

Topic :- Body Fluids And Circulation

- 1 (b)
Nothing happens, when Rh⁻ person donated blood to Rh⁺ person for the second time.
- 2 (d)
Systemic circulation
- ```
graph TD
 LV[LV] -->|Oxygenated blood| Aorta[Aorta]
 Aorta --> Tissues[Tissues]
 Tissues -->|Deoxygenated blood| RA[Right auricle]
```
- 3 (a)  
SA-node controls the rate of heart beat.
- 4 (a)  
First sound of heart is lubb (a long and booming sound), created by the closure of atrio-ventricular valve (AV), tricuspid and bicuspid at the beginning of ventricular systole. At the beginning of ventricular diastole, the semilunar valves close, producing the second sound 'dup'.
- 5 (c)  
A-Fishes, B-Mammals, C-Reptiles.  
**Fish** Two-chambered heart. One atrium and one ventricle  
**Amphibian and Reptiles**  
Three-chambered heart, Two atrium (one left and one right) and one ventricle mammal  
four-chambered heart (two atria and two ventricle)
- 6 (d)  
The systemic circulation pathway is -  
Left auricle → Left ventricle → Pulmonary  
Aorta → arteries → tissues → Veins right atrium.

7 **(a)**  
Haemoglobin is a respiratory pigment found in RBCs. It contains iron ( $\text{Fe}^{2+}$ ).

8 **(b)**  
Extracellular fluid is the fluid found outside the cells. This is found in blood, lymph, body cavities and in various channels. It has high concentration of sodium ions and chloride ions, while intracellular fluid has high concentration of potassium ions. This concentration is maintained with the help of  $\text{Na}^+ - \text{K}^+$  pumps.

9 **(b)**  
**Atrial natriuretic hormone** is produced by heart, which helps in regulating the sodium and water balance of the body.

10 **(c)**  
*Auto-Rhythmicity of Heart*  
Automatic rhythmicity of the heart is the ability to contract spontaneously. Mammalian heart is myogenic. It means heart beat results from a wave of electrical potential called cardiac impulse arising from sinoatrial node SA node and spreading over cardiac chambers.  
SA-node lies in the wall of right atrium near opening of superior vena cava and contract about 72 times per minute. From SA node cardiac impulse travels to atrioventricular node (lies between right atrium and ventricle)  
Then pass to AV bundle (also called bundle to His) and its branches reaches to the Purkinje fibres in ventricles.  
Bundle of His provides the only route for the transmission of wave of excitation from atria to ventricles. Purkinje fibres conducts the impulses five times more rapidly than surrounding cells. It forms a pathway for conduction of impulse that ensures that the heart muscle contracts in the most efficient manner

11 **(a)**  
I and II.  
**Types of Valve**  
(i) **Atrioventricular Valve** *These are two types*  
1. **Bicuspid valve** It also called mitral valve which is present on the left side between the left atrium and left ventricle. It consists of two cups of flaps  
2. **Tricuspid valve** It consists of three flaps or cups present between the right atrium and right ventricle  
(ii) **Semilunar Valve** It is present where the arteries leaves heart. They are of two types (a) Pulmonary valve (b) Aortic valve, which are present at the base of pulmonary artery and aorta, respectively.  
The pulmonary and aortic valves are virtually identical through aortic valve consists of thicker fibrous structure than the pulmonary valve

12 **(c)**  
'Dup' (a second heart sound) occurred by closing the semilunar valve.

13 **(b)**  
SA-node is located in upper lateral wall of right atrium.

14 **(a)**  
The heart is formed of cardiac muscles which have the property of excitability and conductivity. When the cardiac muscles are stimulated by a specific stimulus these get excited and initiate the waves (depolarization) of electric potential called **cardiac impulse**. Cardiac impulse is propagated through SA node → AV node → Bundle of His → Purkinje fibres.

15 **(b)**  
Excess nitrate combines with haemoglobin and forms non-functional methaemoglobine that inhibits oxygen transport. It is known as methaemoglobinemia or **blue baby syndrome**.

16 **(c)**  
Bundle of His is a network of muscle fibres found in between two ventricles.

17 **(c)**  
Erythrocytes or RBC are the most abundant of the three types of blood cells. They have a count of about 5-5.5 million per cubic mm of the blood in an adult male and 4.5-5 million/mm<sup>3</sup> in females. They are formed in the red bone marrow in the adults

18 **(a)**

| Blood Group | May Receive Blood | May Donate Blood |
|-------------|-------------------|------------------|
| O           | O                 | O, A, B, AB      |
| A           | A, O              | A, AB            |
| B           | B, O              | B, AB            |
| AB          | O, A, B, AB       | AB               |

19 **(b)**  
The cardiac cycle in normal person takes about 0.8s. Atrial systole takes 0.1s, while atrial diastole is of about 0.7s.

20 **(d)**  
During joint diastole, blood continues of flow into auricle through the great veins (superior and inferior vena cava), which bring venous blood from all parts of the body. During atrial diastole, venous blood again passes from the great veins to the auricle.

| <b>ANSWER-KEY</b> |           |           |           |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Q.</b>         | <b>1</b>  | <b>2</b>  | <b>3</b>  | <b>4</b>  | <b>5</b>  | <b>6</b>  | <b>7</b>  | <b>8</b>  | <b>9</b>  | <b>10</b> |
| <b>A.</b>         | <b>b</b>  | <b>d</b>  | <b>a</b>  | <b>a</b>  | <b>c</b>  | <b>d</b>  | <b>a</b>  | <b>b</b>  | <b>b</b>  | <b>c</b>  |
|                   |           |           |           |           |           |           |           |           |           |           |
| <b>Q.</b>         | <b>11</b> | <b>12</b> | <b>13</b> | <b>14</b> | <b>15</b> | <b>16</b> | <b>17</b> | <b>18</b> | <b>19</b> | <b>20</b> |
| <b>A.</b>         | <b>a</b>  | <b>c</b>  | <b>b</b>  | <b>a</b>  | <b>b</b>  | <b>c</b>  | <b>c</b>  | <b>a</b>  | <b>b</b>  | <b>d</b>  |
|                   |           |           |           |           |           |           |           |           |           |           |

**PE**