What is the Wavelength of the electron..

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MODEL QUESTIONS

1. Which of the following set of transition metal of 3d-series have maximum and minimum melting point respectively?
1) Cr and Mn 2) Fe and Zn
3) Cr and Cu 4) Fe and Hg

2. At the given condition of CH_4–O_2 fuel cell the cell emf is 0.8 V and the enthalpy of combustion of $CH_4(g)$ is –772 kJ/mol.The maximum efficiency of the given fuel cell in the given condition is:
1) 60 % 2) 75 %
3) 80 % 4) 90 %

3. Which of the following is NOT true ?
1) The catalyst ZSM–5 converts alcohols directly into gasoline (petrol).
2) Charge on Lyophilic colloids depends on pH of medium.
3) The charged colloidal particles of the sol formed by addition of $FeCl_3$ in excess $NaOH_{(aq.)}$ moves towards cathode during electrophoresis.
4) Physisorption is reversible in nature

4. Select the incorrect match for the extraction process involved for the given metal ore.
1) Cu_2S : Self reduction
2) $CuCO_3.Cu(OH)_2$:Carbon Reduction
3) $CuFeS_2$: Froth floatation
4) FeS_2 : Self Reduction

5. What is the pH of the solution obtained by mixing equal volumes of two solutions having pH values 9 and 11.Assume no components of the two solutions reacts. [Given : log 5 = 0.7]
1) 3.3 2) 10.7
3) 11.3 4) 10.3

6. A species 'X' can show reaction with both HCl and NaOH. 'X' cannot be :
1) Al_2O_3 2) Zn
3) PbS 4) $ZnCO_3$

7. The molar mass of a gas is 50 g/mol.The density of the gas at critical temperature and critical pressure of 30 atm is 125 g/L.What is the critical temperature of the gas?
[Take: R =0.08 L atm mol^{-1} K^{-1}]
1) 200 K 2) 500 K
3) 300 K 4) 400 K

8. The ionic radii (in Å) of N^{3-}, O^{2}, F^- are respectively
1) 1.71, 1.40 and 1.36
2) 1.71, 1.36 and 1.40
3) 1.36, 1.40 and 1.71
4) 1.36, 1.71 and 1.40

9. A photon of energy 9.4 eV strikes to the electron present in third excited state of He^+. What is the Wavelength of the electron after absorption of the 9.4 eV energy of the photon ?
1) 4 Å 2) 1.8 Å
3) 5 Å 4) 6.65 Å

10. In which of the following complex, ligands are considered as strong field ligands (SFL)?
1) $[NiCl_4]^{2-}$ 2) $[PtCl_4]^{2-}$
3) $[Fe(NH_3)_6]^{2+}$
4) $[FeF_6]^{3-}$

11. A mixture of $NaHC_2O_4$ and $H_2C_2O_4$ requires 50mL, 0.1 M$KMnO_4$ (aq.) solution during titration in Acidic medium. The same mass of $NaHC_2O_4$ and $H_2C_2O_4$ requires 50mL, 0.4M NaOH (aq.) solution for the complete neutralisation. Calculate the mass of $H_2C_2O_4$ in the initial mixture.
1) 1.250 g 2) 0.900 g
3) 0.450 g 4) 0.675 g

12. In which of the following option the property of the given substance is wrongly matched?
1) CrO_2 - Ferromagnetic
2) MnO -Antiferromagnetic
3) C_6H_6 - Ferrimagnetic
4) Fe_3O_4 - Ferrimagnetic

13. Calculate the weight of urea which must be dissolved in 490 g water so that the solution obtained has vapour pressure 2% less than vapour pressure of pure water.
1) 60 g 2) 30 g
3) 33.33 g 4) 40 g

14. Which of the following option is incorrect about NO_2 and ClO_2?
1) Both are paramagnetic species
2) Both have bent shape
3) Both compounds dimerised readily.
4) Both have sp^2 hybridisation

15. Which statement is incorrect ?
1) Proline has 2° amine group
2) D-Glucose and D-Fructose form same product on reduction by red P / HI
3) D-Glucose and D-Mannose form different product on reaction with 3 eq. of phenyl hydrazine.
4) Sucrose is non reducing carbohydrate

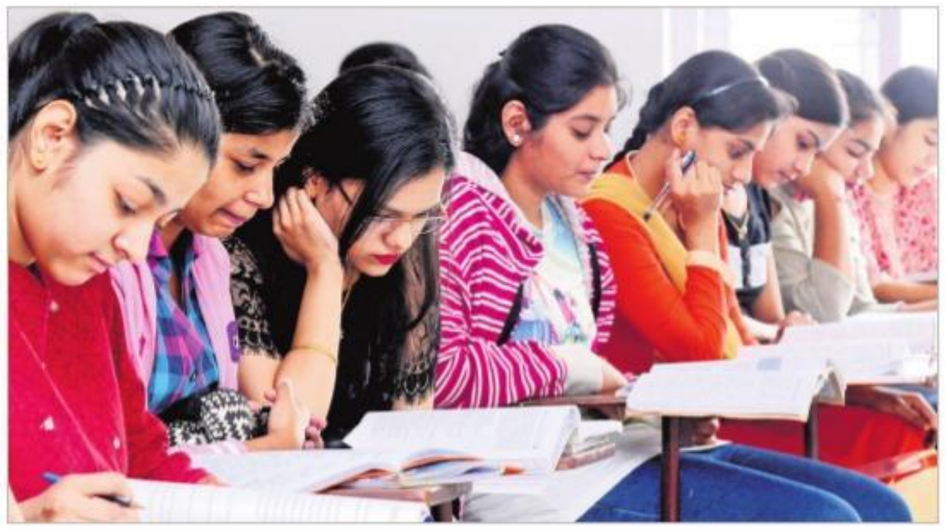
16. Which of the following agents is responsible for generating chlorine radicals into stratosphere?
1) Smog 2) NO_2
3) UV radiation
4) CFC

17. Which one is a copolymer?
1) PVC 2) Polypropene
3) Polystyrene
4) Glyptal

18. An optically active compound (A) has the molecular formula C_6H_{10}. The compound gives a ppt. when treated with $Ag(NH_3)_2OH$. On catalytic hydrogenation, A yields $B(C_6H_{14})$ which is only optically inactive. Identify the total number of Alpha H in product formed by treatment of A with O_3/H_2O_2 then LAH and then H^+/ Heat .
1) 7 2) 6
3) 8 4) 9

19. which of the following will give cannizaro reaction
1) 2-Butanone
2) Cyclo pentanone
3) 2-Methyl Propanone
4) Glyoxal

20. In which of the following pairs at least one of the compounds give positive Tollens test?
1) Glucose and sucrose
2) Glucose and fructose
3) Fructose and sucrose
4) All



KEY WITH SOLUTIONS

1. 3;
Theory based

2. 3;

$\Delta G = -nFE_{cell}$
$= (-8 \times 96500 \times 0.8)$ J/mol
$\therefore$ % efficiency
$= \frac{-8\times96500\times0.8}{-772\times1000}\times100\%$

3. 3; Theory based

4. 4;
Self reduction is done for sulphide ores. FeS_2 is not suphide ore. so carbon reduction is done for FeS_2. Self reduction is done for Pb, Hg and Cu.

5. 2;
For the solution 1 : pH = 9
$\therefore$ pOH = 5 $\therefore [OH^-]_1 = 10^{-5}$ M
For the solution 2 : pH = 11
$\therefore$ pOH = 3 $\therefore [OH^-]_2 = 10^{-3}$ M
Resultant $[OH^-]$ =
$(10^{-3} + 10^{-5})/2 = 5 \times 10^{-4}$ M
$\therefore$ pOH = – log (5×10^{-4})
= 4 – 0.7
$\therefore$ Resultant pH
= 14 – (4 – 0.7)
= 10.7

6. 3;
$PbS + HCl_{(aq.)} \rightarrow$ no reaction
$PbS + NaOH \rightarrow$ no reaction

7. 4;
VC =(50/125) L / mol
= 0.4 L / mol
Zc = (PcVc)/RTc=3/8
Tc=(8PcVc)/3R=
$\frac{(8\times30\times0.4)}{(3\times0.08)} = 400K$

8. 1;
Order of ionic radii
$N^{3-} > O^{2-} > F^-$
1.71, 1.40, 1.36

9. 3;
K.E. of ejected electron
$= 9.4–13.6(2^2/4^2) =$ 6eV
Wavelength $=(150/6)^{1/2}$ = 5A0

10. 2;
All ligands act as SFL for 4d & 5d series elements, so in $[PtCl_4]^{2-}$, ligand are considered as SFL

11. 4;
Let n $NaHC_2O_4$ be 'a' mol&n $NaHC_2O_4$ be 'b' mol
In 1st titration :
$\left(\frac{2a}{5}\right)+\left(\frac{2b}{5}\right)=\frac{0.1}{50}$
a+b =12.5.....(i)
in 2nd titration:
a + 2b = 20 .....(ii)
on solving (i) and (ii) b = 7.5
$\therefore m_{H_2C_2O_4} = \left(\frac{7.5}{1000}\right)\times 90g = 0.675$ g

12. 3;
Memory based

13. 3;
(P0–Ps/Ps) = n/N
(100–98/98) = (m/60)/(490/18)
m = 33.33g

14. 3;
Dimerisation tendency of
$NO_2 > ClO_2$
Reason : Odd e^- is localized in NO_2 and delocalized in ClO_2

15. 3;
D-glucose and D-Mannose are C_2 epimers and form the same osazone.

16. 4;
Theory based

17. 4;
Glyptal is made from polymerization of ethylene glycol and pthalic acid.

18. 4;
3-Methyl But 1-ene ----→ White Ppt
3-Methyl But 1-ene -ozonalysis→ 3-Methyl Butanoic acid --- LAH →3-Methyl But 1-ol
3-Methyl But 1-ol --H^+/Heat---→ 2-Methyl But 2-ene

19. 4;

20. 4;
Glucose, Fructose, Maltose are reducing sugars.