Exam Review Questions - Multiple Choice

SCH 3UE_07-08

The following questions are for review. They are in no particular order.

1. An atom of iro	n ⁵⁶ ₂₆ Fe has				
b) 30 pro c) 26 pro	An atom of iron ⁵⁶ ₂₆ Fe has a) 26 protons, 26 electrons, 30 neutrons b) 30 protons, 30 electrons, 26 neutrons c) 26 protons, 26 electrons, 56 neutrons d) 30 protons, 26 electrons, 26 neutrons A bromide ion will have a charge of a) -1 b) -2 c) -3 d) +1 The atom with an atomic number 13 will tend to a) gain 5 electrons b) gain 3 electrons c) lose 5 electrons d) lose 3 electrons The first four ionization energies of an element X are 740, 1450, 7730, and 10 470 kJ mol ⁻¹ . The brimula for the stable ion of X is most likely to be a) X ⁻ b) X ²⁺ c) X ³⁺ d) X ⁴⁺ Which one of the following best supports the concept that electrons in atoms may have only ertain energies (i.e. are quantized) a) emission spectrum of mercury b) mass spectrum of the isotopes c) scattering of alpha particles by gold foil d) make up of the periodic table For the species below, the one that would be expected to require the most energy for the emoval of another electron is a) Na ⁺ b) Mg ⁺ c) Al ²⁺ d) Cl ⁺ discovered the nuclear atom a) Thomson b) Bohr c)Rutherford d) Ms. Pall				
2. A bromide ion	will have a charge	e of			
a) -1	b) -2	c) -3	d) +1		
3. The atom with	an atomic number	r 13 will tend to			
a) gain 5	electrons b)	gain 3 electrons	c) lose 5 electrons	d) lose 3 electrons	3
	_		e 740, 1450, 7730, and	d 10 470 kJ mol ⁻¹ .	The
a) X ⁺	b)	X^{2+}	c) X ³⁺	d) X ⁴⁺	
			t that electrons in aton	ns may have only	
· ·	•	•	-	-	
		at would be expected	ed to require the most of	energy for the	
a) Na ⁺	b)	Mg^+	c) Al ²⁺	d) Cl ⁺	
7	discovered the	nuclear atom			
a) Thoms	son b)	Bohr	c)Rutherford	d) Ms. Pall	
8. How many ele	ctrons are in the o	uter (highest) energy	y level of a 39 ₁₉ K +1 ior	n ?	
a) 3	b)	5	c) 7	d) 8	
9. The following	species Cl ⁻ , Ar, ar	nd K ⁺ all have the sa	me		
	er of protons er of neutrons	,	mber of electrons mber of isotopes		

10. W	hich of the following ele	ments would have the la	rgest atomic radius				
	a) Li	b) Cs	c) F	d) I			
11. Al	l of the following ions ar	e isoelectronic with a No	oble gas except				
	a) Al ³⁺	b) H ⁻	c) Ga ³⁺	d) Cl ⁻			
12. Of	the pairs of elements be	low, which would have t	he highest melting point	?			
	a) MgCl ₂	b) NaCl	c) CCl ₄	d) NCl ₃			
13. W	hich of the following mo	lecule has only Van-der-	Walls forces of attraction	n			
	a) HF	b) CF ₄	c) NaF	d) NF ₃			
14. Th	ne formula for a compour	nd of thulium is TmPO ₄ .	The formula for the nitra	ate of thulium would			
	a) $Tm(NO_3)_3$	b) Tm N	c) Tm ₂ (NO ₃) ₃	d) $(NO_3)_3$ Tm			
15. W	hich of the following mo	lecule would be polar an	d pyramidal				
	a) CHCl ₃	b) NI ₃	c) OF ₂	d) BeCl ₂			
16. At	oms of the different isoto	opes of the same element	are identical in the				
	a) number of electronsc) sum of the number of	of protons and neutrons	b) sum of number of pr d) mass number	rotons and neutrons			
17. Al	l of the following are iso	electronic (have the sam	ne number of valence elec	ctrons) except			
	a) CO ₃ ²⁻	b) NO ₃	c) SO ₃ ²⁻	d) BO ₃ ³⁻			
18. W	hat is the basis of metalli	c bonding?					
	b) the attraction between c) the attraction of opp	en neutral metal ions	ectrons				
	d) the sharing of two v	alence electrons between	n two atoms				
19. W	8. What is the basis of metallic bonding? a) the attraction of metal ions for delocalized electrons b) the attraction between neutral metal ions c) the attraction of oppositely charged ions d) the sharing of two valence electrons between two atoms 9. When is ionic bonding likely to occur between two atoms?						

20. W	Which of the liquid substances listed below has polar molecules, predominantly covalent bonding between atoms of the molecule and a significant degree of hydrogen bonding between molecules?							
	a) liquid hydrogen, H ₂ c) liquid silane, SiH ₄			b) liquid sodiu d) liquid hydro				
21. W	hich of the three followin	g molecules will	be polar	?				
		$\mathrm{H_{2}O}$	PF_3	$\mathrm{CH_4}$				
	a) H ₂ O and CH ₄	b) H ₂ O	and PF ₃	c) all c	of them	d) none of them		
22. W	hich one of the following	elements has the	e highest	first ionizatio	n energy	?		
	a) Na	b) Fe		c) Cl		d) I		
23. In	which group of the period	dic table are you	likely to	find a metallo	id?			
	a) the alkali metal famic) the carbon family	ly	/	kaline earth far alogen family	mily			
24. W	hich atom has the smaller	st radius?						
	a) K	b) Ga		c) Br		d) Rb		
25. A	certain element is listed a	s having atomic	mass of 7	72.6 u. It is pro	bably tru	ue that it contains		
	a) a mixture of isomers b) a mixture of allotropes c) a mixture of isotopes d) an impurity							
26. In	which of the following so	olids are all the a	toms held	d together by co	ovalent b	oonds?		
	a) silicon dioxide	b) sodium chlor	ride	c) iodine	d) pota	ssium nitrate		
27. Th	e number of valence elec	trons in sulphur	trioxide,	SO ₃ , is				
	a) 18	b) 24		c) 32	d) 40			
28. W	hich elements are charact	erized by the fill	ing of d c	orbitals?				
	a) Halogens	b) Rare earths		c) Actinides		d) 1 st Transition series		
29. Th	e chemical family that re	adily forms anio	ns is the	•				
	a) alkali metals	b) alkaline eart	hs	c) transition el	ements	d) halogens		

a) it produces a continb) it produces a discortc) it produces an absortd) it produces a magnet	ntinuous spectrum rption spectrum	n	
31. Which one of the following of elements on the periodic tab	_	he atomic number of the el	ements in a single group
a) an increase in the atb) an increase in the icc) an increase in the eld) a decrease in the ion	onisation energies ectronegativities		
32. Hydrogen, HF, has a boilir - 84°C This is explained by	ng point of 20 °C, whil	e hydrogen chloride, HCl ,	has a boiling point of
a) the Van der Waals'b) the hydrogen bondsc) the orbital structured) the molecular struct	}		
33. Given a list of the following		$_{4}$, Ne , $C_{2}H_{5}OH$, CO_{2}	
Which of these is molecular	and bonded by hydrog	gen bonds?	
a) CH ₄	b) Ne	c) C ₂ H ₅ OH	d) CO ₂
34. Given the following subst	ances: CaF ₂ , HF, I	F ₂ , CH ₃ Cl	
Which substance would yo	ou expect to have the h	ighest melting point?	
a) CaF ₂	b) HF	c) F ₂	d) CH ₃ Cl
35. The elements X and Y hav What is the formula and		pectively, in the highest end n a compound formed by t	
a) XY ₂ , ionic	b) X ₂ Y, ionic	c) X ₂ Y, covalent	d) XY ₂ , covalent
36. An element, J, has three is	sotopes with the relativ	re abundances of	
Atomic Number 22 22 22 Given this information, wh	Atomic Mass 45.00 46.00 47.00	Relative Abundance 10 % 75 % 15 %	
·			1) 47 00
a) 22.00 u	b) 46.00 u	c) 46.05 u	d) 47.90 u

30. When an electron in an atom moves from an excited state to a ground state...

37. V	Vhich statement i	s true about ion	zation energies	s?		
	a) The first ion table.	nization energies	s in a period inc	crease sm	oothly from left	to right across the periodic
	b) The first ion c) Successive	ionization energ	ies increase sm	noothly wi	ith the charge or	oothly down the family. I the species. es in an irregular manner.
38. In	which one of the	e species below	would the F - 2	X - F bond	d angle be expec	ted to be the smallest?
	a) CF ₄	b) NF	3	c) BF	3	d) OF ₂
39. T	he increase in bo	iling points obse	erved for F ₂ , C	l_2 , Br_2 , I_2	is best attribute	ed to
	b) a decrease i c) an increase	in Van der Waa n the electroneg in the X - X bor n the ionization	ativity with ind ad energy with	creasing a increasing	tomic number. g atomic number	
40. W	hich of the follo	wing substances	would be expe	ected to ex	khibit hydrogen	bonding?
	I. CH ₃ F	II. C	H_3OH	III. (CH ₃ NH ₂	
	a) I only	b) II only	c) II and III	only	d) I, II and II	I
41. W	hich one of the f	following specie	s would be exp	ected to h	nave the largest i	radius?
	a) Sr	b) Sr ²⁺	c) Te		d) I	
	Magnesium is fou les will it have a			_		ic state and charged
	b) Mg ²⁺ , 12 pc c) Mg ⁺ , 12 pr	rotons, 12 electrotons, 10 electrotons, 10 electrotons, 14 electrotons, 15 electrotons, 16 electrotons, 16 electrotons, 17 electrotons, 17 electrotons, 17 electrotons, 18 ele	ons ons			
43. V	Which of the follo	owing particles i	s isoelectronic	with an at	tom of argon?	
	a) K ⁻	b) Cl ⁺	c) Na ⁺	d) S ²⁻		
44. V	Which one of the	following electr	onic configurat	tions is co	rrect for a halog	en atom?
	 a) [Ne] 3s² 3d b) [Ar] 4s² 4p c) [Ar] 4s² 3d d) [Kr] 5s² 4d 	5 5				
45. V	Vhat is the system	natic, IUPAC, n	ame for the cor	npound C	$\mathrm{Cr_2O_3}$?	
	a) Chromiumc) Chromium	` '	,		n (II) oxide (III) um dioxide	

46.	In the periodic table, the element	s are arranged in	order of increasing	
	a) Number of neutronsc) Ionization energy	,	umber of protons lectronegativity	
47.	Which molecule shows covalent	bonding, with the	e least ionic characte	er?
	a) F-Be-F b) F-Li	c) F-	-Br	d) F-F
48.	Which pair of characteristics app	lies to typical ior	nic solids?	
	a) Good electrical conductiveb) High melting point and melting point and conductived) Low melting point and low	alleability ystalline structure	e	
49.	The following electronic configu	ration applies to	a neutral atom or a	cation:
		$1s^2 2s^2 2p^6 3s$	2 3p ⁶ 4s ¹	
	The element or ion could be:			
	a) An argon ionc) A chloride ion		neutral potassium a neutral calcium ato	
50.	Sulfur has three natural isotopes sulfur is 32.07, which one of the			
	 a) ³²S is less abundant than ³ b) ³⁴S is more abundant than c) ³²S is more abundant than d) Another natural isotope of 	³³ S either ³³ S or ³⁴ S	st exist	
51.	Which of the following comp	ounds possesses	at least one σ bond:	
	A. CH ₄ B. C	C_2H_2	C. C ₂ H ₄	D. All of the above
52.	In a double-bonded carbon a	tom:		
	A. hybridization between the B. hybridization between the C. hybridization between the D. no hybridization occurs by	es orbital and two es orbital and thr	o p orbital occurs. ee p orbital occurs.	
53.	Which of the following hybr	dizations does th	e Be atom in BeH ₂	assume?
	A. sp B. sp	p^2	$C. sp^3$	D. None of the above
54.	π bonds are formed by which	h of the followin	g orbitals?	
	A. two s orbitalsC. one s and one p orbital		o p orbitals	

55.	Which of the following decrease(s) as	s the number of bonds between two atoms increases?
	I. Bond length	II. Bond strength

- A. I only
- B. II only
- C. Both I and II
- D. Neither I nor II
- 56. What type of hybrid orbitals are used for bonding by Xe in the XeF₄ molecule? C. dsp^3 B. sp^3
- The hybridization of the carbon atom in the carbonate ion, CO_3^{2-} , is best described as: A. sp B. sp C. sp D. sp d² 57.
- 58. The following equations represent processes in which solid calcium fluoride is formed. Which one of these has an enthalpy change which is known as the **lattice energy** of calcium fluoride?
- 59. Which one of the following compounds would be expected to have the highest crystal lattice energy?
 - A. MgS

A. I only

D

В

A

В

A

- B. MgO
- C. CaSO₄
- D. BaSO₄
- 60. Which one of the following species would be deflected by an electric field?

B. III only

I-electron

II-proton

III-neutron C. I and II only

D. I, II, and III

Answers: Exam Review: Multiple Choice

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1	2	3	4	5	6	7	8	9	10
A	A	D	В	A	A	С	D	В	В
11	12	13	14	15	16	17	18	19	20
С	A	В	A	В	A	С	A	D	D
21	22	23	24	25	26	27	28	29	30
В	С	С	С	С	С	В	D	D	В
31	32	33	34	35	36	37	38	39	40
A	В	С	A	D	С	D	D	A	С
41	42	43	44	45	46	47	48	49	50
A	В	D	D	A	В	D	С	В	С
51	52	53	54	55	56	57	58	59	60

D

В

C

C

В