

SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

CHEMISTRY

NEET-UG - Chemistry

Time Allowed: 1 hour

General Instructions:

- For each correct response, the candidate will get 4 marks.
- For each incorrect response, one mark will be deducted from the total scores

CHEMISTRY (Section-A)

1. 1 cc N_2O at NTP contains:

a)
$$\frac{1.8}{224} \times 10^{22}$$
 atomsb) all of thesec) $\frac{1.32}{224} \times 10^{23}$ electronsd) $\frac{6.02}{22400} \times 10^{23}$ molecules

2. P is the probability of finding the Is electron of hydrogen atom in a spherical shell of infinitesimal thickness, dr, [4] at a distance r from the nucleus. The volume $4\pi r^2 dr$. The qualitative sketch of the dependence of P on r is:



- 3. Which family of elements has solid, liquid and gaseous members at 25° C and 1 atm pressure?
 - a) Alkali metals (Li—Cs) b) Chalcogens (O—Te)
 - c) Halogens (F—I) d) Pnictogens (N—Bi)
- 4. The ratio of σ bond in P₄O₁₀ and P₄O₆ is respectively:
 - a) 4:3 b) 3:4
 - c) 4:1 d) 1:4
- Consider the following species: CN⁺, CN⁻, NO, CN
 Which one of these will have the highest bond order?

a) _{CN}⁺ b) NO

c) _{CN}- d) CN

Maximum Marks: 180

[4]

[4]

[4]

- 6. Which of the following sets of orbitals has/have same geometry?
 - a) ${}_{sp^3,d^3s}$ b) ${}_{sp^2,d^4s}$

c)
$$sp_z$$
, $p_zd_z^2$ d) Both sp_z , $p_zd_z^2$ and sp^3 , d^3s

7. Enthalpy change for the reaction, $4H(g) \rightarrow 2H_2(g)$ is -869.6 kJ

The dissociation energy of H - H bond is

- a) +434.8 kJ b) +217.4 kJ
- c) -434.8 kJ d) -869.6 kJ
- 8. Identify the CORRECT graph for a weak electrolyte.

9.

10.

11.

12.

13.

b) a) √C √C α α c) d) \sqrt{C} α α Equivalent masses of NH₃ in the reactions are: [4] i. $4NH_3 + 5O_2 \longrightarrow 4NO + 6H_2O_2$ ii. $2NH_3 \longrightarrow N_2 + 3H_2$ b) 5:3 a) 5:6 d) 6 : 5 c) 3:5 It is found that V forms a double salt isomorphous with Mohr's salt. The oxidation number of V in this [4] compound is: b) -4 a) +4 c) +3 d) +2 [4] LiAlH₄ violently decomposes in water to give: a) Al(OH)₃ b) all of these c) LiOH d) H₂ Which statement is wrong? [4] a) Basic structural unit in silicates is the SiO₄ b) Mg₂SiO₄ is orthosilicate. tetrahedron. c) Beryl is an example of cyclic silicate. d) Feldspars are not aluminosilicates. The order of stability of the following tautomeric compound is: [4]

[4]



20. For two I order reaction:

A \longrightarrow B; K ₁ = 10 ¹⁵ × e^{-1}	$\frac{2 \times 10^3}{T}$
$C \longrightarrow :; K_2 = 10^{14} \times e^{-2}$	$\frac{10^3}{T}$

The temperature at which both have same rate if [A] = [C] at t = 0:

21. Which of the following statements is incorrect?

i. Actinoid series comprises a group of 14 elements from Th to Lr.

ii. Actinoids interrupt the fourth transition series of d-block elements.

iii. Actinoids are placed in group 3 and period 6 of the periodic table.

iv. In actinoids, the differentiating electron enters 5f orbital.

a) Option (ii)

c) Option (i)

22. Which has sp²-hybridization?

a) CO

c) SO₂

23. Compound **X**, an orange coloured crystalline solid having Cr in its +6 oxidation state, is used in volumetric analysis. This compound **X** in presence of sulphuric acid oxidizes potassium iodide to form A, B, C and D. A and B are metal sulphates. D reacts with excess chlorine to form a yellow powder, E. However, an equimolar mixture of D and chlorine gives F. Compound E on hydrolysis gives F, iodic acid and hydrochloric acid. Based on the information, identify **X**, **C**, **D**, **E**, F respectively, and give the chemical formula of iodic acid.

b) Option (iv)

d) Option (iii)

b) CO₂

d) N₂O

a)
$$X = K_2Cr_2O_7$$
, $C = H_2O$, $D = KIO_3$, $E =$
 ICl_3 , $F = ICl$, Iodic acid = HIO_3
c) $X = K_2Cr_2O_7$, $C = H_2O$, $D = I_2$, $E = ICl_3$, F
 $= ICl_3$, Iodic acid = HIO_3
d) $X = K_2Cr_2O_7$, $C = H_2O$, $D = I_2$, $E = ICl_3$, F
 $= ICl_3$, Iodic acid = HIO_3
d) $X = K_2Cr_2O_7$, $C = H_2O$, $D = I_2$, $E = ICl_3$, F
 $= ICl_3$, Iodic acid = HIO_3
() $X = K_2Cr_2O_7$, $C = H_2O$, $D = I_2$, $E = ICl_3$, F
 $= ICl_3$, Iodic acid = HIO_3
() $X = K_2Cr_2O_7$, $C = H_2O$, $D = I_2$, $E = ICl_3$, F
 $= ICl_3$, Iodic acid = HIO_3

24. In the compound Lithium tetra-hydroaluminate, the ligand is

a) _H -	b) H
a) H-	U) N

c) _H+ d) F-

25. Match the following:

Coordination compounds	Coordination number
i. $[CoCl_2(en)_2]^+$	a. 6
ii. [Ag(NH ₃) ₂] ⁺	b. 5

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[4]

[4]

[4]

[4]

	iii. [Fe(CO) ₅]		c. 4	
	iv. [Pt(NH ₃)BrCl(NO ₂)]		d. 2	
	a) i - b, ii - a, iii - c, iv - d	b) i -	a, ii - b, iii - d, iv - c	ı
	c) i - a, ii - d, iii - b, iv - c	d) i -	d, ii - c, iii - a, iv - b	
26.	$\begin{array}{c} \text{2-Chlorobutan} \xrightarrow{15\% \ aq. \ solution \ of \ ethyl \ alcohol} P \end{array}$			[4]
	In this reaction 70% racemisation takes place. %	of inverted	product would be:	
	a) 70	b) 35		
	c) 30	d) 65		
27.	The strongest acid from the following is		L'rs	[4]
	a) OH	b)	OH	
		ĺ		
	NO ₂		CH ₃	
	c) OH	d)	OH	
	CI CI			
28.	The major product formed in the following react	ion is:	X Y	[4]
	$CO_2H \xrightarrow{(i) \text{ LiBH}_4} \text{ major pro}$	oduct		
	$\bigcirc \qquad \qquad$			
		b)	CO ₂ H	
	CO ₂ Et CO		O OH	
	c) ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	d) /		
29.	The major product formed in the following reaction	ion is		[4]
	CONH ₂ Br ₂ /NaOH			
	$_{\text{COOCH}_3} _{\Delta}$			
	a) NH	^{b)}		
			Ş.↓	
			$\sim \sim \sim 0$	
		d) (QL J	
30.	Calorific value is in the order:			[4]

a) Fats > Carbohydrates > Proteins

b) Fats > Proteins > Carbohydrates

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c) Proteins > Carbohydrates > Fats	d) Carbohydrates > Fats > Protein	
The end product of protein digestion is:		[4]
a) α - amino acids	b) protones	
c) peptones	d) peptides	
Find the correct sequence of intermediates formed due	ring the conversion of p-nitrotoluene to p-nitroaniline.	[4]
a) p-Nitroacetanilide, p-Bromoaniline, p- Nitrobenzoic acid	b) p-Bromoacetanilide, p-Bromoaniline, p- Nitrobenzoyl chloride	
c) Benzenediazonium chloride, Benzyl alcohol, p-Nitrobenzaldehyde	d) p-Nitrobenzoic acid, p-Nitrobenzoyl chloride, p-Nitrobenzamide	
$\Lambda^\circ_{m(\mathrm{NH}_4\mathrm{OH})}$ is equal to:		[4]
a) $\Lambda^\circ_{m({ m NaOH})} + \Lambda^\circ_{m({ m NaCl})} - \Lambda^\circ_{m({ m NH}_4{ m Cl})}$	b) $\Lambda^{\circ}_{m(\mathrm{NH}_4\mathrm{Cl})} + \Lambda^{\circ}_{m(\mathrm{NaOH})} - \Lambda^{\circ}_{m(\mathrm{NaCl})}$	
c) $\Lambda^{\circ}_{m(\mathrm{NH}_4\mathrm{Cl})} + \Lambda^{\circ}_{m(\mathrm{NaCl})} - \Lambda^{\circ}_{m(\mathrm{NaOH})}$ Lassaigne's extract obtained from p-amino thiophenol	d) $\Lambda^{\circ}_{m(\mathrm{NH}_4\mathrm{OH})} + \Lambda^{\circ}_{m(\mathrm{NH}_4\mathrm{Cl})} - \Lambda^{\circ}_{m(\mathrm{HCl})}$ I on treatment with excess of sodium contain	[4]
a) only NaCN	b) only Na ₂ S	
c) only NaSCN	d) NaCN and Na ₂ S	
The concentration of oxalic acid is \mathbf{x} mol litre ⁻¹ . 45 m KMnNO ₄ . What is the pH of \mathbf{x} M oxalic acid solution (Assume that oxalic acid dissociates completely.)	L of this solution reacts with 20 mL of 0.05 M acidified ?	[4]
a) 3.2 c) 3	b) 2.5 d) 1	
CHEMIST	RY (Section-B)	
Attempt an Which of the following statement is true for IO_2 F_2^- ? i. The electrons are located at the corners of a trigon ii. It has sp ³ d hybridisation and is T-shaped. iii. Its structure is analogous to SF ₄ . iv. Both (i) and (iii)	y 10 questions al bipyramidal but one of the equatorial pairs is unshared.	[4]
a) (i)	b) (ii)	
c) (iii)	d) Both (i) and (iii)	
Which of the followings is an spectator ion in the read $2Na + 2HCl \longrightarrow 2NaCl + H_2$	ction?	[4]
a) H+	b) _{Na} +	
c) Cl-	d) _H -	
Aluminium dissolves in hot concentrated sulphuric ac this oxide is	id, evolving a sulphur oxide 'X'. Oxidation state of S in	[4]

a) +4b) +6c) +2d) +3The electron affinity values for the halogens show the following trend:a)
$$F < Cl > Br > I$$
b) $F < Cl > Br < I$

c)
$$F < Cl < Br < I$$
 d) $F > Cl > Br > I$

40. The orbital diagram in which the Aufbau principle is violated:

39.

41.

42.

a)
$$2s 2p$$

 $1 111$
c) $2s 2p$
 $1 1111$
c) $2s 2p$
 $1 1111$
Select the correct statement(s) regarding Sc₂Si₂O₇. [4]
a) It is an example of orthosilicate. b) Anion is made of two tetrahedra units, sharing one comer.
c) It has cyclic structure. d) All of these
For the reaction (1)
 $2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g),$
if $-\frac{d[N_2O_5]}{dt} = 0.04 \text{ M s}^{-1}$, then $\frac{d[NO_2]}{dt}$ is _____.
a) 0.04 M/s b) 0.12 M/s
c) 0.02 M/s d) 0.08 M/s

43. Equivalent conductance of NaCI, HCI and C_2H_5COONa at infinite dilution are 126.45, 426.16 and 91 Ω^{-1} cm², [4] respectively. The equivalent conductance of C_2H_5COOH is:

a) 698.28
$$\Omega^{-1}$$
 cm²
b) 390.71 Ω^{-1} cm²
c) 201.28 Ω^{-1} cm²
d) 540.48 Ω^{-1} cm²

- 44. Al₂O₃ is reduced by electrolysis at low potentials and high currents. If 4.0×10^4 amperes of current is passed [4] through molten Al₂O₃ for 6 hours, what mass of aluminium is produced? (Assume 100% current efficiency. At. mass of Al = 27 g mol⁻¹)
 - a) 1.3×10^4 g b) 8.1×10^4 g c) 2.4×10^5 g d) 9.0×10^3 g
- 45. A substance A decomposes by a first order reaction starting initially with [A] = 2.00 m and after 200 min, [A] [4] becomes 0.15 m. For this reaction $t_{\frac{1}{2}}$ is:

a) 46.45 min	b) 48.45 min
c) 53.49 min	d) 50.49 min

- 46. Repeated use of which one of the following fertilizers would increase the acidity of the soil?
 - a) Urea b) Superphosphate of lime

[4]

	c) Potassium nitrate	d) Ammonium sulphate	
47.	In a familiar classroom demonstration, concentrated	$\rm H_2SO_4$ is added to a breaker containing sucrose	[4]
	$(C_{12}H_{22}O_{11})$, to produce a column of carbon. In this reaction, the H_2SO_4 is acting primarily as a:		
	a) dehydrating agent	b) precipitating agent	
	c) complexing agent	d) oxidizing agent	
48.	The manganate and permanganate ions are tetrahedra	al, due to	[4]
	a) there is no π -bonding	b) the π -bonding involves overlap of p-orbitals of oxygen with d-orbials of manganese	
	c) the π -bonding involves the overlap of p-	d) the π -bonding involves the overlap of d-	
	orbitals of oxygen with p-orbitals of	orbitals of oxygen with d-orbitals of	
	manganese	manganese	
49.	$[Ni(CN)_4]^{2-}$ and $[NiCl_4]^{2-}$ have similarity but not	in:	[4]
	a) C.N. and O.N.	b) magnetic moment	
	c) both magnetic moment and structure	d) structure	
50.	Arrange the following amines in the decreasing order	r of basicity:	[4]
	(I) (I) (I) (I) (II) (II) (III) (III) (III) (III) (III)	b) III > I > II	
	c) I > II > III	d) I > III > II	