

VIETNAM NATIONAL UNIVERSITY
VNU UNIVERSITY OF SCIENCE

FINAL EXAMINATION TEST
Academic calendar: 2020 – 2021, Fall 2020 semester

Subject: General Chemistry
Class: CHE1080 18QTS Credits: 03
Student: CHE1080 18QTS (General chemistry for QTS student)
Time: 90 minutes

Q1 (1.0 point): The power output of a laser is measured in units of watts (W), where one watt is equal to 1 one joule per second ($1 \text{ W} = 1 \text{ J}\cdot\text{s}^{-1}$) What is the number of photons emitted per second by a 1.00 mW nitrogen laser? The wavelength emitted by a nitrogen laser is 337 nm.

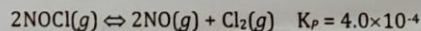
Q2 (2.0 points): With molecules CH_4 , PCl_3 , and SF_6
a. Write Lewis structure of these molecules, then shows the hybridization of center atom in each molecule?
b. Draw the molecular shape of each molecule? Determine the angle (with center atom) in each case?

Q3 (2.0 points): Draw molecular orbital of N_2 and N_2^+ . Calculate the bonding order of each molecule, and then indicate they are paramagnetic or diamagnetic.

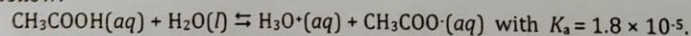
Q4 (1.0 point): When 50.0 g of 0.2 M $\text{NaCl}(aq)$ at 24.1°C is added to 100.0 g of 0.1 M $\text{AgNO}_3(aq)$ at 24.1°C in a calorimeter, the temperature increases to 25.2°C as $\text{AgCl}(s)$ forms. Assuming the specific heat of the solution and products is $4.20 \text{ J}\cdot\text{g}^{-1}\cdot^\circ\text{C}^{-1}$, calculate the approximate amount of heat in joules produced.

Q5 (1.0 point): Carbon tetrachloride, CCl_4 , was once used as a dry cleaning solvent, but is no longer used because it is carcinogenic. At 57.8°C , the vapor pressure of CCl_4 is 54.0 kPa, and its enthalpy of vaporization is 33.05 kJ/mol. Use this information to estimate the normal boiling point for CCl_4 .

Q6 (1.0 point): Calculate the pressures of all species at equilibrium in a mixture of NOCl , NO , and Cl_2 produced when a sample of NOCl with a pressure of 10.0 atm comes to equilibrium according to this reaction:



Q7 (2.0 points): (a) pH of 0.2M HF acid solution is 1.9, calculate acid constant, K_a , for HF acid?
(b) What is the pH of solution containing 0.25M CH_3COOH and 0.03M CH_3COONa . The dissociation reaction of acetic acid as follow:



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Constant: $h = 6,626 \times 10^{-34} \text{ J}\cdot\text{s}$; $c = 3 \times 10^8 \text{ m/s}$; $R = 8,314 \text{ J/mol}\cdot\text{K}$, $0,082 \text{ L}\cdot\text{atm/mol}\cdot\text{K}$; $F = 96485 \text{ C/mol}$

1 H 1.01																	2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.30											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc -	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57-71 -	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po -	85 At -	86 Rn -

The test is only 01 page.