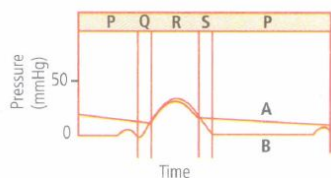


Body Fluids and Circulation Important Questions With Answers

NEET Biology 2023

1. Refer to the given figure in which A refers to pulmonary artery pressure and B refers to right ventricular pressure. Identify P, Q, R and S in the figure and match with the list (i - iv) given below. (i) Isovolumetric ventricular contraction (ii) Ventricular ejection (iii) Isovolumetric ventricular relaxation (iv) Ventricular filling



- a) P-(iv), Q-(iii), R-(ii), S-(i) b) P-(ii), Q-(iii), R-(i), S-(iv) c) **P-(iv), Q-(i), R-(ii), S-(iii)**
d) P-(i), Q-(ii), R-(iii), S-(iv)

Solution : -

The pressure changes in the right ventricle and pulmonary arteries are qualitatively similar to those for the left ventricle and aorta. There are striking quantitative differences, however. Typical pulmonary artery systolic and diastolic pressures are 25 and 10 mm Hg, respectively, compared to systemic arterial pressures of 120 and 80 mm Hg. Thus, the pulmonary circulation is a low-pressure system. Despite the difference in pressure during contraction, however, the stroke volumes of the two ventricles are the same. During isovolumetric contraction and relaxation, the ventricular volume does not change, though the ventricular pressure increases and decreases respectively.

2. Assertion: Type 'O' blood group individuals are called 'universal donors'.

Reason: RBCs of 'O' blood group have both 'A' and 'B' surface antigens.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) **If assertion is true but reason is false.** d) If both assertion and reason are false.

Solution : -

If a blood transfusion is made between an incompatible donor and recipient, reaction of antigens on the cells and antibodies in the plasma produces clots that clog the capillaries. Type O blood group individuals are without A and B antigens on their RBCs, but have antibodies for both these antigens in their plasma. Hence, these can donate blood to anyone.

3. Which one of the following has an open circulatory system?

- a) **Periplaneta** b) Hirudinaria c) Octopus d) Pheretima

Solution : -

Insects do not have closed blood circulation. Periplaneta is the Indian Cockroach which is an insect. Their blood (called haemolymph) even does not serve for respiration. They do not possess blood vessels in this circulatory system and hence it is an open system.

4. Assertion: The process of clotting can occur in absence of all cellular elements except platelets

Reason: Vitamin K is essential for blood clotting

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion

c) If assertion is true but reason is false. d) If both assertion and reason are false

Solution : -

Activated platelets are essential for blood clotting because several of the cascade reactions take place on the surface of platelets. Vitamin K is essential for production of prothrombin. Prothrombin and many plasma clotting factors are produced in the liver. The liver requires vitamin K to produce prothrombin and several other clotting factors.

5. Blood of AB group cannot be given to B group patient because

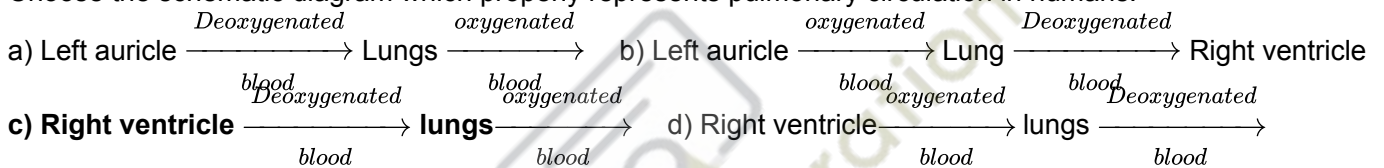
a) patient has antibodies b) patient lacks antibodies b c) patient lacks antibodies a

d) patient has antibodies a

Solution : -

Persons with blood group B have B antigen on the surface of their RBCs and anti A antibodies (against A antigen) in their plasma. The person with AB blood group possesses both the antigens A and B on the surface of RBCs. If AB blood group is given to B group patient, agglutination occurs between anti A antibodies and A antigen

6. Choose the schematic diagram which properly represents pulmonary circulation in humans.



Solution : -

Pulmonary circulation is the movement of blood between heart and lungs. During this pathway deoxygenated blood entering the right atrium, moves into the right ventricle. From here it moves through the pulmonary arch into the lungs for oxygenation. Then from lungs the oxygenated blood moves into the left atrium through pulmonary veins.

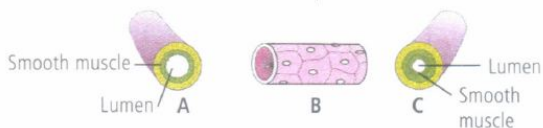
7. In veins, valves are present to check backward flow of blood flowing at

a) atmospheric pressure b) high pressure **c) low pressure** d) all of these.

Solution : -

Veins bring blood from different body parts to the heart. The flow of blood in veins is not so fast because the blood in veins is under low pressure. Veins possess valves which prevent backward flow of blood

8. Given below are the figures of blood vessels. Identify them and select the correct option.



a)

A	B	C
Capillary	Vein	Artery

b)

A	B	C
Artery	Capillary	Vein

c)

A	B	C
Vein	Capillary	Artery

d)

A	B	C
Vein	Artery	Capillary

9. Assertion: Left atrium has the thickest muscles.

Reason: Right atrium receives blood from the lungs

a) If both assertion and reason are true and reason is the correct explanation of assertion.

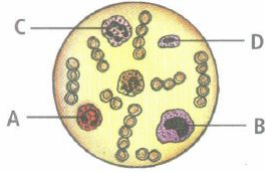
b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false **d) If both assertion and reason are false**

Solution : -

Left ventricle has thickest muscles because it pumps the blood to the whole body. Left atrium receives blood from the lungs.

10. Study the given figure and identify the cells labelled as A, B, C and D.



- a) A - Eosinophil, B - Erythrocyte, C - Neutrophil, D - Basophil
b) A - Eosinophil, B - Lymphocyte, C - Neutrophil, D - Monocyte
c) A - Erythrocyte, B - Basophil, C - Neutrophil, D - Lymphocyte
d) **A - Eosinophil, B - Monocyte, C - Neutrophil, D - Lymphocyte**
11. The haemoglobin of a human foetus _____
a) has a lower affinity for oxygen than that of the adult b) its affinity for oxygen is the same as that of an adult
c) has only 2 protein subunits instead of 4 **d) has a higher affinity for oxygen than that of an adult**

Solution : -

The haemoglobin of human foetus has higher affinity for oxygen than that of an adult. Haemoglobin is a protein which contains two alpha and two beta chain. Haemoglobin is carrier of the oxygen.

12. Which one of the following animals has two separate circulatory pathways?
a) Lizard **b) Whale** c) Shark d) Frog

Solution : -

Separate circulatory pathways is the features of mammals and birds. It is also called double circulation. It occurs in Whale, because it is also a mammal.

13. Bundle of His is a part of which one of the following organs in human?
a) Brain **b) Heart** c) Kidney d) Pancreas

Solution : -

The bundle of nodal fibres, atrioventricular bundle (AV bundle) continues from the AVN which passes through the atrioventricular septa to emerge on the top of the interventricular septum and immediately divides into a right and left bundle. These branches give rise to minute fibres throughout the ventricular musculature of the respective sides and are called Purkinje fibres. These fibres along with right and left bundles are known as bundle of His.

14. 'Bundle of His, is a part of which one of the following organs in humans?
a) Brain **b) Heart** c) Kidney d) pancreas

Solution : -

Bundle of His is a part of Heart. Bundle of His is also known as AV bundle is a group of specialised cardiac muscles meant for electrical conduction.

15. Read the following statements and select the correct option

Statement 1: The 4-chambered heart of birds is superior to the 4-chambered heart of crocodiles

Statement 2: Crocodilian heart retains both systemic arches that join, causing mixing of blood in the dorsal aorta while avian heart has lost left systemic arch

- a) Both statements 1 and 2 are correct** b) Statement 1 is correct but statement 2 is incorrect
c) Statement 1 is incorrect but statement 2 is correct d) Both statements 1 and 2 are incorrect

16. Match column I with column II and select the correct option from the codes given below.

	Column-I		Column-II
A	Heart failure	(i)	Heart muscle is suddenly damaged by an inadequate blood supply

B	Cardiac arrest	(ii)	Chest pain due to inadequate O ₂ reaching the heart muscles
C	Heart attack	(iii)	Atherosclerosis
D	Coronary artery disease (CAD)	(iv)	Heart not pumping blood effectively enough to meet the needs of the body
E	Angina pectoris	(v)	Heart stops beating

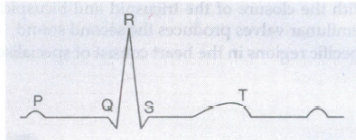
- a) **A-(iv), B-(v), C-(i), D-(iii), E-(ii)** b) A-(v), B-(iv), C-(i), D-(iii), E-(ii) c) A-(iv), B-(v), C-(i), D-(ii), E-(iii)
d) A-(v), B-(iv), C-(ii), D-(iii), E-(i)

17. **Assertion:** RBCs are devoid of nucleus in most of the mammals

Reason : Entire cytoplasm of RBCs is filled with red coloured, iron containing complex protein called haemoglobin

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is assertion and but reason is false. d) If both assertion and reason are false.

18. The diagram given here is the standard ECG of a normal person. The P-wave represents the :



- a) **Contraction of both atria** b) Initiation of the ventricular contraction c) Beginning of the systole
d) End of the systole

Solution : -

The P-wave represents the electrical excitation (or depolarisation) of the atria, which leads to the contraction of both the atria.

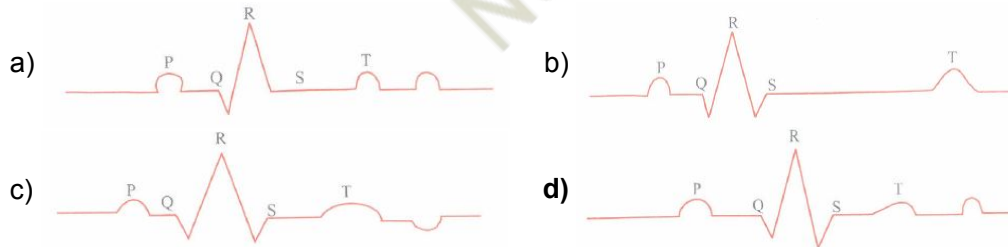
19. The hepatic portal vein drains blood to liver from:

- a) Heart b) Stomach c) Kidneys **d) Intestine**

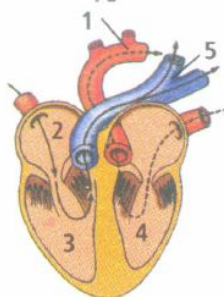
Solution : -

The hepatic portal vein carries blood from intestine to the liver before it is delivered to the systemic circulation. It carries maximum amount of nutrients from intestine to liver.

20. Which of the following is the diagrammatic representation of standard electrocardiogram (ECG)?



21. In the given figure of the heart which of the labelled part (1,2,3,4,5) carries oxygenated blood?



- a) 1, 2, 3 and 4 b) 1 and 5 **c) 1 and 4** d) 3 and 5

Solution : -

The labelled parts '1' and '4' are aorta and left ventricle respectively, which carry oxygenated blood. Left ventricle receives oxygenated blood from left auricle which received it from pulmonary veins and this oxygenated blood then moves into the aorta to be supplied to the whole body.

22. In mammals, histamine is secreted by _____

- a) fibroblasts b) histocytes c) lymphocytes **d) mast cells**

Solution : -

Histamine is a potent vasodilator formed by decarboxylation of the amino acid histidine and released by mast cells in response to appropriate antigens. Mast cells are especially prevalent in the connective tissue of the skin, respiratory tract and in surrounding blood vessels.

23. Blood pressure in the pulmonary artery is :

- a) More than that in carotid **b) More than that in the pulmonary vein** c) Less than that in the vena cava
d) Same as that in aorta

Solution : -

The pulmonary arteries have thick, smooth muscles and connective tissue than the pulmonary veins to accommodate higher pressure and flow of blood.

24. Consider the following four statements and select the correct option stating which ones are true (T) and which ones are false (F)?

- (i) Proteins contribute 6 - 8% of the blood plasma.
(ii) Plasma contains very high amount of minerals.
(iii) Plasma without the clotting factors is called serum.
(iv) Glucose, amino acids, lipids, etc., are also present in the plasma as they are always in transit in the body

- | | | | |
|------------------|------------------|------------------|------------------|
| a) | b) | c) | d) |
| (i)(ii)(iii)(iv) | (i)(ii)(iii)(iv) | (i)(ii)(iii)(iv) | (i)(ii)(iii)(iv) |
| F F T T | T F T T | T T F F | F F F T |

Solution : -

Plasma contains small amounts of minerals like Na^+ , Mg^{2+} , Ca^{2+} , HCO_3^- , Cl^- etc.,

25. Open circulatory system is present in_(i)_and_(ii)_Fill the correct option for (i) and (ii).

- | | | |
|----------------------------------|--------------------------------|-----------------------------|
| a) | b) | c) |
| (i)-platyhelminthes(ii)-molluscs | (i)-arthropods(ii)-echinoderms | (i)-annelids(ii)-arthropods |

- d)
- | |
|------------------------------------|
| (i)-arthropods(ii)-molluscs |
|------------------------------------|

Solution : -

Open circulatory system is present in arthropods and molluscs in which blood pumped by the heart passes through large vessels into open spaces or body cavities called sinuses.

26. Which one of the following mammalian cells is not capable of metabolising glucose to carbon-dioxide aerobically?

- a) unstrained muscle cells b) liver cells **c) red blood cells** d) white blood

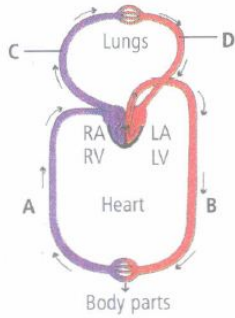
Solution : -

As RBCs do not have mitochondria so they can respire only anaerobically.

27. The life span of human granulocytic WBC is approximately

- a) between 2 to 3 months b) more than 4 months **c) less than 10 days** d) between 20 to 30 days.

28. What is the nature of blood passing through blood vessels A, B, C and D respectively?



a)

A	B	C	D
Deoxygenated	Oxygenated	Deoxygenated	Oxygenated

b)

A	B	C	D
Deoxygenated	Deoxygenated	Oxygenated	Oxygenated

c)

A	B	C	D
Oxygenated	Oxygenated	Deoxygenated	Deoxygenated

d)

A	B	C	D
Oxygenated	Deoxygenated	Oxygenated	Deoxygenated

Solution : -

'A' is vena cava that carries deoxygenated blood. 'B' is aorta that carries oxygenated blood. 'C' is pulmonary artery that carries deoxygenated blood.

'D' is pulmonary vein that carries oxygenated blood.

29. Which one of the following plasma proteins is involved in the coagulation of blood?

- a) Albumin b) Serum amylase c) Globulin **d) Fibrinogen**

Solution : -

Fibrinogens are needed for clotting or coagulation of blood.

30. The second heart sound (dubb) is associated with the closure of

- a) tricuspid valve** b) semilunar valves c) bicuspid valve d) tricuspid and bicuspid valves.

Solution : -

During beginning of ventricular diastole the ventricles relax and the semilunar valves are closed. This causes the second heart sound (dubb).

31. Examine the diagrammatic representation of standard ECG. Select an option with correct matching.



a)

P-wave	QRS complex	T-wave
Repolarisation of the atria	Repolarisation of the ventricles	Depolarisation of the atria

b)

P-wave	QRS-complex	T-wave
Depolarisation of the atria	Depolarization of ventricles	Repolarisation of the ventricles

c)

P-wave	QRS complex	T-wave
Repolarisation of the ventricles	Repolarisation of the atria	Depolarization of ventricles

d)

P-wave	QRS complex	T-wave
Depolarization of ventricles	Depolarisation of the atria	Repolarisation of the atria

32. Which statement is true for WBC?

- a) Non-nucleated b) Its deficiency causes cancer c) Manufactured only in thymus

d) Can squeeze through blood capillaries

Solution : -

WBCs can change their shape and are capable of amoeboid movement. This enables them to squeeze out of blood capillaries into the tissues. This process is known as diapedesis.

33. Which of the following statements is/are incorrect about lymph?

- (i) Lymph is colourful as it has haemoglobin but no RBC.
 (ii) It contains specialised lymphocytes which are responsible for immunity of the body.
 (iii) Lymph is an important carrier for nutrients and hormones.
 (iv) Fats are absorbed through lymph in the lacteals present in the intestinal villi.

a) (i) only b) (iii) and (iv) c) (ii) and (iii) d) (iv) only

Solution : -

Lymph is a colourless fluid containing lymphocytes which are involved in immune responses of the body.

34. The most active phagocytic white blood cells are:

- a) Neutrophils and monocytes** b) Neutrophils and eosinophils c) Lymphocytes and macrophages
 d) Eosinophils and lymphocytes

Solution : -

The nucleus of neutrophil is many lobed they are phagocytic. Monocytes are motile and phagocytic in nature

35. pH of blood

- a) is greater than 9 b) ranges between 7-8 **c) is less than 7** d) none of these

36. Erythropoiesis starts in ____

- a) Liver** b) Spleen c) Red bone marrow d) Kidney

Solution : -

Erythropoiesis starts in Liver. Erythropoiesis is the formation of Red Blood Cell. In different stages of life, the production of RBC takes place in different organs - In early stage of development it occurs in yolk sac, after some time (3-4 months) it occurs in liver and then later part of gestation and after birth it takes place in red bone marrow.

37. In the ABO system of blood groups. if both antigens are present but no antibody, the blood group of the individual would be _____.

- a) B b) O **c) AB** d) A

Solution : -

AB blood group is also known as the universal recipient.

38. Read the following statements and select the correct ones

- (i) Nodal tissue is specialised cardiac musculature in human heart which has the ability to generate action potential due to an external stimuli
 (ii) Position of SAN - right corner of right atrium

(iii) Position of AVN - right corner of ventricle

(iv) AV bundle continues from AVN

(v) Purkinje fibres are modified cardiac muscle fibres that originate from the atrioventricular node and spread into the two ventricles.

a) (i) and (ii) b) (i) and (iii) **c) (ii), (iv) and (v)** d) All of these

Solution : -

The nodal musculature has the ability to generate action potential without any external stimuli i.e., it is autoexcitable. AVN is located in the lower left corner of the right atrium close to the atrio-ventricular septum

39. What happens when the pacemaker becomes nonfunctional?

a) Only auricles contract rhythmically b) Only ventricles contract rhythmically

c) Cardiac muscles do not undergo co-ordinated rhythmic movements

d) Auricles and ventricles contract rhythmically

Solution : -

The SA node possesses a unique property of selfexcitation, which enables it to act as the pacemaker of heart. It spontaneously generates a wave of contraction which spreads over both the auricles more or less simultaneously along the muscle fibres that fan out from the pacemaker. The pacemaker establishes the basic rhythm at which the heart beats. Thus, if the pacemaker becomes nonfunctional, then the cardiac muscles do not undergo co-ordinated rhythmic movements.

40. Which of the following correctly explains a phase/event in cardiac cycle in a standard electrocardiogram?

a) QRS complex indicates atrial contraction. **b) QRS complex indicates ventricular contraction**

c) Time between S and T represents atrial systole d) P-wave indicates beginning of ventricular contraction.

41. A drop of each of the following, is placed separately on four slides. Which of them will not coagulate?

a) Blood serum b) Blood from pulmonary artery c) Whole blood from pulmonary vein d) Blood plasma

Solution : -

Blood serum is blood plasma from which the fibrinogens and clotting factors have been removed. So, blood serum will not clot.

42. People who have migrated from the plains to an area adjoining Rohtang Pass about six months back.

a) Have more RBCs and their haemoglobin has a lower binding affinity to oxygen

b) Are not physically fit to play games like football

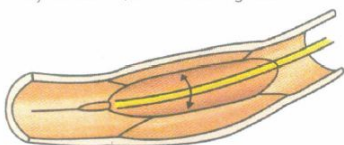
c) Suffer from altitude sickness with symptoms like nausea, fatigue etc.

d) Have the usual RBCcount but their haemoglobin has very high binding affinity to oxygen

Solution : -

When a person moves up a hill, the partial pressure of oxygen and total atmospheric pressure decreases which stimulates the JG cells of kidney to secrete erythropoietin hormone. The increasing in the number of RBCs to compensate the supply of oxygen. At higher altitude the haemoglobin has lower binding affinity to oxygen because the primary factor responsible for binding is partial pressure of oxygen which decreases with altitude

43. The given figure shows an angiogram of the coronary blood vessel. Which one of the following statements correctly describes, what is being done?



a) It is a coronary artery which has a cancerous growth that is being removed.

b) It is a coronary artery which is blocked by a plaque and the same is being cracked

- c) It is a coronary vein in which the defective valves are being opened.
 d) It is a coronary vein blocked by a parasite (blood fluke) that is being removed.

Solution : -

Angiogram is an X-ray diagnostic procedure used to visualise the blood vessels following injection of a contrast substance into an artery. Coronary angiography is used to detect obstruction in the coronary arteries, due to presence of atherosclerotic plaques which can lead to heart attack. To clear the passage, a very small balloon tipped catheter is inserted into the coronary artery under X-ray observation. Then the balloon is inflated with air to destroy the plaques, thereby clearing the lumen of the blood vessel for blood flow. This procedure is known as coronary artery angioplasty.

44. ABO blood groups in humans are controlled by the gene I. It has three alleles - I^A , I^B and I. Since there are three different alleles; six different genotypes are possible. How many phenotypes can occur _____ .
 a) 3 b) 1 **c) 4** d) 2

Solution : -

In ABO blood group system of human, four types of phenotypes can occur. These A, B, AB and O. ABO blood group is controlled by single gene 'I'. But 'I' gene has three alleles I^A , I^B and I^O . Blood group is decided on the basis of presence or absence of antigens and antibodies.

45. Reduction in pH of blood will _____ .
 a) reduce the rate of heart beat. b) reduce the blood supply to the brain.
c) decrease the affinity of hemoglobin with oxygen. d) release bicarbonate ions by the liver.

Solution : -

Reduction of pH of blood will decrease the affinity of hemoglobin with oxygen which in turn causes acidosis.

46. As per the guidelines of the Indian Red Cross Society, which of the following persons is recommended for blood donation?
 a) People not in good health, under the influence of alcohol or drugs
 b) Ladies during menstruation, pregnancy and breast feeding
 c) Healthy women but unwed and below the age of 35 **d) Persons who are immunised with live vaccines**

Solution : -

Indian Red Cross Society has recommended some guidelines for suitable persons for blood donation, a person who is immunised with live vaccines is one of them.

47. Detection of blood groups is done by agglutination test using antiserum. According to this method, if the blood shows coagulation with
 a) antiserum B, blood group is AB **b) antiserum B, blood group is B**
 c) antiserum A and B, blood group is O d) antiserum A, blood group is O.

48. Match column I with column II and select the correct option from the codes given below.

Column-I	Column-II
A Superior vena cava (i)	Carries deoxygenated blood to lungs
B Inferior vena cava (ii)	Carries oxygenated blood from lungs
C Pulmonary artery (iii)	Brings deoxygenated blood from lower part of body to right atrium
D Pulmonary vein (iv)	Bring deoxygenated blood from upper part of body to right atrium

- a) A - (ii), B - (iv), C - (iii), D - (i) b) A - (iv), B - (i), C - (ii), D - (iii) **c) A - (iv), B - (iii), C - (i), D - (ii)**
 d) A - (iv), B - (i), C - (iii), D - (ii)

49. Compared to blood our lymph has _____ .
 a) plasma without proteins **b) more WBCs and no RBCs** c) more RBCs and less WBCs d) no plasma

Solution : -

Compared to blood our lymph has more WBC and no RBCs. Lymph is blood minus RBCs. It is clear, colourless fluid similar to plasma but less protein. It is formed by the filtration of blood.

50. The antibodies are_____

- a) germs b) carbohydrates **c) proteins** d) lipids

Solution : -

Antibodies are glycoproteins and are secreted by mature vertebrate plasma cells which are modified form of B-cells. These selectively bind to epitopes of antigens and clumping them (agglutination) prior to phagocytic engulfment.

