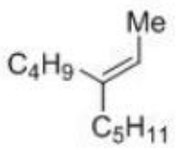
-  [Option ID = 2866]

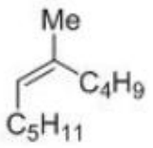
58)

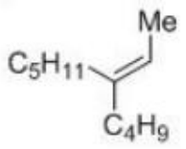
The major product in the following reaction is:

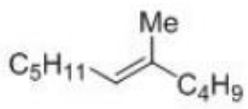


[Question ID = 711]

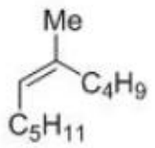
1.  [Option ID = 2843]

2.  [Option ID = 2842]

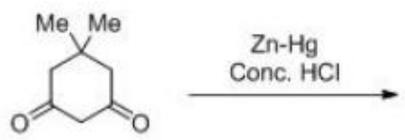
3.  [Option ID = 2844]

4.  [Option ID = 2841]

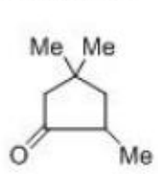
Correct Answer :-

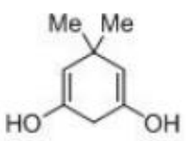
-  [Option ID = 2842]

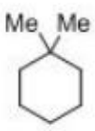
59) The product obtained in the following conversion is:

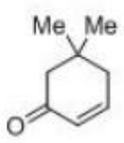


[Question ID = 710]

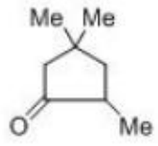
1.  [Option ID = 2838]

2.  [Option ID = 2839]

3.  [Option ID = 2837]

4.  [Option ID = 2840]

Correct Answer :-



- [Option ID = 2838]

60) The ionic strength of an aqueous 0.10 M $Pb(NO_3)_2$ solution is

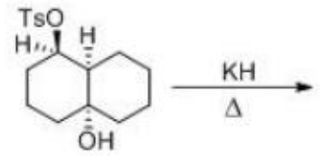
[Question ID = 682]

1. 0.30 M [Option ID = 2728]
2. 0.25 M [Option ID = 2727]
3. 0.60 M [Option ID = 2725]
4. 0.10 M [Option ID = 2726]

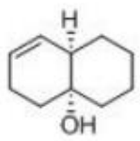
Correct Answer :-

- 0.30 M [Option ID = 2728]

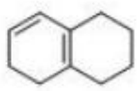
61) Find out the product of the following reaction

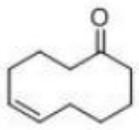


[Question ID = 772]

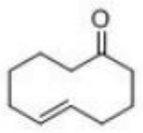
1. 

[Option ID = 3087]

2.  [Option ID = 3088]

3. 

[Option ID = 3086]

4. 

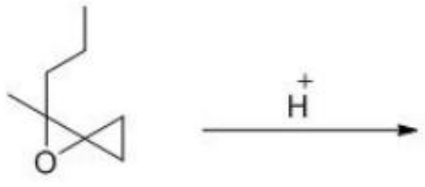
[Option ID = 3085]

Correct Answer :-

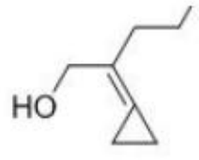
-

[Option ID = 3086]

62) The major product formed in the following reaction is

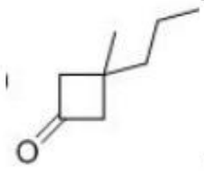


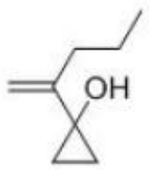
[Question ID = 733]

1. 

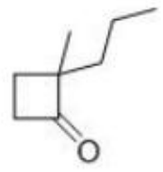
[Option ID = 2932]

2.  [Option ID = 2929]

3.  [Option ID = 2930]

4.  [Option ID = 2931]

Correct Answer :-

-  [Option ID = 2929]

---

63) The energies of activation for forward and reverse reactions for $A_2 + B_2 \rightarrow 2AB$ are 180 kJ mol^{-1} and 200 kJ mol^{-1} respectively. The presence of a catalyst lowers the activation energy of both (forward and reverse) reactions by 100 kJ mol^{-1}. The enthalpy change of the reaction ($A_2 + B_2 \rightarrow 2AB$) in the presence of catalyst will be (in kJ mol^{-1}):

[Question ID = 767]

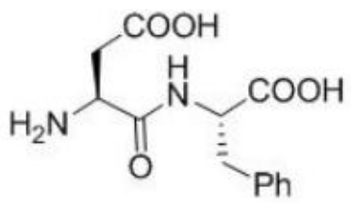
1. 120 [Option ID = 3065]
2. 280 [Option ID = 3066]
3. 300 [Option ID = 3068]
4. 20 [Option ID = 3067]

Correct Answer :-

- 20 [Option ID = 3067]

---

64) The amino acid constituents of artificial sweetener given below are



[Question ID = 734]

1. L-Aspartic acid and L-tyrosine [Option ID = 2936]
2. D-Glutamic acid and L-phenylglycine [Option ID = 2933]
3. L-Glutamic acid and L-phenylalanine [Option ID = 2934]
4. L-Aspartic and L-phenylalanine [Option ID = 2935]

Correct Answer :-

- L-Aspartic and L-phenylalanine [Option ID = 2935]

---

65) Graphite reacts with potassium to produce a compound with empirical formula KC_8 of the following which is the best description of this structure:

[Question ID = 676]

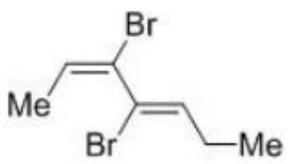
1. K^+ ion packed with C_2^{2-} ions [Option ID = 2702]
2. Negatively charged hexagonal carbon layers with intercalated K^+ ions [Option ID = 2703]
3. An expanded diamond lattice with K^+ ions in the tetrahedral holes [Option ID = 2704]
4. K^+ -ion closed packed with polyhedral C_8^- ions [Option ID = 2701]

Correct Answer :-

- Negatively charged hexagonal carbon layers with intercalated K^+ ions [Option ID = 2703]

---

66) The IUPAC name for the following molecule is:



[Question ID = 729]

1. (2Z, 4Z)-3, 4-dibromo hepta-2, 4-diene [Option ID = 2914]
2. (2E, 4E)-3, 4-dibromo hepta-2, 4-diene [Option ID = 2915]
3. (2E, 4Z)-3, 4-dibromo hepta-2, 4-diene [Option ID = 2916]
4. (2Z, 4E)-3, 4-dibromo hepta-2, 4-diene [Option ID = 2913]

Correct Answer :-

- (2E, 4Z)-3, 4-dibromo hepta-2, 4-diene [Option ID = 2916]

---

67) Saturated solution of KNO_3 is used to make 'salt bridge' because-

[Question ID = 765]

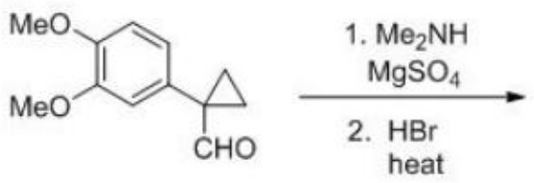
1. KNO_3 is highly soluble in water [Option ID = 3060]
2. velocity of K^+ is greater than that of NO_3^- [Option ID = 3057]
3. velocity of NO_3^- is greater than that of K^+ [Option ID = 3058]
4. velocity of both K^+ and NO_3^- are nearly the same [Option ID = 3059]

Correct Answer :-

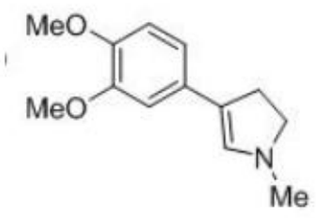
- velocity of both K^+ and NO_3^- are nearly the same [Option ID = 3059]

---

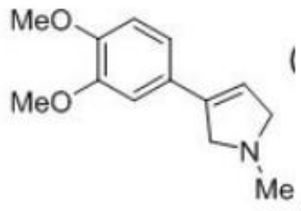
68) In the following reaction the major product formed is:

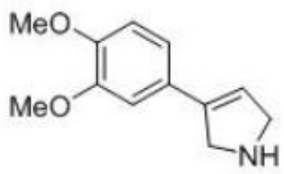


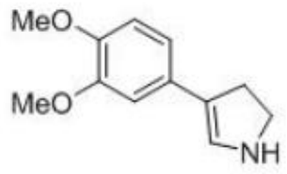
[Question ID = 724]

1. 

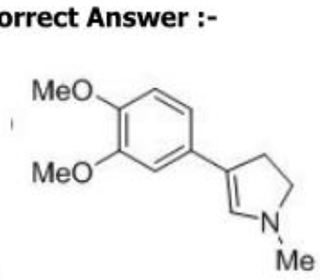
[Option ID = 2893]

2.  [Option ID = 2895]

3.  [Option ID = 2896]

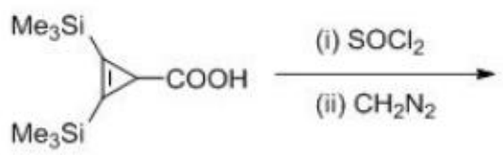
4.  [Option ID = 2894]

Correct Answer :-

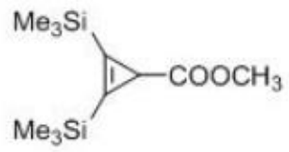
-  [Option ID = 2893]

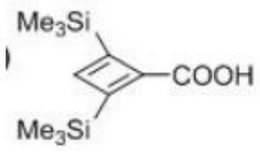
---

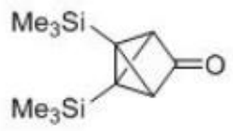
69) The product formed in the following reaction is:

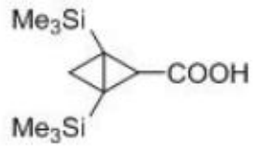


[Question ID = 721]

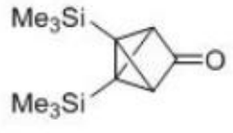
1.  [Option ID = 2881]

2.  [Option ID = 2884]

3.  [Option ID = 2882]

4.  [Option ID = 2883]

Correct Answer :-

-  [Option ID = 2882]

70) In a zero-order reaction for every 10° C rise of temperature, the rate is doubled. If the temperature is increased from 10°C to 100°C, the rate of the reaction will become-

[Question ID = 766]

1. 512 times [Option ID = 3064]
2. 256 times [Option ID = 3063]
3. 128 times [Option ID = 3062]
4. 64 times [Option ID = 3061]

Correct Answer :-

- 512 times [Option ID = 3064]

71) $\_\_\_H^+ + \_\_\_\_IO_3^- + \_\_\_I^- \longrightarrow \_\_\_\_I_2 + \_\_\_\_H_2O$

The reaction is not balanced. If the reaction is balanced using the smallest whole number coefficients possible, the coefficients for I^- will be:

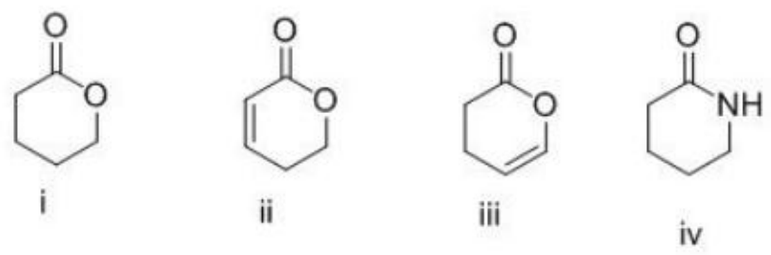
[Question ID = 670]

1. 2 [Option ID = 2678]
2. 5 [Option ID = 2680]
3. 1 [Option ID = 2677]
4. 3 [Option ID = 2679]

Correct Answer :-

- 5 [Option ID = 2680]

72) Arrange the following compounds in decreasing order of IR stretching frequency of C=O



[Question ID = 731]

1. iv > i > ii > iii [Option ID = 2924]
2. ii > i > iii > iv [Option ID = 2923]
3. iii > i > ii > iv [Option ID = 2922]
4. i > ii > iii > iv [Option ID = 2921]

Correct Answer :-

- iii > i > ii > iv [Option ID = 2922]

73) $\_\_\_\_MnO_4^- + \_\_\_\_I^- + \_\_\_\_H^+ = \_\_\_\_Mn^{2+} + \_\_\_\_IO_3^- + \_\_\_\_H_2O$

The correct balanced one will be:

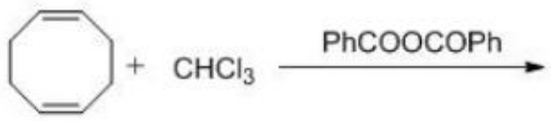
[Question ID = 690]

1. MnO_4^- : IO_3^- is 1:1 [Option ID = 2760]
2. MnO_4^-: Mn^{2+} is 3:1 [Option ID = 2759]
3. I^- : IO_3^- in 3:1 [Option ID = 2757]
4. MnO_4^- : I^- in 6:5 [Option ID = 2758]

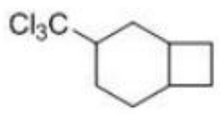
Correct Answer :-

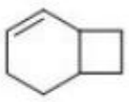
- MnO_4^- : I^- in 6:5 [Option ID = 2758]

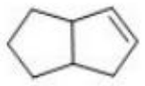
74) In the following reaction sequence, the structure of the product is:

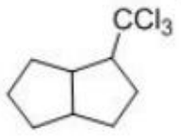


[Question ID = 720]

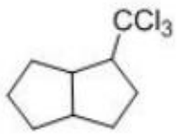
1.  [Option ID = 2879]

2.  [Option ID = 2878]

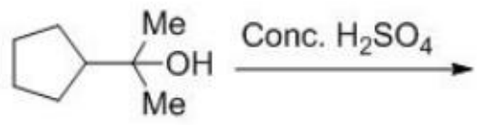
3.  [Option ID = 2880]

4.  [Option ID = 2877]

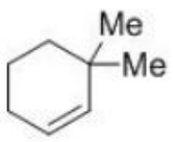
Correct Answer :-

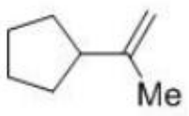
-  [Option ID = 2877]

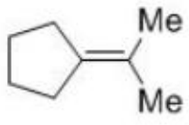
75) The major product formed in the sulphuric acid mediated rearrangement of compound is:

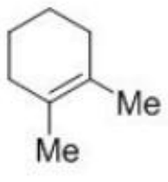


[Question ID = 722]

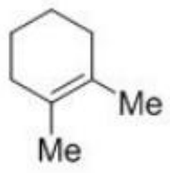
1.  [Option ID = 2886]

2.  [Option ID = 2888]

3.  [Option ID = 2885]

4.  [Option ID = 2887]

Correct Answer :-

•  [Option ID = 2887]

76) What is the specific resistance (or resistivity) of a conductor with cross-sectional area 4 cm^2, length 2cm and resistance 10 ohms?

[Question ID = 755]

1. $20\ Siemens^{-1}cm$ [Option ID = 3019]
2. $10\ Siemens^{-1}cm$ [Option ID = 3018]
3. None of the above [Option ID = 3020]
4. $40\ \ Siemens^{-1}cm$ [Option ID = 3017]

Correct Answer :-

• $20\ Siemens^{-1}cm$ [Option ID = 3019]

77) The anhydride of $Ba(OH)_2$ is

[Question ID = 695]

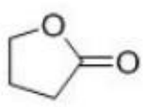
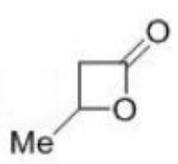
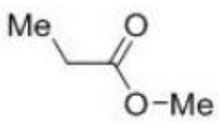
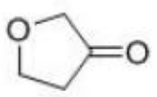
1. Ba [Option ID = 2779]
2. BaO [Option ID = 2780]
3. BaOH [Option ID = 2778]
4. BaH_2 [Option ID = 2777]

Correct Answer :-

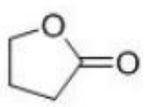
• BaO [Option ID = 2780]

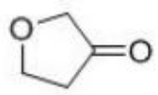
78) A compound with molecular formula $C_4H_6O_2$ shows band at 1770 cm^{-1} in IR spectra and peaks at 178, 68, 28, 22 ppm in ^{13} C NMR spectrums. The correct structure of the compound is:

[Question ID = 703]

1.  [Option ID = 2811]
2.  [Option ID = 2809]
3.  [Option ID = 2812]
4.  [Option ID = 2810]

Correct Answer :-

•  [Option ID = 2811]



- [Option ID = 2810]

79) An aqua's solution of an optically pure compound of conc. 100 mg in 1 ml of water and measured in sample of 5 cm length was found to be -3° the specific rotation is

[Question ID = 732]

1. -6 °C [Option ID = 2927]
2. +6 °C [Option ID = 2928]
3. -60 °C [Option ID = 2926]
4. -30 °C [Option ID = 2925]

Correct Answer :-

- -60 °C [Option ID = 2926]

80) A monoatomic gas following Fermi-Dirac statistics begins to follow Maxwell-Boltzmann statistics at: [Question ID = 735]

1. Low Temperature and low density [Option ID = 2937]
2. High Temperature and high density [Option ID = 2940]
3. Low Temperature and high density [Option ID = 2938]
4. High Temperature and low density [Option ID = 2939]

Correct Answer :-

- High Temperature and low density [Option ID = 2939]

81) The Dulong and Petit's Law says that the molar heat capacity of elements is: [Question ID = 741]

1. $10\ Cal\ mol^{-1}\ K^{-1}$ [Option ID = 2964]
2. $6\ Cal\ mol^{-1}\ K^{-1}$ [Option ID = 2961]
3. $12\ Cal\ mol^{-1}\ K^{-1}$ [Option ID = 2963]
4. $3\ Cal\ mol^{-1}\ K^{-1}$ [Option ID = 2962]

Correct Answer :-

- $6\ Cal\ mol^{-1}\ K^{-1}$ [Option ID = 2961]

82) What is the most common natural form in which fluorine is found on earth?

[Question ID = 684]

1. As a fluoride ion in various minerals [Option ID = 2735]
2. As weak acid HF (aq) [Option ID = 2734]
3. In various fluorocarbon compounds in the atmosphere. [Option ID = 2736]
4. As XeF_2 (s) [Option ID = 2733]

Correct Answer :-

- As a fluoride ion in various minerals [Option ID = 2735]

83) What is the correct form of Stirling's approximation?

[Question ID = 738]

1. $\ln x! = x \ln x - x$ [Option ID = 2950]
2. $\ln x! = \ln x + x$ [Option ID = 2951]

3. $\ln x! = x \ln x + x$ [Option ID = 2949]
4. $\ln x! = x - x \ln x$ [Option ID = 2952]

Correct Answer :-

- $\ln x! = x \ln x - x$ [Option ID = 2950]

---

84) What is the total energy of one mole of an ideal monoatomic gas in terms of Boltzmann's Constant (k), Avogadro's number (N) and temperature (T)

[Question ID = 739]

1. 3 NkT [Option ID = 2953]
2. (3/2) NkT [Option ID = 2956]
3. (1/2) NkT [Option ID = 2955]
4. NkT [Option ID = 2954]

Correct Answer :-

- (3/2) NkT [Option ID = 2956]

---

85) The following equation is associated with the relationship between the diffusion current and the concentration of the depolarizer used in polarography: [Question ID = 753]

1. Debye-Huckel equation [Option ID = 3009]
2. Stern-Volmer equation [Option ID = 3010]
3. Nyquist equation [Option ID = 3012]
4. Ilkovic equation [Option ID = 3011]

Correct Answer :-

- Ilkovic equation [Option ID = 3011]

---

86) Electronic transitions originating from the 1S energy level of the Hydrogen atom to higher levels belong to which series? [Question ID = 747]

1. Lyman Series [Option ID = 2985]
2. Brackett Series [Option ID = 2987]
3. Balmer Series [Option ID = 2986]
4. Pfund Series [Option ID = 2988]

Correct Answer :-

- Lyman Series [Option ID = 2985]

---

87) Which of the following reactions best classified as an oxidative addition? [Question ID = 701]

1. $[Cr(CO)_6] + Br^- \rightarrow [Cr(CO)_5Br]^- + CO$ [Option ID = 2801]
2. $[Pt(NH_3)Cl_3]^- + NH_3 \rightarrow Pt(NH_3)_2Cl_2 + Cl^-$ [Option ID = 2803]
3. $[Pt\{P(C_2H_5)_3\}_2 HCl] + HCl \rightarrow [Pt\{P(C_2H_5)_3\}_2 (H)_2Cl_2]$ [Option ID = 2802]
4. $[MnH(CO)_5] + CF_2 = CF_2 \rightarrow [Mn\ (CF_2CF_2H)(CO)_5]$ [Option ID = 2804]

Correct Answer :-

- $[MnH(CO)_5] + CF_2 = CF_2 \rightarrow [Mn\ (CF_2CF_2H)(CO)_5]$ [Option ID = 2804]

---

88) Which of the following is required for both paramagnetism and ferromagnetism? [Question ID = 698]

1. Super exchange [Option ID = 2791]
2. unpaired electrons [Option ID = 2792]
3. Low-spin electron configuration [Option ID = 2790]
4. Strong oxidizing conditions [Option ID = 2789]

Correct Answer :-

- unpaired electrons [Option ID = 2792]

---

89) Which of the following experimental techniques is not used to determine the average molecular weight of a polymer? [Question ID = 760]

1. Transmission electron microscopy [Option ID = 3039]
2. Equilibrium sedimentation [Option ID = 3038]
3. Intrinsic viscosity measurement [Option ID = 3040]
4. Dynamic light scattering [Option ID = 3037]

Correct Answer :-

- Transmission electron microscopy [Option ID = 3039]

90) Which of the following is NOT a known relatively stable compound of uranium? [Question ID = 687]

1. UF_6 [Option ID = 2745]
2. UO_3 [Option ID = 2748]
3. UO_2 [Option ID = 2747]
4. $U(CH_3)_2$ [Option ID = 2746]

Correct Answer :-

- $U(CH_3)_2$ [Option ID = 2746]

91) Which of the following compounds exist in stereoisomeric form? [Question ID = 681]

1. $[Pt(NH_3)_3Cl)]^+$ [Option ID = 2721]
2. $[Pt(NH_3)_2Cl_2]$ [Option ID = 2724]
3. $[Pt(NH_3)Cl_3]^-$ [Option ID = 2722]
4. $[PtCl_4]^{2-}$ [Option ID = 2723]

Correct Answer :-

- $[Pt(NH_3)_2Cl_2]$ [Option ID = 2724]

92) Which of the following statement is not true? [Question ID = 745]

1. Methane is a spherical top molecule [Option ID = 2978]
2. Chloroform is a symmetric top molecule [Option ID = 2980]
3. Vinyl chloride is a symmetric top molecule [Option ID = 2979]
4. Water is an asymmetric top molecule [Option ID = 2977]

Correct Answer :-

- Vinyl chloride is a symmetric top molecule [Option ID = 2979]

93) Which of the following is a n-type semiconductor? [Question ID = 696]

1. Silicon carbide [Option ID = 2784]
2. Silicon [Option ID = 2781]
3. Arsenic doped silicon [Option ID = 2783]
4. Gallium doped silicon [Option ID = 2782]

Correct Answer :-

- Arsenic doped silicon [Option ID = 2783]

94) Which of the statement is not true? [Question ID = 746]

1. Franck Condon Principle states that during electronic transition the internuclear distance of a molecule does not change [Option ID = 2983]
2. The intensity of a fundamental vibrational transition is higher than that of a first overtone transition. [Option ID = 2984]
3. Morse equation represents the energy expression of a simple harmonic oscillator [Option ID = 2982]
4. The energy spacing between various vibrational levels are the same in a simple harmonic oscillator [Option ID = 2981]

Correct Answer :-

- Franck Condon Principle states that during electronic transition the internuclear distance of a molecule does not change [Option ID = 2983]

95) Which of the statement is true? [Question ID = 752]

1. The mean ionic activity coefficients of aqueous NaCl solution and aqueous KBr solution, both at low concentrations, are independent of their respective ionic strengths [Option ID = 3008]
2. The mean ionic activity coefficient of aqueous NaCl solution at low concentration decreases with increase in its ionic strength [Option ID = 3006]
3. The mean ionic activity coefficients of aqueous NaCl solution and aqueous KBr solution, both at low concentrations, vary differently upon increase of their respective ionic strengths [Option ID = 3007]
4. The mean ionic activity coefficient of aqueous NaCl solution at low concentration increases with increase in its ionic strength [Option ID = 3005]

Correct Answer :-

- The mean ionic activity coefficient of aqueous NaCl solution at low concentration decreases with increase in its ionic strength [Option ID = 3006]

96) The highest temperature that can be achieved due to a single normal mode of vibration in a solid crystal is known as: [Question ID = 757]

1. Debye Temperature [Option ID = 3026]
2. Theta Temperature [Option ID = 3027]
3. Curie Temperature [Option ID = 3025]
4. Flory Temperature [Option ID = 3028]

Correct Answer :-

- Debye Temperature [Option ID = 3026]

97) Which is not a scientific site? [Question ID = 691]

1. Research Gate [Option ID = 2763]
2. Scopus [Option ID = 2761]
3. Web of Science [Option ID = 2762]
4. Google Plus [Option ID = 2764]

Correct Answer :-

- Google Plus [Option ID = 2764]

98) According to the Michaelis Menten equation for unimolecular reactions: [Question ID = 751]

1. The rate is first order at low pressure, but becomes zero order at high pressure [Option ID = 3003]
2. The rate is zero order at both low and high pressures [Option ID = 3002]
3. The rate is zero order at low pressure, but becomes first order at high pressure [Option ID = 3004]
4. The rate is first order at both low and high pressures [Option ID = 3001]

Correct Answer :-

- The rate is first order at low pressure, but becomes zero order at high pressure [Option ID = 3003]

99) The +1 oxidation state is more stable than +3 oxidation state for which of the following Group 13 element [Question ID = 694]

1. In [Option ID = 2775]
2. B [Option ID = 2773]
3. Al [Option ID = 2774]
4. Tl [Option ID = 2776]

Correct Answer :-

- Tl [Option ID = 2776]

100) In how many ways can 10 distinguishable particles be placed in 3 boxes, so that there are 3 particles in first box, 5 in second and 2 in third? [Question ID = 737]

1. None of these [Option ID = 2948]
2. 1520 ways [Option ID = 2946]
3. 3260 ways [Option ID = 2947]
4. 2520 ways [Option ID = 2945]

Correct Answer :-

- 2520 ways [Option ID = 2945]