

High Yield Hints – Heart

1. **Lung fish** has two auricles and one ventricle.
2. **Crocodile, Alligator and Gravidalis** have four chambered heart.
3. Heart of fish is venous heart because it receives deoxygenated blood.
4. **Nereis and Amphioxus** do not have heart.
5. Heart of Prawn contains **oxygenated blood**.
6. Average weight of human heart is – **Male 300 g and Female 250 g**.
7. **Excess Calcium** increases heart rate.
8. **Papillary muscles** are found in Mammalian heart.
9. **Keber's organ** or Pericardial gland is found in Freshwater Mussel. It discharge excretory materials to the Pericardial cavity.
10. **Blue whale** has the largest heart in the animal kingdom.
11. **Tread Mill Test or TMT** is used to check the efficiency of Heart.
12. **CARDIAC INDEX** is the minute volume per square meter of body surface area. Its normal volume is **3.3 lit / min / sq.m**.
13. Heart is the **busiest organ** in the body.
14. **Atrioventricular groove** or Coronary Sulcus and Interventricular groove are present on the surface of Heart.
15. **Sinus Venosus** is completely merged with Right auricle in Mammals.
16. Right auricle receives Superior venacava, Inferior venacava and Coronary sinus.
17. **Valve of Thebesius** is present at the opening of Coronary sinus.
18. Tricuspid valve is present between Right Auricle and Right Ventricle.
19. **Chordae tendinae** are White fibrous threads extending from Bicuspid , Tricuspid valves and to the Papillary muscles of Ventricle.
20. Left ventricle is thicker than Right ventricle to push blood forcefully.
21. **Heart wall has 3 layers**

Outer	Epicardium	Membraneous
Middle	Myocardium	Muscular
Inner	Endocardium	Membraneous
22. **CARDIAC CYCLE**

Atrial systole	0.18 seconds
Atrial diastole	0.08 seconds
Ventricular systole	0.3 seconds
Ventricular diastole	0.32 seconds
Joint diastole – all chambers in diastole	0.4 seconds
23. **Cardiac cycle is completed in 0.88 second.**
24. **Lubb sound** is produced when AV valve closes during the Ventricular Systole. It is the first sound low pitched and long duration (0.15 seconds). Its frequency is 25-45 Hz.

25. **Dupp sound** is produced when Semilunar valve closes at the start of relaxation of Ventricles. It is the second sound with high pitch and short duration (0.12 seconds). Its frequency is 50 Hz.
26. **Pulse Pressure** is the difference between Systolic and Diastolic pressures. Its normal value is 40 mm.Hg.
27. Normal heart beat at rest is 70-72 /minute in man and 80 / minute in women and children.
28. Cardiac output is the volume of blood pumped in to the Aorta per minute. It is 5 litres.
29. **SA node** is the first to originate heart beat. It determines the rate of Heart beat.
30. SA node has the highest rate of Autorhythmicity.
31. **AV node** is the Pace Setter of Heart. It conducts impulse from SA node.
32. **Bradycardia** is the slowing of heart rate – below 60 / min.
33. **Tachycardia** is the increase in heart rate - above 72 / min.
34. Heart rate is accelerated by Sympathetic system and Adrelalin.
35. **Mouse** has the highest heart rate.
36. **Bicuspid valve is called Mitral valve.** It is present between Left Auricle and Left Ventricle.
37. **Origin of heart beat and conduction** – SA node AV node ---- Bundle of His Purkinje fibres Ventricle wall.
38. Elephant has the largest heart.
39. Pericardium has two layers. Outer Parietal (Fibrous) and inner Visceral (Serous).
40. **CARDIAC MUSCLE**
 - Smaller in diameter – 15 microns
 - Formed of individual muscle cells.
 - Intercalated discs present between the cardiac muscle cells conduct impulses.
 - Contains Large number of Mitochondria.
 - Do not fatigue because it is incapable of Oxygen debt.
41. **Fossa ovalis** is the depression present in the inter auricular septum. It is the remnant of the embryonic Foramen Ovale.
42. **Moderator band** is the thick muscle bundle extending between the inter ventricular septum and ventricular wall.
43. Left ventricle is three times thicker than Right ventricle.
44. **Eustachian valve** is present at the opening of Inferior venacava.
45. **Thesbian valve** is present at the opening of Coronary sinus.
46. The cusps of Bicuspid and Tricuspid valves are formed by the folding of Endocardium.
47. When heart valves break down in older persons and inactive persons, blood pool in the vein of legs leading to **Vericose vein**.

48. **Mechanical heart valves** are made up of **plastic or metal**. **Regular use of Anticoagulants is necessary to prevent blood clotting if the mechanical valve is transplanted.**
49. **Bio-prosthetic valve** is artificial valve taken from animals like **Pig**.
50. **Semi lunar valves** are present at the opening of Arteries in the heart.
51. **Stenosis** is the condition in which the heart valve narrows and open incompletely.
52. **Myocardium** is supported by **White Fibrous tissue**. **It forms the cardiac skeleton.**
53. **AV node can act as Pace maker** in diseased heart but rate of impulse formation is low – 40-50- / min.
54. **FRANK – STARLING LAW**
States that the more the heart muscle is stretched, the greater will be the quantity of blood pumped in to the aorta.
55. **Cardiomegaly** is the enlargement of Heart.
56. **Nervous regulation of heart beat**
Sympathetic Accelerate heart beat
Parasympathetic through Vagus nerve - reduces heart rate.
by producing Acetylcholine.
57. **Hormonal regulation of heart beat.**
Thyroxine Increases heart beat.
Epinephrine Increases heart rate in emergency
Nor Epinephrine Increases heart rate in normal situations
58. Pulse rate increases when there is excitement.
59. **Acetylcholine hyper polarize the SA node and slows down impulse formation. It leads to Bradycardia or slow heart beat.**
60. Heart rate is related to the size of animal and metabolism. Small animals have high metabolism and hence high heart rate. Larger animals have low metabolic rate and hence low heart rate. Eg. Heart rate of Rat- 300 times / min. Elephant – 25 times / min.
61. **Tachycardia is produced by**
Increase in BP in Vena cava
High blood CO₂ content
Decrease in O₂ and low pH
High body temperature
Decrease of Thyroxine and Increase in Adrelalin
Stimulation of pain receptors
62. **Bradycardia is produced by**
Increase in BP in Aorta

63. ISOMETRIC PHASE

Low CO₂ content in blood
High O₂ content and High pH
Decrease in core body temperature
Increase in Thyroxine and Decrease in Adranalin
First phase of cardiac cycle when all valves are closed and atria and ventricles are relaxed.

ECG

Waller in 1887 recorded first ECG.

Einthoven is considered as the **Father of Electrocardiography**

ECG is represented by 5 waves – PQRST.

P De polarisation of Atria. Actvation of SA node

QRS De polarization of Ventricles

PQ Atrial contraction

QR Spread of excitation from SA node to AV node

RS Spread of excitation from AV node to Purkinje system

T Repolarisation of Ventricles

R It has the largest Amplitude.

64. MAREY'S LAW

Shows the inversion relationship between rate of heart beat and Blood pressure.

65. CARDIAC OUTPUT **Stroke volume X Heart rate.** 70 ml X 72 / min = 5040 ml/min .That is 5L per minute.