

Name _____

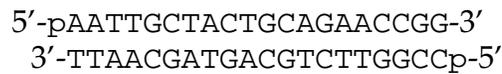
3. (12 pts) Draw the structures of two compounds that result from the hydrolysis of phosphatidyl choline in a reaction catalyzed by phospholipase C. The starting phosphatidyl choline molecule contains a 18:0 fatty acid and a 18:2(9,12) fatty acid. You must show the ionization of the products at neutral pH.

4. (8 pts) Draw the structure of two glucose residues within the middle of the starch polysaccharide that are joined at a branchpoint. Clearly indicate on each glucose how these residues are joined to the remainder of the polysaccharide.

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5. (8 pts) The restriction endonuclease *Pst*I cuts DNA symmetrically on both strands at the sequence:
CTGCAG
GACGTC

On the resulting DNA fragments are left 3' overhanging ends of 4 nucleotides. *Pst*I cleaves the phosphodiester backbone with a-type specificity. In short-hand notation, showing the identity of phosphates on the ends, draw the two fragments that result from *Pst*I digestion of the following double-stranded oligonucleotide:



6. (8 pts) Draw the structure of an appropriate amino acid sidechain and N-acetyl galactosamine in an O-glycosidic linkage found in glycoproteins. N-acetyl-galactosamine is alpha-D-galactose modified at C-2 with NHCOCH_3 (i.e., an amino sugar that has been acetylated on that amino group).

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7. (15 pts) Calculate the maximum ratio of $[\text{glucose}]_{\text{inside}} : [\text{glucose}]_{\text{outside}}$ that can be driven by the symport of Na^+ in a secondary active transport process. The ratio of $[\text{Na}^+]$ outside the cell to $[\text{Na}^+]$ inside the cell is 15 and the membrane potential is -70 mV , with the outside being more positive than the inside. Use a temperature of 37°C for your calculations.

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8. (28 pts) Short answer

a) Name two chemicals (NOT detergents) that are commonly used to denature proteins.

_____ / _____

b) Before modification, two most common amino acids in the collagen triple helix:

_____ / _____

c) Number of reducing ends on a molecule of sucrose: _____

d) (3 pts) Draw the steroid ring structure.

e) (3 pts) Draw the structure of the isoprene unit found in terpenes.

f) Number of fatty acids joined in an ester linkage in one ganglioside molecule: _____

g) Name of a substance that you would use to release an integral membrane protein from the lipid bilayer:

h) (3 pts) Give an example of a membrane transport protein that is involved in an antiport process. Also, name the molecules that are transported.

i) Name two intercalating agents:

_____ / _____

j) How many base-pairs in a double-stranded piece of DNA with a molecular weight of 9900?

k) Name of transporter protein that uses light energy in an active transport process:

l) (3 pts) Structure of the D-isomer of the simplest aldose: