**Essay Questions for Unit 3 Exam**

1. Describe the action potentials in cardiac ventricular muscle and in the SA node. During each phase of the action potentials describe the channels, ion currents and membrane potentials involved. Explain the ECG tracing and how each of the P, QRS and T waves are made. Describe what is happening to form a NSTEMI and a STEMI.  Describe the mechanisms for the inotropic, lusitropic, and chronotropic actions of norepinephrine and acetylcholine on the heart. Explain the role of calcium in cardiac muscle contraction. Include the mechanism of its release into the cytosol and its return to the SR and extracellular fluids. Finally, Describe the events taking place in the left ventricle and aorta during the cardiac cycle. Include the various stages, blood volume changes, pressure changes, opening and closing of valves, and heart sounds.

2. Explain the pressure volume curve for a single cardiac cycle. Include descriptions of Inotropy, Afterload and Preload. Describe the Baroreceptor reflex and how it works. Explain the variables that regulate MAP. Explain how the Baroreceptor reflex works. Explain the mechanism by which fluids normally move out of and into capillaries. Describe the various forces involved (i.e. hydrostatic and colloid osmotic pressure) and how these forces differ at the arterial and venous ends of the capillaries. Then, give one example of edema and how it is caused.

3. Describe the composition of the blood. Include the components of the plasma. Describe the mechanism by which red blood cells are removed from the circulation. Especially explain how heme is broken down and what happens to the various components of the heme.  Describe the three mechanisms that contribute to hemostasis (vasoconstriction, platelet aggregation and coagulation). Special attention should be given to the role of the platelets and coagulation cascade. For the coagulation process describe the intrinsic, extrinsic and common pathways. Also discuss the role of tPA, plasminogen and plasmin.