Question 1

Not yet answered

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Flag question

A 86.9-g sample of chromium (s = 0.447 J/(g . °C)), initially at 338.33°C, is added to an insulated vessel containing 189.9 g of water (s = 4.18 J/(g . °C)), initially at 16.17°C. At equilibrium, the final temperature of the metal–water mixture is 28.06°C. How much heat was absorbed by the water? The heat capacity of the vessel is 0.220 kJ/°C.

- a. 6.82 kJ
- b. 112 kJ
- c. 9.43 kJ
- d. 15.2 kJ
- e. 12 kJ

Question 2

Not yet answered

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Flag question

A bond in which both electrons of the bond are donated by one atom is called ____.

- a. a double bond
- b. a triple bond
- c. a coordinate covalent bond
- d. a polar covalent bond
- e. an ionic bond

Question 3

Not yet answered

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Flag question

A student must prepare 7.00 L of 0.100 M Na_2CO_3. Which is the best procedure for preparing this solution?

a. Measure 74.2 g Na_2CO_3 and add 7.00 L of H_2O.

b. Measure 74.2 g Na_2CO_3 and add 7.00 kg of H_2O.

c. Measure 10.6 g Na_2CO_3 and add H_2O until the final homogeneous solution has a volume of 7.00 L.

d. Measure 74.2 g Na_2CO_3 and add H_2O until the final homogeneous solution has a volume of 7.00 L.

e. Measure 10.6 g Na_2CO_3 and add 7.00 kg of H_2O.

Question 4

Not yet answered

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Flag question

An atom of which of the following elements has the highest fourth ionization energy?

- a. Se
- b. Si
- c. Al
- d. Ga
- e. As

Question 5

Not yet answered

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Flag question

An atom of which of the following elements has the smallest atomic radius?

- a. B
- b. Tl
- c. Al
- d. Ga
- e. In

Question **6**

Not yet answered

Marked out of 1.0

Flag question

In the Lewis dot formula that minimizes formal charge, how many bonds are there in the tetrathionate ion, $S_4O_6^{2-}$?

- a. 11
- b. 7
- c. 15
- d. 9
- e. 13

Question 7

Not yet answered

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Flag question

An impure sample of benzoic acid is titrated with 0.9855 M NaOH. A 3.412-g sample requires 24.43 mL of titrant to reach the endpoint. What is the percent by mass of benzoic acid in the sample?

$C_6H_5COOH(aq) + NaOH(aq) \rightarrow NaC_6H_5COO(aq) + H_2O(l)$

- a. 2.407 %
- b. 0.01971 %
- c. 19.71 %
- d. 100 %
- e. 86.18 %

Question 8

Not yet answered

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Flag question

A mixture consisting of 0.140 mol N_2, 0.037 mol O_2, 0.104 mol CH_4, and an unknown amount of CO_2 occupies a volume of 8.48 L at 27°C and 1.06 atm pressure. How many moles of CO_2 are there in this sample?

a. 0.364 mol

b. 0.0839 mol

c. 0.719 mol

d. 2.45 mol

e. 3.77 mol

Question 9

Not yet answered

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Flag question

A 70.4-L sample of a gaseous hydrocarbon, measured at 1.00 atm pressure and 25.0°C, is burned in excess oxygen, liberating 4.06×10^3 kJ of heat at constant pressure. What is the identity of the hydrocarbon? (R = 0.0821 L . atm/(K . mol));

Substance	$\Delta H°f$ (kJ/mol)
$CO_2(g)$	−393.5
$H_2O(l)$	−285.8

- a. propylene (C_3H_6, $\Delta H°f$ = 20.41 kJ/mol)
- b. ethane (C_2H_6, $\Delta H°f$ = −84.68 kJ/mol)
- c. acetylene (C_2H_2, $\Delta H°f$ = 226.73 kJ/mol)
- d. ethylene (C_2H_4, $\Delta H°f$ = 52.47 kJ/mol)
- e. propane (C_3H_8, $\Delta H°f$ = −104.7 kJ/mol)

Question 10

Not yet answered

Marked out of 1.0

Flag question

For each of the following species except ____, the electronic structure may be adequately described by two resonance formulas.

- a. SO_2
- b. NO_2^-
- c. C_6H_5
- d. SO_3^{2-}
- e. O_3

Question 11

Not yet answered

Marked out of 1.0

Flag question

Suppose atom 1 has the same number of protons as atom 2, and atom 2 has the same number of neutrons as atom 3. Atom 1 does not have the same number of neutrons as atom 3. Which of the following statements is true?

a. Atoms 1 and 3 must be isotopes.

b. Atom 3 must have the same number of protons as atom 1.

c. Atom 3 must have the same number of protons as atom 2.

d. Atoms 1 and 2 must be isotopes.

e. Atom 2 must have the same number of neutrons as atom 1.

Question 12

Not yet answered

Marked out of 1.0

Flag question

What is the mass of NH_3 in a 80.0-cm^3 sample that has a density of 0.92 g/cm^3 and consists of 20% (by mass) NH_3?

- a. 74 g
- b. 15 g
- c. 25 g
- d. 45 g
- e. 20 g

Question 13

Not yet answered

Marked out of 1.0

Flag question

All the following statements about resonance are true except

- a. Resonance describes a more stable situation than does any one contributing resonance formula
- b. Resonance describes the oscillation and vibration of electrons.
- c. Resonance describes the bonding as intermediate between the contributing resonance formulas.
- d. The contributing resonance formulas differ only in the arrangement of the electrons.
- e. A single Lewis formula does not provide an adequate representation of the bonding.

Question 14

Not yet answered

Marked out of 1.0

Flag question

What is the hybridization of I in IF_4^- ?

- a. sp^3d^2
- b. sp^3
- c. sp^2
- d. sp
- e. sp^3d

Question 15

Not yet answered

Marked out of 1.0

Flag question

What is the bond angle in a trigonal planar molecule or ion?

- a. 180°
- b. 109°
- c. 90°
- d. 72°
- e. 120°

Question 16

Not yet answered

Marked out of 1.0

Flag question

How many p orbitals are in the n = 3 shell?

- a. 5
- b. 1
- c. 3
- d. 0
- e. 6

Time left 0:19:52

Question 17

Not yet answered

Marked out of 1.0

Flag question

A 1.50-L sample of a gas at STP has a mass of 4.75 g. What is one possible formula of the gas?

- a. C_2F_4
- b. PCl_3
- c. NF_3
- d. NHF_2
- e. NO_2

Time left 0:17:00

Question 18

Not yet answered

Marked out of 1.0

Flag question

The approximate CCO angle in acetone, , is

- a. 109°.
- b. 90°.
- c. 120°.
- d. 180°.
- e. 60°.

Question 19

Not yet answered

Marked out of 1.0

Flag question

A 4.94-g sample of an oxide of chromium contains 3.06 g of chromium. Calculate the simplest formula for the compound?

- a. CrO_2
- b. CrO
- c. Cr_2O_3
- d. CrO_5
- e. Cr_2O

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Question 20

Not yet answered

Marked out of 1.0

Flag question

Analysis of a compound containing only C and Cl revealed that it contains 33.33 % C atoms by number and has a molar mass of 248.75 g/mol. What is the molecular formula of this compound?

- a. C_2Cl_4
- b. C_3Cl_6
- c. C_2Cl_6
- d. CCl_3
- e. CCl_2

Q1: $q_{water} = m \times S \times \Delta t$

$= 189.9\,g \times \frac{4.18\,J}{g.^{\circ}C} \times (28.06 - 16.17)^{\circ}C$

$= 9438\,J = 9.438\,KJ$

[c]

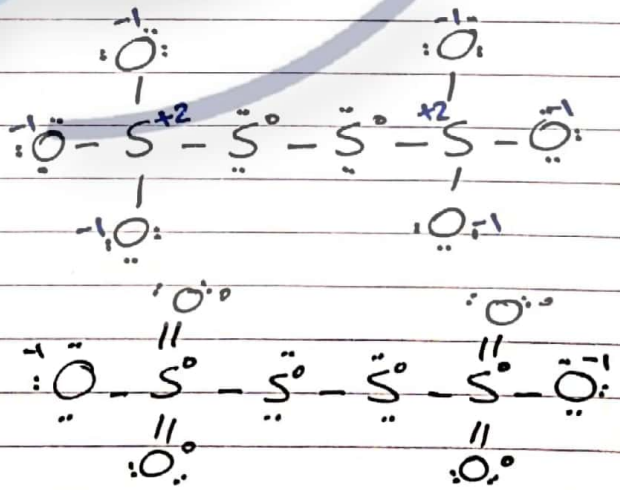
Q2: coordinate bond [c]

Q3: [d]

Q4: Si [b] because after losing the first $3\bar{e}$ it will have the Ne arrangement (noble gas).

Q5: [a] B

Q6: $S_4O_6^{-2}$



minimum formal charge ← 13 bond

[e]

Q7: $0.9855\ M \times 0.02443\ L = 0.02408\ mol\ NaOH$

$1\ mol\ NaOH \longrightarrow 1\ mol\ C_6H_5COOH$

$0.02408 \longrightarrow ??$ $\quad MW_{C_6H_5COOH} = 122$

$$n_{C_6H_5COOH} = 0.02408\ mol \times 122\ \frac{g}{mol} = 2.938\ g$$

$$mass\ \% = \frac{2.938}{3.412} \times 100\% = 86.1\%$$ **e**

Q8: $$P_{TOT} = P_{N_2} + P_{O_2} + P_{CH_4} + P_{CO_2}$$

$$1.06 = \frac{n_1RT}{V} + \frac{n_2RT}{V} + \frac{n_3RT}{V} + \frac{n_4RT}{V}$$

$$1.06 = \frac{(n_1 + n_2 + n_3 + n_4) \times R \times T}{V}$$

$$1.06 = \frac{(0.14 + 0.037 + 0.104 + n) \times 0.0821 \times (27+273)}{8.48L}$$

$$n_{CO_2} = 0.0839\ mol$$ **b**

Q9: $$n = \frac{PV}{RT} = \frac{70.4 \times 1}{0.0821 \times 298} = 2.88\ mol$$

d

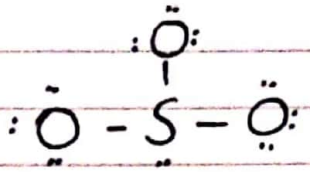
$$\frac{-4060\ KJ}{2.88\ mol} = -1411\ KJ/mol$$

→ You have to calculat ΔH_f° from each choice to find the one gives you $-1411\ KJ/mol$, here it is C_2H_4 by writing equation then balance it and solve

$$C_2H_4 + 3O_2 \longrightarrow 2CO_2 + 2H_2O$$

$$\Delta H_R^\circ = 2 \times -393.5 + 2 \times -285.8 + 52.47 = -1411\ KJ/mol$$

Q10: SO_3^{2-} [d] $6+3\times6+2=26\bar{e}$



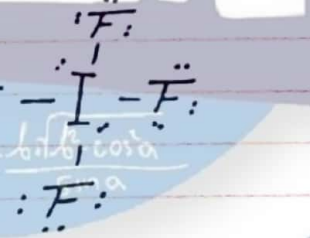
Q11: [d] Atom 1 and 2 must be isotopes.

Q12: $80\,cm^3 \times 0.92\,\frac{g}{cm^3} = 73.6\,g \times \frac{20}{100} = 14.72 \approx 15$

[b]

Q13: [e]

Q14: IF_4^+ $7+7\times4+1=36\bar{e}$



[a] octahedral sp^3d^2

Q15: Trigonal planar → 120° [e]

Q16: 3 orbitals [c]

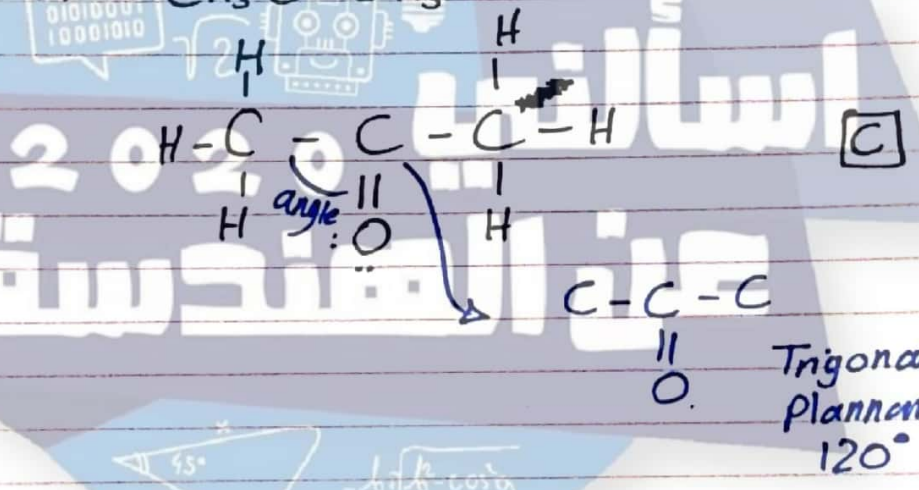
Q17: $n = \frac{PV}{RT} = \frac{1 \times 1.5}{0.0821 \times 273} = 0.067 \text{ mol}$

$$\text{Molar Mass} = \frac{4.75\text{g}}{0.067} = 71 \frac{\text{g}}{\text{mol}}$$

now calculate the molar mass for each answer and the one ~~from~~ which have a molar mass of 71 is the right one.

$NF_3 = 14 + 19 \times 3 = 71 \frac{\text{g}}{\text{mol}}$ [C]

Q18: acetone CH_3COCH_3



[C]

Q19: $m_{sample} = 4.94\text{g}$ $m_{Cr} = 3.06\text{g}$

$m_O = 4.94 - 3.06 = 1.88\text{g}$

	Cr	O
m	3.06	1.88
n	0.056	0.1175
ratio	1	2

CrO_2 [a]

Q20: 33.33% C by number

66.67% Cl

C_aCl_b

$X = a + b$

$a = 33.33\% X$

$b = 66.67\% X$

	C	Cl
n	$\frac{0.3333X}{0.3333X}$	$\frac{0.6667X}{0.3333X}$
ratio	1	2

CCl_2

$MW = 82.9$

$k = \frac{248.75}{82.9} = 3$

Molecular formula $\Rightarrow C_3Cl_6$ **b**