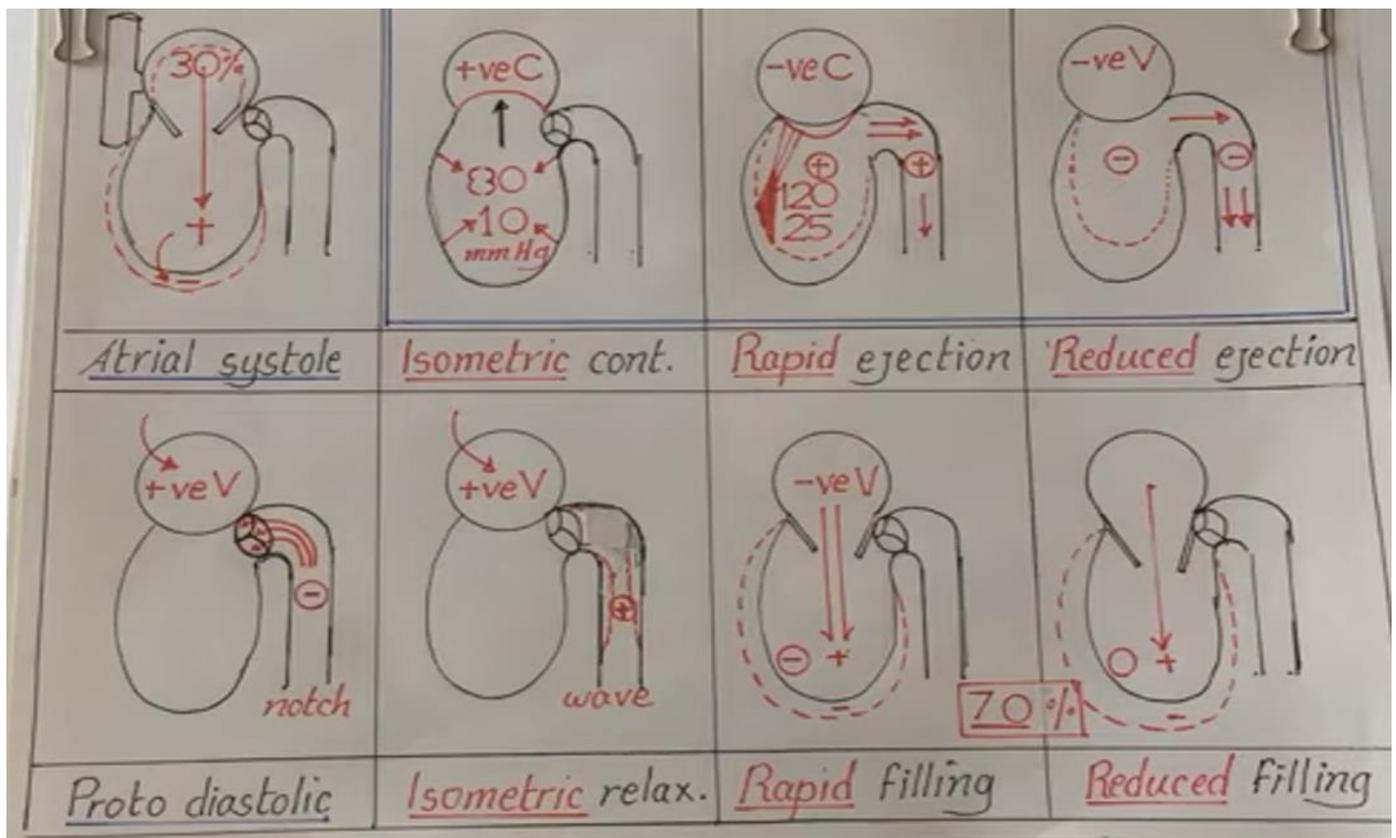


	systolic				diastolic			
phase	Atrial contraction	Isometric iso-volumetric	Rapid maxi. ejection	Reduc. mini. ejection	Proto-diastolic phase	Isometric relaxation	Maxi. rapid filling	Reduc. filling
duration	0.1 Sec	0.05 sec	0.15 sec	0.1 sec	0.04 sec	0.06 sec	0.1 sec	0.2 sec
Events	the atria contract and pump 30% of the ventricular filling	closure of AV valve , ventricles contract filling	opening AV, rushing blood into aorta 70% SV	the 30% SV is ejected to aorta.	From end of ventricular systole to closure of AV	closure of AV , and the ventricles relax isometrically	opening of AV valve 60% SV	10% of SV flow slowly to the ventricle
The atrial pressure	rise from 4 to 8 mmHg and return to 4 mmHg (evacuation)	Rise, bulging of AV and regurgitation of blood into atria	decrease	Increase	-	increased above the ventricular pressure	-	-
Ventricular pressure	rise from 4 to 8 mmHg and return to 4 mmHg (evacuation)	rise from 4 to 80 mmHg	rise from 80 to 120 mmHg	reach max. then decrease	Decreases about 20 mmHg	falls rapidly from 90 to 0 mmHg	around zero	rises to 4 mmHg
Ventricular volume	Increased by (20 ml) to reach EDV = 140	constant (isometric)	decrease	Decrease to ESV = 70 ml	constant	-	increased	increase gradually

Heart sounds	S4	first component S1	Second components S1	-	-	S2	S3	-
Valves	Semilunar closed , AV opened .	Both closed	Semilunar opened , AV closed	-	AV closed at the end. Semilunar close.	Both closed at the beginning , SL then open	AV closed at the beginning	-
ECG	P wave	QRS complex	Beginning of T wave	-	T wave (slop)	end of T wave	-	-



- P wave of ECG → atrial contraction
- QRS complex waves of ECG → ventricular depolarization
- T wave → ventricular repolarization (after QRS complex)

- *S1* → due to closure of the AV valves. Loudest at mitral area
- *S2* → due to closure of semilunar valves
- *S3* → due to rushing of blood into the ventricles (when dilated)
- *S4* → due to vibration of atrial muscle during the contraction (late diastole)
- In phase 2 – isometric : same length
- In phase 3 & 4 – isotonic : same tension

