BIOLOGY

NEET / AIIMS

CRASH COURSE

BODY FLUID AND CIRCULATION

SMART ACHIEVERS

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587, Nitikhand-1, Indirapuram, Gzb.

7292077839 / 7292047839 | smartachievers.online

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BODY FLUID AND CIRCULATION

1. All vertebrates and a few invertebrates have a closed circulatory system.

2. Human circulatory system consists of a muscular heart, a network of vessels and blood.

3. Heart has two atria and two ventricles in case of mammals and birds.

4. Cardiac muscles are auto-excitable.

5. Sino-atrial node (SAN) generates the maximum number of action protentials per minute (70-75/min) and therefore, it sets the pace of the activities of the heart.

6. Hence, it is called the Pacemaker.

7. The action potential causes the atria and then the ventricles to undergo contraction (systole) followed by their relaxation (diastole).

8. The systole forces the blood to move from the atria to the ventricles and to the pulmonary artery and the aorta.

9. The cardiac cycle is formed of sequential events in the heart which are cyclically repeated.

10. A healthy person shows 72 such cycles per minute.

11. About 70mL of blood is pumped out by each ventricle during a cardiac cycle and is called the stroke or beat volume.

12. Volume of blood pumped out by each ventricle of heart per minute is called the cardiac output and is equal to the product of stroke volume and heart rate (approx 5 litres).

13. The electrical activity of the heart can be recorded from the body surface by using electrocardiograph and the recording is called electrocardiogram (ECG) which is of clinical importance.

14. We have a complete double circulation, i.e., two Circulatory pathways, namely, pulmonary and systemic.

15. The pulmonary circulation starts by the pumping of deoxygenated blood by the right ventricle which is carried to the lungs where it is oxygenated and returned to the left atrium.

16. The systemic circulation starts with the pumping of oxygenated blood by the left ventricle to the aorta which is carried to all the body tissues and the deoxygenated blood from there is collected by the veins and returned to the right atrium.

17. Though the heart is auto excitable, its functions can be regulated by neural and hormonal mechanisms.

EXERCISE

Q.1 The blood returning to the heart from lungs via pulmonary vein has more
(1) RBC per ml of blood (2) Haemoglobin per ml of blood
(3) Oxygen per ml of blood (4) Nutrient per ml of blood

Q.2 The nerve like modified muscle in the right auricle is know as
(1) Lymph node (2) Atrio-ventricular node
(3) Pacemaker (4) Bulbus arteriosus

Q.3 The first heart sound is
(1) 'Lubb' sound at the end of systole (2) Dup' sound at the end of systole
(3) 'Lubb' sound at the beginning of systole (4) 'Dup' sound at the beginning of systole

Q.4 In the heart of mammals the bicuspid valve is situated between
(1) Left auricle and left ventricle (2) Post caval and right caval
(3) Right auricle and left auricle (4) Right ventricle and pulmonary aorta

Q.5 Which valve is present between the left atrium and the ventricle
(1) Tricuspid (2) Mitral (3) Aortic (4) Pulmonary

Q.6 Epinephrine is secreted by
(1) Adrenal medulla and increases the heart rate
(2) Adrenal medulla and decreases the heart rate
(3) Adrenal cortex and increases the heart rate
(4) Adrenal cortex and decreases the heart rate

Q.7 Heart beat can be initiated by
(1) Sinu-auricular node (2) Atrio-ventricular node
(3) Sodium ion (4) Purkinje's fibres

Q.8 Purkinje's fibres are special types of
(1) Muscle fibres located in heart
(2) Nerve fibres located in cerebrum
(3) Connective tissue fibres joining one bone to another bone
(4) Sensory fibres extending from retina into optic nerve

Q.9 The typical Lubb-Dup sounds heard in the heart beat of a healthy person are due to
(1) Closing of the tricuspid and bicuspid valve
(2) Blood flow through the aorta
(3) Closing of the tricuspid and semilunar valves
(4) Closing of the semilunar valves

Q.10 The duration of cardiac cycle is
(1) 0.8 sec (2) 0.8 μ sec (3) 0.08 sec (4) 0.008 sec

Q.11 Which one is the correct route through which pulse making impulse travels in the heart
(1) SA node $\rightarrow$ Purkinje fibres $\rightarrow$ Bundle of His $\rightarrow$ AV node $\rightarrow$ Heart muscles
(2) AV node $\rightarrow$ SA node $\rightarrow$ Purkinje fibres $\rightarrow$ Bundle of His $\rightarrow$ Heart muscles
(3) AV node $\rightarrow$ Bundle of His $\rightarrow$ SA node $\rightarrow$ Purkinje fibres $\rightarrow$ Heart muscles
(4) SA node $\rightarrow$ AV node $\rightarrow$ Bundle of His $\rightarrow$ Purkinje fibres $\rightarrow$ Heart muscles

Q.12 Bundle of His is a network of
(1) Nerve fibres found throughout the heart
(2) Muscle fibres distributed throughout the heart walls
(3) Muscle fibres found only in the ventricle wall
(4) Nerve fibres distributed in ventricles

Q.13 Match the blood vessels of human heart listed under column-I with the functions given under Column-II; Choose the answer which given the correct combination of the alphabets of the two columns

Column-I (Blood vessel)		**Column-II** (Function)	
A	Superior vena cava	p	Carries deoxygenated blood to lungs
B	Inferior vena cava	q	Carries oxygenated blood to lungs
C	Pulmonary artery	r	Bring deoxygenated blood from lower parts of the body to the right atrium
D	Pulmonary vein	s	Brings oxygenated blood to the left atrium
		t	Brings deoxygenated blood from upper parts of the body into the right atrium

(1) A = t, B = p, C = r, D = q (2) A = t, B = r, C = p, D = s
(3) A = s, B = t, C = r, D = p (4) A = t,

Q.14 Which one of the following is not related to the clotting of blood
(1) Fibrin (2) fibrinogen (3) Ca^{++} (4) Na^{+} of the plasma

Q.15 Covering of heart is called
(1) Pericardium (2) Peritoneum (3) Perineurium (4) Periostium

Q.16 Chordae tendinae are found in
(1) Ventricle of heart (2) Atria of heart (3) Joints (4) Ventricle of brain

Q.17 Neurogenic heart is characteristic of
(1) Lower vertebrates (2) Humans (3) Rat (4) Rabbit

Q.18 Systolic pressure of heart is higher than diastolic pressure because
(1) Blood is forcefully pumped into arteries by the heart during systole and not during diastole
(2) Arteries offer resistance to the flowing of blood during systole only
(3) Arteries contract during systole only
(4) Volume of blood in heart is greater during systole than during diastole.

Q.19 If due to some injury the chordae tendinae of the tricuspid valve of the human heart is partially non-functional, what will be the immediate effect
(1) The flow of blood into the aorta will be slowed down
(2) The ' pacemaker' will stop working
(3) The blood will tend to lfow back into the left atrium
(4) The flow of blood into the pulmonary artery will be reduced

Q.20 An oval depression called fossa ovalis, is seen on
(1) inter atrial septum (2) inter ventricular septum
(3) right auriculo-ventricular septum (4) left auriculo-ventricular septum

Q.21 Cardiac output is determined by
(1) heart rate (2) stroke volume (3) blood flow (4) Both (1) and (2)

Q.22 Which type of white blood cells are concerned with the release of histamine and the natural anticoagulant heparin
(1) Neutrophils (2) Basophils (3) Eosinophils (4) Monocytes

Q.23 The pH of blood is
(1) between 7-8 (2) between 2-4 (3) between 12-14 (4) between 4-7

Q.24 The low pressure below the arterial pO_2 results in
(1) release of CO_2 from the cell (2) formation of haemoglbin
(3) production of bicarbonate (4) formation of carbonic acid

Q.25 The artery can be distinguished from the vein in having
(1) Thicker walls (2) More blood cells (3) More plasma (4) Larger cavity

Q.26 The artery which supplies blood to the diaphragm is known as
or
The diaphragm is supplied with blood by
(1) Cardiac artery (2) Phrenic artery (3) Lingual artery (4) Lumbar artery

Q.27 Blocking of arteries due to deposition of fats and calcium is called
(1) Arterosclerosis (2) Atherosclerosis (3) Emphysema (4) Heart syndrome

Q.28 Rh^- person donated blood to Rh^+ person for the second time, Then
(1) Rh^- person will die
(2) Nothing happens to Rh^+ person
(3) Rh^+ blood strts reacting reacting to Rh^- blood
(4) Rh^+ person will die

Q.29 ECG records
(1) Electric current of the body (2) Potential differences
(3) Pulse rate (4) Quantity of blood pumped per minute

Q.30 In an ECG, the depolarization of atria is indicated by
(1) P - wave (2) Q - wave (3) R - wave (4) S - wave

Q.31 P - wave of ECG occur before the
(1) Onset of ventricular ejection (2) End of atrial contraction
(3) Beginning of atrial contraction (4) None of these

Q.32 Blood pressure instrument records
(1) Systolic pressure (2) diastolic pressure (3) Both (1) and (2) (4) None of the above

Q.33 During the process of blood coagulation, vitamin -K helps in the
(1) formation of prothrombin (2) formation of thromboplastin
(3) conversion of fibrinogen into fibrin (4) conversion of prothrombin into thrombin

Q.34 Which organ is considered as "Graveyard of RBC" where most of them are destroyed by macrophages
(1) Red bone marrow (2) Spleen (3) Kidney (4) Intestine

Q.35 The antibodies are formed in
(1) Bone marrow (2) Spleen (3) Calcium (4) Liver

Q.36 T - Lymphocytes originate from
(1) Thymus (2) Bone marrow (3) Liver (4) None of these

Q.37 The lymph serves to
(1) Transport O_2 to the brain
(2) Transport CO_2 to the lungs
(3) Return the interstitial fluid to the blood
(4) Return the WBCs and the RBCs to the lymph nodes

Q.38 A portal system is a system in which
(1) A vein starts from an organ and ends up in heart
(2) An artery breaks up in an organ and restarts by the union of its capillaries
(3) The blood from the gut is brought into the kidney before it is poured into posterior venacava
(4) A vein breaks up in an organ into capillaries and restarts by their union as a new vein in the same organ

Q.39 Hypophyseal portal system is found in
(1) Kideny (2) Liver (3) Brain (4) Heart

AIIMS Special

Instructions for following questions (Q.40 to Q.54).

(1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1).
(2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
(3) If Assertion is true statement but Reason is false, then mark (3).
(4) If both Assertion and Reason are false statements, then mark (4).

Q.40 **Assertion :** The cardiac impulse which originates from SA node in mammalian heart can not spread directly from atria to ventricles.
Reason : In mammalian heart there is no continuity between cardiac muscle fibres of atria and those of ventricles except AV bundles.

Q.41 **Assertion :** First phase of ventricular filling is rapid and causes 3rd sound of heart.
Reason : It is because of auricular systole.

Q.42 **Assertion :** Dub is a long and sharp sound.
Reason : It is caused by closing of atria ventricular valves.

Q.43 **Assertion :** Portal system consists of veins which start from capillaries and end into capillaries.
Reason : All vertebrates have hepatic portal system.

Q.44 **Assertion :** Arterioles possess smooth muscles on their walls.
Reason : These smooth muscles help in regulating blood volume flowing through a tissue or organ.

Q.45 **Assertion :** The open circulatory system is more efficient than the closed circulatory system.
Reason : The blood flows far more rapidly in open circulatory system than in the closed one.

Q.46 **Assertion :** Heart of fish contains only deoxygenated blood.
Reason : Oxygenated blood do not return back to the heart in fishes.

Q.47 **Assertion :** The cardiac impulse is said to be myogenic.
Reason : Rate of formation and conduction of cardiac impulse can be changed by the action of nerves.

Q.48 **Assertion :** Left ventricle of heart has a thinner wall than that of the right ventricle.
Reason : Left ventricle needs to pump blood to nearby lungs only.

Q.49 **Assertion :** AV bundle is essential for the conduction of cardiac impulse.
Reason : There is no continuity between the cardiac muscle fibres of the auricles and those of the ventricles.

Q.50 **Assertion :** AV node is also called as the pacemaker of the heart.
Reason : It is because of the fact that AV node determines the rate of heart beat.

Q.51 **Assertion :** There is no mixing of oxygenated and deoxygenated blood in the human heart.
Reason : Valves are present in the heart which allows the movement of blood in one direction only.

Q.52 **Assertion :** Hypotension is observed in arteriosclerotic patients.
Reason : In the condition of arteriosclerosis, the arteries gain their elasticity and get stiffened.

Q.53 **Assertion :** EEG is of immense diagnostic value in the cardiac diseases.
Reason : Defects in cardiac functions can be reflected in changes in the pattern of electrical potential recorded in the EEG.

Q.54 **Assertion :** An artificial pacemaker can replace the sinoatrial node of heart.
Reason : This is because, an artificial pacemaker is capable of stimulating the heart electrically to maintain its beats.

ANSWER KEY

Q.1	3	Q.2	3	Q.3	3	Q.4	1	Q.5	2	Q.6	1	Q.7	1
Q.8	1	Q.9	3	Q.10	1	Q.11	4	Q.12	3	Q.13	2	Q.14	4
Q.15	1	Q.16	1	Q.17	1	Q.18	1	Q.19	4	Q.20	1	Q.21	4
Q.22	2	Q.23	1	Q.24	1	Q.25	1	Q.26	2	Q.27	2	Q.28	2
Q.29	2	Q.30	1	Q.31	3	Q.32	3	Q.33	1	Q.34	2	Q.35	2
Q.36	2	Q.37	3	Q.38	4	Q.39	3	Q.40	1	Q.41	3	Q.42	4
Q.43	2	Q.44	1	Q.45	4	Q.46	1	Q.47	2	Q.48	4	Q.49	1
Q.50	4	Q.51	2	Q.52	4	Q.53	4	Q.54	1				