CALIFORNIA CHEMISTRY · UNIT 4 · 25 QUESTIONS

Energy, Equilibrium, and Nuclear Processes — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **An exothermic reaction releases energy to the surroundings, so its enthalpy change is**

- A Negative
- B Zero
- C Always 100
- D Positive

Understand It with Pulse | Flag a mistake

2 **An endothermic reaction absorbs energy, so the temperature of the surroundings typically**

- A Stays the same
- B Reaches boiling point
- C Falls
- D Rises

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3 **The energy absorbed or released when 100 g of water is heated by 10 degrees Celsius, using specific heat capacity 4.18 joules per gram per degree Celsius, in joules, is**

ANSWER _____

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4 **The energy, in joules, absorbed when 200 g of water is heated by 10 degrees Celsius, using specific heat capacity 4.18 joules per gram per degree Celsius, is**

ANSWER _____

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5 **A reaction A to B has enthalpy change -100 kilojoules per mole, and B to C has enthalpy change +30 kilojoules per mole The enthalpy change for A to C, in kilojoules per mole, is**

ANSWER _____

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6 **Breaking bonds in reactants requires energy, while forming bonds in products**

A Has no energy change

B Destroys energy

C Requires energy

D Releases energy

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7 **Entropy increases when a solid melts because the particles become**

A More ordered

B Heavier

C More disordered

D Smaller

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8 **At equilibrium, the forward and reverse reaction rates are**

A Zero

B Equal

C Infinite

D Unequal always

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9 **If more reactant is added to a system at equilibrium, the equilibrium typically shifts toward the**

- A Products
- B Catalyst
- C Reactants
- D Solvent

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10 **For the equilibrium**
$N_2 + 3\ H_2 \rightarrow 2\ NH_3$,
increasing the pressure shifts the equilibrium toward the

- A Left, with more moles of gas
- B Neither side
- C Right, with fewer moles of gas
- D Left, with fewer moles of gas

Understand It with Pulse | Flag a mistake

11 **For an exothermic forward reaction at equilibrium, increasing the temperature shifts the equilibrium toward the**

A Reactants

B Catalyst

C Products

D Solvent

Understand It with Pulse | Flag a mistake

12 **A catalyst in an equilibrium system speeds up both forward and reverse reactions and**

A Stops the reverse reaction

B Shifts equilibrium to reactants

C Does not change the equilibrium position

D Shifts equilibrium to products

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13 **An equilibrium constant much greater than 1 indicates that at equilibrium the mixture is mainly**

- A Reactants
- B Products
- C Solvent
- D Catalyst

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14 **A solution with hydrogen ion concentration 0.01 mol per litre has pH**

ANSWER _____

Understand It with Pulse | Flag a mistake

15 **A solution with pH 3 has hydrogen ion concentration, in mol per litre, of**

ANSWER _____

Understand It with Pulse | Flag a mistake

16 **At 25 degrees Celsius, pH plus pOH equals 14 A solution with pH 9 has pOH**

ANSWER _____

Understand It with Pulse | Flag a mistake

17 **A strong acid in water**

A Does not dissociate

B Forms a base only

C Dissociates only slightly

D Dissociates almost completely

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18 **A neutral solution at 25 degrees Celsius has pH**

- A 14
- B 7
- C 1
- D 0

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19 **An alpha particle is a helium nucleus, so alpha decay reduces the mass number by 4 and the atomic number by**

- A 1
- B 2
- C 0
- D 4

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20 **Uranium 238 undergoes alpha decay The mass number of the product nucleus is**

ANSWER

Understand It with Pulse | Flag a mistake

21 **Beta decay increases the atomic number by 1 and leaves the mass number unchanged Carbon 14, atomic number 6, decays by beta emission to nitrogen with atomic number**

ANSWER

Understand It with Pulse | Flag a mistake

22 **Gamma radiation changes neither the mass number nor the atomic number, and is best described as**

A High energy electromagnetic radiation

B A proton

C An electron

D A helium nucleus

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23 **A radioactive sample has mass 100 g After 3 half lives, the mass remaining, in grams, is**

ANSWER _____

Understand It with Pulse | Flag a mistake

24 **A radioactive sample has mass 80 g After 2 half lives, the mass remaining, in grams, is**

ANSWER _____

Understand It with Pulse | Flag a mistake

25 **Nuclear fission is the process in which a heavy nucleus**

A Splits into smaller nuclei

B Loses only electrons

C Forms a molecule

D Joins with a light nucleus

Understand It with Pulse | Flag a mistake

ANSWER KEY

1.	A	**10.**	C	**19.**	B
2.	C	**11.**	A	**20.**	234
3.	4180	**12.**	C	**21.**	7
4.	8360	**13.**	B	**22.**	A
5.	-70	**14.**	2	**23.**	12.5
6.	D	**15.**	0.001	**24.**	20
7.	C	**16.**	5	**25.**	A
8.	B	**17.**	D		
9.	A	**18.**	B		

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