CHEMISTRY

1. For Ist order reaction, time required for 99.9% completion is :

(1)
$$2t_{1/2}$$
 (2) $4t_{1/2}$ (3) $5t_{1/2}$ (4) $10t_{1/2}$

Ans. (4)

Sol. $\frac{t_{99.9\%}}{t_{1/2}} = \frac{\frac{1}{k} \ln\left(\frac{100}{100 - 99.9}\right)}{\frac{1}{k} \ln 2} = \frac{\ln(10^3)}{\ln 2} = \frac{3}{0.3} = 10$ $t_{99.9\%} = 10t_{1/2}$

- 2. Number of non polar molecules among following are : HF, H₂O, CO₂, NH₃, SO₂, H₂, CH₄, BF₃
- Ans. (4)

Sol. CO₂, H₂, CH₄, BF₃

3. 3M NaOH solution is to be prepared using 84 g NaOH, then the volume of solution in litre is $_ \times 10^{-1}$

Ans. (7)

Ans.

Sol.
$$3 = \frac{84/40}{V_{sol(L)}}$$

- \therefore V_{solution} = 0.7 L
- 4. Select incorrect match :

(3)	
(4) Photography :	AgBr
(3) Wacker's process :	PtCl ₂
(2) Polythene :	Ziegler-Natta catalyst [Al ₂ (CH ₃) ₆ + TiCl ₄]
(1) Haber process :	Fe

Sol. Wacker's process : PdCl₂

5.	1 mole PbS is oxidised by x mole O_3 liberating y mole O_2 .				
	Determine $(x + y)$.				
Ans.	(8)				
Sol.	$PbS + 4O_3 \longrightarrow PbS$	$SO_4 + 4O_2$			
	x = 4; $y = 4$				
6.	Spin only magnetic	moment of [Pt(NH ₃) ₂ C	cl(CH ₃ NH ₂)]Cl is :		
Ans.	(0)				
Sol.	$Pt^{+2}: 5d^8 \Rightarrow dsp^2 \& unpaired e^- = 0 \Rightarrow Magnetic moment = 0$				
7.	S-1: Formation of Ce^{4+} is favoured by inert gas configuration.				
	S-2: Ce^{4+} acts as strong oxidising agent & converts to Ce^{3+} .				
Ans.	Both S-1 & S-2 are correct.				
8.	Which of the follow	ing can't act as oxidisin	ng agent ?	2	
	(1) MnO_4^-	(2) N^{3-}	(3) BrO_3^{-}	(4) $SO_4^{2^-}$	
Ans.	(2) (2)			· • •	
Sol.	In N^{-3} , nitrogen is present in minimum O.N. & hence it cannot act as oxidising agent.				
0					
).	(1) Molarity	(2) Molality	(3) Mole fraction	(A) Mass %	
Ans	(1) Wolanty (1)	(2) woranty		(4) 11/1/05 /0	
Sol.	Ouantities involving	volume are temperatu	re dependent		
201		••••••••••••••••••••••••••••••••••••••	•••••		
10.	Reduction potential of hydrogen electrode at $pH = 3$ is				
	$(2.303 \text{RT}_{0.052})$				
	$\left($				
Ans.	(-0.177 volt)				
Sol.	$\mathrm{H}^{+}(\mathrm{aq}) + \mathrm{e}^{-} \longrightarrow \frac{1}{2} \mathrm{H}_{2}(\mathrm{g})$				
	R.P. = $-\frac{0.059}{1}\log\left(\frac{1}{H^+}\right) = -0.059\log(10^{+3})$				
	$= -0.059 \times 3 = -0.177$ volt				

11. Identify the species in which central atom is in d^2sp^3 hybridisation :

(3) $[PtCl_4]^{2-}$ (4) $[Co(NH_3)_6]^{3+}$ (1) SF_{6} (2) BrF_5 Ans. (4) sp^3d^2 SF_6 : Sol. sp^3d^2 BrF₅ : $[PtCl_4]^{2-}$: dsp^2 $[Co(NH_3)_6]^{3+}$ d^2sp^3 •

- **12.** $\Delta H^{\circ} = +77.2 \text{ kJ}, \Delta S^{\circ} = 122 \text{ J/mol-K}, T = 300 \text{ K}, \log K = ?$
- Ans. (-7.07)
- **Sol.** $\Delta G^{\circ} = -2.303 RT log k$

77.2	$\frac{300 \times 122}{2}$	$-2.303 \times 8.314 \times 300 \log K$
11.2 -	1000	1000
∴ logl	K = -7.07	

13. In group 16

Statement-I: Oxygen shows only –2 oxidation state.

Statement-II : On moving top to bottom, stability of +4 oxidation state decreases, whereas that of +6 oxidation state increases.

- (1) Both Statement I and Statement II are correct.
- (2) Both Statement I and Statement II are incorrect.
- (3) Statement I is correct but Statement II is incorrect.
- (4) Statement I is incorrect but Statement II is correct.
- Ans. (2)
- Sol. Statement-I : Since electronegativity of oxygen is very high, it shows only negative oxidation state as -2 except in the case of OF₂ where its oxidation state is +2.

Statement-II: The stability of + 6 oxidation state decreases down the group and stability of + 4 oxidation state increases (inert pair effect).

- 14. How many of following has/have noble gas configuration ? Sr^{2+} , Cs^+ , Yb^{+2} , La^{2+}
- Ans. (2)
- **Sol.** (Sr^{2+}, Cs^{+})
- **15.** Which of the following has d^{10} configuration ?

	(1) Cr, Cd, Cu, Ag	(2) Cd, Cr, Ag, Zn
	(3) Ag, Cr, Cu, Zn	(4) Cu, Cd, Zn, Ag
Ans.		
Sol.	$Cr : [Ar] 3d^5 4s^1$	

Cu : [Ar] $3d^{10} 4s^1$ Ag : [Kr] $4d^{10} 5s^1$ Zn : [Ar] $3d^{10} 4s^2$ Cd : [Kr] $4d^{10} 5s^2$

16. Which of the following is used to identify the phenolic group test?

- (1) Carbylamine test(2) Lucas test(3) Tollen's test(4) Phthalein dye test
- Ans. (4)





Ans. (P) – (2); (Q) – (1); (R) – (4); (S) – (3)

19. When egg is boiled then which of the following structure of protein remains intact?

- (1) Quaternary structure (2) Primary structure
- (3) Secondary structure (4) Tertiary structure

Ans. (2)

20. Which of the following compound will not give S_N 1 reaction?

- (1) $CH_2=CH-CH_2Cl$ (2) $Ph-CH_2-Cl$ (3) $\underset{H_3C}{H_3C}CH-Cl$ (4) $CH_3-CH=CH-Cl$
- Ans. (4)
- 21. The second homologue of monocarboxylic acid is

(1) HCOOH (2) CH₃COOH (3) CH₃CH₂COOH (4) CH₃CH₂CH₂-COOH Ans. (2)

22.
$$() \xrightarrow{CH=CH_2} (1) \xrightarrow{B_2H_6/H_2O_2,OH^{\Theta}} \text{Product is} \\ (2) \xrightarrow{HBr} (3) \xrightarrow{Mg/dry \text{ ether}} (4) \xrightarrow{H-C-H} (4) \xrightarrow{H-C-H} (5) \xrightarrow{H_3O^+} (5) \xrightarrow{H_3O^+} (5) \xrightarrow{H_3O^+} (2) \xrightarrow{Ph-CH_2-CH_2-CH_2-OH} (1) \xrightarrow{Ph-CH-CH_3} (2) \xrightarrow{Ph-CH_2-CH_2-OH} (3) \xrightarrow{Ph-CH_2-CH_2-O-CH_3} (4) \xrightarrow{Ph-CH_2-CH_3-OH} (4) \xrightarrow{Ph-CH_2-CH_3-OH} (4) \xrightarrow{Ph-CH_2-CH_3-OH} (4) \xrightarrow{Ph-CH_2-CH_3-OH} (4) \xrightarrow{Ph-CH_2-CH_3-OH} (4) \xrightarrow{Ph-CH_2-CH_3-OH} (4) \xrightarrow{Ph-CH_3-OH} (4) \xrightarrow{P$$



23. When 9.3 gm of aniline in reacted with acetic anhydride then mass of acetanilide formed is [X] gm. Report your answer as 10X.



Mole of Aniline =
$$\frac{9.3}{93} = 0.1$$

Mole of acetanilide = 0.1 Mass of acetanilide = $0.1 \times 135 = 13.5$ gm $10x = 13.5 \times 10 = 135$ gm

24. The correct stability order of following resonating structures is

(I) CH₂=CH–CH=O (II)
$$\stackrel{\oplus}{CH_2-CH=C-H}$$
 (III) $\stackrel{\Theta}{CH_2-CH=C-H}$
(1) II > III > I (2) I > II > III (3) I > III > II (4) III > II > I
Ans. (2)

- 25. Steam volatile and water immiscible substances are separated by
 - (1) Steam distillation (2) Fractional distillation under reduced pressure
 - (3) Fractional distillation (4) Distillation.
- Ans. (1)

26. How many of the following compounds contain chiral centre ?





27. The bond line representation of following compound is CH(OH)(CN)₂



