1) Which of the following receptors does NOT belong in the group? Justify! [2]
   a) β-Adrenergic receptor
   b) IL-8 receptor
   c) IFNα receptor
   d) Bombesin receptor

2) Describe three enzymes that utilize PIP2 as a substrate, and briefly outline the pathways and cellular responses triggered by the products [6]

3) You are stimulating cells with a novel chemokine and you make the following observations:
   a) Release of Ca2+ from intracellular stores
   b) Activation of Protein Kinase C
   c) Induction of CREB binding to DNA
   In your opinion, what type of receptor is the most likely to be activated by the ligand (describe how you reached your conclusion!)? [5]

4) How would you generate a dominant negative mutant of the following enzymes (state why you would expect them to act as such) [4.5]:
   a) CD45
   b) lck
   c) STAT1

5) Describe how the phosphatase PTEN regulates cell survival [3]

6) Name two kinases that are activated in response to osmotic shock or heat shock [2]

7) Numerous enzymes and transcription factors are regulated by association with proteins/subunits that inhibit their function. Provide two examples that illustrate this observation. [4]