

Heritage Science Postgraduate Program
Entrance Examinations - Academic Year 2019/2020

Chemistry Exam for Heritage Science Program

Academic Year:	Semester:
Program Type:	Exam Time:
Exam Type: (for Conservation Science candidates only)	Time Allowed:
Exam Date :	Exam Day:
Exam Instructor(s):	

Student Name:

Student ID No:

Examination Instructions

1. Examinees will be provided with a question booklet.
2. Questions are printed on the front and back of the page.
3. Answers are to be written in the space provided in the question booklet.
4. Answer ALL questions to the best of your ability and understanding.
5. Be sure to select legibly the right answers.
6. All question booklets are to be handed in to proctors at the end of the exam.

Final Exam Assessment (pass or fail)

Choose the correct answer:

Q1. Which is the most acidic solution?

- A. pH = 11
- B. pOH = 5
- C. pH = 2
- D. pH = 7

Q2. According to the first law of thermodynamics, the total sum of all energy in an isolated system always

- A. increase.
- B. decrease.
- C. constant.
- D. None of the above.

Q3. Which substance is NOT generally considered as toxic pollutant in water?

- A. Sodium carbonate
- B. Lead
- C. Mercury
- D. Cadmium

Q4. Which the following principle energy level can accommodate a maximum number of 8 electrons?

- A. $n = 1$
- B. $n = 2$
- C. $n = 3$
- D. None of the above.

Q5. An element has the electron configuration of $1s^2 2s^2 2p^6 3s^2 3p^5$. What is the number of valence electrons?

- A. 1
- B. 2
- C. 5
- D. 7

Q6. Which molecule contains non-polar covalent bond?

- A. H_2O
- B. NH_3
- C. SO_2
- D. H_2S

Q7. In solid, atoms are held together with freedom of motion.

- A. little
- B. high
- C. moderate
- D. None of the above.

Q8. Atoms having the same number of protons but different number of neutrons called

- A. isotopes.
- B. basic radicals.
- C. acid radicals.
- D. None of the above.

Q9. Egyptian scientist Ahmed Zewail awarded Nobel prize in 1999 for his great achievements in the field of

- A. nuclear chemistry.
- B. femtosecond laser chemistry.
- C. green chemistry.
- D. biotechnology.

Q10. The reaction with the high value of energy of activation is

- A. slow.
- B. fast.
- C. moderate.
- D. None of the above.

Q11. Compared to the charge and mass of a proton, an electron has

- A. an opposite charge and the same mass.
- B. the same charge and same mass.
- C. the same charge and a smaller mass.
- D. an opposite charge and a smaller mass.

Q12. The buffer solution consists of

- A. weak acid and its salt.
- B. weak acid and weak base.
- C. strong acid and its salt.
- D. strong base and strong acid.

Q13. Proteins are composed of -----

- A. Enzymes
- B. Amino Acids
- C. Lignin
- D. Hemicellulose

Q14. The formula of Potassium Sulfate is -----

- A. K_2SO_4
- B. KSO_4
- C. K_2CO_3
- D. $KHCO_3$

Q15. Identify which of the following alcohols is most likely used to make hand soap?

- A. Isopropyl
- B. Glycerol
- C. Ethanol
- D. Methanol

Q16. Which type of bond will carbon commonly form?

- A. Covalent
- B. Ionic
- C. Metallic
- D. None of the above

Q17. Which method of water treatment is useful for controlling disease causing organisms such as viruses, bacteria, and parasites?

- A. Water softening
- B. Filtration
- C. Chlorination
- D. Distillation

Q18. An aqueous solution is prepared by dissolving 80 g NaOH in 1.0 L water. What is the molar concentration of the solution?

- A. 1 mol/L
- B. 2 mol/L
- C. 3 mol/L
- D. 4 mol/L

Q19. Which of the following forms of radiation has the longest wavelength?

- A. Infrared
- B. X-ray
- C. Ultraviolet
- D. Visible

Q20. What is the IUPAC name for $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$?

- A. Butanol
- B. Propanol
- C. Ethanol
- D. Propanal

PERIODIC TABLE OF THE ELEMENTS

<http://www.chemical.mn>

GROUP		PERIODIC TABLE OF THE ELEMENTS																18 VIIIA								
1 IA																		2 4.0026								
PERIOD	1	1																	2	He						
	2	3	4																	5	6	7	8	9	10	18
	3	11	12																	13	14	15	16	17	18	
	4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36							
	5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54							
	6	55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86							
	7	87	88	89-103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118							
		GROUP NUMBERS IUPAC RECOMMENDATION (1985)																		GROUP NUMBERS CHEMICAL ABSTRACT SERVICE (1966)						
		ATOMIC NUMBER																		RELATIVE ATOMIC MASS (1)						
		SYMBOL																		ELEMENT NAME						

(1) Pure Appl. Chem., 81, No. 11, 2121-2150 (2009).
Relative atomic masses are expressed with two significant figures. For elements that have no stable nuclides, the value enclosed in brackets indicates the mass number of the longest-lived isotope of the element. Elements from such elements (Tl, Po and U) do have a characteristic terrestrial isotopic composition, and for these an atomic weight is tabulated.

LANTHANIDE														
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
ACTINIDE														
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

(Good Luck)