Name _____

Biology Semester 1 Final Exam Free Response
Describe in detail how the structure of biological membranes function in the synthesis of ATP in the mitochondria. Include in your discussion:

1. a description of the four categories of biomolecules in regard to their structure and function in the living world.
2. a complete description of membrane structure and specific description of the inner membrane of the mitochondria.
3. how this structure allows these membranes to be an effective barrier (to be selectively permeable)
4. the manner in which a concentration gradient of H+ ions is established in the mitochondria.
5. the role of the enzyme ATP synthase and the nature of general enzyme function

#1 ENTIRE LIVING WORLD DEPENDS ON CHEM RXNS. AMONG 4 PRIMARY BIOMOL.:

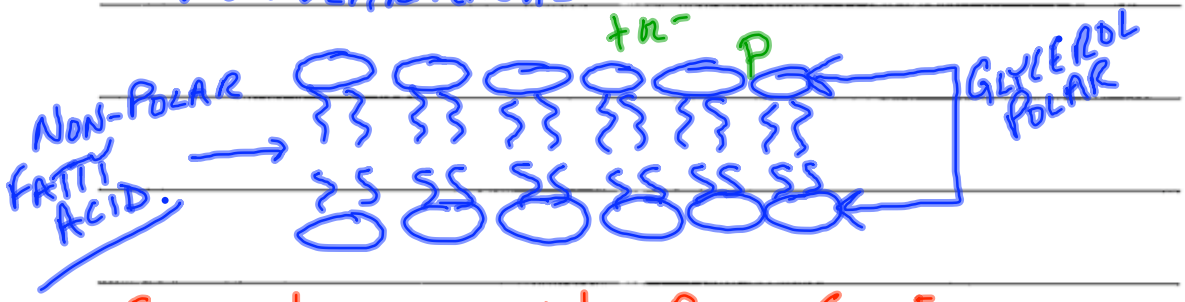
CARBOHYDRATES => LONG CHAINS OF MONOSACC. THAT FUNCTION FOR E SOURCE & E STORAGE.

LIPIDS => COMPOSED OF 3-C GLYCEROL ATTACHED TO F.A => LONG HYDROCARBON CHAINS.

NUCLEIC ACID => COMPOSED OF NUCLEOTIDES, BEING MOL. OF HEREDITY

PROTEINS => COMPOSED OF AMINO ACIDS THAT FCN. MUSCLE, ENZYMES, TRANSPORT PTNS., ANTIBODIES, HORMONES.....

#2 BIOLOGICAL MEMBRANES MADE OF 2 LAYERS OF PHOSPHOLIPIDS. SEPARATE TWO POLAR AREAS.



SMALL, UNCHARGED & NON-POLAR CAN EASILY MOVE ACROSS. LARGER SUBSTANCES WON'T FIT. SUBSTANCES ARE POLAR OR CHARGED DON'T PASS ACROSS EASILY BEC./ ATTRACTED POLAR EDGE OF MEM.

#3 WE ALSO SEE TRANSPORT PROTEINS IN MEM. HELP TRANSPORT SUBSTANCES THAT ARE BIG, POLAR OR CHARGED.

THIS STRUCTURE ALLOWS MEMBRANES TO BE SELECTIVELY PERM. & CONTROL WHAT ENTERS & LEAVES CELLS.

#4 The Inner Mem. Mitochondria has an electron transport chain, series of protein that have increasing attraction for electrons. $NADH$ & $FADH_2$ deliver e^- to chain when we see redox rxns. (Ptns. accept & release e^-). Every redox rxn releases E to actively transport H^+ from matrix to outer compartment. This creates a concentration gradient from which H^+ diffuse down gradient through ATP synthase transport ptns. by falilitated diffusion. This flow of H^+ down gradient releases E that is required to $E + P + ADP \longrightarrow ATP$

#5 This reaction like all reactions in living things is between stable mol. & requires enzymes. All enzymes are like a lock & key & have a specific active site to react w/ one kind of mol, its substrate. ATP synthase is the enzyme that catalyzes the reaction to form ATP.