**1.** (a) steroid hormones enter cell whereas protein hormones bind to receptors  
in membranes / steroid hormones can pass through cell membranes  
while protein hormones cannot;  
steroid hormones interact directly with genes/receptor proteins in  
cytoplasm whereas protein hormones cause release of secondary  
messenger in cell;  
steroid hormones control whether or not particular enzymes or  
proteins are synthesized whereas protein hormones change the  
cell’s activity usually by activating or inhibiting enzymes; 2 max

(b) I: acinus cell/secretory cell/secretory vesicles;

II: duct/lumen; 2

(c) sight/smell of food initiate release of gastric juice;  
before food reaches stomach, gastric juice already secreted by reflex action;  
chemoreceptors/stretch receptors detect food in stomach;  
impulses (from these receptors) are sent to brain, which sends impulses  
to release more gastric juice;  
impulses also sent to endocrine glands to release gastrin;  
gastrin stimulates stomach wall to increase secretions/release acid/gastric juices/pepsinogen;  
low pH of stomach (and hormones) inhibits gastrin; 4 max

[8]

**2.** (a) steroid hormones enter cell while protein hormones bind to specific  
membrane receptors / steroid hormones can pass through cell  
membranes while protein hormones cannot;  
steroid hormones interact directly with genes/receptor proteins in  
the cytoplasm while protein hormones achieve their effects by  
causing the release of secondary messenger into the cell; 2

(b) causes increased acid secretion / produces toxins / forms pores in  
epithelial cell membrane / produces urease which produces ammonia  
(which is toxic) / resides in gastric mucous protected from immune  
system reactions but cause inflammation and increase acid  
production / destroys mucus lining exposure to acid/causing inflammation 1

[3]

**3.** (a) 2 max

|  |  |
| --- | --- |
| *protein hormones* | *steroid hormones* |
| do not enter cells / do not pass through plasma membrane | pass through plasma membrane; |
| bind to receptors on the outside of the cell | form complex with cytoplasmic receptors; |
| causes release of a secondary messenger inside the cell | can act as transcriptional regulators; |

(b) SA (sino atrial) node / pacemaker receives signal to fire;

when ventricle 70% / almost full;

AV (atrio ventricular) valve opens and blood fills ventricle (to maximum) /

atrial systole;

pressure increase in ventricle closes AV valve / ventricular systole;

AV node fires;

Purkinje fibres carry impulses to all areas of ventricles for simultaneous firing;

pressure increase causes semilunar valve to open;

blood pumped from ventricle to aorta / systole sound / ventricular diastole;

pressure lowers in ventricle closing semilunar valve / diastole sound;

pressure in ventricle lower than atria so AV valve opens;

increases blood ventricular volume;

both atria and ventricles are relaxed / diastole;

atria receive blood from veins;

cycle repeats; 6 max

[8]