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YAKEEN NEET 2.0

2026

BODY FLUIDS AND CIRCULATIONS

ZOOLOGY

Lecture – 7

By- SAMAPTI MAM





Topics to be covered

1

cardiac cycle, 

(2)

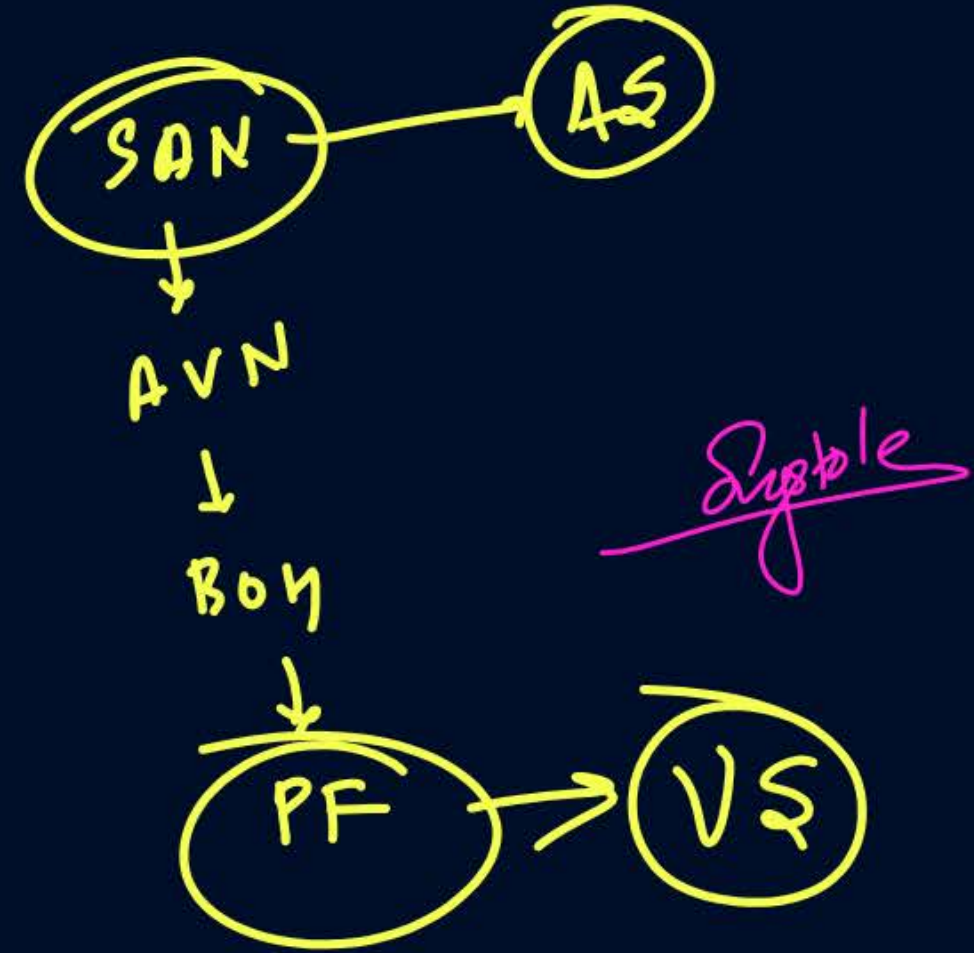
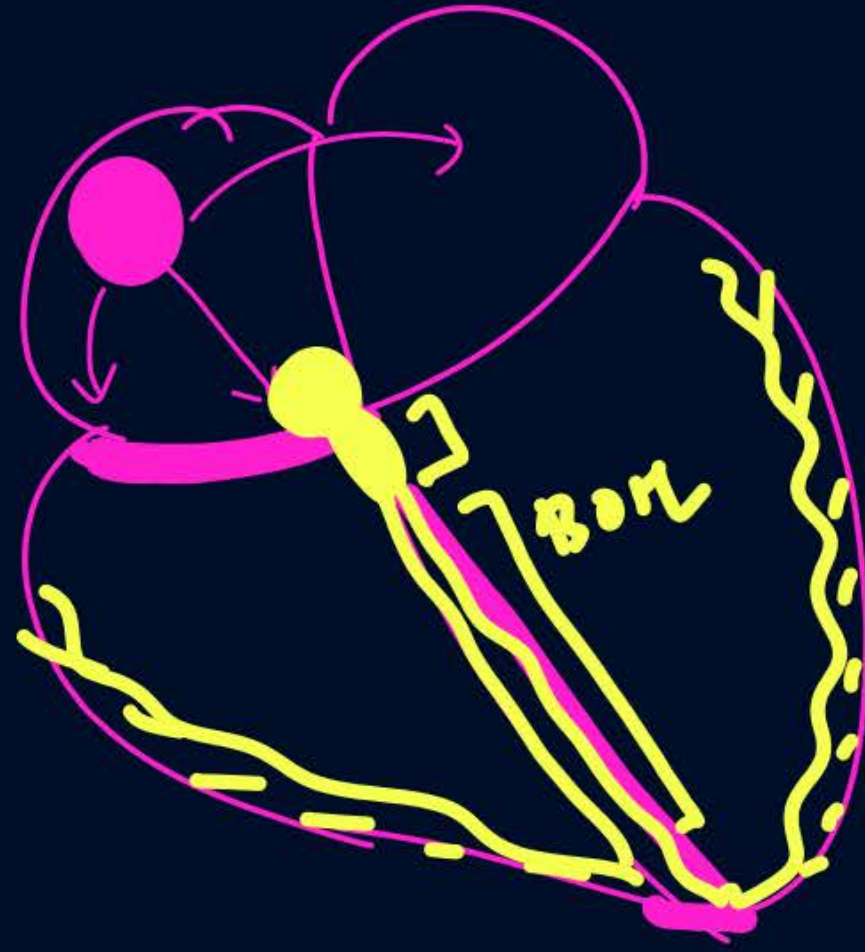
2

3

4



Sanaphiexpress



②①

doz

↓
BVCIVE

↓
RA

↓
RV (70.1)

↓
SL

↓
P. artery

SAH

AS 0.15

AVN

BOH

PR

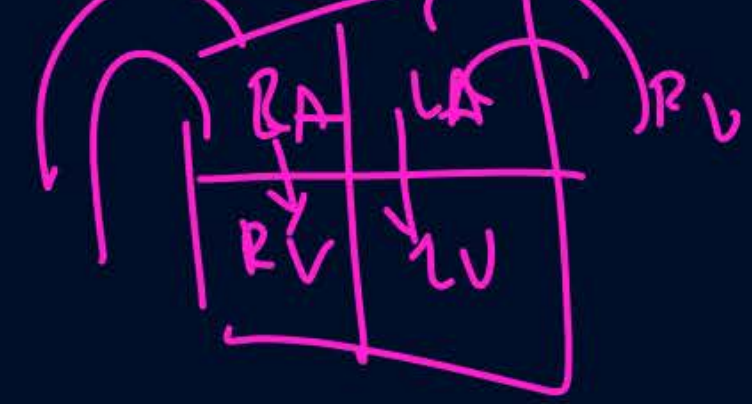
LU RB

VS 0.3

DURB

Joint D 0.45

SVC IIV



②②

O₂

↓
PV

↓
LA

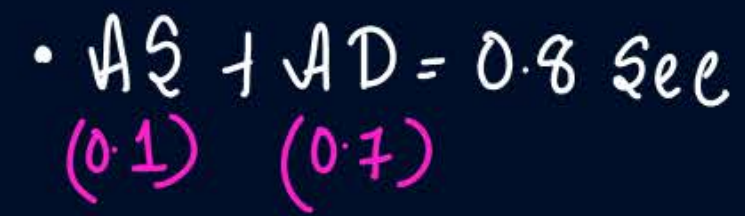
↓
AV-valve

↓
LV

(70.1)

↓
SL

↓
Aorta



- $V_S + V_D = 0.8 \text{ sec}$
 $(0.3) \quad (0.5 \text{ sec})$

- 1st heart sound

- Due to closure of AV-valve

- At the beginning of ventricular systole

- Longer Duration,
Lower Pitch

- 2nd Heart sound

- Due to closure
SL-valve

- At the beginning of Ventricular Diastole

- Shorter Duration,
High Pitch.

- 1 Cardiac cycle = 0.8 sec = 1 Heart Beat (1 Lubb-Dub)

* 72 Beat = 1 minute (60 sec)

$$1 \text{ Beat} = \frac{60}{72} = 0.8 \text{ sec}$$

1 Beat = 0.8 sec = 1 Cardiac cycle

☆☆ Cardiac output (CO) = Stroke Volume (SV) × Heart Beat Rate

→ 72 Beat/min

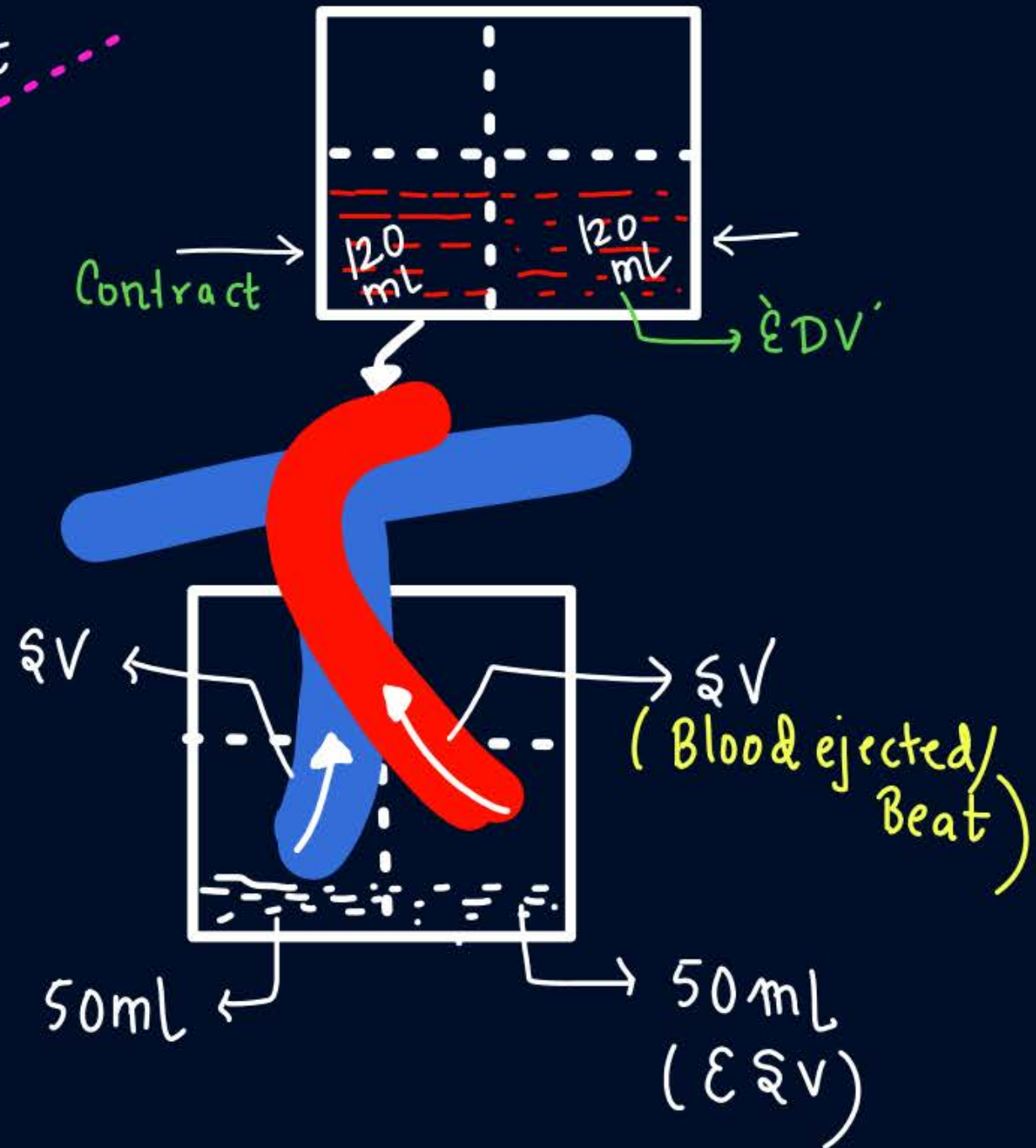
Amount of Blood pumped by each ventricle per minute ✓

Amount of Blood pumped by each ventricle / Beat

$$CO = 70 \text{ ml/Beat} \times 72 \text{ Beat/min}$$

$$CO = 5040 \text{ ml/min} \approx 5 \text{ L/min}$$

* EDV: End Diastolic Volume: At the end of Diastole, the amount of Blood (Ventricular) present in each ventricle. (120 ml)



* ESV (End systolic volume): The amount of blood left in each ventricle at the end of Ventricular systole.

* We have the ability to change Heart rate & SV hence CO can also change.

* Athletes have much higher CO which could be 5 times more.

Note When 'Athletes' workout using skeletal muscles; more Blood reaches heart, also their Ventricle are slightly Bigger; means \uparrow EDV

means Heart 'contracts' more

more Blood ejected / Beat; \uparrow SV.

15.3.2 Cardiac Cycle

How does the heart function? Let us take a look. To begin with all the four chambers of heart are in a relaxed state, i.e., they are in joint diastole. As the tricuspid and bicuspid valves are open, blood from the pulmonary veins and vena cava flows into the left and the right ventricle respectively through the left and right atria. The semilunar valves are closed at this stage. The SAN now generates an action potential which stimulates both the atria to undergo a simultaneous contraction – the atrial systole. This increases the flow of blood into the ventricles by about 30 per cent. The action potential is conducted to the ventricular side by the AVN and AV bundle from where the bundle of His transmits it through the entire ventricular musculature. This causes the ventricular muscles to contract, (ventricular systole), the atria undergoes relaxation (diastole), coinciding with the ventricular systole. Ventricular systole increases the ventricular pressure causing the closure of tricuspid and

J.D → start

0.4s

A.S, V.D (D.I)

↓

V.S, A.D (0.3)

bicuspid valves due to attempted backflow of blood into the atria. As the ventricular pressure increases further, the semilunar valves guarding the pulmonary artery (right side) and the aorta (left side) are forced open, allowing the blood in the ventricles to flow through these vessels into the circulatory pathways. The ventricles now relax (ventricular diastole) and the ventricular pressure falls causing the closure of semilunar valves which prevents the backflow of blood into the ventricles. As the ventricular pressure declines further, the tricuspid and bicuspid valves are pushed open by the pressure in the atria exerted by the blood which was being emptied into them by the veins. The blood now once again moves freely to the ventricles. The ventricles and atria are now again in a relaxed (joint diastole) state, as earlier. Soon the SAN generates a new action potential and the events described above are repeated in that sequence and the process continues.

This sequential event in the heart which is cyclically repeated is called the cardiac cycle and it consists of systole and diastole of both the atria and ventricles. As mentioned earlier, the heart beats 72 times per minute, i.e., that many cardiac cycles are performed per minute. From this it could be deduced that the duration of a cardiac cycle is 0.8 seconds. During a cardiac cycle, each ventricle pumps out approximately 70 mL of blood which is called the stroke volume. The stroke volume multiplied by the heart rate (no. of beats per min.) gives the cardiac output. Therefore, the cardiac output can be defined as the volume of blood pumped out by each ventricle per minute and averages 5000 mL or 5 litres in a healthy individual. The body has the ability to alter the stroke volume as well as the heart rate and thereby the cardiac output. For example, the cardiac output of an athlete will be much higher than that of an ordinary man.

During each cardiac cycle two prominent sounds are produced which can be easily heard through a stethoscope. The first heart sound (lub) is associated with the closure of the tricuspid and bicuspid valves whereas the second heart sound (dub) is associated with the closure of the semilunar valves. These sounds are of clinical diagnostic significance.

72 B - 60 sec
1 → 0.8 s.

Heart
murmur

Valves: Problem/
Damaged

closure

Abnormal

Ncert Catalyst

- 2 When the right ventricle contracts, the blood is pumped into the;
- (A) superior vena cava.
 - (B) dorsal aorta.
 - (C) pulmonary artery.
 - (D) pulmonary veins.

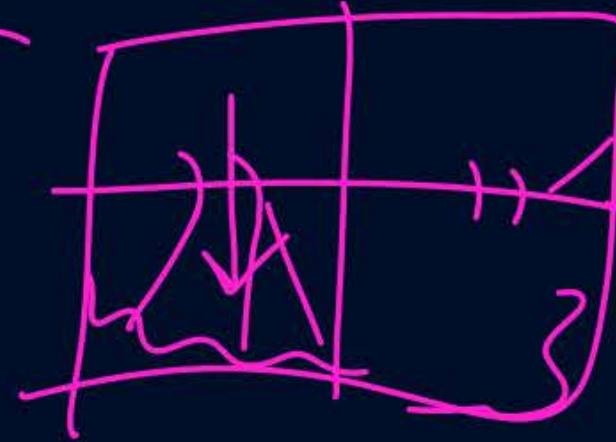
Q-1
3

QUESTION

Given below are two statements.

Statement I: AV valves are present in between the ATRIUM and VENTRICLES

Statement II: If chordae tendenae gets damaged flow of blood into aorta and pulmonary artery will be affected



(T)

(T)

1 Statement I is correct but Statement II is incorrect.

2 Statement I is incorrect but Statement II is correct.

3 Both Statement I and Statement II are correct.

4 Both Statement I and Statement II are incorrect.

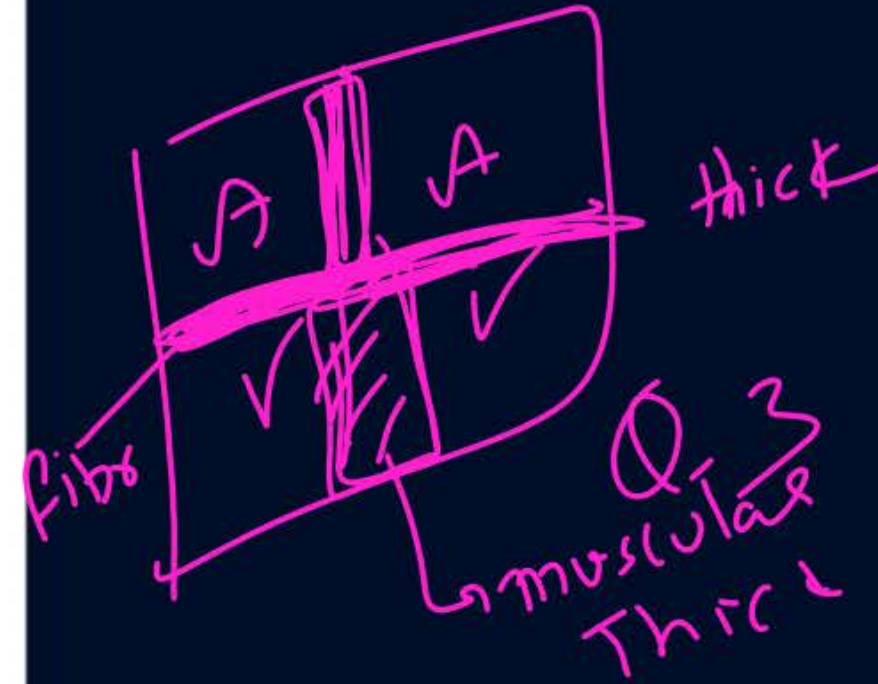
Read the following statements.

Assertion (A): The atrium and the ventricle of the same side are separated by a thick fibrous tissue called the atrioventricular septum. (T)

Reason (R): Mitral valve guards the opening between the right atrium and the right ventricle. (F)

Mark the correct choice as:

- (A) Both Assertion (A) and Reason (R) are true and the Reason (R) is a correct explanation of the Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of the Assertion (A).
- (C) Assertion (A) is true but the Reason (R) is false. ✓
- (D) Assertion (A) is false but the Reason (R) is true.



Statement-I: SAN is also called pacemaker.

(F)

Statement-II: SAN present in right upper corner of atrium can generate the maximum number of action potentials.

→ Right

- (A) Both Statement I and Statement II are correct.
- (B) Statement I is correct, but Statement II is incorrect.
- (C) Statement I is incorrect, but Statement II is correct.
- (D) Both Statement I and Statement II are incorrect.

Q4
1

Read the following statements.

Assertion (A): AV node generates impulses still it is not called as the pacemaker of heart. (T)

Reason (R): The rhythmicity of impulse production is not highest in AV node. (T)

(A) Both Assertion (A) and Reason (R) are true and the Reason is the correct explanation of Assertion.

(B) Both Assertion (A) and Reason (R) are true but the Reason is not the correct explanation of the Assertion.

(C) Assertion (A) is true and the Reason (R) is false.

(D) Assertion (A) is false and the Reason (R) is true.

Bicuspid Mitral 0.5 1

When an action potential is initiated by SAN,
which one of the following do not occur?

- (A) Both atria contract simultaneously. ✓
- (B) Blood flow from atria to ventricles increases by 60%. 30.1
- (C) Blood from atria to ventricles passes through atrioventricular valves. ✓
- (D) Volume of atria decreases. ✗

SAN → (A)

Q6
(2)

QUESTION

Assertion(A): left ventricle of heart has a thinner wall than right ventricle

Reason(R): left ventricle of heart has to pump blood to complete body parts

Q-7

T

1

Both Assertion (A) and Reason (R) are true, and Reason (R) is a correct explanation of Assertion (A).

2

Both Assertion (A) and Reason (R) are true, but Reason (R) is not a correct explanation of Assertion (A).

4

3

Assertion (A) is true, and Reason (R) is false.

4

Assertion (A) is false, and Reason (R) is true.

What is the role of the semilunar valves during the cardiac cycle?

- (A) To prevent the backflow of blood into the ventricles during ventricular diastole
- (B) To allow the blood to flow from the atria into the ventricles during ventricular systole
- (C) To regulate the pressure within the atria during atrial diastole
- (D) To open and close in response to the action potential generated by the SAN

Q8
①

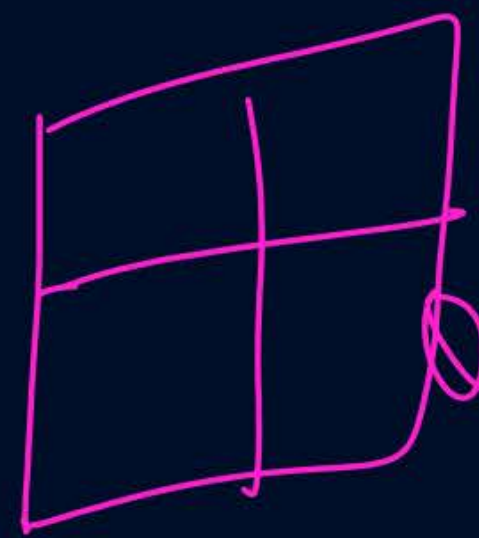
Which of the following events occur during joint diastole?

- I. Semilunar valves are closed. ✓
- II. Tricuspid and bicuspid are open. ✓
- III. All four chambers are in relaxed state. ✓
- IV. Blood from the pulmonary veins and vena cava flows into the left and right ventricles, respectively through the left and right atria. ✓

Choose the correct option containing correct statement(s):

- (A) Only I
- (B) Only III
- (C) II and IV
- (D) I, II, III and IV ✓

(T)



AV- valves: open
SL- close
70-1. filling

(4)

H.W Questions

Q- what causes the closure of AV valves during ventricular systole

- 1) Increased pressure in atria
- 2) decreased pressure in the ventricle
- 3) Attempt of backflow of blood towards atria
- 4) Opening of semilunar valve

STATEMENT-1- In each heartbeat, 70ml of blood is pumped by each ventricle

STATEMENT-2- The duration of a cardiac cycle is directly propotional to the number of heartbeat

- 1) Statement I is correct but Statement II is incorrect.
- 2) Statement I is incorrect but Statement II is correct.
- 3) Both Statement I and Statement II are correct.
- 4)Both Statement I and Statement II are incorrect.



Homework

- REVISE CLAASNOTES / ZOOLOGY MED EASY

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YOU