


Course No: PHRM 1204
Course Title: Inorganic
Pharmaceutical chemistry
Date: 1/6/2017
No. of Questions: (2)
Time: 2 hour
Using Calculator (Yes)

University of Palestine

Final Exam
2016/2017
Total Grade: 50 Marks


Instructor Name: Sharief Mezyed
Student No.: _____
Student Name: _____
College Name: Pharmacy
Dep. / Specialist: _____
Using Dictionary (No)

Question one- Choose the correct answer:

40 Marks

- 1) Which of the following species, _____ will have bond angles of 120° .
 - A) PH_3
 - B) ClF_3
 - C) NCl_3
 - D) BCl_3
 - E) All of these will have bond angles of 120° .
- 2) Of the molecules below, only _____ is nonpolar.
 - A) CO_2
 - B) H_2O
 - C) NH_3
 - D) HCl
 - E) SCl_2
- 3) The electron-domain geometry of _____ is tetrahedral.
 - A) CBr_4
 - B) PH_3
 - C) CCl_2Br_2
 - D) XeF_4
 - E) all of the above except XeF_4
- 4) The carbon-carbon σ bond in ethylene, $\text{H}_2\text{C}=\text{CH}_2$, results from the overlap of _____.
 - A) sp hybrid orbitals
 - B) sp^3 hybrid orbitals
 - C) sp^2 hybrid orbitals
 - D) s atomic orbitals
 - E) p atomic orbitals
- 5) The combination of two atomic orbitals results in the formation of _____ molecular orbitals.
 - A) 1
 - B) 2
 - C) 3
 - D) 4
 - E) 0
- 6) In comparing the same two atoms bonded together, the _____ the bond order, the _____ the bond length, and the _____ the bond energy.
 - A) greater, shorter, greater
 - B) greater, greater, greater
 - C) greater, longer, greater
 - D) smaller, longer, smaller
 - E) smaller, greater, greater
- 7) Based on molecular orbital theory, the bond order of the NN bond in the N_2^{2+} ion is _____.
 - A) 0
 - B) 3
 - C) 1
 - D) 2
 - E) $1/2$


Course No: PHRM 1204
Course Title: Inorganic
Pharmaceutical chemistry
Date: 1/6/2017
No. of Questions: (2)
Time: 2 hour
Using Calculator (Yes)

University of Palestine

Final Exam
2016/2017
Total Grade: 50 Marks

Instructor Name: Sharief Mezyed
Student No.: _____
Student Name: _____
College Name: Pharmacy
Dep. / Specialist: _____
Using Dictionary (No)

- 8) Acetic acid has a heat of fusion of 10.8 kJ/mol and a heat of vaporization of 24.3 kJ/mol. The estimated value for the heat of sublimation of acetic acid is
- A) -13.5 kJ/mol.
 - B) -35.1 kJ/mol.
 - C) 13.5 kJ/mol.
 - D) 17.6 kJ/mol.
 - E) 35.1 kJ/mol
- 9) Arrange the following in order of increasing boiling point: NaCl, CH₃Cl, CH₃OH, CH₄.
- A) CH₃OH < CH₃Cl < NaCl < CH₄
 - B) NaCl < CH₃Cl < CH₃OH < CH₄
 - C) CH₄ < CH₃OH < CH₃Cl < NaCl
 - D) CH₄ < CH₃Cl < CH₃OH < NaCl
- 10) When an ionic salt dissolves in water, the solute-solvent interaction is
- A) dipole-dipole.
 - B) hydrogen bonding.
 - C) ion-ion forces.
 - D) ion-induced dipole interaction.
 - E) ion-dipole.
- 11) Freon-11, which has the chemical formula CCl₃F, has a normal boiling point of 23.8°C. The specific heats of CCl₃F(l) and CCl₃F(g) are 0.87 J/g·K and 0.59 J/g·K, respectively. The heat of vaporization is 24.75 kJ/mol. Calculate the heat required to convert 10.0 g of Freon-11 from a liquid at -50.0°C to a gas at 50.0°C.
- A) 3.9 kJ
 - B) 0.64 kJ
 - C) 2.6 kJ
 - D) 0.15 kJ
 - E) 1.8 kJ
- 12) Which of the following compounds shows optical isomerism?
- A) [Cu(NH₃)₄]²⁺
 - B) [ZnCl₄]²⁻
 - C) [Cr(C₂O₄)₃]³⁻
 - D) [Co(CN)₆]³⁻
- 13) The stabilization of coordination compounds due to chelation is called the chelating effect. Which of the following compound is the most stable complex species? (en) = Ethylenediamine
- A) [Cr(en)₃]³⁺
 - B) [CrCl₆]³⁻
 - C) [CrF₆]³⁻
 - D) [Cr(NH₃)₆]³⁺
- 14) The reaction $2\text{NO} + 2\text{H}_2 \longrightarrow \text{N}_2 + 2\text{H}_2\text{O}$ is second-order in NO and first-order in H₂. What happens to **the rate** when (i) [NO] is doubled, while [H₂] is fixed; (ii) [NO] is fixed, while [H₂] is doubled; (iii) both [NO] and [H₂] are doubled?
- A) (i) increases by a factor of 4 ; (ii) doubles ; (iii) increases by a factor of 6

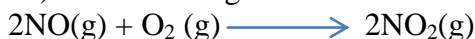
Course No: PHRM 1204
Course Title: Inorganic
Pharmaceutical chemistry
Date: 1/6/2017
No. of Questions: (2)
Time: 2 hour
Using Calculator (Yes)

University of Palestine

Final Exam
2016/2017
Total Grade: 50 Marks

Instructor Name: Sharief Mezyed
Student No.: _____
Student Name: _____
College Name: Pharmacy
Dep. / Specialist: _____
Using Dictionary (No)

- B) (i) increases by a factor of 4 ; (ii) doubles ; (iii) increases by a factor of 8
C) (i) doubles ; (ii) doubles ; (iii) increases by a factor of 4
D) (i) doubles ; (ii) increases by a factor of 4 ; (iii) increases by a factor of 4
E) (i) increases by a factor of 4 ; (ii) doubles ; (iii) increases by a factor of 4

15) The following data were collected for the rate of disappearance of NO in the reaction:



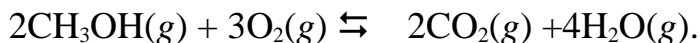
What is the rate law for the reaction and the value of the rate constant?

- A) Rate = $k[\text{NO}]^2[\text{O}_2]$, $k = 7.11 \times 10^3 \text{ M}^{-2} \text{ s}^{-1}$
B) Rate = $k[\text{NO}]^2$, $k = 8.88 \times 10^1 \text{ M}^{-1} \text{ s}^{-1}$
C) Rate = $k[\text{NO}][\text{O}_2]^2$, $k = 7.16 \times 10^3 \text{ M}^{-2} \text{ s}^{-1}$
D) Rate = $k[\text{O}_2]$, $k = 1.12 \text{ M}^{-2} \text{ s}^{-1}$
E) Rate = $k[\text{NO}][\text{O}_2]$, $k = 8.95 \times 10^1 \text{ M}^{-1} \text{ s}^{-1}$

Experiment Number	[NO] (M)	[O ₂] (M)	initial rate (M/s)
1	0.0126	0.0125	1.41×10^{-2}
2	0.0252	0.0250	1.13×10^{-1}
3	0.0252	0.0125	5.64×10^{-2}

- 16) Which one of the following would alter the **rate constant (k)** for the reaction $2\text{A} + \text{B} \longrightarrow$ products?
A) increasing the concentration of A.
B) increasing the concentration of B.
C) increasing the temperature.
D) measuring k again after the reaction has run for a while.
- 17) For the hypothetical reaction $\text{A} + 3\text{B} \rightarrow 2\text{C}$, the rate of appearance of C given by $(\Delta\text{C}/\Delta t)$ may also be expressed as
A) $\Delta\text{C}/\Delta t = \Delta\text{A}/\Delta t$
B) $\Delta\text{C}/\Delta t = -(3/2) \Delta\text{B}/\Delta t$
C) $\Delta\text{C}/\Delta t = -(2/3) \Delta\text{B}/\Delta t$
D) $\Delta\text{C}/\Delta t = -(1/2) \Delta\text{A}/\Delta t$


18) Using the following tabulated values of S° in the following table, calculate the value of ΔS° for the reaction as written:



- A) -40.2 J/K
B) -161.8 J/K
C) -383.4 J/K
D) 313.9 J/K
E) 92.2 J/K

Substance	$S^\circ(\text{J/mol}\cdot\text{K})$
CH ₃ OH(g)	237.6
CH ₃ OH(l)	126.8
O ₂ (g)	205.0
CO ₂ (g)	213.6
H ₂ O(g)	188.8
H ₂ O(l)	69.9

Course No: PHRM 1204
Course Title: Inorganic
Pharmaceutical chemistry
Date: 1/6/2017
No. of Questions: (2)
Time: 2 hour
Using Calculator (Yes)

University of Palestine

Final Exam
2016/2017
Total Grade: 50 Marks

Instructor Name: Sharief Mezyed
Student No.: _____
Student Name: _____
College Name: Pharmacy
Dep. / Specialist: _____
Using Dictionary (No)

19) ΔH° is 137 kJ and ΔS° is 120 J/K for the reaction:



at standard conditions, and assuming the values given for the ΔH° and the ΔS° do not change significantly with temperature, this reaction will be

- A) Spontaneous only at high temperatures.
- B) Nonspontaneous at all temperatures.
- C) Spontaneous only at low temperature.
- D) Spontaneous at all temperatures.

20) Consider the following table of thermodynamic data. All values are tabulated for 25°C. Determine the value of ΔG° in kJ for the following reaction, taking place at 25°C.



- A) 14 kJ
- B) -472 kJ
- C) -122 kJ
- d) -14 kJ

Substance	ΔG_f° (kJ/mol)	S° (J/mol·K)
$\text{C}_2\text{H}_2(\text{g})$	209	201
$\text{C}_2\text{H}_4(\text{g})$	68	219
$\text{C}_2\text{H}_6(\text{g})$	-33	230
$\text{H}_2(\text{g})$	0	131
$\text{H}_2\text{O}(\text{g})$	-229	189
$\text{C}_2\text{H}_5\text{OH}(\text{l})$	-175	161

Question Two: Answer the following questions as required: 10 Marks

1) What type(s) of intermolecular forces exist between the following pairs: (a) HBr and H_2S , (b) I_2 and NO_3^- ?

2) a. Give the molecular formula for each of the following coordination compounds

1- dichlorobis(ethylenediamine)platinum(IV) nitrate


2- Tetraammineaquachloridecobalt (III) chloride

b) Give the systematic names for the following coordination compounds:

1- $[\text{Co}(\text{en})_3](\text{SO}_4)_3$

2- $[\text{Fe}(\text{OH})(\text{H}_2\text{O})_5]\text{Br}_2$

Course No: PHRM 1204
 Course Title: Inorganic
 Pharmaceutical chemistry
 Date: 1/6/2017
 No. of Questions: (2)
 Time: 2 hour
 Using Calculator (Yes)

University of Palestine

 Final Exam
 2016/2017
 Total Grade: 50 Marks

Instructor Name: Sharief Mezyed
 Student No.: _____
 Student Name: _____
 College Name: Pharmacy
 Dep. / Specialist: _____
 Using Dictionary (No)

3) The thermal decomposition of phosphine (PH_3) into phosphorous and molecular hydrogen is a first-order reaction: $4\text{PH}_3(\text{g}) \rightarrow \text{P}_4(\text{g}) + 6\text{H}_2(\text{g})$ The half-life of the reaction is 35.0 s at 680°C . Calculate; the time required for 95 percent of the phosphine to decompose.

4) When the concentration of A in the reaction $\text{A} \longrightarrow \text{B}$ was changed from 1.20 M to 0.60 M, the half-life increased from 2.0 min to 4.0 min at 25°C . Calculate the order of the reaction and the rate constant.

IA											VIIIA										
1																					2
H 1.008	IIA																				He 4.003
3	4											5	6	7	8	9	10				
Li 6.941	Be 9.012											B 10.81	C 12.0	N 14.01	O 15.99	F 19.00	Ne 20.18				
11	12											13	14	15	16	17	18				
Na 22.99	Mg 24.31	IIIB	IVB	VB	VIB	VIIIB	VIIIB		IB	IIB	Al 26.98	Si 28.0	P 30.97	S 32.07	Cl 35.45	Ar 39.94					
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36				
K 39.10	Ca 40.08	Sc 44.96	Ti 47.88	V 50.94	Cr 52.00	Mn 54.94	Fe 55.85	Co 58.93	Ni 58.69	Cu 63.55	Zn 65.39	Ga 69.72	Ge 72.6	As 74.92	Se 78.96	Br 79.90	Kr 83.80				
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54				
Rb 85.47	Sr 87.62	Y 88.91	Zr 91.22	Nb 92.91	Mo 95.94	Tc (98)	Ru 101.1	Rh 102.9	Pd 106.4	Ag 107.9	Cd 112.4	In 114.8	Sn 118.7	Sb 121.8	Te 127.6	I 126.9	Xe 131.3				

☺ Good Luck ☺