

GATE – 2007 – Chemistry



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Q.1 – Q.20 Multiple Choice Question (MCQ), carry ONE mark each(for each wrong answer: – 1/3).The rate of sulphonation of benzene can be significantly enhanced by the use of(a) a mixture of HNO3 and H2SO4(b) conc. H2SO4

(c) a solution of SO_3 in H_2SO_4

- (d) SO_3
- 2. The given reaction is an example of a

+ 2 Na + 2 C₂H₅OH
$$\xrightarrow{\text{liq.NH}_3}$$
 + 2 C₂H₅ONa

(a) Birch reduction

1.

- (b) Clemmenson reduction
- (c) Wolff-Kishner reduction (d) hydride reduction
- 3. The major product (X) of the monobromination reaction is



4. Benzene can not be iodinated with I₂ directly. However, in presence of oxidants such as HNO₃, iodination is possible. The electrophile formed in this case is

(a)
$$[I^+]$$
 (b) $[I^-]$ (c) $\begin{bmatrix} +\delta & +\delta \\ I & OH_2 \end{bmatrix}^{\mathsf{T}}$ (d) $\begin{bmatrix} +\delta & -\delta \\ I & OH_2 \end{bmatrix}^{\mathsf{T}}$

NT---

5. Classify the given species as electrophiles (E) and nucleophiles (Nu) in routine organic synthesis, SO₃ ; Cl⁺ ; CH₃NH₂ ; H₃O⁺ ; BH₃ ; CN⁻

	E		INU
(a)	SO_3 , Cl^+ , BH_3	;	CH_3NH_2 , H_3O^+ , CN^-
(b)	Cl^{+} , $H_{3}O^{+}$;	SO_3 , CH_3NH_2 , BH_3 , CN^-
(c)	Cl ⁺ , H ₃ O ⁺ , BH ₃	;	SO_3 , CH_3NH_2 , H_3O^+ , CN^-
(d)	SO ₃ , Cl ⁺ , H ₃ O ⁺ , BH ₃	;	CH_3NH_2 , CN^-

6. The major product obtained upon treatment of compound 'X' with H_2SO_4 at 80 °C is:





	(a) (b)	(c) (d	
7.	BaTi[Si₃O ₉] is a class of		
	(a) ortho silicate (b) cyclic silicate	(c) chain silicate (d)	sheet silicate
8.	The ground state term for V ³⁺ ion is		
	(a) ${}^{3}F$ (b) ${}^{2}F$	(c) ${}^{3}P$	(d) 2 D
9.	In photosynthesis, the predominant	metal present in the	reaction centre of
	photosystem-II is		
	(a) Zn (b) Cu	(c) Mn	(d) Fe
10.	The octahedral complex/complex ior	n which shows both fa	cial and meridional
	isomers is	CAL	
	(a) Triglycinatocobalt(III)	(b) Tris(ethylenediam	ine) cobalt(III)
	(c) Dichlorodiglycinatocobalt(III)	(d) Trioxalactocobalta	te(III)
11.	Zn in carbonic anhydrase is Coord	linated by three histic	line and one water
	molecule. The reaction of CO ₂ with this	s enzyme is an example of	of
	(a) electrophilic addition	(b) electron transfer	
	(c) nucleophilic addition	(d) electrophilic substit	ution
12.	The difference in the measured and c	alculated magnetic mor	nent (based on spin-
	orbit coupling) is observed for	No. And	
	(a) Pm^{3+} (b) Eu^{3+}	(c) Dy^{3+}	(d) Lu^{3+}
13.	For a redox reaction, Cd ²⁺ + 2e ⁻	\leftrightarrow Cd, the $(E_P)_{anodic}$	observed in cyclic
	voltammetry at hanging mercury drop	electrode is -650 mV	vs SCE. The expected
	value for $(E_P)_{cathodic}$ is		
	(a) -708 mV (b) -679 mV	(c) -650 mV	(d) -621 mV
14.	The dimension of Planck constant is	(M, L and T denote m	ass, length and time
	respectively)		
	(a) ML^3T^{-2} (b) ML^2T^{-1}	(c) $M^2 L^{-1} T^{-1}$	(d) $M^{-1}L^2T^{-2}$
15.	For a homonuclear diatomic molecule,	the bonding molecular of	orbital is
	(a) σ_u of lowest energy	(b) $\sigma_{\rm u}$ of second lo	owest energy
	(c) π_g of lowest energy	(d) π_{u} of lowest e	nergy
16.	The selection rules for the appearance	ce of P-branch in the r	otational-vibrational
	absorption spectra of a diatomic mol	ecule within rigid rotor	-harmonic oscillator

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 \bigoplus



19. Which of the following statements is NOT correct for a catalyst?

(b) $(\partial H/\partial n_i)_{s.v.n_i}$

(b) (x, -y, -z)

(a) It increases the rate of a reaction TE & JAN

model are

(a) $\Delta v = \pm 1$ and $\Delta J = \pm 1$

(c) $\Delta v = +1$ and $\Delta J = -1$

nucleus at (x, y, z) to

mixture $(i \neq j)$ is:

(a) $(\partial E/\partial n_i)_{s.v.n_i}$

(a) (-x, -y, z)

18.

- (b) It is not consumed in the course of a reaction
- (c) It provides an alternate pathway for the reaction
- (d) It increases the activation energy of the reaction
- 20. The value of the rate constant for the gas phase reaction $2NO_2 + F_2 \rightarrow 2NO_2F$ is 38 dm³mol⁻¹s⁻¹ at 300K. The order of the reaction is
 - (a) 0(b) 1 (c) 2(d) 3

Q.21 – Q.85 Multiple Choice Question (MCQ), carry TWO marks each (for each wrong answer: - 2/3).

- Boric acid in aqueous solution in presence of glycerol behaves as a strong acid due 21. to the formation of ем Аср
 - (a) an anionioc metal-chelate
 - (c) glycerate ion

- (b) borate anion
- (d) a charge transfer complex

22. Match the compounds in List-I with the corresponding structure/property given in List-II

	List I		List II
(P)	(Ph ₃ P) ₃ RhCl	(i)	Spinel
(Q)	LiC ₆	(ii)	Intercalation
(R)	PtF ₆	(iii)	Oxidizing agent
(S)	Ni ₃ S ₄	(iv)	Catalyst for alkene hydrogenation
	l		I
	P Q R	S	P Q R S

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iii ; i

; ii

iv

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(b) iv ;

ii ; iii ;

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i



(a)

4

(c) iii ; ii ; i ; iv (d) iv ; iii ; ii ; i

23. W(CO)₆ reacts with MeLi to give an intermediate which upon treatment with CH₂N₂ gives a compound X. 'X' is represented as

(a) WMe_6 (b) $(CO)_5W-Me$ (c) $(CO)_5W=C(Me)OMe$ (d) $(CO)_5W\equiv CMe$

- 24. Considering the quadrupolar nature of M-M bond in [Re₂Cl₈]²⁻, the M-M bond order in [Re₂Cl₄(PMe₂Ph)₄]⁺ and [Re₂Cl₄(PMe₂Ph)₄] respectively are
 (a) 3.0 and 3.0
 (b) 3.0 and 3.5
 (c) 3.5 and 3.5
 (d) 3.5 and 3.0
- 25. A student recorded a polarogram of 2.0 mM Cd²⁺ solution and forgot to add KCl solution. What type of error do you expect in his results?
 - (a) Only migration current will be observed
 - (b) Only diffusion current will be observed
 - (c) both migration current as well as diffusion current will be observed
 - (d) Both catalytic current as well as diffusion current will be observed
- 26. The separation of trivalent lanthanide ions, Lu³⁺, Yb³⁺, Dy³⁺, Eu³⁺ can be effectively done by a cation exchange resin using ammonia o-hydroxy isobutyrate as the eluent. The order in which the ions will be separated is
 - (a) Lu^{3+} , Yb^{3+} , Dy^{3+} , Eu^{3+} (b) Eu^{3+} , Dy^{3+} , Yb^{3+} , Lu^{3+}
 - (c) Dy^{3+} , Yb^{3+} , Eu^{3+} , Lu^{3+} , $DY_{AM-TN-27-001930}$ (d) Yb^{3+} , Dy^{3+} , Lu^{3+} , Eu^{3+}
- 27. Arrange the following metal complexes in order of their increasing hydration energy

$[Mn(H_20)_6]^{2+}$					[V ((H ₂ 0) ₆] ²⁺	Λ	[Ni((H ₂ 0) ₆] ²	+	I	[Ti(ł	H ₂ 0)) ₆] ²⁻	F	
		Р					Q	141		U.	R				5	5		
(a)	Р	<	S	<	Q	<	< R				(b)	Р	<	Q	<	R	<	S
(c)	Q	<	Р	<	R	<	< S				(d)	S	<	R	<	Q	<	Р

28. In the complex, Ni₂(η⁵-Cp)₂(CO)₂], the IR stretching frequency appears at 1857 cm⁻¹ (strong) and 1897 cm⁻¹ (weak). The valence electron count and the nature of the M-CO bond respectively are

- 29. The correct classification of $[B_5H_5]^{2-}$, B_5H_9 and B_5H_{11} respectively is
 - (a) closo, arachno, nido (b) arachno, closo, nido
 - (c) closo, nido, arachno (d) nido, arachno, closo
- 30. The compounds **X** and **Y** in the following reaction are

 $P_4S_{10} \xrightarrow{EtOH} (X) \xrightarrow{Cl_2} (Y) \xrightarrow{p-O_2NC_6H_4ONa} Parathion$

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⁽a) $16 e^-$, bridging (b) $17 e^-$, bridging (c) $18 e^-$, terminal (d) $18 e^-$, bridging

	X	Y		X	Y
	(a) $(Et)_2 P(S)SH$; (E	$(t)_2 P(S) Cl$	(b) (EtO)) ₂ P(S)SH	; (EtO) ₂ P(S)Cl
	(c) (EtO) ₂ PSH ; (E	to) ₂ PCl	(d) (Et) ₃	РО	; (Et) ₂ PCl
31.	Consider the reactions				
	1. $[Cr(H_20)_6]^{2+} + [CoCl(H_20)_6]^{2+}$	$[\mathrm{NH}_3)_5]^{2+} \rightarrow$	$[Co(NH_3)_5(H_$	$[I_20)]^{2+} + [$	$[CrCl(H_2O)_5]^{2+}$
	2. $[Fe(CN)_6]^{4-} + [Mo(CN)_6]^{4-}$	$ _8]^{3-} \rightarrow [Fe]$	$(CN)_6]^{3-} + [N]^{3-}$	$10(CN)_8]^{4-1}$	-
	Which one of the following	is the correc	t statement?		
	(i) Both involve an inner sph	ere mechanis	m.		
	(ii) Both involve an outer sp	here mechanis	sm		
	(iii) Reaction 1 follows inner	r sphere and re	eaction 2 follow	vs outer sph	ere mechanism
	(iv) Reaction 1 follows outer	r sphere and re	eaction 2 follow	vs inner sph	ere mechanism
	(a) i (b) ii		(c) iv	(d)) iii
32.	The pair of compounds ha	ving the <mark>same</mark>	hybridization	for the ce	ntral atom is
	(a) XeF_4 and $[SiF_6]^2$		(b) $[NiCl_4]^2$	and [PtCl	4] ²⁻
	(c) Ni(CO) ₄ and XeO_2F_2		(d) [Co(NH ₃) ₆] ³⁺ and [$Co(H_2O)_6]^{3+}$
33.	In the reaction shown belo	w, X and Y r	espectively are	5	
	$\operatorname{Mn}_2(\operatorname{CO})_{10} \xrightarrow{\operatorname{Na}} (X)$	$() \xrightarrow{CH_3COCI} \rightarrow$	(Y)		
	\mathbf{x}	DYAMYTN-2			
	(a) $[Mn(CO)_4]^{2-}$; [CI	H ₃ C(0)Mn(CO)) ₅] ⁻	A	
	(b) [Mn(CO) ₅] ⁻ ; CH	₃ C(0)Mn(CO)5	W	
	(c) $[Mn(CO)_5]^-$; CIM	/In(CO) ₅	ICAD'		
	(d) $[Mn(CO)_4]^{2-}$; [Cl	$Mn(CO)_5]^-$			
34.	The Lewis acid character of	of BF ₃ , BCl ₃	and BBr ₃ foll	ows the ord	ler
	(a) $BF_3 < BBr_3 <$	BCl ₃	(b) BCl	₃ < BBr	₃ < BF ₃
	(c) $BF_3 < BCl_3 <$	BBr ₃	(d) BBr	$_{3}$ < BCl ₂	$_3 < BF_3$
35.	The compound which show	vs L←M char	<mark>ge</mark> transfer is		
	(a) Ni(CO) ₄ (b) K_2	Cr_2O_7	(c) Hg0	(d)	$[Ni(H_20)_6]^{2+}$
36.	The reaction of $[PtCl_4]^{2-1}$	vith <mark>NH</mark> 3 give	es rise to		
	(a) $[PtCl_4(NH_3)_2]^{2-}$		(b) trans-[P	$tCl_2(NH_3)_2$]
	(c) $[PtCl_2(NH_3)_4]$		(d) cis-[PtCl	$_{2}(NH_{3})_{2}]$	
37.	Zeise's salt is represented a	as			
	(a) H_2 PtCl ₆ (b) [PtCl	$[4]^{2-}$ (c)	$[\operatorname{ZnCl}_4]^{2-}$	(d) [PtCl ₃	$(\eta^2 - C_2 H_4)]^-$
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38. The catalyst used in the conversion of ethylene to acetaldehyde using Wacker process is (b) $[PdCl_4]^{2-}$ (c) V_2O_5 (d) TiCl₄ in the presence of Al(C_2H_5)₃ (a) $HCo(CO)_4$ The temperature of 54 g of water is raised from 15 °C to 75 °C at constant pressure. 39. The change in the enthalpy of the system is: $(C_{P;m} \text{ of water} = 75 \text{ JK}^{-1} \text{mol}^{-1})$ (c) 9.0 kJ (a) 4.5 kJ (b) 13.5 kJ (d) 18.0 kJ The specific volume of liquid water is 1.0001 mLg^{-1} and that of ice is 40. 1.0907 mLg⁻¹ at 0 °C. If the heat of fusion of ice at this temperature is 333.88 J g^{-1} , the rate of change of melting point of ice with pressure in deg atm⁻¹ will be (b) $0.0075 \stackrel{\text{E}}{=} \sim 14$ (c) 0.075(d) -0.075(a) -0.007541. If $E_{0_{(Fe^{3+}/Fe)}} = -0.04V$ and $E_{0_{(Fe^{2+}/Fe)}} = -0.44V$, then the value of $E_{0_{(Fe^{3+}/Fe^{2+})}}$ is (b) −0.40 V (a) 0.76 V (c) - 0.76 V(d) 0.40 V 42. For the reaction $P + Q + R \rightarrow S$, experimental data for the measured initial rates is given below. Expt. Initial conc. P Initial conc. Q Initial conc. R **Initial rate** (Ms^{-1}) **(M) (M) (M)** 0.2 0.5 8.0×10^{-5} I. 0.4 II. 0.4 0.5 0.4 3.2×10^{-4} 0.4 2.0 0.4 1.28×10^{-3} III. 0.25 IV. 0.1 4.0×10^{-5} 1.6

The order of the reaction with respect to P, Q and R respectively is:

(b) 2, 1, 2

43. Sucrose is converted to a mixture of glucose and fructose in a pseudo first order process under alkaline conditions. The reaction has a half life of 28.4 min. The time required for the reduction of a 8.0 mM sample of sucrose to 1.0 mM is

(c) 2, 1, 1

44. The reaction, $2NO_{(g)} + O_{2(g)} \rightarrow 2NO_{2(g)}$ proceeds via the following steps

$$NO + NO \xrightarrow{k_a} N_2O_2$$
$$N_2O_2 \xrightarrow{k_a'} NO + NO$$
$$N_2O_2 + O_2 \xrightarrow{k_b} NO_2 + NO_2$$

(a) 2, 2, 1

(d) 1, 1, 2





The rate of this reaction is equal to

- (a) $2k_b [N0][0_2]$ (b) $(2k_ak_b[N0]^2[0_2])/(k_a + k_b[0_2])$
- (c) $2k_b [NO]^2[O_2]$ (d) $k_a [NO]^2[O_2]$
- 45. 40 millimoles of NaOH are added to 100 mL of a 1.2 M HA and 'Y' M NaA buffer resulting in a solution of pH 5. 30. Assuming that the volume of the buffer remains unchanged, the pH of the buffer ($K_{HA} = 1.00 \times 10^{-5}$) is (a) 5.30 (b) 5.00 (c) 0.30 (d) 10.30
- 46. The entropy of mixing of 10 moles of helium and 10 moles of oxygen at constant temperature and pressure (assuming both to be ideal gas) is:
 (a) 115.3 [K⁻¹
 (b) 5.8 [K⁻¹
 (c) 382.9 [K⁻¹
 (d) 230.6 [K⁻¹
- 47. The ionisation potential of hydrogen atom is 13.6 eV. The first ionistaion potential of a sodium atom, assuming that the energy of its outer electron can be represented by a H-atom like model with an effective nuclear charge of 1.84, is
 - (a) 46.0 eV (b) 11.5 eV (c) 5.1 eV (d) 2.9 eV
- 48. The quantum state of a particle moving in a circular path in a plane is given by $\varphi_m(\varphi) = (1/\sqrt{2\pi})e^{im\varphi}, m = 0, \pm 1, \pm 2,$

When a perturbation $H_1 = P \cos \phi$ is applied (P is a constant), what will be the first order correction to the energy of the mth state

(a) 0 (b) P/(2
$$\pi$$
) (c) P/(4 π) (d) Pm²/(4 π ²)

49. The correct statement(s) among the following is/are

- (i) The vibrational energy levels of a real diatomic molecule are equally spaced
- (ii) At 500K, the reaction $A \rightarrow B$ is spontaneous when $\Delta H = 18.83 \text{ kJ mol}^{-1}$ and $\Delta S = 41.84 \text{ JK}^{-1} \text{mol}^{-1}$
- (iii) The process of fluorescence involves transition from a singlet electronic state to another singlet electronic state by absorption of light
- (iv) When a constant 'P' is added to each of the possible energies of a system, its entropy remains unchanged
- (a) Only i (b) Only ii (c) Both i and iii (d) Both ii and iv
- 50. Assuming H₂ and HD molecules having equal bond lengths, the ratio of the rotational partition functions of these molecules, at temperature above 100 K is
 (a) 3/8
 (b) 3/4
 (c) 1/2
 (d) 2/3
- 51. N number of non-interacting molecules are distributed among three nondegenerate energy levels $\epsilon_0 = 0$, $\epsilon_1 = 1.38 \times 10^{-21}$ J and $\epsilon_2 = 2.76 \times 10^{-21}$ J at





100 K. If the average total energy of the system at this temperature is 1.38×10^{-18} J, the number of molecules in the system is:

(a) 1000 (b) 1503 (c) 2354 (d) 2987

52. The J = 0 → 1 rotational transition for ¹H⁷⁹Br occur at 500. 72 GHz. Assuming the molecule to be a rigid rotor, the J = 3 → 4 transition occurs at
(a) 50.1 cm⁻¹
(b) 66.8 cm⁻¹
(c) 16.7 cm⁻¹
(d) 83.5 cm⁻¹

53. The rate constants of two reactions at temperature T are $k_1(T)$ and $k_2(T)$ and the corresponding activation energies are E_1 and E_2 with $E_2 > E_1$. When temperature is raised from T_1 to T_2 , which one of the following relations is correct?

(a)
$$\frac{k_1(T_2)}{k_1(T_1)} = \frac{k_2(T_2)}{k_2(T_1)}$$
 (b) $\frac{k_1(T_2)}{k_1(T_1)} > \frac{k_2(T_2)}{k_2(T_1)}$ (c) $\frac{k_1(T_2)}{k_1(T_1)} \ge \frac{k_2(T_2)}{k_2(T_1)}$ (d) $\frac{k_1(T_2)}{k_1(T_1)} < \frac{k_2(T_2)}{k_2(T_1)}$

54. The number of degrees of freedom for a system consisting of NaCl_(s), Na⁺_(aq) and Cl⁻_(aq) at equilibrium is

55. Match the structures in List - I with their correct names in List - II.



iii

i

; ii

; v ;

; iv



(c)

- (d) i ; iii ; v ; ii ; iv
- 56. The result of the reduction of either (R) or (S) 2-methylcyclohexanone, in separate reactions, using LiAlH₄ is that the reduction of
 - (a) The R enantiomer is stereoselective
 - (b) The R enantiomer is stereospecific
 - (c) The S enantiomer is stereospecific
 - (d) Both the R and S enantiomers is stereoselective
- 57. The increasing order of basicity among the following is



if the concentration of both the reactants is doubled, then the rate of the reaction will

(a) remain unchanged
(b) quadruple
(c) reduce to one fourth
(d) double

59. Match the structures in List - I with the coupling constant given in List - II

$$\begin{array}{c|c} \textbf{List} - \textbf{I} & \textbf{List} - \textbf{II} \\ [^{1}\text{H} J (\text{Hz})] \end{array}$$

$$(\textbf{P}) \begin{array}{c} B^{r} \leftarrow C^{l} & (\textbf{i}) \\ H & H \end{array} & (\textbf{i}) \end{array} \sim 1 \text{ Hz}$$

$$(\textbf{Q}) \begin{array}{c} B^{r} \leftarrow H \\ H & Cl \end{array} & (\textbf{iii}) \end{array} \sim 10 \text{ Hz}$$

$$(\textbf{R}) \begin{array}{c} B^{r} \leftarrow H \\ Cl & H \end{array} & (\textbf{iiii}) \end{array} \sim 15 \text{ Hz}$$

	Р		Q		R		Р		Q		R
(a)	i	;	ii	;	iii	(b)	ii	;	iii	;	i
(c)	iii	;	ii	;	i	(d)	iii	;	i	;	ii







0



64. Match the observed principal absorptions in the visible spectrum shown in List - I with the bond shows this absorption in List - II.

	List – I		List - I	HE.	Р		Q		R		S
(P)	$\sigma \to \sigma^*$	(i)	С-С	(a)	i	;	ii	;	iii	;	iv
(Q)	$n \to \sigma^*$	(ii) 🍐	С-О	(b)	国	;	iii	;	ii	;	iv
(R)	$n \to \pi^*$	(iii)	C=O	(b)	ii	;	i	;	iv	;	iii
(S)	$\pi \to \pi^*$	(iv)	C=C	(d)	iv	;	ii	;	iii	;	i

65. Among the isomers $C_{10}H_{14}$ shown, the isomer that can be identified uniquely by mass spectrometry alone is: AM-TN-27-001930



66. The direction of rotation of the following thermal electrocyclic ring closures is,



- (a) disrotatory, disrotatory, disrotatory
- (c) disrotatory, disrotatory, conrotatory
- (b) conrotatory, conrotatory, conrotatory

(d) disrotatory, conrotatory, disrotatory.

67. The molecule(s) that exist as meso structure(s) is/are:

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68. Stereochemical descriptors for the atoms labeled H_a and H_b in the given structures are,



- 69. Treatment of the pentapeptide Gly-Arg-Phe-Ala-Ala, in separate experiments, with the enzymes Trypsin, Chymotrypsin and Carboxypeptidase-A respectively, gives:
 - (a) Gly-Arg + Phe-Ala-Ala; Gly-Arg-Phe + Ala-Ala; Gly-Arg-Phe-Ala + Ala
 - (b) Gly-Arg-Phe + Ala-Ala; Gly-Arg-Phe + Ala-Ala; Gly-Arg-Phe-Ala + Ala
 - (c) Gly-Arg + Phe-Ala-Ala; Gly-Arg-Phe-Ala + Ala; Gly-Arg-Phe + Ala-Ala
 - (d) Gly-Arg + Phe-Ala-Ala; Gly-Arg-Phe + Ala-Ala; Gly+Arg-Phe-Ala + Ala
- 70. Hordenine (X), an alkaloid, undergoes Hoffmann degradation to give compound-Y.
 (Y) on treatment with alkaline permanganate give (Z). Y and Z respectively are

$$\mathbf{X} = \mathsf{HO} - \mathsf{CH}_2 \mathsf{CH}_2 \mathsf{N} (\mathsf{CH}_3)_2$$



0



0



Linked Answer Type Questions. 84 and 85.

- 84. In the mixture obtained by mixing 25.0 mL of 1.2×10^{-3} M MnCl₂ and 35.0 mL of 6.0×10^{-4} M KCl solution, the concentrations (M) of Mn²⁺, K⁺ and Cl⁻ ions respectively are
 - (a) 6.0×10^{-4} , 3.0×10^{-4} , 1.5×10^{-3} (b) 6.0×10^{-4} , 3.0×10^{-4} , 9.0×10^{-4} (c) 5.0×10^{-4} , 3.5×10^{-4} , 1.35×10^{-3} (d) 5.0×10^{-4} , 3.5×10^{-4} , 8.5×10^{-4}

85. The activity (M) of Mn²⁺ ions in the above solution is

(a) 1.0×10^{-4}

(b) 2.0×10^{-4}

 10^{-4} (c) 3.0

(c) 3.0×10^{-4} (d) 4.0×10^{-4}

Answer Key

Q.No	Ans	Q.No	Ans	ATE	Q.No	Ans		Q.No	Ans
1.	b	26.	а	3AL C	51.	а		76.	b
2.	а	27.	а	6	52.	b		77.	а
3.	d	28.	С		53.	d		78.	d
4.	а	29.	С	K	54.	а	2	79.	b
5.	d	30.	b	A CO	55.	а	ſR	80.	b
6.	С	31.	d		56.	d	Y	81.	b
7.	b	32.	а		57.	С		82.	а
8.	а	33.	b		58.	d		83.	С
9.	С	34.	С		59.	b		84.	С
10.	а	35.	а		60.	а		85.	d
11.	С	36.	d	1VI~1IN-Z	61.	b			
12.	b	37.	d	Ş.	62.	d			
13.	b	38.	b	N.	63.	а	5		
14.	b	39.	b		64.	а	1 A		
15.	d	40.	а	M A	65.	b			
16.	С	41.	а		66.	а			
17.	d	42.	С		67.	d			
18.	а	43.	С		68.	С			
19.	d	44.	b		69.	а			
20.	С	45.	b		70.	d			
21.	а	46.	а		71.	b			
22.	b	47.	С		72.	d			
23.	С	48.	а		73.	d			
24.	d	49.	b		74.	b			
25.	С	50.	а		75.	b			

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