

CG-11-2020

WINTER EXAM 2020

Subject Name : RB-04_CHEMISTRY - Physical Chem-+ Inorganic Chemistry- XV (CBCS)_VI

Date : 16/03/2021

Duration : 60 min. |

Instruction / सूचना / :-

* Follow the detail instructions given on OMR Sheet

* ओ एम आर वरील सर्व सूचनांचे पालन करावे.

Q.1 The decrease in free energy function at constant temperature and pressure is measure of

A] change in enthalpy []

B] Net work done []

C] Change in entropy []

D] Net change in internal energy []

Q.2 The work function 'A' is a

A] State function property []

B] Extensive property []

C] Both 'a' and 'b' []

D] None of these []

The partial molar volume is given by the equation

A) $\bar{U}_i = \left(\frac{\partial U}{\partial n_i} \right)_{T, P, n_1, n_2, \dots}$

B) $\bar{V}_i = \left(\frac{\partial V}{\partial n_i} \right)_{T, P, n_1, n_2, \dots}$

C) $\bar{A}_i = \left(\frac{\partial A}{\partial n_i} \right)_{T, P, n_1, n_2, \dots}$

D) $\bar{G}_i = \left(\frac{\partial G}{\partial n_i} \right)_{T, P, n_1, n_2, \dots}$

Q.3

A] A []

B] B []

C] C []

D] D []

The Gibbs and Duhem equation is given by

A) $\sum n_i d\mu_i = 1$

B) $\sum n_i d\mu_i \neq 1$

C) $\sum n_i d\mu_i \neq 0$

D) $\sum n_i d\mu_i = 0$

Q.4

A] A []

B] B []

C] C []

D] D []

Variation of chemical potential with pressure is given by

A) $\left(\frac{\partial \mu_i}{\partial T} \right)_{P, N} = \bar{S}_i$

B) $\left(\frac{\partial \mu_i}{\partial T} \right)_{P, N} = -\bar{S}_i$

C) $\left(\frac{\partial \mu_i}{\partial P} \right)_{T, N} = \bar{V}_i$

D) $\left(\frac{\partial \mu_i}{\partial P} \right)_{T, N} = -\bar{V}_i$

Q.5

A] A []

B] B []

C] C []

D] D []

Q.6 The variation of work function 'A' with volume and temperature is given as

A] $dA = -PdV - SdT$ []B] $dA = +PdV + SdT$ []C] $dA = -PdV + SdT$ []D] $dA = PdV - SdT$ []

Q.7

The equation $10g \frac{k p_2}{k p_1} = \frac{\Delta H^\circ}{2.303R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$ is integrated form of

A) Clausius - clapeyron equation

B) Van't - Hoff equation

C) Gibbs - Duhem equation

D) none of these

A] A []

B] B []

C] C []

D] D []

Q.8 The application of clausius - clapeyron equation is / are

A] To calculate molar heat of vaporisation []

B] To study thermodynamics of elevation of boiling point []

C] To study thermodynamics of depression of freezing point []

D] All of these []

Q.9

The relation between standard free energy change and equilibrium constant is

A) $\Delta G^\circ = -RT/nkp$ B) $\Delta G^\circ = RT/nkp$ C) $\Delta G^\circ = R/nkp$ D) $\Delta G^\circ = T/nkp$

A] A []

B] B []

C] C []

D] D []

Q.10

The relation between k_p and k_c is

- A) $k_p = k_c (T)^{\Delta n}$ B) $k_p = -k_c (RT)^{\Delta n}$
 C) $k_p = k_c (RT)^{\Delta n}$ D) $k_p = k_c (T)^{\Delta n}$

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- A]A
 B]B

- C]C
 D]D

Q.11 The work function 'A' mathematically define as

- A]A = U + TS
 B]A = U - TS

- C]A = TS - U
 D]A = TS + U

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Q.12 When $P_o > P_s$, then electrode acts as

- A]Positive electrode
 B]Null electrode

- C]Negative electrode
 D]Reference electrode

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Q.13 According to conventional representation, the electrode at which oxidation takes place, it acts as

- A]Negative electrode
 B]Anode

- C]Both 'a' and 'b'
 D]none of these

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Q.14 Dry cell is a type of cell

- A]Reversible cell
 B]Irreversible cell

- C]Electrolytic cell
 D]None of these

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Q.15

The relation between entropy change and emf of cell is

- A) $\Delta G = -nFE$ B) $\Delta H = -nFE + nFT \left(\frac{\partial E}{\partial T} \right)_p$
 C) $\Delta S = nF \left(\frac{\partial E}{\partial T} \right)_p$ D) $\Delta G^\circ = RT/nk$

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- A]A
 B]B

- C]C
 D]D

Q.16 Which statement is correct, with respect to concentration cell with transport

- A]There is transfer of ions from one electrolyte solution to the other take place directly.
 B]The two electrolyte solution are not in direct contact.

- C]The cell reaction does not involve transfer of electrolyte from one solution to the other directly
 D]None of these

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Q.17

The equation for emf of concentration cell without transport is

- A) $E = \frac{RT}{F} \ln \frac{a_2}{a_1}$ B) $E = -\frac{RT}{F} \ln \frac{a_2}{a_1}$
 C) $E = \frac{n^2 h^2}{8\pi m a^2}$ D) $E = h_2$

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- A]A
 B]B

- C]C
 D]D

Q.18 The limitation of quinhydrone electrode is

- A]It gives good result in solution with pH less than 8
 B]In more alkaline solution quinhydrone electrode is not valid

- C]It fails to give satisfactory result in the presence of proteins.
 D]All of these

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Q.19

In cell formula $Zn | Zn^{++} || Fe^{++} | Fe$, the single vertical line represent

- A) Direct contact B) Salt bridge
 C) Same phase D) None of these

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- A]A
 B]B

- C]C
 D]D

Q.20 The example of reference electrode is / are

- A]Calomel
 B]SHE

- C]Silver / Silverchloride electrode
 D]All of these

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Q.21 The reduction potential of calomel electrode for saturated kcl is

- A]0.333 v
 B]0.280 v

- C]0.242 v
 D]none of these

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Q.22 The site of reduction in an electrochemical cell is

- A]The anode
 B]The cathode

- C]The salt bridge
 D]none of these

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Q.23 The paramagnetism is due to presence of

- A]All paired electron
 B]One or more unpaired electron

- C]Both 'A' & 'B'
 D]None of these

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Q.24 Diamagnetism is exhibited by

- A]Cobalt
 B]Klater

- C]Oxygen
 D]Iron

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Q.25 Which of the following is ferromagnetic substance ?

- A]Water
 B]Nacl

- C]Benzene
 D]CrO2

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Q.26 Which type of substance do not obey the Curie's law

- A]Paramagnetic
 B]Diamagnetic

- C]Ferromagnetic
 D]None of these

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Q.27 Which type of substance get permanently magnetised, when placed in magnetic field.

- A]Paramagnetic
 B]Diamagnetic

- C]Ferromagnetic
 D]None of these

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Q.28 Metal present in chlorophyll is			
A]Mg(II) <input type="checkbox"/>	114	C]Zn(II) <input type="checkbox"/>	114
B]Ca(II) <input type="checkbox"/>		D]Fe(II) <input type="checkbox"/>	
Q.29 .			
A]A <input type="checkbox"/>	114	C]C <input type="checkbox"/>	114
B]B <input type="checkbox"/>		D]D <input type="checkbox"/>	
Q.30 .			
A]A <input type="checkbox"/>	114	C]C <input type="checkbox"/>	114
B]B <input type="checkbox"/>		D]D <input type="checkbox"/>	
Q.31 Function of Hemoglobin in biological system is			
A]To carry oxygen <input type="checkbox"/>	114	C]Nitrogen Fixation <input type="checkbox"/>	114
B]To carry carbondioxide <input type="checkbox"/>		D]To carry sulpher dioxide <input type="checkbox"/>	
Q.32 In wade's rule each 'H' is assumed to be contributing ____ number of electron to the skeletal bonding in boranes			
A]One <input type="checkbox"/>	114	C]Three <input type="checkbox"/>	114
B]Two <input type="checkbox"/>		D]Four <input type="checkbox"/>	
Q.33 Borazine is formed when borane react with			
A]Ammonia <input type="checkbox"/>	114	C]Alkali <input type="checkbox"/>	114
B]Water <input type="checkbox"/>		D]Acid <input type="checkbox"/>	
Q.34 The stable isomer obtained at 700oc from ortho dicarba closo dodecacborane is			
A]Meta isomer <input type="checkbox"/>	114	C]Both A & B <input type="checkbox"/>	114
B]Para isomer <input type="checkbox"/>		D]None of these <input type="checkbox"/>	
Q.35 Boron trifluoride on reduction with sodium hydride at 180oc forms			
A]Metalloborane <input type="checkbox"/>	114	C]Diborane <input type="checkbox"/>	114
B]Carborane <input type="checkbox"/>		D]Borazine <input type="checkbox"/>	
Q.36			
According to wade's rule number of electron pairs present in multicentre bonding orbitals of (CH) ₂ B ₁₀ H ₁₀ carborane is	114		114
A) 12 B) 13 C) 14 D) 10			
A]A <input type="checkbox"/>		C]C <input type="checkbox"/>	
B]B <input type="checkbox"/>		D]D <input type="checkbox"/>	
Q.37			
Select the correct statement about B ₁₂ H ₁₂ ⁻² is	114		114
A) Closo metalloborane B) Nido metalloborane			
C) Aracheno metalloborane D) None of the above			
A]A <input type="checkbox"/>		C]C <input type="checkbox"/>	
B]B <input type="checkbox"/>		D]D <input type="checkbox"/>	
Q.38 The compounds having borane cage with one or more metal atom are known as			
A]Carboranes <input type="checkbox"/>	114	C]Borazine <input type="checkbox"/>	114
B]Boranes <input type="checkbox"/>		D]Metalloborane <input type="checkbox"/>	
Q.39 Number of electrons involved in hydrogen bridging bond of diborane is			
A]One <input type="checkbox"/>	114	C]Three <input type="checkbox"/>	114
B]Two <input type="checkbox"/>		D]Four <input type="checkbox"/>	
Q.40			
[Cr(C ₂ BgH ₁₁) ₂] ⁻² is a	114		114
A) Borane B) Carborane			
C) Metalloborane D) Metallo Carborane			
A]A <input type="checkbox"/>		C]C <input type="checkbox"/>	
B]B <input type="checkbox"/>		D]D <input type="checkbox"/>	