

Syllabus	CT_IK_03, CT_IK_04, CT_IK_04, PR_IK_06, PB_IK_03
Topic	Heart failure

a)

List 3 common causes for chronic heart failure in the UK. (3 marks)

1.
2.
3.

b)

Myocardial dysfunction or death will lead to a decrease in contractility, resulting in reduced stroke volume and subsequent increased LV end diastolic pressure and volume. List 4 physiological compensatory mechanisms that occur as a result of this. (4 marks)

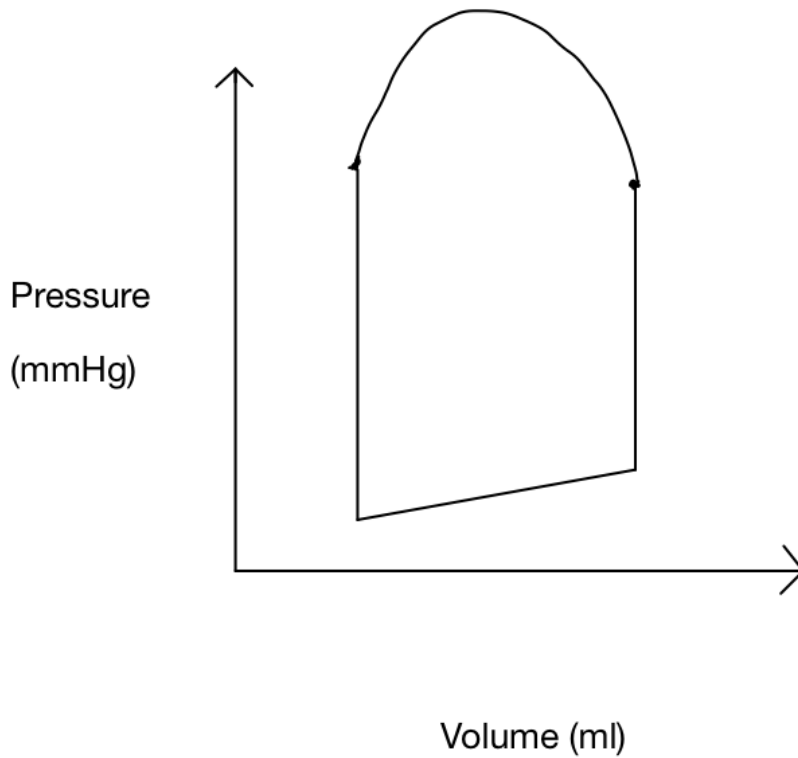
1.
2.
3.
4.

c)

List 3 key ECG changes that are associated with heart failure. (3 marks)

1.
2.
3.

d)



Above is a pressure-volume loop of the left ventricle. Label the graph above with an arrow and the corresponding letter: (4 marks)

- A - Stroke volume
- B - End systolic pressure volume relationship (ESPVR)
- C - End diastolic pressure volume relationship
- D - Mitral valve closure

e)

Define end systolic pressure volume relationship (ESPVR) and how does it change with systolic heart failure? (2 marks)

Definition:

.....

How it changes with systolic heart failure:

.....

f)

A patient presents with acute decompensated heart failure with evidence of organ hypoperfusion requiring inotropic support. Milronone is a drug that may be used. What class of drug is it and describe its mechanism of action. (2 marks)

Class of drug:

Mechanism of action:

.....

g)

In addition to an ejection fraction <35%, what ECG criteria would warrant consideration of cardiac resynchronisation therapy (CRT)? (2 marks)

1.

2.

Syllabus	CT_IK_03, CT_IK_04, CT_IK_04, PR_IK_06, PB_IK_03
Topic	Heart failure

Q	Answer	Mark	Guidance
a)	<ul style="list-style-type: none"> • Ischaemic heart disease • Hypertension • Valvular heart disease • Diabetes • Cardiomyopathies 	1 mark for each point	<p>Must have either IHD or hypertension in the answer</p> <p>Max 3 marks</p>
b)	<ul style="list-style-type: none"> • Increased SV as a result of Frank-Starling law • Ventricular remodelling/hypertrophy • Activation of Renin-Aldosterone-Angiotensin –System (RAAS) • Sympathetic nervous system activation 	1 mark for each point	<p>Note: Changes become maladaptive: leads to increased tension and increased LVEDP causing increased O2 demand. Also causes stiffened ventricle leading to diastolic dysfunction</p>
c)	<ul style="list-style-type: none"> • Chamber hypertrophy • Axis deviation • Ventricular strain patterns • Signs of ischaemia • Previous infarction changes • Arrhythmia (e.g. AF) 	1 mark for each (Max. 3 marks)	<p>Accept LVH</p> <p>May include examples but must include cause, i.e. ischaemia, infarction</p> <p>Accept AF as common in HF patients</p>
d)		4 marks	<p>Must show ESPVR and EDPVR as lines</p>
e)	<p><u>Definition:</u></p> <ul style="list-style-type: none"> • ESPVR describes the maximal pressure that can be developed by the ventricle at any given volume • ESPVR represents the inotrope state of the 	1	<p>Either answer for definition</p>

	heart <u>How it changes with systolic heart failure:</u> • ESPVR will reduce in systolic heart failure	1	
f)	<u>Class of drug:</u> • Phosphodiesterase III inhibitor <u>Mechanism of action:</u> • Acts to prevent breakdown of cAMP • Results in increased calcium and subsequent increased inotropy	1 1	Must include type III to gain mark Either answer is sufficient
g)	• QRS >120ms + LBBB • QRS >150ms with/without LBBB	1 1	Accept QRS >120ms + NYHA class IV

References:

- 1) Valchanov K, Parameshwar KP. Inpatient management of advanced heart failure. CEACCP (2008) 8(5)167-171 <https://academic.oup.com/bjaed/article/8/5/167/268260>
- 2) Kotzé A, Howell SJ. Heart failure: Pathophysiology, risk assessment, community management and anaesthesia. CEACCP (2008) 8(5)161-166 <https://academic.oup.com/bjaed/article/8/5/161/268279>
- 3) Reddi BAJ, Shanmugam N, Fletcher N. Heart failure - pathophysiology and inpatient management. BJA Education (2017) 17(5)151-160 <https://academic.oup.com/bjaed/article/17/5/151/3002015>