

Candidate's Name: _____

Matric No: _____

Department: _____

Course of study: _____

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2					7					12					17				
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- _____ is the heat energy content of a substance. A) Entropy B) Gibb's free energy C) Kinetic energy D) enthalpy
- A reaction in which heat energy is absorbed into the system from the surroundings is termed _____ reaction. A) endothermic B) reversible C) exothermic D) irreversible
- ΔH_f° means _____. (A) standard enthalpy change of formation (B) standard enthalpy change of combustion (C) enthalpy change of combustion (D) enthalpy change of formation
- The average energy absorbed to break 1 mole of a specified bond when all species involved are in the gaseous state is called _____. (A) enthalpy of decomposition (B) bond enthalpy (C) enthalpy of neutralization (D) energy level diagram
- _____ energy is the energy required to break apart an ionic solid and convert its component atoms into gaseous ions. (A) Kinetic (B) Potential (C) Lattice (D) Heat
- Give the name of the scientist who defined acid as: acid is a proton donor while base is a proton acceptor. (A) Arrhenius (B) Newton (C) Brønsted (D) Brønsted Lowry
- Calculate the pH of a 0.00001 M acid solution (A) 5 (B) 3 (C) 4 (D)
- Acids are substances that dissociate in water to produce H^+ ions and bases are substances that dissociate in water to produce OH^- ions. The definitions were proposed by (A) Arrhenius (B) Newton (C) Kelvin (D) Brønsted Lowry

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9. $\text{HCl}(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{Cl}^-(\text{aq}) + \text{H}_3\text{O}^+(\text{aq})$ In the equation, what is the Brønsted base? (A) H_2O (B) Cl^- (C) HCl (D) H_3O^+
10. $\text{H}_2\text{O}(\text{l}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{H}_3\text{O}^+(\text{aq}) + \text{OH}^-(\text{aq})$ In the equation, what is the conjugate base? (A) HCl (B) H_2O (C) H_3O^+ (D) OH^-
11. Catalytic action occurs when reactants attach themselves to which area of the catalyst? (A) Layer (B) Inner cavity (C) Active sites (D) Surface The difference between a homogenous and heterogeneous catalyst is in the (A) Phase difference (B) Composition (C) Molecular structure (D) Catalytic mechanism
12. The power a particular concentration of a reactant is raised to in a reaction is called (A) Partial order (B) Overall order (C) Complex order (D) Reaction order
13. A reaction whose rate is independent on reactant concentration is called (A) First order (B) Second order (C) Zero order (D) Third order
14. A reaction whose successive half life are in the following order: 20min, 40min, 3sec, 81min, 161min, and 320min corresponds to (A) Third order (B) First order (C) Zero order (D) Second order
15. How much 4M stock solution is needed to prepare 92ml of 1.5M solution? (A) 40ml (B) 35.4ml (C) 34.5ml (D) 43.5ml
16. NutraSweet is 57.14% C, 6.16% H, 9.52% N, find the molecular formula (the molar mass of NutraSweet is 294.30g/mol) (A) $\text{C}_{14}\text{H}_{17}\text{N}_2\text{O}_4$ (B) $\text{C}_{14}\text{H}_{15}\text{N}_2\text{O}_5$ (C) $\text{C}_{14}\text{H}_{13}\text{N}_2\text{O}_4$ (D) $\text{C}_{14}\text{H}_{15}\text{NO}_5$
17. If Magnesium carbonate (MgCO_3) decomposed to form 14grams of MgO in the actual experiment if the theoretical yield is 17grams, what is the percent yield of MgO ? (A) 79% (B) 82.9% (C) 82.4% (D) 79.3%
18. If 250g of sugar, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$, are dissolved in 1400g of water, what is the molality of the solution? (A) 0.585m (B) 0.525m (C) 0.522m (D) 0.4225m (Molar mass of $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ = 342)
19. Calculate the mole fraction of water in a solution of hydrochloric acid in water, containing 35% HCl by weight. (A) 0.214 (B) 0.22 (C) 0.786 (D) 0.722 (Molar mass HCl = 36.5, H_2O = 18)
20. Which of the following is not a type of reaction? (A) Combustion (B) Combination (C) Decomposition (D) Single Acid

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