BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER - 1



EIC INDIA'S N	OSINDIA	FINAL SOLU	TION MASTER FO	OR JEE MAIN BY J.H. SIR
1.	The composition of a sar	nple in Sn _{4.44} O ₈ . Calculate t	he ratio of Sn^{+4} to Sn^{+2} .	
	(A) 2	(B)4	(C) 6	(D) 1
2.	The ratio of the energy of state of Be ³⁺ is	of the electron in ground sta	te of hydrogen atom to th	at of the electron in the first excited
	(A) 1 : 4	(B) 1 : 8	(C) 1 : 16	(D)4:1
3.	In the following reaction	:		
	$B(OH)_3 + H_2O \longrightarrow [B(OH)_3 + H_2O) \longrightarrow [B(OH)_3 + H_$	$[H]_4]^- + H^+$		
	(A) $B(OH)_3$ is a Lewis act	id	(B) $B(OH)_3$ is a Lewis b	base
	(C) $B(OH)_3$ is amphoteric		(D) None is correct	
4.	Two samples A and B of $V/2$, isothermally for A a	an ideal gas, initially at sam nd adiabatically for B. The f	e temperature and pressuring of A will be	re, are compressed from volume V to
	(A) Greater than that of]	B	(B) Less than that of B	
	(C) Twice that of B		(D) Equal to that of B	
5	The pair of amphoteric h	vdrovide in :		
5.	(A)Al(OH) ₃ , LiOH	$(B) Be(OH)_2, Mg(OH)_2$	$(C) B(OH)_3, Be(OH)_2$	(D) $\operatorname{Be}(OH)_2$, $\operatorname{Zn}(OH)_2$
6.	Given at 150°C for the rea a, b & c mol. At same ter [↑ increases ↓ decrease (A) Concentration (B) Partial pressure (C) Concentration (D) Partial pressure	action $PCl_{5}(g) \rightleftharpoons PCl_{3}(g) +$ mperature volume is increases s] $PCl_{5} PCl_{3} Cl_{2}$ $\downarrow \qquad \uparrow \qquad \uparrow$ $\uparrow \qquad \uparrow \qquad \uparrow$ $\downarrow \qquad \downarrow \qquad \downarrow \qquad \downarrow$ $\downarrow \qquad \uparrow \qquad \uparrow$	Cl ₂ (g) equilibrium moles f ed then at new equilibrium	for PCl_5 , PCl_3 and Cl_2 respectively are m select correct option(s) :
7.	Four rubber tubes are fill firstly is -	ed with H_2 , O_2 , N_2 & He resp	pectively. The tube which	will require to be reinflated (refilled)
	(A) H_2 filled tube	(B) O_2 filled tube	(C) N_2 filled tube	(D) He filled tube
8.	Select correct statement (A) Li_2CO_3 decomposes (B) LiCl is predominant (C) Li_3N is stable (D) All of the above	(s). into oxides while other alka ly convalent	lli carbonates are thermal	ly stable.
9.	Assuming 2s-2p mixing O_{2}^{+} , NO:	is not operative, the no. of pa	ramagnetic species among	g the following are Be_2, B_2, C_2, N_2, O_2 ,
	(A) 1	(B)2	(C) 3	(D)4

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Calculate the density of NaCl type ionic solid AB ($M_w = 60$) in gm/cm³ if shortest distance between two nearest 10. neighbours is 100 pm & solid having 20% schottky defect ($N_A = 6 \times 10^{23}$) 40 (A) 1

$$0 (B) 20 (C) 30 (D)^2$$

11. The kinetic data recorded at 278 K for the reaction $NH_{4}^{+}(aq) + NO_{2}^{-}(aq) \longrightarrow N_{2}(g) + 2H_{2}O(l)$ is

Set no.	[NH4 ⁺]/M	[NO ₂ ⁻]/M	Rate of reaction MS ⁻¹
1	0.24	0.10	7.2×10 ⁻⁶
2	0.12	0.10	3.6×10 ⁻⁶
3	0.12	0.15	5.4×10 ⁻⁶

The kinetic rate expression and the unit of rate constant (k) of the above reaction are respectively: (B) $k[NH_{4}^{+}]$ and s^{-1}

 $(A) k[NH_4^{+}] [NO_2^{-}] and Ms^{-1}$ $(C)k[NH_4^+][NO_2^-]$ and $M^{-1}s^{-1}$

 $(D) k[NO_2^{-1}] and s^{-1}$

12. Which of the following graph correctly illustrate the dependence of the cell voltage, E_{cell}, on the pH for the reaction, $2Ag^{+}(aq) + H_{2}(g) \rightarrow 2Ag(s) + 2H^{+}(aq)$

Assume the silver ion remains constant at, $[Ag^+] = 1.0$ M and the H, pressure remains constant at 1 atm



13.	Which of the following will have two stereoisomeric forms?					
	$(I) [Cr(NO_3)_3(NH_3)_3]$	(II) $K_{3}[Fe(C_{2}O_{4})_{3}]$	(III) $[\text{CoCl}_2(\text{en})_2]^+$	(iv) $[\text{CoBrCl}(\text{Ox})_2]^{3-}$		
	(A) I only	(B) I and II	(C) III and IV	(D) All of these		

14. 2 g of an organic compound is burnt completely in a bomb calorimeter at 298 K. The final temperature of calorimeter was found to be 298.5 K. Calorimeter constant is 200 JK⁻¹ and molar mass of the compound is 50g. What is the enthalpy of combustion per mol of the compound in kJ unit?

(C) 15 kJ (A) 2.5 kJ (B) 10 kJ (D) 20 kJ

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- 15. When H_2O_2 is added to an acidified solution of $K_2Cr_2O_2$ then : (A) solution turns green due to formation of Cr₂O₃ (B) solution turns yellow due to formation of K₂CrO₄ (C) a blue coloured compound $CrO(O_2)_2$ is formed (D) solution gives green ppt of $Cr(OH)_3$ 16. The solubility of AgBr in water and in 0.01M CaBr, 0.01M KBr, and 0.05M AgNO₃ be S₁, S₂, S₃ and S₄ respectively, give the relation of solubilities. (A) $S_1 > S_2 > S_3 > S_4$ (B) $S_1 > S_3 > S_2 > S_4$ (C) $S_2 > S_1 > S_3 > S_4$ (D) $S_4 > S_3 > S_1 > S_2$ $Na_2CrO_4 \xrightarrow{A} Na_2SO_4 + \underset{(Orange)}{B} \rightarrow \underset{(Orange red)}{C} + NaCl$ 17. A, B and C respectively are : (A) K_2SO_4 , K_2CrO_4 and $K_2Cr_2O_7$ (B) K₂SO₄, Na₂CrO₄ and Na₂Cr₂O₇ (D) H₂SO₄, Na₂Cr₂O₇ and K₂Cr₂O₇ (C) H_2SO_4 , NaCrO₂ and $K_2Cr_2O_7$ 18. A compound X dimerises in water, if its observed molecular weight and theoretical molecular weight are 161.84 and 94 respectively. The %degree of association of compound X will be (A) 84 (B)60 (C) 80(D)45 19.
- Which is INCORRECT statement?
 - (A) Polling process is used to remove Cu₂O from Cu
 - (B) Cupellation process is used to remove traces of lead from silver
 - (C) Liquation process is used for purification of metals whose melting point are higher than those of impurities
 - (D) Extraction of lead from galena involves roasting at moderate temperature followed by self reduction at high temperature
- 20. The incorrect statement pertaining to the adsorption of a gas on a solid surface is :
 - (A) Adsorption is always exothermic
 - (B) Physisorption may transform into chemisorption at high temperature
 - (C) Physisorption increases with increasing temperature but chemisorption decreases with increasing temperature
 - (D) Chemisorption is more exothermic than physisorption, however it is very slow due to higher energy of activation.

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4.

5.

6.

- **1.** Identify the incorrect statement below :
 - (A) Goldstein discovered neutrons in his experiments on "canal rays".
 - (B) The Millikan "oil drop" experiment was able to determine the charge of an electron.
 - (C) Rutherford's "gold foil experiment" established that atoms are mostly empty.
 - (D) Thomson determined the charge to mass ratio of electrons in his cathode ray tube experiments.
- 2. An electron resides in a subshell which has 9 degenerate orbitals and the principal quantum number associated with this subshell has minimum possible value. The sum of 'n' & ' ℓ ' for this electron is (A) 4 (B) 6 (C) 7 (D) 9
- 3. Which of the following is zero overlapping which leads to non-bonding?



 $Ag^{+}(aq) + Cl^{-}(aq) \rightleftharpoons AgCl(s);$

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	$\Delta G^\circ = -56.6 \text{ kJ} \pmod{4}$	$(r^{+})^{-1}$		
	Calculate the value for	the thermodynamic equil	ibrium constant, K at 25°C	for the reaction
	$AgCl(s) + 2NH_{3}(l) \rightleftharpoons A$	$Ag(NH_{3})_{2}^{+}(aq) + Cl^{-}(aq)$		
	(A) 3.62×10^2	(B) 1.00	(C) 9.94×10^{-1}	(D) 2.76×10^{-3}
7.	The ionic radii of alkali	i metal ions in water (hyd	rated radii) are in the order	
	(A) $Li^+ > Na^+ < K^+ > R$	$b^+ < Cs^+$	(B) $Li^{+}(aq.) > Na^{+}(aq.)$	$aq.) > K^+(aq.) > Rb^+(aq.) > Cs^+(aq.)$
	(C) $Li^+ < Na^+ > K^+ > Rb$	$D^{+} > CS^{+}$	(D) $Li^{+}(aq.) < Na^{+}(aq.)$	$(aq.) < K^+(aq.) < Rb^+(aq.) < Cs^+(aq.)$
8.	Which metal and metal	l sulphide both give NO g	gas with dil. HNO ₃ .	
	(A) Zn, ZnS	(B) Fe, FeS	(C) Pb, PbS	(D) Hg, HgS
9.	Using the following en	ergy values, determine th	ne lattice energy of KF(s) :	
	Property	Energy (kJ mol ⁻¹)		
	$\Delta H_{atomization}$ of K(s)	90		
	$\Delta H_{atomization}$ of $F_2(g)$	158		
	ΔH_{f} of KF(s)	-567		
	IE of K(g)	419		
	EA of F(g)	328		
	(A) 51 kJ	(B)-827 kJ	(C)–1145 kJ	(D) 328
10.	Select the incorrect stat	tement about FCC (ABC	AB) structure :	
	(A) Distance between 1	nearest octahedral void a	nd tetrahedral void is $\frac{\sqrt{3}}{4}$	<u>a</u>
	(B) Distance between t	wo nearest octahedral vo	bid is $\frac{a}{\sqrt{2}}$	
	(C) Distance between t	wo nearest tetrahedral ve	bid is $\frac{\sqrt{3}a}{2}$	
	(D) Distance between 1	ayer A and B is $2r\sqrt{\frac{2}{3}}$	(r = radius of atom)	
11.	If the solubility produc distilled water is close	t of iron (III) hydroxide i to	s 1.8×10^{-37} , the pH of satu	arated solution of iron (III) hydroxide in
	(A) 4	(B)5	(C)7	(D) 9
12.	The resultant dipole m moment do you predict (A) 1.81 D for NO ₂ F and	oment µ of two compour t? d 0.47D for NOF	nd NOF and NO ₂ F is 1.81 I	D and 0.47D respectively. Which dipole
	(B) 0.47 D for NO_2F and	d 1.81 D for NOF		
	(C) For both NO_2F and NO_2F and NO_2F and	NOF, dipole moment (µ) i NOF. Dipole moment (µ)	s 0.81D. is 0.47D.	

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13.	Bromine water reacts with	n SO ₂ to form :		
	(A) H_2O and HBr	(B) HBr and S	(C) H_2SO_4 and HBr	(D) S and H_2O
14.	For the coagulation of 10 flocculation value of NaC	00 ml arsenious sulphide s 1?	ol, 10 ml of 0.5 M NaCl s	olution is required. Calculate the
	(A) 50	(B) 60	(C) 80	(D) 100
15.	A radioactive substance u yr) some time back. Not 6.0×10^{x} yr back, the valu	pon nuclear fission produce w the sample contains 709 the of x is?	ed two radio-isotopes $X(t_{1/2})$ % Y of total nuclei preser	= 10^{10} years) and Y($t_{1/2} = 2.5 \times 10^9$ nt. If the nuclear fission occured
	(A) 5	(B)6	(C)7	(D)9
16.	Which of the following co	omplexs have a maximum n	umber of unpaired electrons	s?
	$(A) [Ni(CO)_4]$	(B) $[Co(NH_3)_4(NO_2)_2]^+$	$(C) [Ag(CN)_2]^-$	(D) $[CuBr_4]^{2-}$
17.	 XeF₆ undergoes partially statement regarding Xen. (A) All have planar geom (B) All are oxo-fluoro xe (C) All are non planar an (D) All have different hyperbolic formula (D) and the statement of the	 and completely Hydrolysi on compounds formed on F netry. non compounds id polar bridisation and different nu 	is and gives different Xen Iydrolysis. mber of lone pairs of centra	on compounds, select the correct I atom.
18.	Depression in freezing po NaA is [Given molarity = 1	int of 0.01 m aqueous soluti molality, K _c (H ₂ O) = 1.85 K k	fon of HA is 0.01924 K. The g mol ⁻¹]	e pH of 0.01 M aqueous solution of
	(A) 5.6	(B)8.4	(C) 9.4	(D)11.2
19.	The specific conductance tivity of the solution is -	of a 0.20 M solution of an el	ectrolyte at 20°C is 2.48×10^{10}	0^{-4} ohm ⁻¹ cm ⁻¹ . The molar conduc-
	(A) $1.24 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$	(B) 4.96 ohm ⁻¹ cm ² mol ⁻¹	(C) 1.24 ohm ^{-1} cm ²	(D) $4.96 \text{ ohm}^{-1} \text{ cm}^2$
20.	$Ag_2S + NaCN + Zn \longrightarrow$	Ag		
	This method of extraction	n of Ag by complex formation	on and then its displacemen	t is called :
	(A) Parke's method		(B) Mac Arthur - Forest n	nethod
	(C) Serpek method		(D) Hall's method	

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ETC	OSINDIA D. 1 ONLINE COACHING	FINAL SO	LUTION MASTEI	R FOR JEE MAIN BY J.H. SIR
1.	If a protein has 0.0	7% Fe (M = 56) by weight as t	he only metal, its molar	mass would be at least $M \times 10^4$ g. Here M
	is			
	(A)4	(B) 6	(C)8	(D) 10
2.	The atomic masses	s of He and Ne are 4 and 20 am	u, respectively. The val	ue of the de-Broglie wavelength of He gas
	at-73°C is 'M' tin	nes that of the de-Broglie wave	length of Ne at 727°C.	Mis
	(A) 4	(B)6	(C)5	(D) 3
3.	Select the hybridis pairs on central ato	sation which have non planar g	geometry when all are b	ond pair, but planar when there are 2 lone
	(A) sp^3	(B) $sp^{3}d$	(C) sp^3d^2	(D) All of the above
4.	Select the correct of	order from the following		
	(A) $N_2 O < N_2 O_3 <$	NO ; acidic character	(B) MgO > Al_2O_3	> SiO ₂ ; basic character
	(C) $Fe^{2+} < Fe^{3+} < Mn^{2+}$; ionic radius order		(D) $Sc > La > Y$; Ionisation energy order	

5. One of the reaction that take place in producing steel from iron ore is the reduction of iron (II) oxide by carbon monoxide to give iron metal and CO_2 . FeO + CO(g) \rightleftharpoons Fe(s) + CO₂(g)

$$Kp = 0.25 \text{ at } 1050 \text{ K}$$

What are the partial pressure of CO & CO₂ at 1050 K if the initial pressure is $P_{CO_2} = 1.5 \& P_{CO_2} = 0.8$?

(A)
$$P_{co} = 1.84$$
, $P_{co_2} = 0.46$ (B) $P_{co} = 1.6$, $P_{co_2} = 0.4$ (C) $P_{co} = 1.5$, $P_{co_2} = 0.8$ (D) $P_{co} = 1.2$, $P_{co_2} = 0.3$

6. The graph that wrongly represents the Boyle's law of an ideal gas is



Codes :

	Р	Q	R	S
(A)	(1)	(2)	(3)	(4)
(B)	(3)	(2)	(1)	(4)
(C)	(2)	(1)	(3)	(4)
(D)	(4)	(3)	(1)	(2)

8. $0.04 \text{ M Na}_2\text{SO}_4$ solution (in water) is isotonic with 0.1 M acetic acid solution (in benzene having 80% association) at the same temperature. What is the apparent degree of dissociation of Na₂SO₄?

(A) 0.25 (B) 0.50 (C) 0.75	(D)0.85
----------------------------	---------

9. The emf of a cell corresponding to the following reaction is 0.20 V at 298 K.

 $Zn(s) + 2H^{+}(aq) \rightarrow Zn^{2+}(0.1 \text{ M}) + H_{2}(g)$

The approximate pH of the solution at the electrode where hydrogen is being produced is $(p_{H_2} = 1 \text{ atm})$

 $(E_{Zn/Zn^{+2}}^0 = 0.76V)$

Assume $\left(\frac{2.30}{2}\right)$	$\left(\frac{03RT}{F}\right) = 0.6$		
(A) 8	(B)9	(C) 10	(D) 11

10. Statement -1: At low pressure and high temperature, the value of compressibility factor Z is unity because

Statement 2 : When pressure is extremely low attractive forces play significant role in deviation from ideal behaviour.

(A) Statement-1 is true, Statement-2 is true and Statement -2 is correct explanation for Statement -1.

(B) Statement-1 is true, Statement-2 is true and Statement -2 is NOT the correct explanation for Statement -1.

(C) Statement-1 is true, Statement-2 is false.

(D) Statement-1 is false, Statement-2 is true.

11. The enthalpy of neutralisation of strong monoprotic acid and strong monoacidic base is -57 kJ mol^{-1} at 300 K temperature. The change in entropy of surrounding due to following reaction is (in JK⁻¹)

 $H^{+}(aq) + OH^{-}(aq) \longrightarrow H_{2}O(\ell)$ (A) 190 (B)-190

(C)750

(D) None of these

- 12. Which of the following statement regarding H_3PO_3 is incorrect.
 - (A) Its pK_a value is less than H_3PO_2
 - (B) On heating it gives PH_3 and H_3PO_4
 - (C) It can be prepared by hydrolysis of both PCl_3 and P_4O_6
 - (D) It is formed during reaction of white phosphorus with alkali
- 13. In the extraction of copper, metal is formed in the Bessemer converter due to reaction.

(A) $Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$	(B) $Cu_2 S \rightarrow 2Cu + S$
(C) $Fe + Cu_2O \rightarrow 2Cu + FeO$	(D) $2Cu_2O \rightarrow 4Cu + O_2$

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- **14.** The C.F.S.E. of $[Co(NH_3)_6]Cl_3$ is (A) - 7.2 Δ_0 (B) - 0.4 Δ_0 (C) - 2.4 Δ_0 (D) - 3.6 Δ_0
- 15. What will be the colour of the solution when Mn(OH)₂ is treated with conc. HNO₃ and sodium bismuthate (or red lead or lead dioxide)?
 (A) yellow
 (B) Purple
 (C) Green
 (D) Blue

16. A (colourless salt)
$$\xrightarrow{\Delta} \underbrace{B+C}_{gas} + D$$

 $D \xrightarrow{H_2O} E$

Gas C turns solution E milky. B burns with blue flame. A also decolourises MnO₄⁻/H⁺. Thus, A, B, C, D and E are

	А	В	С	D	Е
(A)	CaC_2O_4	CO	CO ₂	CaO	Ca(OH) ₂
(B)	CaC_2O_4	CO ₂	CO	CaO	Ca(OH) ₂
(C)	CaCO ₃	CaO	CO	CO ₂	Ca(OH) ₂
(D)	CaOCl,	Cl,	O ₂	CaO	Ca(OH),

- 17. Which of the following statement is incorrect
 - (A) On mixing of solutions of equal concentration of $NH_4Cl(aq)$ and NaOH(aq) can act as buffer solution.
 - (B) Aqueous solution of NaCN salt is basic
 - (C) pH of solution of NaH_2PO_4 is independent of its concentration
 - (D) $pH of 10^{-7} M NaOH$ (aq) solution is 7 at 25°C

18. In order to measure the volume of the blood system of an animal, the following experiment was done : A 1.0 mL sample of an aqueous solution containing tritium with an activity of 2.0×10^6 disintegrations per second (dqs) was injected into the blood stream. After time was allowed for complete circulatory mixing, a 1.0 mL blood sample was withdrawn and found to have an activity of 1.5×10^4 dps. What was the volume of the circulatory system? (The half-life of tritium is 12.3 years)

(A) 133.33 mL (B) 122.13 mL (C) 143.23 Ml (D) 153.31 mL

19. Sodium (Na = 23) crystallizes in BCC arrangement. If the unoccupied edge length of sodium crystal is 53.6pm, then density of sodium crystals is

	(A) 2.	07 g/cc	(B) 1.19 g/cc	(C) 2.38 g/cc	(D) 0.59 g/cc
20.	Select	the incorrect mate	ch		
		Set of species		Distinguished by using	
	(A)	NaCl, NaBr		Conc. H_2SO_4	
	(B)	SO ₃ ²⁻ , S ₂ O ₃ ²⁻		CaCl ₂	
	(C)	$Pb^{2+}(aq), Zn^{2+}(aq)$	aq)	Excess NH ₄ OH	
	(D)	$Ag^{+}(aq), Cd^{2+}(aq)$	aq)	Excess KCN	

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1.	Which of the followi	ng is correct code ? (T =	true, F = False)					
	(a) Amongs 1s, 2p, 3	d orbitals, 1s orbital have the	e nature of $\psi_r v/s r$ graph is d	ifferent from others				
	(b) According to He particles.	isenberg uncertainty princip	le, we can not find trajecto	ries of electrons and other similar				
	(c) An atomic orbital	is the wave function ψ for an	electron in an atom.					
	(A) T T T	(B) F T T	(C) F T F	(D) T T F				
2.	Which of the followi	ng traids have approximately	equal size?					
	(A) Na^{\oplus} , Mg^{2+} , Al^{3+}		(B) F ⁻ , Ne, O ²⁻					
	(C) Fe,Co,Ni		(D) Mn^{2+} , Fe^{2+} , Cr					
3.	The curve drawn bel	ow shows the variations of P	as a	_				
	function of 1/V for a	fixed mass and temp. of an id	leal gas.	$/^{T_1}$ T				
	It follows from the cu	urve that		/ / 2				
	$(A) T_{3} > T_{2} > T_{1}$							
	(B) $T_1 > T_2 > T_3$							
	(C) $T_1 = T_2 = T_3$							
	(D) Nothing can be p	predicted about temp	-	1				
				/				
4.	For elementary gase	ous phase reaction $2NO + O_2$	\Rightarrow 2NO ₂ at 27°C Rate of the	e forward reaction is given by				
	rate = 2×10^3 [NO] ² [O,] and						
	Rate of reverse reaction	ion at 27°C is given by rate =	20[NO ₂] ² Hence equilibrium	constant for reaction is :				
	$NO_2 \longrightarrow NO + \frac{1}{2}O$	0₂ at 27°C						
	(A)100	(B)0.01	(C) 0.1	(D) 10				
5.	The enthalpy of atom	nisation of C.H. (liquid) is (in	$kJ mol^{-1}$)					
	[Given : B.E. (C–C) = 80 kJ mol ⁻¹ : B.E. (C=C) = 420 kJ mol ⁻¹ : B.E. (C–H) = 100 kJ mol ⁻¹ .							
	Resonance energy of	Resonance energy of benzene = 150 kJ mol ⁻¹ : Δ H(C H ℓ) = 35 kJ mol ⁻¹]						
	(A) 1230	(B) 2215	(C) 2250	(D)2285				
6.	Certain amount of a	non-ideal gas is changed from	n state (500 K, 5 atm, 2L) to	(150 K, 2 atm, 1L). If the change in				
	internal energy is 14	L-atm, change in enthalpy in	L-atm unit is					
	(A) 5	(B)6	(C)7	(D) 8				
7.	Which of the followi	ng reactions are disproportic	nation reactions					
	(i) $Cu^+ \rightarrow Cu^{2+} + Cu^{2+} + Cu^{2+}$	u						
	(ii) $3MnO_4^{2-} + 4H^+ -$	$\rightarrow 2MnO_4^- + MnO_2 + 2H_2O$						
	(iii) $3KMnO_4 \rightarrow K_2N$	$\operatorname{AnO}_4 + \operatorname{MnO}_2 + \operatorname{O}_2$						
	(iv) $3NinO_4^2 + 3Nin^2$ (A) (i)	(B)(i),(ii) and (iii)	(C) (ii), (iii) and (iv)	(D)(i) and (ii)				
0	· · · ·		· · · · · · · · · · · · · · · · · · ·					
8.	In the dichromate dia	nnion						
	(A) $4 \text{ Cr} - 0$ bonds a	re equivalent	(B) 6 Cr $-$ O bonds are (equivalent				
	(C) All $Cr - O$ bonds	are equivalent	(D) All $Cr - O$ bonds as	re non-equivalent				

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- 9. The nitrogen atoms in NH_3 , NH_2^- and NH_4^+ are all surrounded by eight electrons. When these species are arranged in increasing order of H–N–H bond angle, correct order is (A) NH_3 , NH_2^- , NH_4^+ (B) NH_4^+ , NH_2^- , NH_3 (C) NH_3 , NH_4^+ , NH_2^- (D) NH_2^- , NH_3 , NH_4^+
- 10. Which one of the following reactions represents a calcination reaction? (A) HgS + $O_2 \rightarrow$ Hg + SO₂ (B) AgNO₃ + NaCl \rightarrow AgCl + NaNO₃ (C) CuCO₃. Cu(OH)₂ \rightarrow CuO + CO₂ + H₂O (D) Al₂O₃ + NaOH \rightarrow NaAlO₂ + H₂O
- 11. The unit cell of a compound made up of the three elements X, Y and Z are given below



- 12. Electrolysis of molten KBr generates bromine gas, which can be used in industrial bromination process. How long will take to convert a 500 kg batch of phenol to monobromophenol using a current of 20 kA?
 (A) 14.26 hour
 (B) 56.52 hour
 (C) 70.14 hour
 (D) 0.7 hour
- 13. $[Cr(H_2O)_6]Cl_3$ (atomic number of Cr = 24) has a magnetic moment of 3.83 B.M. The correct distribution of 3d-electrons in the chromium present in the complex is :

(A) $3d_{xy}^{1}, 3d_{yz}^{1}, 3d_{zx}^{1}$ (B) $3d_{xy}^{1}, 3d_{yz}^{1}, 3d_{z^{2}}^{1}$ (C) $3d_{(x^{2}-y^{2})}^{1}, 3d_{z^{2}}^{1}, 3d_{zx}^{1}$ (D) $3d_{xy}^{1}, 3d_{(x^{2}-y^{2})}^{1}, 3d_{xz}^{1}$

14.Which ion has least flocculation/ coagulation value for a positive sol ?(A) C^{1-} (B) SO_4^{2-} (C) PO_4^{3-} (D) $[Fe(CN)_6]^{4-}$

15.Which reactions are used for the preparation of the halogen acid?(A) KBr + H_2SO_4(conc.) \rightarrow K_2SO_4 + 2HBr(B) CaF_2 + H_2SO_4(conc) \rightarrow Ca (HSO_4)2 + HF(C) NaCl + H_2SO_4(conc) \rightarrow NaHSO_4 + HCl(D) 2KI + H_2SO_4(conc) \rightarrow K_2SO_4 + 2HI

16. A piece of charred bone found in the ruins of an Indian village has a ¹⁴C to ¹²C ratio of 0.25 times that found in living organisms. Calculate the age of the bone fragment. Half-life of ¹⁴C = 5730 years.

(A) 5730 years (B) 2865 years ((C) 11460 years	(D) 22920 years
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INDIA'S	NO. 1 ONLINE COACHING	FINAL	SOLUTION MASTE	r for jee main by j.h. s	SIR			
17.	$A_{(aq)} + Zn \rightarrow B_{(g)}$							
	$\mathbf{A}_{(\mathrm{aq})} + (\mathbf{C}) \xrightarrow{\Delta} \mathbf{P} \mathbf{H}$	I_3						
	$A_{(aq)} + NH_4Cl \rightarrow D$	(g)						
	Find compound A w	hich imparts golden yello	w colour to the Bunsen fla	me.				
	(A) NaOH	(B)LiOH	(C) KOH	(D) RbOH				
18.	Select the correct order of (Ksp) of following compounds in H_2O .							
	(A) $CaCrO_4 < SrCrO_4$	4 < BaCrO4	$(B) Na_2 SO_4 < Ag_2 SO_4 < Ba SO_4$					
	(C) PbS $<$ ZnS $<$ BaS	5	(D) $\text{LiClO}_4 < \text{NaClO}_4 < \text{KClO}_4$					
19.	Solubility product constant of a sparingly soluble salt MCl_2 is 4×10^{-12} at 25°C. Also, at 25°C solubility of MCl_2 in an aqueous solution of $CaCl_2$ is 4×10^8 times less compared to its solubility in pure water. Hence, concentration (molarity) of CaCl, solution is :							
	(A) 1	(B)2	(C) 3	(D) 4				
20.	'A' imparts green colour to the flame. Its solution does not give a precipitate on passing H_2S . When it is heated with solid $K_2Cr_2O_7$ and conc. H_2SO_4 , reddish brown gas is evolved. The gas when passed in an aqueous solution of NaOH turns it yellow. Find out A.							
	(A) HgCl ₂		(B) BaCl ₂					

(C) Both (A) and (B)

(D) None of these

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER - 5



ETC INDIA'S N	O. 1 ONLINE C	DIA DACHING			FINAL	SOLU	TION MAST	TER FOR	JEE MAIN	BY J.H. SIR
1.	ETOOSINDIAINDIA'S NO. 1 ONLINE COACHING1.The volume of and 1 atm prediction(A) 11.2 dm³(A) 11.2 dm³2.Consider the form $A(g) + 2B(g)$ The above equipoles of B is $(A) 6$ 3.The dipole modes of B is $(A) 6$ 3.The dipole modes of B is $(A) 6$ 3.The dipole modes of B is 	ume of ni tm pressu	trogen ev are is	rogen evolved on complete reaction of 9g of ethylamine with a mixture of NaNO ₂ and HCl at 273°C re is						
	(A) 11.2	2 dm ³		(B) 5.6	o dm ³		(C) 4.48dm ³		(D) 22.4 dm^3	
2.	Consid A(g) + 2 The abo moles of	er the fol 2B(g) ⇔ ove equili of B is ad	lowing r AB ₂ (g); brium is ded furth	eversible $K_c = 1/2$ estabilis her, how	be system : hed in a 1 many mo	0 L flask a les if AB ₂	and at equilibri should be adde	um 2 moles ed so that mo	of each A and B a bles of A does no	are present. If 2.0 t change ?
3.	The dipole moment of H_2O_2 is 2.1D while that of water is 1.84D. But water (H_2O) is a better solvent than that of H_2O_2 because								than that of H_2O_2	
	(A) Its(B) It i	dipole m s less con	oment is rrosive	less tha	n of H_2O_2					
	(C) H_2 (D) H_2	O_2 gets 10 O_2 gets de	ecompos	ed durin	mical ract g chemica	al reaction				
4.	Which(A) At(B) De(C) Bo(D) De	of the fol critical p ensity of v iling occu- ensity of 1	lowing i point, the vapours o urs iquid inc	s incorre densitie decreases creases of	ect when a s of liquid s on increa n increasin	l liquid is h d and vapo casing tem ng temper	neated in a clos purs become san perature. ature.	ed rigid vess ne.	sel?	
5.	Match	the colum	nn - I witl	h columr	n II					
	(0	Colum	n-I				Column-II			
	(O)	the hybrid	volved disation)				(Predicted) Geometry)			
	(P) s,p	p_{x,p_y,p_z}, d_{x^2}	$_{-y^2}, d_{z^2}$				(1) Trigonal bipyramidal			
	(Q) $s, p_x, p_y, d_{x^2-y^2}$						(2) Tetrahedra	al		
	(R) s, d_{xy} , d_{yz} , d_{xz}						(3) Square pla	anar		
	(S) s, j	$p_{x,p_{y},p_{z}}, \alpha$	d_{z^2}				(4) Octahedra	ıl		
	Codes			_	~					
	(1)	P (1)	Q (2)	R (2)	S (4)					
	(A) (B)	(1)	(2)	(3)	(4)					
	(C)	(4)	(3)	(2)	(1)					
	(D)	(4)	(2)	(1)	(3)					

	OOSINDIA S NO. 1 ONLINE COACHING	FINAL SOL	UTION MASTER FO	R JEE MAIN BY J.H. SIR
6.	Which of the following stat	ements are correct ?		
	(1) The energy of light is i	nversely proportional to	its wavelength.	
	(2) Electrons behave as be	oth waves and particles.		
	(3) Energy of second orbit	of hydrogen is same as	energy of 4th orbit of He ⁺	ion.
	(4) Infrared radiations hav	e higher energy than ga	mma rays.	
	(A) 1, 2 and 3	(B) 1 and 3	(C) 2 and 4	(D) Only 4
7.	$0.1 \mathrm{M}\mathrm{Cr}_2\mathrm{O}_7^{2-}$ will be a better	er oxidizing agent in wh	ich of the following solution	n?
	(A) 10 ml of 1 M CH ₃ COOH	$1 + 10 \mathrm{ml}\mathrm{of}1\mathrm{M}\mathrm{NH}_4\mathrm{OH}$		
	(B) 100 ml of 0.1 M NaOH+	100 ml of 0.1 M HCl		
	(C) 50 ml of 0.1 M HCl			
	(D) 100 ml of 10 ⁻⁷ M HCl			
8.	In which of the following co	ombination product is pa	aramagnetic species.	
	(A) Na(s) + $NH_3(\ell)$		(B) Hot $Na(s) + NH_3(g)$	
	(C) $ZnSO_4(aq) + excess NH_4$	4OH	(D) $AlCl_3(aq) + excess N$	laOH
9.	Correct order of C – O bond	l length is :		
	(A) $\rm CO^{+} > C_2O_4^{2-} > \rm CO$		(B) $\rm CO^+ > \rm CO > C_2O_4^{2-}$	
	(C) $C_2O_4^{2-}>CO^+>CO$		(D) $C_2 O_4^{2-} > CO > CO^+$	
10.	n-factor for HCl in reaction I	$K_2Cr_2O_7 + HCl \rightarrow KCl +$	$\operatorname{CrCl}_3 + \operatorname{Cl}_2$	
	(A) 5/7	(B) 3/7	(C) 7/3	(D) 7/5
11.	An element has cube type diagonals. If the volume of t present in 100 gram of the e	unit cell having one at he unit cell is 24×10^{-24} c lement.	com on each corner of the eleme	cube and two atoms on one of its nt 7.2 gram/cm ³ , calculate the atoms
	(A) 1.736×10^{20} atoms	(B) 1.537×10^{22} atoms	(C) 1.736×10^{24} atoms	(D) 1.264×10^{24} atoms
12.	Which of the following stat weak electrolyte is true ?	ements concerning cond	centration dependence of m	olar conductivity for a strong and a
	(A) Molar conductivity inc	creases linearly on incre	asing concentration for bo	th types of electrolytes.
	(B) Molar conductivity de	creases linearly on incre	easing concentration for bo	th types of electrolytes.
	(C) Molar conductivity in electrolyte.	ncreases linearly on c	lilution for strong electro	olyte but it is constant for weak
	(D) On dilution. molar con	ductivity increases linea	arly for strong electrolyte by	ut for weak electrolyte, the

) On dilution, molar conductivity increases linearly for strong electrolyte but for weak electrolyte, increase is gradual in higher concentration range but very rapid in lower concentration range.

13. Potassium chlorate, $KClO_3$ is heated in test tube and following reaction occurs at 25°C. $KClO_3 \longrightarrow KCl+O_2$

Which graph shows the change in mass of test tube and its contents ?



- 14. When a small amount of solid calcium phosphide Ca_3P_2 is added to water, what are the most likely products? (A) Aqueous Ca^{2+} and OH^- ions and gaseous PH_3 .
 - (B) Aqueous Ca^{2+} and OH^{-} ions and gaseous $H_{3}PO_{3}$.
 - (C) Solid CaH_2 and aqueous H_3PO_2 .
 - (D) Solid CaO and aqueous PH₃.
- 15. Which of the following curve represents the Henry's law?



ET	OOSINDIA 5 NO. 1 ONLINE COACHING	FINAL SO	LUTION MASTER F	OR JEE MAIN BY J.H. SIF			
16.	Identify the correct order of wavelength of light absorbed by the following complex ions.						
	(I) $[Co(H_2O)_6]^{3+}$	(II) $[Co(CN)_6]^{3-}$	(III) $[CoF_6]^{3-}$	$(IV)[Co(en)_3]^{3+}$			
	(A) III > I > IV > II	(B)II > IV > I > III	(C) III > I > II > IV	(D) None of these			
17.	Softening of leads me	ans					
	(A) Conversion of lead	d to PbO					
	(B) Conversion of lead	$1 \text{ to Pb}_{3}O_{4}$					
	(C) Removal of impuri	ties from lead					
	(D) Washing lead with	HNO ₃ followed by alkali so	olution				
18.	How many of the follo						
	Li,O, KO,, RbO,, Cs,O	, BeO, MgO, BaO,, SrO					

(A) 3 (B) 4 (C) 5 (D) 6

19. Which of the following is correct regarding the following diagram of reduction of haematite.



Ellingham diagram for the reduction of haematite

- (A) Below 1073 K, C is better reducing agent
- (B) Below 1073 K, CO is better reducing agent
- (C) Above 1073 K, C is better reducing agent
- (D) Haematite cannot be reduced by C or CO
- 20. Which species is completely dissolved in dil. HCl (A) Ag_2O (B) FeS (C) Pb

(D) Cu

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER -6



ETO INDIA'S NO	OSINDIA 0. 1 ONLINE COACHING	FINAL SOLU	JTION MASTER FO	R JEE MAIN BY J.H. SIR			
1.	pq r s $4s^2$	t u v 3d ⁵					
	If the spin quantum nur having at least three qu	nber of 'p' and 'u' is same. The antum numbers same are :	he group of electrons (Give	en in the same bracket in options)			
	(A) (pq) (rst) (tup)	(B) (pr) (qs) (st	u) (C) (pq) (rst) (tuv) (D) None of these			
2.	Work done in expansio used to heat up 1 mol of in °C? Give your answe	n of an ideal gas from 2 litre water at 275 K. If specific he r to the nearest whole numb	to 3.8 litre against a consta at of water is 4.2 J g ⁻¹ K ⁻¹ , w er.	ant external pressure of 2.1 bar was what is the final temperature of water			
	(A) 5	(B)6	(C)7	(D) None of these			
3.	A compound, on analys Na = 14.31% S = 9 H = 6.22% O = 6	sis, gave the following perce 97% 9.50%	entage composition :				
	Calculate the molecular in combination with ox (Na=23 S=32 H=1)	formula of the compound or ygen as water of crystallization $\Omega = 16$	n the assumption that all the ion. Molecular weight of th	e hydrogen in the compound is reset e compound is 322.			
	$(A) Na_2 SO_4.10H_2O$	$(B) \operatorname{Na}_2 \operatorname{SO}_4 \cdot \operatorname{8H}_2 O$	(C)Na ₂ SO ₄ .11H ₂ O	$(D) Na_2 SO_4.13H_2O$			
4.	 Statement-1 : For an element order of successive ionisation energy is IE₁ < IE₂ < IE₃ < IE₄ Statement-2 : Removal of an electron from cation is difficult than neutral atom because effective nuclear charge increases. (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1. (B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1. (C) Statement-1 is True, Statement-2 is False. (D) Statement-1 is False, Statement-2 is True. 						
5.	If the density of a mixter (A) partial pressure of C (C) partial pressure of C	are of $O_2 & N_2$ at NTP is 1.3 O_2 will be 0.28 atm O_2 will be 1 atm	g/l, then (B) partial pressure of C (D) partial pressure of C	P_2 will be 29.12 atm P_2 will be 0.72 atm			
6.	The colour of the red g (A) Sb_2S_3	lass in traffic signals is due (B) HgI ₂	to: (C) CdS	(D) CdSe			
7.	At constant volume and combustion of benzene	that 27°C, the heat of combute at constant pressure ($R = 8$.)	stion of 7.8 g of benzene is 3 J/mol-K)	327 KJ. What will be the heat of			
	(A)-3273 KJ	(B) – 3278 J	(C)-327.3 KJ	(D) – 32.73 KJ			
8.	K_{c} for the reaction PCl _s container).	$(s) \rightleftharpoons PCl_3(g) + Cl_2(g)$ is g	iven by (α is degree of diss	ociation and V is the volume of the			
	(A) $K_c = \frac{\alpha^2}{1-\alpha^2}$	(B) $K_c = \frac{\alpha^2}{(1-\alpha)V}$	(C) $K_c = \frac{(1-\alpha^2)}{\alpha V}$	(D) $K_c = \frac{\alpha}{(1-\alpha)V}$			

	DOSINDIA	FINAL SO	LUTION MASTER FO	OR JEE MAIN BY J.H. SIR				
9.	The type of bonds presen	t in $B_{2}H_{6}$.2NH ₃ are						
	(A) banana bond and co	valent bond						
	(B) banana bond and ion	nic bond						
	(C) banana bond and co	ordinate bond						
	(D) Ionic bond, covalent	t bond and coordiate bon	nd					
10	The mass of glucose tha pressure as is produced b	t would be dissolved in by dissolving 1 g of urea	50 g of water in order to pro in the same quantity of wate	oduce the same lowering of vapour or is :				
	(A) 1 g	(B) 3 g	(C) 6 g	(D) 18 g				
11.	A hydrogen electrode is	immersed in a solution	with $pH = 0$ (HCl). By how	much will the potential (reduction)				
	change if an equivalent amount of NaOH is added to the solution. (Take $p_{H_2} = 1$ atm & T = 298 K).							
	(A) increase by 0.41 V		(B) increase by 59 mV					
	(C) decrease by 0.41 V		(D) decrease by 59 mV					
12.	In NaCl the centres of tw	o nearest like charged io	ons are present at a distance	of				
	(A) $\frac{a}{\sqrt{a}}$	(B) $\frac{a}{a}$	(C) $\frac{\sqrt{3}}{\sqrt{3}}a$	(D) $\sqrt{2}a$				
	$\sqrt{\sqrt{2}}$	\$ 2	2	() 124				
13.	Select the correct produc	t(s) formed on hydrolys	is					
	(A) BrF + H $O \longrightarrow HOBr + 3HF$ (B) I + H $O \longrightarrow HI + HOI$							
	$(C) N_{0}O_{1} + H_{0}O \longrightarrow HNO$	O, +HF						
		3 2	5 2	4				
14.	Which of the following h	as largest number of iso	mers?					
	$(A) [Co(en)_2 Cl_2]^+$	(B) $[Co(NH_3)_5Cl]^{2+}$	$(C) [Ir(PR_3)_2 H(CO)]^{2+}$	(D) $[Ru(NH_3)_4Cl_2]^+$				
15.	Chemical leaching is use	ful in the concentration of	of					
101	(A) copper pyrites	(B) bauxite	(C) galena	(D) cassiterite				
16.	Which of the following of	loes not produce any ga	seous product when reacts w	rith water ?				
	(A) Ca_3N_2	$(B) CaC_2$	(C)CaO	$(D) \operatorname{Ca}_{3} P_{2}$				
17.	Sodium palmitate colloid	al solution in water has	negative charge on its partic	les, it is due to the				
	(A) Electron capture by	sol particles	-9					
	(B) Preferential adsorpti	on of ions						
	(D) Self-disconition of sodium polmitate malegular							
	(D) Eurther dissociation	of ionized molecules	105					
18.	The volume of 30% (w/w solution is :) HNO ₃ solution (density	y 3 gm/mL) required by a stud	lent to prepare 3 L of 3.0M HNO_3				
	(A) 350 mL	(B)410 mL	(C) 630 mL	(D) 850 mL				

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19. For a first order homogeneous gaseous reaction $A \rightarrow 2B + C$ then initial pressure was P_i while total pressure after time t was P_i . Then expression for rate constants K in terms P_i , P_i and t is.

(A)
$$K = \frac{2.303}{t} \log \left(\frac{2p_i}{3p_i - p_t} \right)$$
 (B) $K = \frac{2.303}{t} \log \left(\frac{2p_i}{2p_t - p_i} \right)$
(C) $K = \frac{2.303}{t} \log \left(\frac{p_i}{p_i - p_t} \right)$ (D) None of these

20. Select the correct curve for a given mass of real gas at constant temperature -



BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER -7



ETOOSINDIA INDIA'S NO. 1 ONLINE COACHING

FINAL SOLUTION MASTER FOR JEE MAIN BY J.H. SIR

1. Molar volume of an Ideal gas is 0.45 dm³/mol. The molar volume of air (assuming as real gas) under the same condition is 0.9 dm³/mol. The point which corresponds to air in the given graph is



- 2. Which of the following statements are correct ?
 - (1) Experimental data shows that when electrons fill into degenerate energy levels, two electrons go into a given orbitals before any go into others of the degenerate set.
 - (2) The frequency of electromagnetic radiations is inversely proportional to its energy.
 - (3) The wavelength of X-rays is greater than that of visible radiations.
 - (4) An atom can only absorb certain types of electromagnetic radiations, has a discrete rather than a continu ous spectrum.

(C) 2 and 4

(D) Only 4

- (A) 1, 2 and 3 (B) 1 and 3
- 3. The incorrect order of boiling point is

 (A) H₂S < H₂Se < H₂Te < H₂O
 (B) H₂S < NH₃ < HF < H₂O
 (C) PH₃ < AsH₃ < SbH₃ < NH₃

 4. Graphite conducts electricity because of the

 (A) Highly polarized nature of π-electrons
 (C) Highly localized nature of π-electrons
 (D) None of these
 - Industrial preparation of nitric acid by Ostwald's process involves :
 (A) Oxidation of NH, (B) Reduction of NH, (C) Hydrogenation of NH, (D) Hydrolysis of NH,

6. At 1000°C equilibrium constant for some reaction are given below : $CO_2 \rightleftharpoons CO + \frac{1}{2}O_2$, $K_{c1} = 8 \times 10^{-12}$ $2H_2O \rightleftharpoons 2H_2 + O_2$, $K_{c2} = 4 \times 10^{-24}$ The equilibrium constant K_c for the reaction $CO_2 + H_2 \rightleftharpoons CO + H_2O$ at same temperature is (A) 2 (B) 4 (C) 0.5 (D) 5

- 7. $CaCO_3$ is decomposed by HCl (density 1.825 g/cc) $CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2O + CO_2$ Volume of HCl required to decompose 10 g of 50% pure CaCO₃ is: (A) 1.825 mL (B) 3.65 mL (C) 0.9125 mL (D) 2 mL
- 8. The set representing the correct order of ionic radius is : (A) $Li^+ > Be^{2+} > Na^+ > Mg^{2+}$ (B) $Na^+ > Li^+ > Mg^{2+} > Be^{2+}$ (C) $Li^+ > Na^+ > Mg^{2+} > Be^{2+}$ (D) $Mg^{2+} > Be^{2+} > Li^+ > Na^+$

	NO. 1 ONLINE COACHING	FINAL SOL	UTION MASTER FO	OR JEE MAIN BY J.H. SIR			
9.	Mg crystallizes in hcp. I	f total number of tetrahedra	al and octahedral voids in 12	2 milligrams of			
	Mg is $A \times 10^{20}$. Then va	lue of A is (N _A = 6×10^{23})					
	(A) 6	(B)7	(C) 8	(D) 9			
10.	Correct order of P–P bo	nd length in following con	npounds is				
	(A) $P_2F_4 < P_2(CH_3)_4 < P_2$	$(CF_3)_4 < P_2H_4$	(B) $P_2F_4 < P_2(CF_3)_4 < P_2$	$(CH_3)_4 < P_2H_4$			
	$(C) P_2 F_4 < P_2 H_4 < P_2 (CH_2)$	$P_4 < P_2(CF_3)_4$	(D) $P_2F_4 < P_2(CH_3)_4 < P_2$	$_{2}H_{4} < P_{2}(CF_{3})_{4}$			
11.	Which of the following	is a mismatch ?					
	(A) Electrophoresis - m	ovement of dispersion med	lium under the influence of	electric field.			
	(B) Lyophilic colloids -	reversible solutions					
	(C) Associated colloids	s - micelles					
	(D) Tyndall effect - sca	ttering of light by colloidal	particles				
12.	To how many liters a 1.6 in order to double pH.	0 mL, 1 M aqueous solution	n of a weak monobasic acid H	$HA(K_a = 10^{-4} at 25^{\circ}C)$ must be diluted			
	(A) 7	(B)8	(C)9	(D) 10			
13.	A current of 5.0 A flows deposition of 0.25 mol c (1 Faraday = 96485 C mo	s for 4.0 h through an elect of the metal M at the cathor bl^{-1})	crolytic cell containing a mo de. The oxidation state of M	olten salt of metal M. This results in I in the molten salt is :			
	(A)+1	(B)+2	(C)+3	(D)+4			
	()						
14.	Which blue-liquid is ob	tained on reacting equimo	lar amounts of two gases at	-30°C?			
	$(A) N_2 O$	$(B) N_2 O_3$	$(C) N_2 O_4$	(D) $N_2 O_5$			
15.	EAN of the elements ()	are equal in					
	(A) Ni(CO). [Fe(CN).] ⁴	-	(B) [Ni(en),] ²⁺ , [Fe(H,C	B) $[Ni(en),]^{2+}, [Fe(H,O),]^{2+}$			
	$(C) [Co(CN)]^{3-}$. [Fe(CN)]	D.1 ³⁻	(D) $[Ni(en),]^{2+}$, $[Sc(H, C)]$	(D) $[Ni(en)]^{2+}$ [Sc(H O)] ³⁺			
	(1)[10(11)6] ,[10(11	761					
16.	The rate constant of a fire reaction would be :	rst order reaction is 4×10	⁻³ sec ⁻¹ . At a reactant concer	ntration of 0.02 M the rate of			
	(A) 8×10^{-5} M sec ⁻¹	(B) $4 \times 10^{-3} \text{ M sec}^{-1}$	(C) $2 \times 10^{-1} \mathrm{M sec^{-1}}$	(D) $4 \times 10^{-1} \mathrm{M sec^{-1}}$			
17.	A colourless water solu HCl and Z does to with nitrates of Ag ⁺ , Pb ²⁺ and	ble solid 'X' on heating giv NH ₃ . Y gives brown precij l Hg ⁺ . 'X' is	ves equimolar quantities of pitate with Nessler's reagen	Y and Z. Y gives dense white fumes t and Z gives white precipitate with			
	$(A) NH_4Cl$	$(B) NH_4 NO_3$	$(C) NH_4 NO_2$	(D) FeSO ₄			
18.	Correct increasing orde	r of freezing point for equi	molal aqueous solution are				
	(I) BaCl,	(II)NaCl	(III) K₄[Fe(CN) ₂]	(IV) NH ₂ CONH ₂			
	(A) III < II < I < IV	(B) III < I < II < IV	(C) II < III < I < IV	(D) III \leq IV \leq I \leq II			

FINAL SOLUTION MASTER FOR JEE MAIN BY J.H. SIR

19. $20 \text{ V H}_2\text{O}_2$ solution is kept in the open vessel and is allowed to decompose by first order kinetics. After 6 hours, 10 ml of this H₂O₂ sample was taken and dilute to 100 ml by adding water. 10 ml of this diluted solution requires 25 ml of 0.025 M KMnO₄ in acidic medium for titration.

Calculate the rate constant for the decomposition of H_2O_2 . [Given : $\log_{10} 2 = 0.3$, $\log_{10} 7 = 0.84$] (A) 0.22 hr⁻¹ (B) 0.023 hr⁻¹ (C) 0.175 hr⁻¹ (D) 17.5 hr⁻¹

20. For the conversion $CCl_4(l) \rightarrow CCl_4(g)$ at 1 bar and 350 K, the correct set of thermodynamics parameters is (boiling point of CCl_4 is 77°C) (A) $\Delta G = 0$, $\Delta S = +ve$

(B) $\Delta G = 0$, $\Delta S = -ve$ (C) $\Delta G = -ve$, $\Delta S = 0$

(D) $\Delta G = -ve, \Delta S = +ve$

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER -8



ETO INDIA'S NO.	1 ONLINE C	DIA OACHING		FINAL SOLU	ITION MASTER FOR	R JEE MAIN BY J.H. SIR			
1.	The ga	s escaping	g from bla	ast furnace has the following	ng composition :				
	12.0 vo	lume% o	fCO,	28.0 Volume % of CO	28.0 Volume % of CO				
	3.0 Vol	ume%of	H,	0.6 Volume % of CH ₄					
	0.2 Volume % of C_2H_4 Calculate the theoretical above gas if both the gas a volume) 2			56.2 Volume % of N_2^{4}					
				consumption of air (in m ³) and air measured at the sa	, which is necessary for a tot me temperature. (Oxygen co	al combustion of 200 m ³ of the ontent in the air is about 20% by			
	(A) 34.	6		(B) 173.0	(C) 86.5	(D) None of these			
2.	Which	represent	s alkali m	netals based on $(IE)_1$ and $(IE)_2$	IE) ₂ values ?				
			(IE) ₁	(IE) ₂					
	(A)	Х	100	110					
	(B)	Y	95	120					
	(C)	Z	55	500					
	(D)	М	200	250					
3.	An elec	ctron in H	e ⁺ has an	energy of –6.04 eV in a co	ertain orbital. What is the rac	dius of that orbital in Li ⁺² ?			
	(A) 0.15	587 nm		(B) 1.19 Å	(C) 0.01763 nm	(D) 2.38 Å			
4.	For adi	abatic exp	pansion o	f a perfect gas $\frac{dp}{P}$ is					
	(A) $\frac{\mathrm{dv}}{\mathrm{V}}$	-		(B) $\gamma \cdot \frac{\mathrm{d}v}{\mathrm{V}}$	$(\mathbf{C}) = \gamma \cdot \frac{\mathbf{d}\mathbf{v}}{\mathbf{V}}$	(D) $-\gamma^2 \cdot \frac{\mathrm{d}v}{\mathrm{V}}$			
-	XX 71 · 1	0.1 0.1	1 .						
5.	Which	of the fol	lowing pa	airs of species have identi	cal electronic structures and	I shapes ?			
	(A) NC	P_2^+ and NO	D_{2}^{-}	(B) PCl_5 and BeF_5	(C) XeF_4 and ICI_4^-	(D) XeF_2 and XeO_4			
6.	In 10 ³ 1 of hard	itre samp ness of ha	le of hard Ird water i	water $CaSO_4$ and $MgSO_4$] is $[K_b(H_2O) = 0.52$ K kg m	present. If elevation in boiling	g point is 0.000052°C. The degree			
	(A) 2.5			(B) 5.0	(C) 7.5	(D) 10.0			
7.	Enthalpy of atomisation of (A) 30 KJ/mol			f diamond is 600 kJ/mol. ((B) 300 KJ/mol	C (diamond) \rightarrow C(g). Find th (C) 15 KJ/mol	e bond energy of C–C bond. (D) None of these			
8.	Select ((A) B ² (B) CC (C) NI (D) F ₂	the correc Al > Ga $D_2 < SiO_2 < H_3 < PH_3 < Cl_2 > Bl$	tly order of $> \ln > T\ell$ $< GeO_2 < S$ $< AsH_3 < S$ $r_2 > I_2$ (Bo	of properly regarding p-bl (Ionisation Enthalpy) SnO ₂ < PbO ₂ (Acidic Natu SbH ₃ (Reducing Character nd Dissociation Energy)	ock elements. re))				
9.	Which (I) K ₃ [F	of the following $G(CN_6)$]	lowing co	mplex compound(s) is/aro (II) [Ni(CO) ₄] ⁰	e paramagnetic and have low (III) [Cr(NH ₃) ₆] ³⁺	/ spin ? (D) [Mn(CN) ₆] ⁴ -			
	(A) I or	nly	ect code :	(B) II and III	(C) I and IV	(D) IV only			

	OOSINDIA	FINAL SC	LUTION MASTER FO	OR JEE MAIN BY J.H. SIR
10.	The standard potent respectively at 298 K	ials (E°) of MnO_4^{-}/Mn^{2+} and The standard potential of N	d MnO_2/Mn^{2+} half-cells in ac MnO_4^{-}/MnO_2 half-cell in acidi	cidic medium are 1.51 V and 1.23 V ic medium at the same temperature is
	(A) 5.09 V	(B) 1.70 V	(C) 0.28 V	(D) 3.34 V
11.	Which is not correct	ly matched		
	(1) Copper Glance : C	Cu ₂ S	(2) Pyrolusite : MnO_2	
	(3) Malachite : CuCC	O_3 .Cu(OH) ₂	(4) Cinnabar : PbS	
	(A) 1 only	(B) 2 only	(C) 4 only	(D) 1 and 4
12.	When 1 mole of stro heat released is "E" comletely neutralized	ng diprotic and H ₂ A (compl KJ mol ⁻¹ . Calculate amoun d by NaOH.	letely ionised) is completely n t of heat released when one r	neutralized by NaOH than amount of nole of weak monoprotic acid HB is
	(A) E	(B) less than E/2	(C) greater than $E/2$	(D) None of these
13.	Coagulation of 200 r solution. What is the	nl gold sol is prevented by th e gold number of starch ?	e addition of 0.50 g of starch	to it before adding 1 ml of 10% NaCl
	(A) 15	(B)25	(C) 40	(D) 65
14.	Which of the followi	ng has weaker oxidising ag	ent than MnO_{4}^{-}/H^{+}	
	(A) $NaBiO_3/H^+$	(B) $S_2O_8^{2-}/H^+$	(C) MnO_4^{-}/OH^{-}	(D) PbO_2/H^+
15.	Which plot best repr hydrogen molecule	esents the potential energy	(E)of two hydrogen atoms as	they approach one another to form a
	Ê	-	Ê	



(A) I, II (B) II, III (C) I, III (D) I, II, III

ET(NO. 1 ONLINE COACHING	FINAL S	OLUTION MASTER	FOR JEE MAIN BY J.H.	SIR				
17.	$K_{3}[Fe(CN)_{6}] + M^{X_{+}}(aq) \longrightarrow ppt of complex salt$								
	Which of the following cation does not respond above reaction.								
	$(A) Cu^{2+}(aq)$	(B) $Fe^{3+}(aq)$	(C) $Zn^{2+}(aq)$	(D) None of these					
19	Conversion of 'A' isc	mer of a compound to 'P'	somer of same compound for	llows reversible first order kinetics	with				

18. Conversion of 'A' isomer of a compound to 'B' isomer of same compound follows reversible first order kinetics with equilibrium constant equal to 10. Starting with 0.1 M of 'A' isomer only, calculate concentration of 'A' isomer 60 sec after the start, if rate constant of forward reaction is 0.063 min^{-1} .

(A) 0.08 M (B) 0.095 M (C) 0.04 M (D) 0.0545 M

19. In this sequence X, Y, Z are respectively



20. The equivalent weight of HNO₃ (molecular weight = 63) in the following reaction is $3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$

(A)
$$\frac{4 \times 63}{3}$$
 (B) $\frac{63}{5}$ (C) $\frac{63}{3}$ (D) $\frac{63}{8}$

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER -9



ETO	OSINDIA D. 1 ONLINE COACHING	FINAL SOL	UTION MASTER	FOR JEE MAIN BY J.H. SIR		
1.	In a H– like species, an e same sign of wave funct is -	lectron jumps from an orbi ion in all direction, at any o	tal having two radial and listance. If energy of the	t two angular nodes to the orbital having e emitted photon is 326.4 eV, the species		
	(A) H	(B) He^+	(C)Li ⁺²	(D) B^{+4}		
2.	The hydrides of alkali n	netals from Li to Cs share the	he following features. Se	elect the correct statement.		
	(A) All are white and c	systalline in nature				
	(B) None of the hydrides from polymeric covalent bridge bonds					
	(C) Thermal stability of	f hydrides decreases from l	Li to Cs			
	(D) All of the above					
3.	$A(s) \rightleftharpoons 2B(g) + C(g)$					
	The above equilibrium pressure at new equilibr at initial equilibrium wil	vas established by initially ium becomes 1/3 rd of origin l be :	taking A(s) only. At equ nal total pressure. Ratio	ilibrium, B is removed so that its partial of total pressure at new equilibrium and		
	(1) 2/3	(B) 14/13	(C) 5/3	(D) 17/19		
4.	$A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$ taking place in a rigid co	(). $\Delta H < 0$. Which of the folontainer with adiabatic wal	lowing parameters rema ls ?	ain constant for the given reaction		
	(A) Temperature	(B) Internal energy	(C) Enthalpy	(D) All of these		
5.	Which systematic diag	am is correct about ionisat	tion energy of coinage n	netals ?		
	(A) Increase Decrease	Decrease	(B) (B) (B) (B) (B) (B) (B) (Cu) (B) (Cu) (B) (Cu) (B) (Cu) (B) (Cu) (B) (Cu) (Cu) (Cu) (Cu) (Cu) (Cu) (Cu) (Cu	$\begin{array}{c} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & $		
	(C) Cu Decrease	Remain almost same	(D) Decrease (D) Decrease	ase Ag		
6.	In the clathrates xenon	with water, the nature of bo	onding between xenon a	nd water molecule is		
	(A) covalent	·····, · · ····	(B) hydrogen bond	ing		
	(C) Coordinate		(D) dipole-induced	dipole interaction		

ETOOSINDIA INDIA'S NO. 1 ONLINE COACHING

7. The volume-temperature graphs of a given mass of an ideal gas at constant pressure are shown below:



What is the correct order of pressure ?

(A) $p_1 > p_3 > p_2$ (B) $p_1 > p_2 > p_3$ (C) $p_2 > p_3 > p_1$

(D) $p_2 > p_1 > p_3$

- 8. Which of the following is correct statement ?
 - (A) Double chain silicates are known as amphiboles
 - (B) In cyclic silicates two oxygen atoms per tetrahedron are shared
 - (C) Orthosilicates contain discrete $(SiO_4)^4$ units.
 - (D) All are correct statements
- **9.** How many litres of water must be added to 2 litre aqueous solution of HCl with a pH of 1 to create an aqueous solution with pH of 2 ?

(A) 10 L (B) 0.9 L (C) 2 L (D) 18 L

10. For an aqueous solution

 $\underline{Information-I}: Ratio of concentration of solute in g/L to molarity is 25$

<u>Information - II</u>: Ratio of $\% \left(\frac{\omega}{\omega}\right)$ to $\% \left(\frac{\omega}{v}\right)$ is 0.8.

(A) Ratio of concentration of solute in g/L to %
$$\left(\frac{\omega}{v}\right)$$
 is 10.

- (B) Density of solution is 0.4 g/ml
- (C) If its molarity is 2M, molality will be 5m

(D) Ratio of concentration of solute in % $\left(\frac{\omega}{\omega}\right)$ to PPM is 100

11. Ice crystallizes in a hexagonal lattice. At a certain low temperature, the lattice constants are a = 4.53 Å and c = 7.41Å. The number of H₂O molecules contained in a unit cell (d = 0.92 g cm⁻³ at the given temperature) is (A) 4 (B) 8 (C) 12 (D) 24

12.	When borax is dissolved in water :	
	(A) $B(OH)_3$ is formed only	(B) $[B(OH)_4]^-$ is formed only
	(C) both $B(OH)_3$ and $[B(OH)_4]^-$ are formed	(D) $[B_2O_3(OH)_4]$ is formed only

ET(DOSINDIA	FINAL SO	LUTION MASTER FO	OR JEE MAIN BY J.H. SIR			
13.	The solubility product f	for AgI in water at 25°C is	8.2×10^{-17} . Determine E° for L	Ag-AgI electrode if E° for			
	$Ag^{+}/Ag = 0.8 V.$						
	(A)+0.3 V	(B)-0.3 V	(C)+0.15 V	(D)-0.15 V			
14.	Which of the following	statement is incorrect?					
	(A) In Hall-Heroult pro	ocess, the electrolyte used	is a molten mixture of alumin	a, cryolite and fluorspar.			
	(B) Lead is extracted from its chief ore galena by self reduction.						
	(C) Electrolytic refinin	ng of Al cannot be carried	out in aqueous medium.				
	(D) Silver (impurity) is	s extracted out as cathode	mud during electrolytic refini	ng of copper.			
15.	At what partial pressure water at 293 K is 34.86	e, oxygen will have solubi k bar. Assume that densi	lity of 0.05 g L ^{-1} in water at 29. ty of the solution to be same a	3 K ? Henry's constant (K_{H}) for O_2 in as that of the solvent.			
	(A) 0.98 bar	(B) 0.61 bar	(C) 1.19 bar	(D) 0.85 bar			
16.	A brown ring is formed	l in the ring test for NO_3^{-1}	on. It is due to the formation	of			
	(A) $[Fe(H_2O)_5(NO)]^{2+}$	(B) $FeSO_4$.NO ₂	(C) $[Fe(H_2O)_5(NO)_2]^{2+}$	(D) $FeSO_4$. HNO ₃			
17.	Three Faradays of elective vessels using inert election	ctricity are passed throug trodes. The ratio (in mole	th aqueous solutions of AgN s) in which the metals Ag, Ni	O_3 , NiSO ₄ and CrCl ₃ kept in three and Cr are deposited is			
	(A) 1:2:3	(B) 3 : 2 : 1	(C) 6:3:2	(D) 2 : 3 : 6			
18.	In which of the followi	ng complexes A (crystal f	ield spliting) does not exceeds	spairing energy?			
101	$(A) [PtCl_4]^{2-}$	$(B) [AgF_4]^-$	(C) [Co(ox) ₃] ³ -	(D) $[CoF_6]^{3-}$			
19.	Find out standard entha	alpy of formation of CH_3C	PH(I) from following data				
	$CH_{3}OH(\ell) + \frac{3}{2}O_{2}(g) \longrightarrow CO_{2(g)} + 2H_{2}O_{(\ell)}.$						
	∆Hº = – 726 k	J/mole					
	C _(Graphite) + O ₂	$C_{(Graphite)} + O_2 \longrightarrow CO_{2(g)}$					
	$\Delta H^{\circ} = -393 \text{ kJ/mole}$						
	$H_{2(g)} + \frac{1}{2}O_{2(g)} \longrightarrow H_2O_{(\ell)}$						
	∆H° = – 286 k	J/mole					
	(A) - 239 kJ/mole	(B) 239 kJ/mole	(C) 47 kJ/mole	(D) - 47 kJ/mole			
20.	A compound which car	n be used in space vehicle	es both to absorb CO, and libe	erate O_2 is :			
	(A) NaOH	$(B) Na_2 O$	$(C) Na_2O_2$	(D) CaO + NaOH			

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER - 10



1. The plot of the radial wave function R as a function of distance r of the electron from the nucleus for 2p orbital is:



. Titration curve if a strong base is titrated with strong acid is:



8. Correct statement is

(A) $[Co(NH_3)_6]^{3+}$ has hybridization d^2sp^3 & octahedral shape

- (B) $[Ni(CN)_{4}]^{2-}$ has hybridization dsp² & square planar shape
- (C) [Ni(CO)₄] has hybridization sp³ & tetrahedral shape

(D) All are correct

- 9. The geometry of ammonia molecule can be best described as :
 - (A) Nitrogen at one vertex of a regular tetrahedron, the other three vertices being occupied by three hydrogens.
 - (B) Nitrogen at the centre of the tetrahedron, three of the vertices being occupied by three hydrogens.
 - (C) Nitrogen at the centre of the equilateral triangle, three corners being occupied by three hydrogens.
 - (D) Nitrogen at the junction of a T, three open ends being occupied by three hydrogens.
- **10.** Which is the correct statement ?
 - (A) Diamond is unaffected by conc. acids but graphite reacts with hot conc. HNO_3 forming mellitic acid, $C_6(COOH)_6$ (B) CO is toxic because it forms a complex with haemoglobin in the blood
 - (C) C_3O_2 , carbon suboxide, is a foul-smelling gas
 - (D) All the above are true statements
- 11. Graph between $\log \frac{x}{m}$ and $\log P$ is a straight line inclined at an angle $\theta = 45^{\circ}$. When pressure is 0.5 atm and $\log k = 0.699$, the amount of solution adsorbed per g of adsorbent will be : (A) 2.5 g per adsorbent (B) 0.25 g per adsorbent (C) 1 g per adsorbent (D) 1.5 g per adsorbent

		FINAL SO		ER FOR JEE MAIN BY J.H. SIR		
12.	An acidic buffer solu HCl is added so that	ution has $[HA] = 1.0 M$ and $[N]$ t pH changes by one unit. The	JaA] = 1.0 M. To (10) e value of x is :	+x) mL of this buffer solution 9 mL of 1.0 M		
	(A) 0.1	(B) 10	(C) 1.5	(D) 1.0		
13.	How many of the fol(a) Extant of physi(b) Electrical conduct(c) Electrical conduct	lowing quantities show incre sorption of gases on solids. activity of metals uctivity of an electrolyte solut	ase in their value on	increasing temperature ?		
	 (d) Ionic product of (e) Vapour pressure (f) Vapour pressure (g) Solubility of ga 	f water. e of a pure liquid. e of an ideal solution which fo ses in liquids	bllows Raoult's law, (keeping composition same)		
	Correct answer is (A) 5	(B)4	(C)6	(D) 3		
14.	From the following I $Cl^- + 3H_2O \rightarrow ClO_3^-$ $\frac{1}{2}Cl_2 + e^- \rightarrow Cl^-$	half-cell potentials + $6H^+ + 6e^-$; E°; E°	=-1.45 V =+1.36 V			
	Calculate the standard state emf of the half-cell.					
	$\frac{1}{2}\text{Cl}_2(g) + 3\text{H}_2\text{O} \rightarrow$	$ClO_{3}^{-}(aq) + 6H^{+} + 5e^{-}$				
	(A)-0.468 V	(B)+1.468 V	(C)+0.468	(D)-1.468 V		
15.	The methods chiefly (A) Self-reduction a (C) Carbon reductio	vused for the extraction of leand carbon reduction n and self-reduction	d and tin from their o (B) Self-reducti (D) Cyanide pr	ores are, respectively : on and electrolytic reduction ocess and carbon reduction		
16.	For cubic structure of (i) Effective numb (ii) Each atom is su	of diamond er of atoms present in a diamo urrounded by four nearest car	ond cubic cell is 8. bon atoms.			
	(iii) Atomic radius o	of carbon is $\frac{\sqrt{3} \times a}{8}$, where a	is edge length of cub	е.		
	(iv) Packing fraction	n of unit cell is $\frac{\sqrt{3} \times \pi}{16}$.				
	Select the correct op (A) I, II, IV are corre	otion is ect (B) I, III, IV are correct	t (C) II & III are c	orrect (D) All are correct		

ETOOSINDIA INDIA'S NO. 1 ONLINE COACHING

FINAL SOLUTION MASTER FOR JEE MAIN BY J.H. SIR

- 17. A complex is represented as CoCl₃.xNH₃. Its 0.1 m solution in aqueous solution shows $\Delta T_f = 0.558^{\circ}C K_f(H_2O) = 1.86/mol K and assume 100% ionization and coordination number of Co(III) is 6. What is the complex ?$ (A) [Co(NH₃)₅Cl]Cl (B) [Co(NH₄)₄Cl₂]Cl (C) [Co(NH₄)₅Cl]Cl₂ (D) [Co(NH₄)₃Cl₃]Cl₃
- **18.** 20 mL of KOH solution was titrated with 0.20 mol L^{-1} H₂SO₄ solution in a conductivity cell. The data obtained were plotted to give the graph shown below :



The concentration of the KOH solution was (A) $0.30 \text{ mol } L^{-1}$ (B) $0.15 \text{ mol } L^{-1}$



(D) 0.075 mol L⁻¹

19. Which of the following reacting sequence is correct regarding conversion of phosphorus compounds ?



20. AgCl and NaCl are colourless. NaBr and NaI are also colourless but AgBr and AgI are coloured. This is due to (A) Ag⁺ polarises Br⁻ and I⁻ (B) Ag⁺ has unpaired d-orbital (C) Ag⁺ depolarises Br⁻ and I⁻ (D) None of above is correct

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER - 11



- 1. Hydrolysis of one mole of peroxodi-sulphuric acid produces :
 - (A) two moles of sulphuric acid
 - (B) two moles of peroxomono-sulphuric acid
 - (C) one mole of sulphuric acid, one mole of peroxomono-sulphuric acid
 - (D) one mole of sulphuric acid, one mole of peroxomono-sulphuric acid and one mole of hydrogen peroxide
- 2. Addition of a catalyst at 300 K increases the rate of a chemical reaction by a factor of 36. By how many kJ, the activation energy of the catalysed pathways is less than the activation energy of original pathways. Answer should be rounded-off to the nearest whole number.
 - (A) 4 (B) 9 (C) 7 (D) 8
- 3. Calculate the degree of hydrolysis of a mixture of aniline with acetic acid each of them being 0.01M. K_a of acetic acid = $1.8 \times 10^{-5} \& K_b$ of aniline = 4.5×10^{-10} . (A) 0.48 (B) 0.52 (C) 0.96 (D) 0.72
- 4. Which one is incorrect statement among the following ?
 - (A) PH₅, SCl₆ & FCl₃ do not exist
 - (B) 12 P–O bonds are present in P_4O_6 molecule.
 - (C) Cation of $PCl_{5}(s)$ has tetrahedral shape.
 - (D) Bond angle in SiH_4 less than that in CH_4 .
- 5. Which of the following statements is incorrect ?
 - (A) Sn²⁺ compounds act as reducing agent
 - (B) Pb⁴⁺ compounds act as oxidising agent
 - (C) Oxides of Sn and Pb are amphoteric in nature
 - (D) Both tin and silicon decompose steam to produce SnO_2/SiO_2 and H_2

6. For the following gaseous equilibrium W, X, Y & Z at 300 K, the increasing order of $\left(\frac{K_{P}}{K_{C}}\right)$ is

$$\begin{split} &W: 2HI \rightleftharpoons H_2 + I_2 \\ &X: O_2 + 2SO_2 \rightleftharpoons 2SO_3 \\ &Y: PCl_5 \rightleftharpoons PCl_3 + Cl_2 \\ &Z: N_2 + 3H_2 \rightleftharpoons 2NH_3 \\ &(A) W = X = Y = Z \end{split} \tag{B)} Z < X < W < Y \qquad (C) Y < W < X < Y \qquad (D) Z < X < W = Y \end{split}$$

- 7. Among the following, which orbital in Be^{3+} has same energy as that of electron in He^+ in ground state and also has 2 angular nodes.
 - (A) 2s (B) $2p_x$ (C) $3d_{xy}$ (D) None of these
- 8. 250 ml sample of a 0.20 M Cr^{3+} is electrolysed with a current of 96.5 A. If the remaining [Cr³⁺] is 0.1 M then the duration of process is (assume volume remain constant during process)

(A) 25 sec	(B) 225 sec	(C) 150 sec	(D) 75 sec
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ETOOSINDIA INDIA'S NO. 1 ONLINE COACHING

A 10 mL 0.5 M H₂SO₄ solution is neutralized by adding 0.25 M NH₂(aq) solution. Determine the pH of solution at the 9. end point at 25°C. At 25°C, K_{h} of NH₃ is 2 × 10⁻⁵ (D)6

10. When a system is taken from state A to B along path ACB as shown in the figure, 8 J of heat flows into the system and the system does 3 J of work.

How much heat flows into the system along the path ADB, if the work done by the system is 4 J?



- 11. Magnetic moments of Cr (Z = 24), Mn⁺(Z = 25) and Fe²⁺ (Z = 26) are x, y, z. They are in order : (A) x < y < z(B) x = y < z(C) z < x = y(D) x = y = z
- 12. CO₂ gas along with solid (Y) is obtained when sodium salt (X) is heated. (X) is again obtained when CO₂ gas is passed into aqueous solution (Y). (X) and (Y) are (B) Na₂CO₂, NaOH (C) NaHCO₃, Na₂CO₃ (A) Na₂CO₂, Na₂O (D) Na₂CO₃, NaHCO₃
- 13. For the following balanced redox reaction $x \operatorname{Cl}_2O_7 + y \operatorname{H}_2O_2 + OH^- \longrightarrow z \operatorname{Cl}O_2^- + O_2 + \operatorname{H}_2O_2$ Select the correct option (A)z=4(B)x=2(C)z=2(D) y = 1
- Which of the following set has the same bond order ? 14. $(B) N_{2}^{2+}, O_{2}, NO^{-}, NO_{2}^{+}$ (C) NO, N_{2}^{-} , O_{2}^{+} , NO^{2+} (A) $N_{2}, O_{2}^{2+}, NO^{+}, CN^{-}$ (D) All correct
- 15. In the purification of Zr and B, which of the following is true?
 - (A) $Zr + 2I_2 \rightarrow ZrI_4(g) \frac{\text{passed over}}{\text{the white hot W}}$ the pure Zr is deposited on W.
 - (B) $2B+3I_2 \rightarrow 2BI_3(g) \frac{\text{passed over}}{\text{the white hot W}}$ the pure B is deposited on W.
 - (C) $Zr + 2I_2 \rightarrow ZrI_4(g) \frac{\text{mixed with W}}{\text{and then heated}}$ ZrI_4 is reduced to ZrI_2
 - (D) Both (A) and (B) are correct
- A gaseous mixture (He and CH₄) has density $\frac{64}{246.3}$ gm / litre at 1 atm & 300 K is kept in a container. Now a pinhole 16. is made on the wall of the container through which He(g) and $CH_{4}(g)$ effuses. What will be the composition of the gas mixture $\begin{bmatrix} n_{He} : n_{CH_4} \end{bmatrix}$ effusing out initially? Take R = 0.0821 atm litre K^{-1} mol⁻¹] (A) 4 : 1 (B)8:1 (C)2:1(D) 16:1

ET INDIA'S	OOSINDIA NO. 1 ONLINE COACHING	FINAL S	OLUTION MASTER	FOR JEE MAIN BY J.H. SIR
17.	Borax is $Na_2B_4O_7$.10	$0H_2O$. Consider the followi	ng statements about borax.	
	I. Two boron atom	ms have four B–O bonds w	whereas the other two have	three B–O bonds.
	II. Each boron has	s one OH groups.		
	III. It is a salt of tet	raboric acid.		
	IV. It is a cyclic me	taborate having two six-me	embered rings.	
	Select the correct st	atement.		
	(A) I, II, III	(B) II, III, IV	(C) I, II, IV	(D) I, II, III, IV
18.	In the complex PtCl	4:4NH3		
	(A) two Cl ⁻ ligands	s satisfy as well as seconda	ry valencies	
	(B) four NH ₃ ligan	ds satisfy secondary valen	су	
	(C) ions are [Pt(NH	$[_{3})_{4}Cl_{2}]^{2+}$ and $2Cl^{-}$		
	(D) All the above a	ire correct statements		
19.	For the reaction : A-	→P		
	when initial concen	tration of reactant is halve	d, the half-life increases by	a factor of eight. Order of reaction is
	(A) 4	(B) 6	(C) 7	(D) 8
20.	Which of the follow	ving statements for crystal	s having Schottky defect is	not correct ?
	(A) The density of	the crystals having Schott	ky defect is larger than tha	t of the perfect crystal
	(B) The crystal hav	ving Schottky defect is elec	ctrically neutral as a hole.	

- (C) Schottky defect arises due to the absence of a cation or anion from the position which it is expected to occupy.
- (D) Schottky defect are more common in ionic compounds with high co-ordination numbers.

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SAMPLE MOCK TEST PAPER - 12



	OSINDIA	FINAL SOLUT	ION MASTER FOR	JEE MAIN BY J.H. SIR
1.	Cl ₂ gas is obtained by various r	reactions but not by :		
	(A) $\text{KMnO}_4 + \text{conc. HCl} \xrightarrow{\Delta}$			
	(B) $\text{KCl} + \text{K}_2\text{Cr}_2\text{O}_7 + \text{conc. H}_2\text{S}$	$O_4 \xrightarrow{\Delta}$		
	(C) $MnO_2 + conc. HCl \longrightarrow$			
	(D) KCl + $F_2 \longrightarrow$			
2.	The products obtained on heating	ng LiNO ₃ will be :		
	(A) $Li_2O + NO_2 + O_2$ (B) I	$Li_3N + O_2$	$(C) Li_2 O + NO + O_2$	(D) $\text{LiNO}_3 + \text{O}_2$
3.	A mixture of ethyl alcohol and propyl alcohol is 200 mm. If the temperature will be	propyl alcohol has a van he mole fraction of eth	apour pressure of 290 mm a nyl alcohol is 0.6, its vapor	at 300 K. The vapour pressure of ur pressure (in mm) at the same
	(A) 700 (B) 3	60	(C) 350	(D) 300
4.	KCl crystallizes in the same typ	e of lattice as does NaC	Cl. Given that $\frac{r_{Na^+}}{r_{C\Gamma^-}} = 0.50$ &	${\bf \hat{k}}~\frac{{\bf \hat{r}}_{_{Na^+}}}{{\bf r}_{_{K^+}}}=0.70$. Calculate the ratio
	of the side of the unit cell for KC	Cl to to that for NaCl :		
	(A) 1.14 (B) 1	22	(C) 1.41	(D)0.87
5	$Z \xleftarrow{\text{with}}_{\text{acid}} \xrightarrow{\text{In}}_{\text{with } H_2O} \xrightarrow{\text{with } H_2O}$			
	The X, Y and Z respectively are	:		
	(A) Ln_2O_3 , H_2 , $Ln(OH)_3 + H_2$		(B) $Ln(OH)_3 + H_2, Ln_2O_3, T$	H ₂
	(C) H_2 , Ln_2O_3 , $Ln(OH)_3 + H_2$		(D) $Ln(OH)_3 + H_2, LnO_2, H_3$	H ₂
6.	The enthalpy of vaporizaiton b transition of vapour to liquid at	benzene is +35.5 kJ/m its boiling point is	ol at its boiling point of 8	0°C. The entropy change in the
	(A) - 100		(B)+100 (D) 242	
	(C)+342		(D)-342	
7.	Identify the correct statement.			
	(A) Gypsum contains a lower p	ercentage of calcium t	han Plaster of Paris.	
	(B) Gypsum is obtained by heat	ing Plaster of Paris.		
	(C) Plaster of Paris can be obtain	ined by hydration of g	ypsum	
	(D) Plaster of Paris is obtained b	by partial oxidation of	gypsum.	

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- 8. For a H-like species M^{+a} , the $(a + 1)^{th}$ ionization energy of M is found to be 870.4 eV. Calculate the no. of electrons present in M atom for which $\ell = 1$. (A) 1 (B)2 (C)3 (D)4
- 9. Consider the following first order decomposition process :



Here "t" corresponds to the time at which $\left(\frac{1}{6}\right)^{th}$ of reactants is decomposed. The value of "n" is

- **10.** According to the Pauli exclusion principle :
 - (A) atoms generally require 8 electrons in order to fill up their valence shell.
 - (B) if a set of orbitals all have the same energy, then each orbital in the set must be occupied by one electron before any pairing of electrons will occur in those orbitals.
 - (C) no two electrons in the same atom can have all four of their quantum numbers the same.
 - (D) the total mass remains constant during a chemical reaction.
- 11. The MO electronic configuration of X_2 can be represented as follows :

$$\begin{array}{c|c} \sigma^{*2s} & & \\ \hline z_{s} & & \\ \sigma^{\dagger} \\ \sigma^{\dagger} \\ \sigma^{*} \\ \hline 1_{s} \\ \sigma^{\dagger} \\ \sigma^{\dagger} \\ \sigma^{\dagger} \\ r_{1s} \\ \sigma^{\dagger} \\ r_{1s} \\ \end{array} \qquad \begin{array}{c} \downarrow \\ \uparrow \\ \downarrow s \\ \hline 1_{s} \\ \end{array}$$

(B) II, III and IV

(D) I, II, III and IV

Following conclusion can be drawn :

(I) It is excited state electronic configuration of X₂

(II) It is more stable state than the ground state of X_2 molecule

(III) Bond order of X_2 in excited state is one

(IV) It is more likely to dissociate into two X-atoms in ground state than in excited state

- Which of the above conclusions are correct from given MO diagrams ?
- (A) I and II
- (C) I, III and IV

- **12.** Select the false statement about silicates.
 - (A) Cyclic silicate having three O atoms shared by each tetrahedral unit.
 - (B) $2\frac{1}{2}$ corner oxygen atoms per tetrahedron unit are shared in double chain silicate.
 - (C) $(Si_2O_5)_n^{2n-}$ is the formula of double chain silicate.
 - (D) SiO_4^{4-} units polymerize to form silicate because Si atom has less tendency to form π bond with oxgen.

13. One mole of an ideal gas is heated from 300 K to 700 K at constant pressure. The change in internal energy of the gas for this process is 8 kJ. What would be the change in enthalpy for the same process ?
 (A) 4.8 kJ
 (B) 11.2 kJ
 (C) -4.8 kJ
 (D) -11.2 kJ

14. Consider the reaction, $2NO(g) + Br_2(g) \longrightarrow 2NOBr(g)$, which has the experimentally observed rate law, rate = k[NO]²[Br₂]. The following two step mechanism has been proposed for the reaction. Step 1 : NO(g) + NO(g) $\longrightarrow N_2O_2(g)$ Step 2 : $N_2O_2(g) + Br_2(g) \longrightarrow 2NOBr(g)$

In order of the proposed mechanism to be reasonable, which step must be the slow step?

- (A) The first step is the slow step
- (B) The second step is the slow step
- (C) The mechanism is reasonable if either the first or the second step is slow
- (D) The mechanism is not reasonable no matter which step is the slow step
- 15. One mole of ideal gas ($C_v = 5/2R$) beginning at 1.00 atm and 300 K is put through the following cycle



Step I : Heating to twice to its initial pressure at constant volume.Step II : Adaibatic expansion to its initial temperature.Step III : Isothermal compression back to 1.00 atmWhat is the volume in state 3 ?(A)40.4 L(B)65.0 L(C) 139 L

16. For the reaction

 $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g), K_p = 1.16 atm at 800^{\circ}C. If 20.0 of CaCO_3 was put in to 10L container and heated to 800^{\circ}C, what percentage of the CaCO_3 would remain unreacted at equilibrium$

(A) 34% (B) 38% (C) 40% (D) 45%

(D) 279 L

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Extraction of metal or	other processes is through th	ne complex formation :		
(I) Cyanide process	(II) Monds process	(III) Photographic	fixing process	
Complexes formed in t	these methods are			
Ι	П	III		
(A) $[Ag(NH_3)_2]Cl$	Ni(CO) ₄	$[Ag(CN)_2]^-$		
(B) $[Ag(CN)_2]^-$	Ni(CO) ₄	$[Ag(S_2O_3)_2]^{3-}$		
(C) $[Ag(CN)_2]^-$	$[Ag(S_2O_3)_2]^{3-}$	$[Ag(S_2O_3)_2]^{3-}$		
(D) $[Cd(CN)_4]^{2-}$	Ni(CO) ₄	$[Ag(S_2O_3)_2]^{3-1}$		
Which of the following	g orders is incorrect ?			
(A) AgCl > AgF : Cova	alent character order	(B) $BaO > BaF_2$: M	felting point order	
(C) $\operatorname{BeF}_2 > \operatorname{BaF}_2$: Solut	bility order	(D) $LiNO_3 > RbNC$	₃ : Thermal stability order	
Consider the following reduction - oxidation reaction :				
$Zn(s) + Cu^{2+}(aq) \rightleftharpoons C$	$Cu(s) + Zn^{2+}(aq);$	$E^{\circ} = +1.10 V$		
When the components of the two half-reactions involved in this reaction are correctly separated, this reaction can be used to do electrical work and the change in internal energy of the system decreases. Which of the following statements best describes what will happen if $Zn(s)$ is added to a solution containing $Cu^{2+}(aq)$ at constant volume at 25°C?				
(A) The reaction will occur and the temperature of the solution will increase				
(B) The reaction will occur and the temperature of the solution will decrease				
(C) The reaction will of	occur and the temperature of	re of the solution will remain the same		
(D) The reaction will	not occur and the temperatur	re of the solution will re	emain the same	
Which of the followin,	g contains both polar and n	on-polar bonds ?		
(A) NH_4Cl	(B) HCN	$(C) H_2O_2$	$(D) CH_4$	
	Extraction of metal or (I) Cyanide process Complexes formed in t I (A) $[Ag(NH_3)_2]Cl$ (B) $[Ag(CN)_2]^-$ (C) $[Ag(CN)_2]^-$ (D) $[Cd(CN)_4]^{2-}$ Which of the following (A) AgCl > AgF : Cova (C) BeF ₂ > BaF ₂ : Solut Consider the following Zn(s) + Cu ²⁺ (aq) \rightleftharpoons C When the components be used to do electrical statements best described at 25°C ? (A) The reaction will of (B) The reaction will of (D) The reaction will of (D) The reaction will of Which of the following Which of the following (A) NH ₄ Cl	Extraction of metal or other processes is through the formation of metal or other processes is through the formation of metal or other processes is through the formation of metal or other processes is through the formation of metal or other processes is through the formation of metal or other processes is through the following or formation of the following reduction or oxidation reacted in the following is the following in the following in the following is the following contains both polar and the following (D). The reaction will not occur and the temperature of (D) The reaction will not occur and the following is the foll	Extraction of metal or other processes is through the complex formation : (I) Cyanide process (II) Monds process (III) Photographic Complexes formed in these methods are I II III (A) $[Ag(NH_3)_2]CI$ Ni(CO) ₄ $[Ag(CN)_2]^-$ (B) $[Ag(CN)_2]^-$ Ni(CO) ₄ $[Ag(S_2O_3)_2]^{3-}$ (C) $[Ag(CN)_2]^ [Ag(S_2O_3)_2]^{3-}$ $[Ag(S_2O_3)_2]^{3-}$ (D) $[Cd(CN)_4]^2$ Ni(CO) ₄ $[Ag(S_2O_3)_2]^{3-}$ Which of the following orders is incorrect ? (A) AgCl > AgF : Covalent character order (B) BaO > BaF ₂ : N (C) BeF ₂ > BaF ₂ : Solubility order (D) LiNO ₃ > RbNC Consider the following reduction - oxidation reaction : $Zn(s) + Cu^{2+}(aq) \rightleftharpoons Cu(s) + Zn^{2+}(aq)$; $E^\circ = +1.10V$ When the components of the two half-reactions involved in this reaction be used to do electrical work and the change in internal energy of the sy statements best describes what will happen if Zn(s) is added to a solution at 25°C ? (A) The reaction will occur and the temperature of the solution will incre (B) The reaction will occur and the temperature of the solution will rema (D) The reaction will not occur and the temperature of the solution will rema (D) The reaction will not occur and the temperature of the solution will rema (D) The reaction will not occur and the temperature of the solution will rema (D) The reaction will not occur and the temperature of the solution will rema (D) The reaction will not occur and the temperature of the solution will rema (D) The reaction will not occur and the temperature of the solution will rema (D) The reaction will not occur and the temperature of the solution will rema (D) Angle Cloues contains both polar and non-polar bonds ? (A) NH ₄ Cl (B)HCN (C) H ₂ O ₂	

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER -13



II (O-N-O angle)

1. Match column I with column II and select the correct answer.

Cal					Calumn
CO	umn I (spec	cies)			Column
A.	NO_2^+			1.	180°
B.	NO ₂			2.	132°
C.	NO_2^{-}			3.	120°
D.	NO_3^-			4.	115°
				5.	109°
Co	des				
	Δ	B	C	D	

	A	D	C	D
(A)	5	4	3	2
(B)	5	2	4	3
(C)	1	2	4	3
(D)	1	4	3	2

2. Consider the following sets of quantum number

	n	1	m	S
(i)	3	0	0	$+\frac{1}{2}$
(ii)	2	2	1	$+\frac{1}{2}$
(iii)	4	3	-2	$-\frac{1}{2}$
(iv)	1	0	-1	$-\frac{1}{2}$
(v)	3	2	3	+ 1/2

Which of the following sets of quantum number is not possible.

 $(A) (i) \& (iii) \\ (B) (ii), (iii) \& (iv) \\ (C) (i), (ii), (iii) \& (iv) \\ (D) (ii), (iv) \& (v) \\ (iv) \& (v)$

3. Ammonia is the produced by the reaction

 $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g); \Delta H = -Ve$

The following curve shows the variation of concentration of H_2 . At 30 min, system was subjected to a change. The change could have been -



(A) H₂ was added(C) Volume was increased



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4.	It is suggested that gases by bubbling th that could be remov	SO ₂ (molar mass 64g), whi ne gases through 0.25 molar yed by 1,000 L of the KOH	ch contributes to acid rain, r KOH, thereby producing K solution ?	could be removed from a stream of waste ${}_{2}SO_{3}$. What is the maximum mass of SO_{2}
	(A) 4.0 kg	(B) 8.0 kg	(C) 16 kg	(D) 20 kg
5.	The standard reaction	on free energy for $N_2O_4(g)$ -	$\rightarrow 2NO_2(g)$ is $\Delta G^\circ = +4.73$ k	J mol ⁻¹ at 298 K. What is the value of ΔG
	and what is the spo	ntaneous direction of the r	eaction when the partial pre	essure of the gases are $p_{N_2O_4} = 0.80$ atm
	and $p_{NO_2} = 2.10$ atr	n ?		
	(A) +6.63 kJ mol ^{-1} ;	towards reactant	$(B) - 8.96 \text{ kJ mol}^{-1}$; towards product
	$(C) + 8.96 \text{ kJ mol}^{-1};$	towards product	(D) $+8.96$ kJ mol ⁻¹	; towards reactant
6.	The state of hybridi	ization for the transition st	ate of hydrolysis mechanism	n of BCl ₃ and SF ₄ are respectively :
	(A) sp^2 , sp^3d	(B) sp^3 , sp^3	(C) sp^2 , sp^3d	(D) sp^3 , sp^3d
7.	 Beryllium and alum (A) exhibiting max (B) forming polym (C) forming covale (D) exhibiting amp Point out the incorr (A) Hardness of way (B) Temporary har (C) Permanent har 	inium exhibit many proper imum covalency in compor eric hydrides ent halides shoteric nature in their oxid rect statement. ater depends upon its soar dness is due to bicarbonate	ties which are similar. But, th ands es o consuming water es of calcium and magnesiu	m
	(D) Permanent har	dness is due to soluble sur	poiling water	
9.	E.A.N. of K[PtCl ₃ (η	$^{2}-C_{2}H_{4})]$ is :		
	(A) 86	(B) 78	(C) 84	(D) 34
10.	The vapour pressur- ture. Assuming a so phase in equilibrium	e of two pure isomeric liqui blution of these component n with the solution contain	ids X and Y are 200 torr and ts to obey Raoult's law, the ing equal amounts of X and	100 torr respectively at a given tempera mole fraction of component X in vapou Y, at the same temperature, is :
	(A) 0.33	(B)0.50	(C) 0.66	(D) 0.80
11.	The standard free er Find E° of a cell ma	nergy of formation of AgCl ade up with standard hydro	(s) at 25°C is –109.7 kJ/mol gen electrode, and Cl ^{-/} Ag /	and $[H^{\oplus} + Cl^{-}]$ (aq) is -131.2 kJ/mol . AgCl (s)
	(A) 0.446 V	(B)0.669 V	(C)0.1115 V	(D) 0.223 V

12. Which of the following diagrams is correctly related to different steps involved in the extraction of Zn from zinc blende ore ?



 $(C) \operatorname{Both} (A) \operatorname{and} (B)$



- 13. Nitrogen dioxide :
 - (A) dissolves in water forming HNO_3
 - (B) does not dissolve in water
 - (C) dissolves in water to form HNO_2 and gives off O_2
 - (D) dissolves in water to form a mixture of nitrous and nitric acids
- 14. Anhydrous ferric chloride is prepared by :
 - (A) heating hydrate ferric chloride at a high temperature in a stream of air
 - (B) heating metallic iron in a stream of dry chlorine gas
 - (C) reaction of ferric oxide with HCl
 - (D) reaction of metallic iron with HCl
- Potassium crystallizes in body centred cubic lattice with a unit cell length a = 5.2 Å. What is the distance between nearest neighbours?
 (A) 4.5 Å
 (B) 9.0 Å
 (C) 5.2 Å
 (D) None of these
- 16. Which of the following is a correct statement
 - (A) Spontaneous adsorption of gases on solid surface is an endothermic process as entropy decreases during adsorption.
 - (B) Formation of micelles takes place when temperature is below Kraft Temperature (T_k) and concentration is above critical micelle concentration (CMC).
 - (C) A colloid of $Fe(OH)_3$ is prepared by adding a little excess (required to completely precipitate Fe^{3+} ions as $Fe(OH)_3$) of NaOH in FeCl₃ solution the particles of this sol will move towards anode during electrophoresis.
 - (D) According to Hardy-Schulze rule for the coagulation of As_2S_3 sol flocculation value of Fe^{3+} ion will be more than Ba^{2+} or Na^+
- 17. According to collision theory, not all collisions between molecules lead to reaction. Which of the following statements provide correct reasons ?
 - (1) The total energy of the two colliding molecules is less than some minimum amount of energy.
 - (2) Molecules cannot react with each other unless a catalyst is present
 - (3) Molecules that are improperly oriented during collision will not react
 - (4) Molecules in different states of matter cannot react with each other
 - (A) 1 and 2 (B) 1 and 3 (C) 2 and 3 (D) 1 and 4

18. $Fe_4[Fe(CN)_6]_3$ is a blue coloured complex. Average oxidation number of Fe in $Fe_4[Fe(CN)_6]_3$ is 'a', oxidation number of central iron atom 'b', oxidation number of counter iron atom 'c'; a, b, c are respectively:

(A)
$$+\frac{5}{2},+2,+3$$
 (B) $+\frac{5}{2},+3,-2$ (C) $+\frac{18}{7},+2,+3$ (D) $+\frac{18}{7},+3,+2$

19. (Ag + Pb) alloy $\xrightarrow{\text{melt and zinc}}_{\text{is added}} \rightarrow$

$$(Ag + Pb + Zn) \text{ melt } \xrightarrow[\text{cool}]{} Layer X \\ Layer Y$$

Select correct statement based on above scheme

- (A) layer X contains zinc and silver
- (B) layer Y contains lead and silver but amount of silver in this layer is smaller than in the layer X
- (C) X and Y are immiscible layers
- (D) all of the above are correct statements
- **20.** In which of the following entropy decreases?
 - (A) $2NaHCO_3(s) \longrightarrow Na_2CO_3(s) + CO_2(g) + H_2O(g)$
 - $(B) \operatorname{H}_2(g) \longrightarrow 2\operatorname{H}(g)$
 - (C) Temperature of crystalline solid increased from 2 K to 50 K.
 - (D) Liquid crystallizes into a solid

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER -14



ETOOSINDIA INDIA'S NO. 1 ONLINE COACHING

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Temperature coefficient is defined as the factor by which the rate of reaction increases on increasing the temperature by 10°C at a given temperature. If activation energy of a reaction is 85 kJ, determine the temperature coefficient at 300 K (Rounded off to the nearest whole number)

 (A) 4
 (B) 3

(A)4	(B) 3
(C)7	(D)8

2. HgCl₂ + excess of KI \longrightarrow (A) $\xrightarrow{\text{NH}_3/\text{NaOH}}$ (B). (A) and (B) are respectively are :



(C) both (X)

(B)(Y),(X)

(D) both (Y)

3. The wave function for '2s' orbital is given as

$$\Psi = \frac{1}{4\sqrt{2}} \left(\frac{1}{a_0}\right)^{3/2} \left[2 - \frac{r}{a_0}\right] e^{-r/2a_0}$$

here : a_0 : Bohr radius of H-atom. Read the given statements & pick the incorrect statement :

- (A) The probability density is independent of direction.
- (B) The probability density is maximum at nucleus.
- (C) The radial node occurs at a distance of $2a_0$ from nucleus.
- (D) The given wave function shows angular dependence too.

4. Colourless salt

 $\begin{array}{ccc} (X) & \stackrel{\Delta}{\longrightarrow} (Y) & \stackrel{Cu^{2+}/\Delta}{\longrightarrow} \text{ coloured bead } (Z). \ (X) \text{ can be } : \\ (A) \text{ borax} & (B) \text{ microcosmic salt} & (C) \text{ both } (A) \text{ and } (B) & (D) \text{ None of these} \end{array}$

5. A graph is plotted for a molecule, by substituting its mass on x-axis & the corresponding number of molecules on y-axis. What is the molecular mass of molecule for which the graph is plotted. ($N_A = 6 \times 10^{23}$) [Given $\theta = \tan^{-1}(7.5 \times 10^{21})$]



6. The constant volume molar capacity of an ideal gas is expressed by $C_{v,m} = 16.5 + 10^{-2} \text{ T} \text{ (All values are in SI units)}$ If 2.5 mol of this gas at constant volume is heated from 27°C to 127°C, the internal energy increases by "X" kJ. Hence X is : (A) 4 (B) 5 (C) 6 (D) 7

7. Calculate the equilibrium constant $[K_c]$ for the reaction

 $aA + bB \rightleftharpoons cC$

(Note : a, b and c are minimum integral stochiometric coefficients)



8. In molecules of the type AX_2L_n where L represents lone pair 'n' its number there exists a bond between elements A and X. Then XAX angle

(A) always decreases if 'n' increases

(C) will be maximum for n = 3

(B) always increases if 'n' increases

(D) will always be less than 180° if n = 0

9. Select correct statement.

(A) Mixture of NH_4Cl and $NaNO_2$ on heating gives N_2 gas.

- (B) CFC is used as refrigerating fluid and as propellant in aerosols.
- (C) Phosgene is formed when P_4 reacts with NaOH
- (D) Phosgene dissolves in water forming P_2O_5

10. Identify the incorrect statement

- (A) HgCl₂ is prepared by heating mercury in chlorine.
- (B) HgO decomposes on heating whereas Al₂O₃ has high thermal stability.
- (C) Mac Aurthor's process is used to extract platinum.
- (D) NO_2 undergoes disproportionation reaction under alkaline medium.
- 11. Calculate ΔS_{sys}° for the following reaction at 373 K

 $CO(g) + H_2O(g) \to CO_2(g) + H_2(g)$ $\Delta H^{\circ} = -4.1 \times 10^4 J, \Delta S^{\circ}_{univ} = 56 J / K$ (A) -54 J/K (B) -166 J/K (C) +54 J/K (D) +166 J/K

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- $\begin{array}{ll} \textbf{12.} & I_2 \mbox{ reacts with aqueous } Na_2S_2O_3 \mbox{ to give } Na_2S_4O_6 \mbox{ and } NaI. \mbox{ The products of reaction of } Cl_2 \mbox{ with aqueous } Na_2S_2O_3 \mbox{ are } (A) \mbox{ } Na_2S_4O_6 + NaCl \mbox{ (B) } NaHSO_4 + HCl \mbox{ (C) } NaHSO_4 + HCl \mbox{ (D) } NaHSO_3 + NaCl \mbox{ Nalson} \\ \end{array}$
- **13.** The mass of argon adsorbed per unit mass of carbon surface is platted against pressure. Which of the following plot is correct if x and m represent the masses of argon and carbon respectively? (..... represents extrapolated area)



15. pH of a saturated of magnesium hydroxide in water at 298 K is 10.5. The solubility of the hydroxide in water at 298 K is (A) 1.58×10^{-4} mol L⁻¹

(B) $1.58 \times 10^{-11} \text{ mol } \text{L}^{-1}$ (C) $3.16 \times 10^{-4} \text{ mol } \text{L}^{-1}$ (D) $9.98 \times 10^{-8} \text{ mol } \text{L}^{-1}$

16. Element X crystallizes in a 12 coordination of fcc lattice. On applying high temperature it changes to 8 coordination bcc lattice. Ratio of densities before and after applying high temperature is :

(A) $(\sqrt{3})^3 : 2(\sqrt{2})^3$ (B) 2 : 1 (C) $2(\sqrt{2})^3 : (\sqrt{3})^3$ (D) 1 : 2

17. The conductivity of 0.10 M KCl solution at 298 K is 1.29×10^{-2} S cm⁻¹. The resistance of this solution is found to be 28.44 Ω . Using the same cell, the resistance of 0.10 M NH₄Cl solution is found to be 28.50 Ω . The molar conductivity of NH₄Cl solution in Scm² mol⁻¹ is : (A) 0.130 (B) 13 (C) 130 (D) 1300

ET(NO. 1 ONLINE COACHING		FINAL SO	LUTION MASTER	FOR JEE MAIN BY	Y J.H. SIR
18.	Which of the following species are hypervalent?					
	$1. \text{ClO}_4^-$	2. BF ₃	3. SO ₄ ^{2–}	4. CO ₃ ^{2–}		
	(A) 1, 2, 3	(B) 1	,3	(C)3,4	(D) 1, 2	
19.	Which of the following on thermal decomposition yield a basic as well as an acidic oxide ?					
	(A) KClO ₃	(B)C	CaCO ₃	$(C) NH_4 NO_3$	(D) NaNO ₃	
20.	In the reaction					
	$K + O_2 \rightarrow KO_2$					
	(A) O_2 acts as an oxidising agent		(B) Both K and O_2 are oxidised			
	(C) O_2 is oxidise	ed while K is red	uced	(D) K acts as an ox	idising agent	

BY JITENDRA HIRWANI

SAMPLE MOCK TEST PAPER -15



1. k for a zero order reaction is 2×10^{-2} mol L⁻¹ s⁻¹. If the concentration of the reactant after 25 s is 0.5 M, the initial concentration must have been

(A) 0.5 M (B) 1.25 M (C) 12.5 M (D) 1.0 M

2. In the concentration cell

Value of cell potential will not depend on -

- (A) Value of pKa of HA
- (B) Temperature

(C) 635 V

- (C) Concentration of HA in two electrodes
- (D) Concentration of NaA in two electrodes
- **3.** Which of the following true of this reaction ?

 $2N_2O_5(g) \rightleftharpoons 4NO_2(g) + O_2(g), \Delta H^\circ = 110 \text{ kJ}$

- (A) Both ΔH° and ΔS° favour the reaction spontaneity.
- (B) Both ΔH° and ΔS° oppose the reaction spontaneity.
- (C) ΔH° favour the reaction but ΔS° oppose the reaction.
- (C) ΔH° oppose the reaction but ΔS° favour the reaction.
- **4.** Statement-1 : In the extraction of copper from copper pyrite, copper matte is put in silica lined converter (i.e. Bessemer converter).

Statement-2 : Silica removes iron compound remaining in the matte by forming silicate, FeSiO₃.

- (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
- (B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
- (C) Statement-1 is True, Statement-2 is False.
- (D) Statement-1 is False, Statement-2 is True.
- An electron beam can undergo diffraction by crystals which proves the wave nature of electrons. The potential required for a beam of electrons to be accelerated so that its wavelength becomes equal to 0.154 nm is.
 (A) 63.5 V
 (B) 31.75 V

(D) 12 [°]	7 V

- 6. The specific conductance of 0.01 M solution of the weak monobasic acid is 0.20×10^{-3} S cm⁻¹. The dissociation constant of the acid is (Given $\wedge_{HA}^{\infty} = 400$ S cm² mol⁻²) (A) 5×10^{-2} (B) 2.5×10^{-5} (C) 5×10^{-4} (D) 2.5×10^{-11}
- Relative to the average energy in the spherical crystal field, the t_{2g} orbitals in tetrahedral field is :
 (A) Raised by (2/5)/Δ_t
 (B) Lowered by (2/5)/Δ_t
 (C) Raised by (3/5)/Δ_t
 (D) Lowered by (1/5)/Δ_t

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8.	In which of the follow	following compounds B-F bond length is shortest ?				
	(A) BF_4^-	$(B) \operatorname{NH}_3 \to \operatorname{BF}_3$	(C) BF_3	$(D) BF_3 \rightarrow N(CH_3)_3$		
9.	NH ₃ can't be obtained	by				
	(A) heating of NH_4NO	V_3 or NH_4NO_2	(B) heating of NH_4Cl	or $(NH_4)_2CO_3$		
	(C) heating of NH_4NO	with NaOH	(D) reaction of ALN	or Mg_3N_2 or $CaCN_2$ with H_2O		
10.). $H_2O(\ell) \longrightarrow H_2O(g)$ $\Delta H_{vap} = 45 \text{ kJ/mol}$ Change in internal energy when 1 mol water is vapourised at 1 atm, 100°C is :					
	$\left(R = \frac{25}{3} \frac{J}{\text{mol } K}\right)$					
	(A) 37.5 KJ/mol	(B) 39.6 KJ/mol	(C) 41.9 KJ/mol	(D) None of these		
11.	Which of the following is incorrect statement regarding 'Tyndall effect' ?(A) It is shown by lyophobic colloids.(B) The refractive index of dispersed phase and dispersion medium differ greatly in magnitude.(C) The diameter of the dispersed particles is much smaller than the wavelength of light used.(D) In this effect path of beam of light is illuminated by bluish light					
12. Find correct statement :						
	(A) Copper (l) compound are unstable in aqueous solution and undergo disproportionation.					
	(B) The stability of Cu^{2+} rather than Cu^{+1} is due to the much more negative ΔH_{Hyd} of Cu^{2+} then Cu^{+} .		$\Delta H_{Hyd.}$ of Cu ²⁺ then Cu ⁺ .			
	(A) Only A	(B) Only B	(C) A & B Both	(D) None		
13.	1 mol of ferric oxalate i	1 mol of ferric oxalate is oxidized by x mol of MnQ $=$ in acidic medium x is:				
	(A) 5/6	(B) 6/5	(C) 5	(D) 6		
14.	The ionisation energy of a certain element is 412 kJ mol ⁻¹ . When the atoms of this element are in the first excited state however, the ionisation energy is only 126 kJ mol ⁻¹ . The region of the electromagnetic spectrum which the wavelength of light emitted in a transition from the first excited state to the ground state is :					
	(A) VISIDIE	$(\mathbf{D}) \cup \mathbf{V}$	(C)IK	(D) X -Ray		
15.	All alkali metals form f (A) Amide, MNH ₂ (B) Superoxide like KO (C) Ionic 'salt-like' hyd (D) Basic oxides	ollowing compound excep 22 Iride MH	ot :			



The above isotherm was observed for a monoatomic gas at certain temperature which of the following is correct?

- (A) The gas is behaving ideally.
- (B) The gas is above its critical temperature.
- (C) In the horizontal QR, the pressure is more than critical pressure.
- (D) The gas shows negative deviation from ideal gas in PQ & QR.
- 17. A crystal is made of particles X, Y and Z. X forms fcc packing. Y occupies all the octahedral voids of X and Z occupies all the tetrahedral voids of X. If all the particles along one body diagonal are removed then the formula of the crystal would be :

(A)
$$X_8 Y_4 Z_5$$
 (B) $X_5 Y_4 Z_8$ (C) XYZ_2 (D) $X_2 YZ_2$

- **18.**Yellow coloured solution of FeCl3 changes to light green when
(A) $SnCl_2$ is added(B) Zn is added(C) H2S gas is added(D) all true
- 19. Select diagram which represents the correct change in bond angle of given ions.



20. Amongst the following hydroxides, the one which has the lowest value of K_{sp} is
(A) Mg(OH)2(B) Ca(OH)2(C) Ba(OH)2(D) Be(OH)2