

ශ්‍රී ලංකා විවෘත විශ්ව විද්‍යාලය
 ඉදහිටි පාඨමාලාව - 2008/2009
 NSF 1303 / NSF 1303 - රසායන විද්‍යාව
 දැනටමත් පරීක්ෂණය II
 කාලය පැය 1කි.



දිනය - 2008.10.28

වේලාව - 3.00 PM - 4.00 P.M.

(A) කොටස - ඔහුරුවා ප්‍රශ්න (ලකුණු - $3 \times 15 = 45$)

සරසා දැනට පිලිතුරු පත්‍රයේ, එක් එක් ප්‍රශ්නයට ගැලපෙන
 වඩාත්ම නිවැරදි පිලිතුර මත කතිරයක් ලකුණු කරන්න. කතිර එකකට
 වඩා ලකුණු කර දැනට පිලිතුරු පරීක්ෂණය ආරම්භය නොකෙරේ.
 එක් නිවැරදි පිලිතුරක් සඳහා ලකුණු 0.5 ක් ප්‍රදානය කරන අතර
 එක් වැරදි පිලිතුරකින් ලකුණු 0.5 ක් අඩු කරනු ලැබේ.

1) Li, Be, B හි පරමාණුක අංකයන්ගේ ආකෘතිය වැඩිවීමේ නිවැරදි
 අනුපිලිවෙල මෙය,

- (1) Li, Be, B (2) B, Be, Li (3) Be, Li, B (4) Li, B, Be (5) B, Li, Be

2) පරමාණුක පරමාණුක ප්‍රමාණයන් සඳහා යෙදිය හැකි න්වෝන්ට්ට්
 අංක අනුපිලිවෙල (n, l, m, s) නිවැරදි ලෙස නිරූපනය
 මෙය,

- (1) 2, 1, 2, +1/2 (2) 1, 1, 0, +1/2 (3) 1, 0, 0, -1/2 (4) 3, 2, -2, 0 (5) 3, 2, +2, 0

3) හයිඩ්‍රජන් පරමාණුක පහත සඳහන් ඉරි අතරින් කුමක් වඩාත්
 නිවැරදි ලෙස සරල "බෝර්" ආකෘතියෙන් නිරූපනය කල හැකිද?

- (1) වඩාත් අතර ආකෘති වෙනස්
 (2) ඉරි අතර වඩාත් නොවැඩි ගණනාවක්
 (3) වඩාත් වැඩි පරිමාව

(4) සංක්‍රමණීය සම්භාවිතාවය

(5) සංක්‍රමණීය සඳහා චර්ථා නීතිය (selection rule.)

4) ජලය සමඟ වඩාත් භාෂ්මික ප්‍රචාරකයක් යාදනු ලබන්නේ,

- (1) P_2O_5 (2) B_2O_3 (3) CO_2 (4) SiO_2 (5) Al_2O_3

5) පහත සංයෝග අතරින් ප්‍රමාණය වැඩිව සංයෝගය වන්නේ,

- (1) KCl (2) MgO (3) NaCl (4) CaO (5) CO_2

6) පහත ඵලාධින ක්‍රමය, වැළඳීමේ (Mg) පරමාණු හෙහි ප්‍රථම අයනීකරණ ශක්තිය නිරූපනය කරයිද?

- (1) $Mg^{2+}(g) + e^{-}(g) \rightarrow Mg^{+}(g)$
- (2) $Mg(g) \rightarrow Mg^{+}(g) + e^{-}(g)$
- (3) $Mg^{-}(g) \rightarrow Mg(g) + e^{-}(g)$
- (4) $Mg^{+}(g) \rightarrow Mg^{2+}(g) + e^{-}(g)$
- (5) $Mg(g) \rightarrow Mg^{2+}(g) + 2e^{-}(g)$

7) Cs හි ප්‍රථම අයනීකරණ ශක්තිය 376 kJ mol^{-1} වේ. Cs (g) පරමාණු ජලයේ (1J) ශක්ති ප්‍රමාණයක් අවශෝෂණය කර ගනිමින් නිපදවිය හැකි උපරිම Cs^{+} අයන සංඛ්‍යාව වනුයේ,

- (1) 1.5×10^{15} atoms (2) 1.6×10^{15} atoms (3) 1.5×10^{16} atoms (4) 1.6×10^{18} atoms
- (5) 1.6×10^{21} atoms

8) ත්‍රිතන අවර්ණිතා වලට වැඩිවන පදනම වනුයේ, වැඩිපුරමයන්නේ.

- (1) පරමාණුක භාරය වැඩිවන අයුරින් සකසා ඇත.
- (2) න්‍යූට්‍රෝන ප්‍රමාණය සංඛ්‍යාව වැඩිවන අයුරින් සකසා ඇත.
- (3) පරමාණුක න්‍යූට්‍රෝන නියුට්‍රෝන සංඛ්‍යාව වැඩිවන අයුරින් සකසා ඇත.
- (4) අවි කාබ්‍රිඩ් වශයෙන් ගැනීම.
- (5) ත්‍රිතන සඳහන් නිවැරදි නොවේ.

9) ආවර්තයක වම් සිට දකුණට යාමේදී ,

- (1) පරමාණුක ක්‍රමාංකය වැඩි වේ.
- (2) ඔක්සයිඩ වල ආම්ලික ස්වභාවය දැකගත හැකි වේ.
- (3) ඔක්සයිඩ වල භෞමික ස්වභාවය දැකගත හැකි වේ.
- (4) මූලාංග වල ඔක්සිජන් බලය වැඩි වේ.
- (5) ඉහත සඳහන් විධිමත් 4 ව නිවැරදි වේ.

10) පහත සඳහන් කුමන යුගලය දැනට වර්ධනය වෙමින් පවතී ?

- (1) Li- Mg (2) Na - K (3) Ca - Mg (4) B- Al (5) C- Si

11) C, N, O, F හි දෛශික අයනීකරණ ශක්ති අගයන්හි නිවැරදි අනුපිලිවෙල වන්නේ ,

- (1) C>N>O>F (2) O>N>F>C (3) O>F>N>C (4) F>O>N>C (5) N>O>F>C

12) හැලජන කාබනිකයෙහි පරමාණුක ක්‍රමාංකයෙහි වැඩිවීමත් සමඟ පහත සඳහන් කුමන සත්‍ය වේද ?

- (1) අයනික ප්‍රමාණය දැනට වැඩි වේ.
- (2) ඉලෙක්ට්‍රෝන පිට කිරීමේ හැකියාව දැනට වැඩි වේ.
- (3) අයනීකරණ ශක්තිය දැනට වැඩි වේ.
- (4) ඉලෙක්ට්‍රෝන ඝනත්වය වැඩි වේ.
- (5) ඉහත සඳහන් කිසිවක් නොවේ.

13) පහත සඳහන් මූලාංග වල විද්‍යුත් ධාරිතාවය වැඩිවීමේ අනුපිලිවෙල වන්නේ ,

- (1) N,Si,C,P (2) P,Si,N,C (3) C,N,Si,P (4) Si,P,C,N (5) Si,P,N,C

14) ග්ලූකෝස් 18g ක් ජලය 90g දිය කරනු ලැබේ. සාපේක්ෂ වාෂ්ප වීර්ණ පාතනය සඳහා වනුයේ ,

(ග්ලූකෝස් වල අණුක ස්ඵරය - 180 g mol⁻¹, පරමාණුක ස්ඵරය - H - 1, O - 16)

- (1) 1/6 (2) 1/5 (3) 1/51 (4) 5.1 (5) 51

✓ **THE OPEN UNIVERSITY OF SRI LANKA**

Foundation Programme in Science/Continuing Education Programme 2008/2009

PSF 1303/PSE 1303 – CHEMISTRY – LEVEL I (NBT)

ASSIGNMENT TEST II

Duration : 1 Hour

DATE: 2008 –10 – 28

TIME 3.00 p.m. – 4.00 p.m.

Part A – Multiple choices Question (Marks 3 x 15 = 45 marks)

Choose the most correct answer to each question and mark a cross over the number on the given answer sheet. Any answer with more than one cross will not be counted. Each correct answer will carry 3.0 marks 0.5 marks will be deducted for each incorrect answer.

1. Which is the correct order of increasing first ionization energy of Li, Be, and B?

- (1) Li, Be, B (2) B, Be, Li (3) Be, Li, B (4) Li, B, Be (5) B, Li, Be

2. Which set of quantum numbers (n , l , m_s , and s) is permissible for an electron in an atom?

- (1) 2, 1, 2, +1/2 (2) 1, 1, 0, +1/2 (3) 1, 0, 0, -1/2 (4) 3, 2, -2, 0 (5) 3, 2, +2, 0

3. Which of the following properties of the hydrogen atom can be predicted most accurately from the simple Bohr model?

- (1) Energy differences between states
(2) Angular momentum of the ground state
(3) Degeneracy of states
(4) Transition probabilities
(5) Selection rules for transitions

4. Which forms the most alkaline solution in water?

- (1) P_2O_5 (2) B_2O_3 (3) CO_2 (4) SiO_2 (5) Al_2O_3

5. Which of the following compound has the highest melting point?

- (1) KCl (2) MgO (3) NaCl (4) CaO (5) CO_2

6. Which of the following represents the first ionization potential of the magnesium atom?

- (1) $Mg^{2+}(g) + e^-(g) \longrightarrow Mg^+(g)$ (2) $Mg(g) \longrightarrow Mg^+(g) + e^-(g)$
(3) $Mg^-(g) \longrightarrow Mg(g) + e^-(g)$ (4) $Mg^+(g) \longrightarrow Mg^{2+}(g) + e^-(g)$
(5) $Mg(g) \longrightarrow Mg^{2+}(g) + 2e^-(g)$

7 The first ionization energy of Cs is 376 kJ mol^{-1} . The maximum number of Cs^+ ions that can be produced per joule of energy absorbed by $\text{Cs}_{(g)}$ atoms are

- (1) 1.5×10^{15} (2) 1.6×10^{15} (3) 1.5×10^{16} (4) 1.6×10^{18} (5) 1.6×10^{21}

8 The fundamental basis of the present periodic table is that the elements are

- (1) Arranged in the order of increasing atomic weight
(2) Arranged in the order of increasing number of protons in the nucleus.
(3) Arranged in the order of increasing number of neutrons in atomic nucleus
(4) Taken in the group of eight
(5) None of the above

9. As we move from left to right along a period

- (1) Atomic size increases
(2) Acidic nature of oxides decreases
(3) Basic nature of oxides decreases
(4) Reducing power of elements increases
(5) All above four correct.

10 Which pair is different from the others

- (1) Li- Mg (2) Na - K. (3) Ca - Mg (4) B- Al (5) C- Si

11 The correct order of second ionization potential of C,N,O,F is

- (1) $\text{C} > \text{N} > \text{O} > \text{F}$ (2) $\text{O} > \text{N} > \text{F} > \text{C}$. (3) $\text{O} > \text{F} > \text{N} > \text{C}$ (4) $\text{F} > \text{O} > \text{N} > \text{C}$ (5) $\text{N} > \text{O} > \text{F} > \text{C}$

12 In halogen group which of the following tendency varies with atomic number

- (1) Ionic size decreases
(2) Tendency to loss electrons decreases
(3) Ionization energy decreases
(4) Electron affinity increases
(5) None of the above

13 The electronegativity of the following elements increases in the order

- (1) N,Si,C,P (2) P,Si,N,C (3) C,N,Si,P (4) Si,P,C,N (5) Si,P,N,C

14 18g of glucose is dissolved in 90 g of water The relative lowering of vapour pressure is equal to (Molecular weight of glucose – 180 g mol^{-1} Atomic weight H-1 O-16)

- (1) $1/6$ (2) $1/5$ (3) $1/51$ (4) 5.1 (5) 51

15 The depression in freezing point directly proportional to

- (1) Molarity (2) Normality (3) Molality (4) Mole fraction (5) Above all four

Part B - ESSAY TYPE QUESTION (55 MARKS)

1. An organic compound is more soluble in CCl_4 than in water. The distribution coefficient is 4. A volume 100 cm^3 of an aqueous solution of this organic compound contains 3.00 g of the organic compound. This above solution was extracted successively with two 25 cm^3 portion of CCl_4 . How much of the organic compound is remaining in the 100 cm^3 of the aqueous solution
2. A solution contains 1 g of iodine dissolved in 20 cm^3 of potassium iodide solution. If we shake this solution with 20 cm^3 of tetra chloromethane (an organic liquid) How much iodine will be transferred into the tetra chloromethane The partition coefficient between tetra chloromethane and water is 85 at 25°C
3. S and D are completely miscible liquids which when mixed form an ideal solution SD. The total vapour pressure of mixture is P_{SD} at temperature T The partial vapour pressure of S and D are respectively P_S and P_D

(i) Prove $P_{SD} = P_S^0 - X_D(P_S^0 - P_D^0)$

(ii) Draw the variation of vapour pressures P_S, P_D and P_{SD} vs X_D at temperature T



THE OPEN UNIVERSITY OF SRI LANKA
B.Sc/B.Ed DEGREE PROGRAMME/STAND ALONE COURSE IN SCIENCE
PSF 1303/PSE 1303 CHEMISTRY II – 2008/2009
ANSWER SHEET FOR MCQ

Index No.

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Unanswered		
Correct Answered		
Wrong Answered		
Total		

1.

1	2	3	4	5
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 2.

1	2	3	4	5
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 3.

1	2	3	4	5
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4.

1	2	3	4	5
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 5.

1	2	3	4	5
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 6.

1	2	3	4	5
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7.

1	2	3	4	5
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 8.

1	2	3	4	5
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 9.

1	2	3	4	
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10.

1	2	3	4	5
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 11.

1	2	3	4	5
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 12.

1	2	3	4	5
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13.

1	2	3	4	5
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 14.

1	2	3	4	5
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 15.

1	2	3	4	5
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கிளங்கைத் திறந்த பல்கலைக்கழகம்

அத்தியாபு பால ணுறி / Continuing education programme 2008/2009

PSF 1303 / PSE 1303 - கிரகாயனம் - ஡ட்டம் 1 (NBT)

஡திப்பீட்டும் பரீட்சை II

காலம் : 1 ஡ணித்தியாலம்

திகதி : 28.10.2008

சுரம் : பி.ப 3:00 - பி.ப 4:00

பகுதி A : - பல்சுதிரவு வினாக்கள் (புள்ளிகள் $3 \times 15 = 45$ புள்ளிகள்).
ஓவ்வொரு வினாவிற்கும் ஡ிகத் திருத்தமான விடை஡யத் தெரிய செய்து
ஓரப்பட விடைத்தானில். சரியான ஂண்ணின் ஡ீது புள்ளியிடுக.
ஓதாவது ஓரு வினாவிற்கு ஓன்றிற்கு ஓரப்பட விடைகள் காணப்படும்
டத்து ஂவ் வினா கடுத்திற்செடுக்கப்பட ஡ாட்டாது. ஓவ்வொரு
திருத்தமான விடையிற்கும் 3.0 புள்ளிகள் ஡டங்கப்படும். ஓவ்வொரு
திருத்த஡ந்ரு விடையிற்கும் 0.5 புள்ளிகள் குறைக்கப்படும்.

1. பின்வருவன஡ற்றுள் ஂது Li, Be, B ஂக்ப஡ற்றுள் ஡ம் ஂயனாகிகற்
சக்தியின் ஂதிரிக்கும் ஡ரிசை஡யக் காட்டுகின்றது?
(1) Li, Be, B (2) B, Be, Li (3) Be, Li, B (4) Li, B, Be
(5) B, Li, Be

2. ஂது ஓன்றியுள்ள கி஡த்திற்கு ஓன்றிற்கான சக்தி் ஓராட்டெண் ஓராடுதி
(n, l, m, s) ஂது?
(1) 2, 1, 2, $+\frac{1}{2}$ (2) 1, 1, 0, $+\frac{1}{2}$ (3) 1, 0, 0, $-\frac{1}{2}$ (4) 3, 2, -2, 0
(5) 3, 2, +2, 0

3. ஂளிய ஓபாற் ஡ாதிரியுடுவிவிடுந்து பின்வரும் ஓதரசன் ஂணு஡ிஓ஡஡ய
கியல்புகளில் ஂதான ஡ிகத் திருத்த஡க ஂதிர்து கூறு஡ம்?
(1) ப஡கஓக்கி஡டயி஡ான சக்தி் ஓ஡று஡ாட்ட஡
(2) ஓற஡ நி஡ையின் ஓகான ஂந்தத்த஡

- (3) சிதைவுடைந்த சக்திப் படிகள்
 (4) தரண்டல் நிகழ்ச்சிகள்
 (5) தரண்டல் கருக்கான தெரிய விதிகள்

4. பின்வருவனவற்றுள் எது நீரின் மிகவும் கடினத்தன்மையான கரைசலாகத் தரும்?

- (1) P_2O_5 (2) B_2O_3 (3) CO_2 (4) SiO_2 (5) Al_2O_3

5. பின்வரும் கரைசல்களுள் எது மிகவும் உருகுநிலையற்றது?
 (1) KCl (2) MgO (3) $NaCl$ (4) CaO (5) CO_2

6. மகனீசியம் அணுவின் முதலாம் அயனாகக் கிடைக்கின்ற பின்வருவனவற்றுள் எது சரியானது?

- (1) $Mg^{2+}(g) + e^-(g) \longrightarrow Mg^+(g)$ (2) $Mg(g) \longrightarrow Mg^+(g) + e^-(g)$
 (3) $Mg^-(g) \longrightarrow Mg(g) + e^-(g)$ (4) $Mg^+(g) \longrightarrow Mg^{2+}(g) + e^-(g)$
 (5) $Mg(g) \longrightarrow Mg^{2+}(g) + 2e^-(g)$

7. Cs கிடைக்கும் முதலாம் அயனாகக் கிடைக்கின்ற 376 kJ mol^{-1} ஆகும். Cs (அ) அணுவின் உருகுநிலை ஒரு மூலம் சக்திக்கு உருவாகக்கூடிய Cs^+ அயன்களின் அதிகப்பட எண்ணிக்கை

- (1) 1.5×10^{15} (2) 1.6×10^{15} (3) 1.5×10^{16} (4) 1.6×10^{18}
 (5) 1.6×10^{21}

8. நீர் போது காணப்படும் ஆவர்த்தன அட்டவணையில் பின்வரும் எவ்வாறு உடையின் மூலகங்கள் ஒழுங்குபடுத்தப்பட்டுள்ளன?

- (1) அவற்றின் அணுநிறை அதிகரிக்கும் வரிசையில்
 (2) அவற்றின் கருவில் புரோட்டான்களின் எண்ணிக்கை அதிகரிக்கும் வரிசையில்

(3) அவற்றின் கருவின் நியூத்திரன்களின் எண்ணிக்கை அதிகரிக்கும்
வரிசையில்

(4) அணு எட்கள் கூடல்களின்

(5) மேலூண் எதுவுமன்று

9. ஆலத்தன்மை வழியாக கிடைத்து வரக்கூடிய வகைகளில்

(1) அணு மடமன் அதிகரிக்கின்றது

(2) ஒட்சைட்டுக்களின் அமிலத்தன்மை குறைகின்றது

(3) ஒட்சைட்டுக்களின் ஸ்தத்தன்மை குறைகின்றது

(4) ஸ்தகங்களின் தாழ்த்தும் வலு அதிகரிக்கின்றது.

(5) மேலூண் நான்கும் திடுத்தமானவை

10. பின்வரும் கோடிக்கள் எது மந்தவழிவழியாக வேறுபடுகின்றது?

(1) Li - Mg (2) Na - K (3) Ca - Mg (4) B - Al (5) C - Si

11. பின்வருவனவற்றுள் எது C, N, O, F என்பவற்றின் கிரக்டாம்

அயனாக்கள் அடித்தத்தின் திடுத்தமான வரிசையைக் காட்டுகின்றது?

(1) $C > N > O > F$ (2) $O > N > F > C$ (3) $O > F > N > C$

(4) $F > O > N > C$ (5) $N > O > F > C$

12. அசன் கூட்டத்தின் பின்வருவனவற்றுள் எதுவுமே போக்கு

அணு எண்ணுடன் மாறுபடுகின்றது?

(1) அயன் மடமன் குறைவடைகின்றது

(2) இலத்திரனை கிழக்கும் போக்கு குறைவடைகின்றது

(3) அயனாக்கள் சக்தி குறைவடைகின்றது

(4) இலத்திரன் நாட்டம் அதிகரிக்கின்றது

(5) மேலூண் எதுவுமன்று

13. பின்வரும் ஸ்தகங்களின் மின்சுத்தத்தன்மை அதிகரிக்கும் வரிசை

(1) N, Si, C, P (2) P, Si, N, C (3) C, N, Si, P

(4) Si, P, C, N (5) Si, P, N, C

14. 18 g குளுக்கோசு 90 g நீரில் கரைந்துள்ளது. ஆவியழுக்கத்தின் சார்ய அறக்கம் பின்வரும் எதற்குக் சமனாகும்?
(குளுக்கோசு வின் மூலக்கூற்று நிறை - 180 g mol^{-1} , H-1, O-16)
(1) $\frac{1}{6}$ (2) $\frac{1}{5}$ (3) $\frac{1}{5}$ (4) 5:1 (5) 51

15. உறைநிலை அறக்கம் பின்வரும் எதற்கு நேர் விகித சமன்
(1) மூலர்த்திநன் (2) நேர்த்திநன் (3) மூலர்த்திநன்
(4) மூல் பிண்டம் (5) மெய்நன் சகலதும்

பகுதி B - கட்டணை வினாக்கள் (55 புள்ளிகள்)

1. சேதனச் சேர்வைமையொன்று நீரிழும் பிளக்க CCl_4 கிள் அநிகையு கறையும. பங்கீட்டுக் குணகம் 4 ஆகும். நீர்க்கறையலின் 100 cm^3 ஆனது இச் சேதனச் சேர்வையின் 300 டி கிக் கெரண்டுள்ளது. கிற் நீர்க்கறையலொன்று அடுத்தடுத்து இடு தடவைகள் 25 cm^3 CCl_4 உடன் பிரிசெகடுக்கப்படுகின்றது. கிற் நீர்க்கறையலின் (100 cm^3) எவ்வளவு சேதனச் சேர்வை எக்சியிடுகிடும்?

2. 20 cm^3 வெற்றாசியல் அயடைடபுள் கறைந்துள்ள 19 அயடைகை கறைசுல் ழுன்று கெரண்டுள்ளது. கிக் கறைசலை 20 cm^3 வெற்றா-குணைரோமசேதுடன் (சேதனக் கறைப்பான்) குகுகிடும் போது எவ்வளவு அயடன் வெற்றா குணைரோமசேதுகிக் கிடமார்ப்பு-படும்? வெற்றா குணைரோமசேதுகிகும் நீடுக்குமிடையிலொன பங்கீட்டுக் குணகம் 25°C யில் 85 ஆகும்.

3. S_1, D எக்பன முற்றாக கல்கிடுந்திகவுள்ள திரவங்கள். கிவை கலக்கப்படும் போது S_1 எலும் கிடையசறைசல் உடுவாகிறது. T வெப்பநிலையில் கிக் கலவையின் வெளித் ஆவியடுக்கம் P_{SD} . S_1, D எக்பவற்றின் பகுதி ஆவியடுக்கங்கள் முறையடய P_S, P_D ஆகும்.

(i) $P_{SD} = P_S^\circ - X_D (P_S^\circ - P_D^\circ)$ என நிபுயக.

(ii) வெப்பநிலை T யில் ஆவியடுக்கங்கள் P_S, P_D, P_{SD} vs X_D யிற் றான மானுகையில்க் வறையவ வறையக.

THE OPEN UNIVERSITY OF SRI LANKA

Foundation Programme in Science/Continuing Education Programme 2008/2009

PSF 1303/PSE 1303 – CHEMISTRY – LEVEL I (NBT)

ASSIGNMENT TEST II

Duration : 1 Hour

DATE: 2008 –10 – 28

TIME 3.00 p.m. – 4.00 p.m.

Part A – Multiple choices Question (Marks 3 x 15 = 45 marks)

Choose the most correct answer to each question and mark a cross over the number on the given answer sheet. Any answer with more than one cross will not be counted. Each correct answer will carry 3.0 marks 0.5 marks will be deducted for each incorrect answer.

- Which is the correct order of increasing first ionization energy of Li, Be, and B?
(1) Li, Be, B (2) B, Be, Li (3) Be, Li, B (4) Li, B, Be (5) B, Li, Be
- Which set of quantum numbers (n , l , m_s , and s) is permissible for an electron in an atom?
(1) 2, 1, 2, +1/2 (2) 1, 1, 0, +1/2 (3) 1, 0, 0, -1/2 (4) 3, 2, -2, 0 (5) 3, 2, +2, 0
- Which of the following properties of the hydrogen atom can be predicted most accurately from the simple Bohr model?
(1) Energy differences between states
(2) Angular momentum of the ground state
(3) Degeneracy of states
(4) Transition probabilities
(5) Selection rules for transitions
- Which forms the most alkaline solution in water?
(1) P_2O_5 (2) B_2O_3 (3) CO_2 (4) SiO_2 (5) Al_2O_3
- Which of the following compound has the highest melting point?
(1) KCl (2) MgO (3) NaCl (4) CaO (5) CO_2
- Which of the following represents the first ionization potential of the magnesium atom?
(1) $Mg^{2+}(g) + e^-(g) \longrightarrow Mg^+(g)$ (2) $Mg(g) \longrightarrow Mg^+(g) + e^-(g)$
(3) $Mg(g) \longrightarrow Mg(g) + e^-(g)$ (4) $Mg^+(g) \longrightarrow Mg^{2+}(g) + e^-(g)$
(5) $Mg(g) \longrightarrow Mg^{2+}(g) + 2e^-(g)$

7 The first ionization energy of Cs is 376 kJ mol^{-1} . The maximum number of Cs^+ ions that can be produced per joule of energy absorbed by $\text{Cs}_{(g)}$ atoms are

- (1) 1.5×10^{15} (2) 1.6×10^{15} (3) 1.5×10^{16} (4) 1.6×10^{18} (5) 1.6×10^{21}

8 The fundamental basis of the present periodic table is that the elements are

- (1) Arranged in the order of increasing atomic weight
(2) Arranged in the order of increasing number of protons in the nucleus.
(3) Arranged in the order of increasing number of neutrons in atomic nucleus
(4) Taken in the group of eight
(5) None of the above

9. As we move from left to right along a period

- (1) Atomic size increases
(2) Acidic nature of oxides decreases
(3) Basic nature of oxides decreases
(4) Reducing power of elements increases
(5) All above four correct.

10 Which pair is different from the others

- (1) Li- Mg (2) Na - K (3) Ca - Mg (4) B- Al (5) C- Si

11 The correct order of second ionization potential of C,N,O,F is

- (1) $\text{C} > \text{N} > \text{O} > \text{F}$ (2) $\text{O} > \text{N} > \text{F} > \text{C}$ (3) $\text{O} > \text{F} > \text{N} > \text{C}$ (4) $\text{F} > \text{O} > \text{N} > \text{C}$ (5) $\text{N} > \text{O} > \text{F} > \text{C}$

12 In halogen group which of the following tendency varies with atomic number

- (1) Ionic size decreases
(2) Tendency to loss electrons decreases
(3) Ionization energy decreases
(4) Electron affinity increases
(5) None of the above

13 The electronegativity of the following elements increases in the order

- (1) N, Si, C, P (2) P, Si, N, C (3) C, N, Si, P (4) Si, P, C, N (5) Si, P, N, C

14 18g of glucose is dissolved in 90 g of water The relative lowering of vapour pressure is equal to (Molecular weight of glucose – 180 g mol^{-1} Atomic weight H-1 O-16)

- (1) $1/6$ (2) $1/5$ (3) $1/51$ (4) 5.1 (5) 51

15 The depression in freezing point directly proportional to

- (1) Molarity (2) Normality (3) Molality (4) Mole fraction (5) Above all four

Part B - ESSAY TYPE QUESTION (55 MARKS)

1. An organic compound is more soluble in CCl_4 than in water. The distribution coefficient is 4. A volume 100 cm^3 of an aqueous solution of this organic compound contains 3.00 g of the organic compound. This above solution was extracted successively with two 25 cm^3 portion of CCl_4 . How much of the organic compound is remaining in the 100 cm^3 of the aqueous solution
2. A solution contains 1 g of iodine dissolved in 20 cm^3 of potassium iodide solution. If we shake this solution with 20 cm^3 of tetra chloromethane (an organic liquid) How much iodine will be transferred into the tetra chloromethane The partition coefficient between tetra chloromethane and water is 85 at 25°C
3. S and D are completely miscible liquids which when mixed form an ideal solution SD. The total vapour pressure of mixture is P_{SD} at temperature T The partial vapour pressure of S and D are respectively P_S and P_D

(i) Prove $P_{SD} = P_S^0 - X_D(P_S^0 - P_D^0)$

(ii) Draw the variation of vapour pressures P_S, P_D and P_{SD} vs X_D at temperature T

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PSF 1303/PSE 1303 – CHEMISTRY – LEVEL I
TEST ASSIGNMENT II Answer Guide

- | | | | | |
|--------|--------|--------|--------|--------|
| 1). 4 | 2). 3 | 3). 1 | 4). 5 | 5). 2 |
| 6). 2 | 7). 4 | 8). 2 | 9). 3 | 10). 1 |
| 11). 3 | 12). 3 | 13). 4 | 14). 3 | 15). 3 |

Part B

1. Partition coefficient $K_D = \frac{C_{\text{compound}}^{\text{Organic}}}{C_{\text{compound}}^{\text{Aqueous}}}$

$$= \frac{a \times 1000/25 \times M}{(3-a) \times 1000/100 \times M}$$

$a = 1.5 \text{ g}$

Partition coefficient $K_D = \frac{C_{\text{compound}}^{\text{Organic}}}{C_{\text{compound}}^{\text{Aqueous}}}$

$$= \frac{b \times 1000/25 \times M}{(1.5-b) \times 1000/100 \times M}$$

$b = 0.75 \text{ g}$

The amount of substance in aqueous = 0.75 g

2. Partition coefficient $K_D = \frac{C_{I_2}^{\text{Organic}}}{C_{I_2}^{\text{Aqueous}}}$

$$85 = \frac{y \times 1000 / 20}{(1-y) \times 1000 / 20}$$

I_2 Extracted = 0.988 g

I_2 Remaining in aqueous = 0.012 g

3.

(i) $P_s = P_s^0 X_s$ $P_D = P_D^0 X_D$

$$P_s + P_D = P_s^0 X_s + P_D^0 X_D \quad X_s + X_D = 1$$

$$P_{SD} = P_s^0 - X_D [P_s^0 - P_D^0]$$

