



2049 FCC CHEMISTRY Practice EXAM 2



Prepared by the Fresno City College Faculty Practice Examination Task Force

FCC EXAMINATIONS TASK FORCE

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DIRECTIONS TO THE EXAMINER

This test is designed to be taken with an answer sheet on which the student records his or her responses. All answers are to be marked on that sheet, not written in the booklet. Each student should be provided with an answer sheet and scratch paper, both of which must be turned in with the test booklet at the end of the examination. Each Local Section may use an answer sheet of its own choice.

The full examination consists of 20 multiple-choice questions representing a fairly wide range of difficulty. Students should be permitted to use non-programmable calculators. A periodic table and other useful information are provided on page two of this exam booklet for student reference.

Suggested Time: 75 minutes

DIRECTIONS TO THE EXAMINEE

DO NOT TURN THE PAGE UNTIL DIRECTED TO DO SO.

This is a multiple-choice examination with four choices for each question. There is only one correct or best answer to each question. When you select your choice, blacken the corresponding space on the answer sheet with your pencil. Make a heavy full mark, but no stray marks. If you decide to change your answer, be certain to erase your original answer completely.

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DIRECTIONS

- When you have selected your answer to each question, blacken the corresponding space on the answer sheet using a soft, #2 pencil. Make a heavy, full mark, but no stray marks. If you decide to change an answer, erase the unwanted mark very carefully.
- There is only one correct answer to each question. Any questions for which more than one response has been blackened **will not be counted**.
- Your score is based solely on the number of questions you answer correctly. **It is to your advantage to answer every question.**

ABBREVIATIONS AND SYMBOLS					
amount of substance	n	Faraday constant	F	molar mass	M
ampere	A	free energy	G	mole	mol
atmosphere	atm	frequency	ν	Planck's constant	h
atomic mass unit	u	gas constant	R	pressure	P
Avogadro constant	N_A	gram	g	rate constant	k
Celsius temperature	°C	hour	h	reaction quotient	Q
centi- prefix	c	joule	J	second	s
coulomb	C	kelvin	K	speed of light	c
density	d	kilo- prefix	k	temperature, K	T
electromotive force	E	liter	L	time	t
energy of activation	E_a	measure of pressure mm Hg		vapor pressure	VP
enthalpy	H	milli- prefix	m	volt	V
entropy	S	molal	m	volume	V
equilibrium constant	K	molar	M		

CONSTANTS	
R	$0.0821 \text{ L} \cdot \text{atm} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$
N_A	$6.022 \times 10^{23} \text{ mol}^{-1}$
c	$2.998 \times 10^8 \text{ m} \cdot \text{s}^{-1}$
0°C	$= 273.15 \text{ K}$

PERIODIC TABLE OF THE ELEMENTS

PERIODIC TABLE OF THE ELEMENTS																	18	
1 1A																	2 8A	
1 H 1.008	2 2A											13 3A	14 4A	15 5A	16 6A	17 7A	2 He 4.003	
3 Li 6.941	4 Be 9.012										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 24.31	3 3B	4 4B	5 5B	6 6B	7 7B	8 8B	9 8B	10 8B	11 1B	12 2B	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95	
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	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 65.39	31 Ga 69.72	32 Ge 72.61	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 (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3	
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.8	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)	
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (281)	111 Rg (272)	112 Cn (277)	113 (Uut)	114 (Uuq)	115 (Uup)	116 (Uuh)	117 (Uus)	118 (Uuo)	

58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

CHEMISTRY TEST PARTS A and B

1. Suppose it took 108 joules of energy to raise a bar of gold from 25.0°C to 29.7°C. Given that the specific heat capacity of gold is 0.128 J/g·°C, what is the mass (in grams) of the bar of gold?

A) 1.8×10^2 g B) 1.08×10^2 g
C) 1.28×10^2 g D) 6.5×10^1 g

2. Place the substances in order of increasing melting point.

CO₂ CH₄ OF₂

A) OF₂ < CO₂ < CH₄
B) CO₂ < CH₄ < OF₂
C) CH₄ < CO₂ < OF₂
D) OF₂ < CH₄ < CO₂

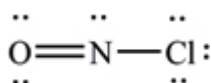
3. Given that sodium chloride is 39.0% sodium by mass, how many grams of sodium chloride are needed to have 0.950 g of Na present?

A) 2.44 g NaCl B) 0.370 g NaCl
C) 37.0 g NaCl D) 244 g NaCl

4. What is the change in temperature if a 25.0-g block of aluminum absorbs 10,000 J of heat? The specific heat of aluminum is 0.900 J/g·°C

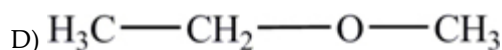
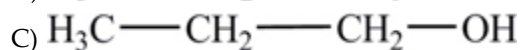
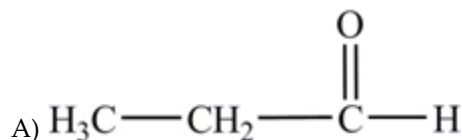
A) 0.44°C B) 444°C
C) 22.5°C D) 225°C

5. What is the molecular geometry of NOCl as predicted by the VSEPR model?



A) bent
B) trigonal planar
C) trigonal pyramidal
D) linear

6. Which has the highest surface tension at a given temperature?



7. How many moles of N₂O₃ contain 2.55×10^{24} oxygen atoms?

A) 12.7 moles N₂O₃
B) 2.82 moles N₂O₃
C) 7.87 moles N₂O₃
D) 1.41 moles N₂O₃

8. Which of the following is defined as the attractive forces between polar molecules?

I. dispersion forces
II. dipole-dipole interactions
III. ion-dipole interactions

A) III only B) II only
C) I and III D) I, II, and III

9. Five vials each contain 12 grams of a solid metal sample. The samples include calcium, platinum, barium, gold, and silver. Which vial has the most metal atoms?

A) Barium B) Gold
C) Platinum D) Calcium

10. The Lewis structure for CS₂ is:

- A) $\begin{array}{c} \cdot\cdot & \cdot\cdot & \cdot\cdot \\ \text{C}=\text{S}-\text{S} \\ \cdot\cdot & \cdot\cdot & \cdot\cdot \end{array}$
- B) $\begin{array}{c} \cdot\cdot & \cdot\cdot & \cdot\cdot \\ :\text{S}-\text{C}-\text{S}: \\ \cdot\cdot & \cdot\cdot & \cdot\cdot \end{array}$
- C) $\begin{array}{c} \cdot\cdot & & \cdot\cdot \\ \text{S}=\text{C}=\text{S} \\ \cdot\cdot & & \cdot\cdot \end{array}$
- D) $\begin{array}{c} \cdot\cdot & \cdot\cdot & \cdot\cdot \\ \text{S}=\text{C}-\text{S}: \\ \cdot\cdot & & \cdot\cdot \end{array}$

11. How much heat is absorbed when 28.6 g of water go from 22.0 °C to 78.3 °C? The specific heat of water is 4.184 J/g·°C.

- A) 9.37 kJ B) 3.94×10^4 kJ
- C) 6.74 kJ D) 2.63 kJ

12. One mole of potassium sulfate contains:

- A) 1 mole of potassium.
- B) 4 moles of oxygen.
- C) 2 moles of sulfur.
- D) 3 moles of potassium.

13. How many moles are present in 17.4 g of lead?

- A) 1.05×10^{25} moles
- B) 11.9 moles
- C) 10.06 moles
- D) 0.0840 moles

14. What mass of water would need to evaporate from your skin in order to dissipate 1.70×10^5 J of heat from the surface of your body?
 $\Delta H_{\text{vap}} = 40.7$ kJ/mol

- A) 2.26 g B) 4.18×10^3 g
- C) 4.18 g D) 75.2 g

15. Calculate the mass percent composition of sulfur in aluminum sulfate.

- A) 9.372 % B) 21.38 %
- C) 35.97 % D) 28.12 %

16. What is the process in which molecules undergo a phase change from the liquid phase to the gas phase?

- A) vaporization B) freezing
- C) melting D) sublimation

17. Place the substances in order of increasing melting point.

CH₄ C₃H₈ C₂H₄

- A) C₃H₈ < CH₄ < C₂H₄
- B) CH₄ < C₂H₄ < C₃H₈
- C) C₂H₄ < CH₄ < C₃H₈
- D) C₃H₈ < C₂H₄ < CH₄

18. Which substance should exhibit hydrogen bonding?

- A) CH₃OH B) H₂S
- C) CH₄ D) All of them

19. What is the predicted molecular geometry of the CH₄ molecule according to the VSEPR model?

- A) square planar
- B) trigonal planar
- C) trigonal pyramidal
- D) tetrahedral

20. How many atoms are in 5.80 moles of He?

- A) 1.03×10^{23} atoms He
- B) 3.49×10^{24} atoms He
- C) 4.00 atoms He
- D) 6.02×10^{23} atoms He

21. How many moles of bromine gas are in 37.7 grams?
- A) 0.472 moles B) 3.01×10^3 moles
C) 0.236 moles D) 79.9 moles
22. The number of resonance structures for the sulfur dioxide molecule that satisfy the octet rule is
- A) 2. B) 4. C) 1. D) 3.
23. One half of a mole of atoms would contain how many atoms?
- A) 0.5 B) 3.011×10^{23}
C) $6.022 \times 10^{11.5}$ D) 6.022×10^{23}
24. One mole of boron has a mass of _____ g.
- A) 5
B) 10.811
C) 9.012
D) 6.022×10^{23}
E) none of the above
25. What would the empirical formula be for the molecular compound $C_6H_9O_3$?
- A) $C_3H_9O_4$ B) C_2H_3O
C) CH_3O_2 D) $C_3H_6O_2$
26. What is the mass of 1.56×10^{21} atoms of magnesium in grams?
- A) 0.0630 B) 1.07×10^{-4}
C) 4.72×10^{-5} D) 0.142
27. How many moles of iron are contained in 1.75 kg of iron?
- A) 31.3 B) 3.13×10^{-2}
C) 3.13×10^4 D) 3.13×10^{-4}
28. You have 10.0 g each of C, Pb, Cu and Ne. Which contains the largest number of moles of atoms?
- A) Cu B) Pb
C) Ne D) C

Answer Key

Testname: PEXAM2- CH5-7

1. A
2. C
3. A
4. B
5. A
6. C
7. D
8. B
9. D
10. C
11. C
12. B
13. D
14. D
15. D
16. A
17. B
18. A
19. D
20. B
21. C
22. A
23. B
24. B
25. B
26. A
27. A
28. D