

MT

2017 ____ 1100

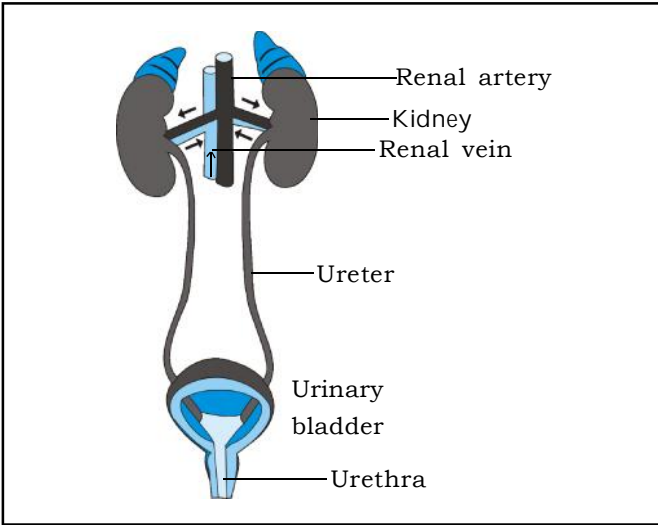
MT - SCIENCE & TECHNOLOGY - II (72) - SEMI PRELIM - II : PAPER - 5

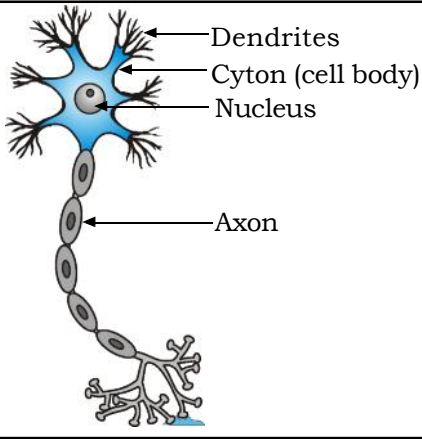
Time : 2 Hours

Model Answer Paper

Max. Marks : 40

A.1.	(A) Fill in the blanks:	
(1)	Each nephron has a cup shaped thin walled upper end called Bowman's capsule .	1
(2)	Cerebrospinal fluid keeps the CNS well nourished and also protects it by absorbing mechanical shocks.	1
(3)	The food is pushed forward in the canal due to rhythmic contraction and relaxation of the muscles of the canal called as peristaltic movement .	1
A.1.	(B) State whether the following statements are true or false and if false, write the correct statement:	
(1)	False - In human beings the blood goes to the heart in two cycles.	1
(2)	True	1
A.2.	Rewrite the following statements by selecting the correct alternative:	
(1)	Rekha was shown slides of leaves. She can distinguish monocot and dicot leaf on the basis of shape of stomata .	1
(2)	(c) I - iii - ii - iv	1
(3)	Cytokinins hormones promote cell division.	1
(4)	(c) by iodine test	1
(5)	Fermentation is a type of anaerobic respiration .	1
A.3.	Answer the following in short : (Any 5)	
(1)	A human adult at rest, on an average breathes about 12-20 times per minute i.e. 28800 times per day. The mechanism of breathing in human beings involves two processes : Inhalation and Exhalation. (i) Inhalation : When the muscular diaphragm of the body contracts, volume of the thoracic cavity increases and air pressure inside the cavity decreases. The air from outside enters the lungs through the nostrils and the alveolar sacs	2

	<p>are filled with air rich in oxygen.</p> <p>(ii) Exhalation : When the diaphragm relaxes or becomes convex, the thoracic cavity decreases in volume. Lungs come to their original size, forcing the air outside the lungs through the same path but in the opposite direction.</p>	
(2)	<p>(i) The undigested food and the residue of the digested food pass into the large intestine (about 1.5 m long).</p> <p>(ii) This part of the intestine does not have any digestive function as the digestion is already completed.</p> <p>(iii) The walls of the large intestine have villi which absorb most of the water and salts.</p> <p>(iv) The rest of the material is removed from the body through the anus. Here, the exit is regulated by the muscle called sphincter.</p>	2
(3)	<p>(i) An animal living in water uses oxygen dissolved in water.</p> <p>(ii) The solubility of oxygen in water is much lower. So the amount of oxygen available is much lesser than air, hence the rate of breathing is faster in aquatic animals.</p> <p>(iii) Fish take in water through the mouth and release it over the gills.</p> <p>(iv) Gills are the site for uptake of dissolved oxygen into the blood by diffusion.</p>	2
(4)	<p>Human excretory system :</p>  <p>The diagram illustrates the human excretory system. It shows two kidneys at the top, each connected to the central aorta by a renal artery (carrying blood to the kidney) and a renal vein (carrying blood away from the kidney). From each kidney, a ureter leads down to the urinary bladder. The urinary bladder is a sac-like structure that stores urine. At the bottom, the urethra leads out of the bladder to the exterior of the body.</p>	2
(5)	<p>(i) Insulin is a hormone which controls the sugar level of blood.</p> <p>(ii) It is very important that insulin should be secreted according to the amount of sugar in the blood.</p> <p>(iii) The required quantity of insulin released and the time of</p>	2

	<p>release are regulated by feedback mechanisms.</p> <p>(iv) When the sugar level of blood rises, it is detected by the cells of the pancreas which respond to the situation by producing more insulin so that the sugar level comes back to normal.</p> <p>(v) On the other hand, as the sugar level of the blood falls, the secretion of insulin is reduced.</p> <p>(vi) Therefore, insulin plays an important role in controlling the sugar level of blood.</p> <p>(6) Neuron :</p> <div data-bbox="300 689 979 1126" style="border: 1px solid black; padding: 10px; text-align: center;">  <p>The diagram illustrates a single neuron. At the top, several branching structures are labeled 'Dendrites'. These connect to a central, larger region labeled 'Cyton (cell body)'. Inside the cyton, a dark, circular structure is labeled 'Nucleus'. A long, thin projection extends from the cyton, labeled 'Axon'. The axon is covered by a series of overlapping, oval-shaped segments representing the myelin sheath. At the bottom of the axon, it branches out into smaller structures.</p> </div>	2
	<p>(7) (i) Today the world is talking about the development in industry, housing, medicines, infrastructure etc.</p> <p>(ii) To achieve this development, various resources are used.</p> <p>(iii) Sustainable use is the use of these resources to achieve growth and rise in the standard of living without harming the environment.</p>	2
<p>A.4. Answer the following in brief : (Any 5)</p>	<p>(1) (i) The root cells absorb water and minerals dissolved in it due to the difference in concentration of the salts inside and outside the root cell.</p> <p>(ii) The cells of the root absorb water and become turgid and thus exert pressure in the neighbouring cells. This is called root pressure.</p> <p>(iii) The root pressure pushes the water into the xylem thus creating a steady upward movement of water.</p> <p>(iv) However water cannot be transported only due to root pressure in tall trees.</p> <p>(v) Transpiration taking place through the aerial parts of plants, creates suction which pulls the water from xylem vessels in the leaf.</p> <p>(vi) Thus the pull due to transpiration helps in absorption and</p>	3

	<p>movement of water during the day, while effect of root pressure is important during the night.</p>	
(2)	<p>Lymph :</p> <p>(i) When blood flows in the capillaries, some amount of water, proteins and dissolved solutes are filtered out from the blood plasma into the tissue spaces. This forms the tissue fluid.</p> <p>(ii) This fluid is similar to blood plasma except that it has very less amount of proteins in it because the capillary wall is impermeable to plasma proteins.</p> <p>(iii) Some amount of this fluid enters small channels called lymph vessels and the fluid now is known as lymph.</p> <p>(iv) This light yellow fluid flows only in the direction that is from the tissues to the heart.</p>	3
(3)	<p>(i) Certain movements of plants do not result in their growth and are termed as growth independent movements.</p> <p>(ii) Hormones bring about various movements in plants in response to the changes occurring in their surroundings.</p> <p>(iii) These movements also happen at a place different from the place of touch. This means that the information that a touch has occurred, has been communicated. e.g. Closing of leaflets of Mimosa on touch.</p> <p>(iv) Plants use electrochemical means to transfer information from cell to another as there is no specialized tissue for the conduction of information.</p> <p>(v) Then the movement is brought about as the plant cells change their shapes by altering the amount of water in them. By this the cells either swell or shrink and thus change their shape.</p> <p>(vi) Some other movements seen in plants which are growth independent are - lotus opens in the morning and the tube rose opens at night, the tentacles on the leaves of the insectivorous plants like Drosera curl inwards at the touch of an insect and trap the insect, the explosive fruit of balsam plant bursts open at appropriate time thus scattering the seeds.</p> <p>(vii) Another example is - the Venus flytrap which looks and smells like a flower to insects. When they land on it they touch a trigger hair which slams the trap shut and they are digested by the plant.</p>	3
(4)	<p>Reflex action :</p> <p>(i) Any sudden change in response to some happening in the environment, is called as reflex action.</p> <p>(ii) We react to such a situation without thinking about it or without feeling in control of our reactions.</p>	3

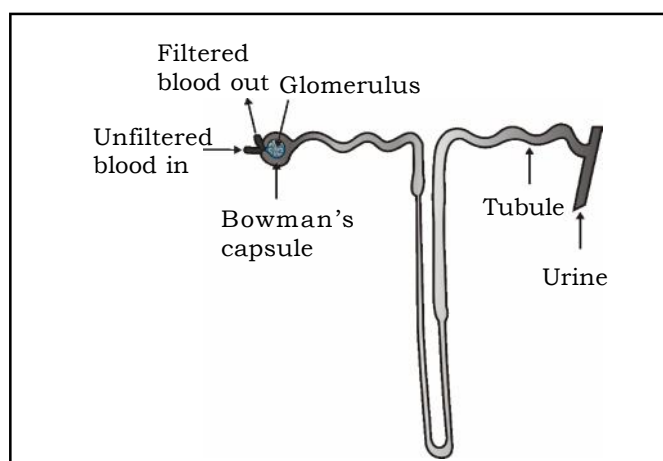
	<p>(iii) Example : When we touch a vessel containing very hot tea, immediately the hand is withdrawn.</p> <p>(iv) In this case, the nerves that detect pain are connected to the nerves that bring about the action of the muscle, hence the action is completed quickly.</p> <p>(v) Nerves from all over the body meeting in a bundle in such a connection is called as the spinal cord.</p> <p>(vi) Hence reflex arcs are formed in the spinal cord, although the messages reach the brain.</p>	
(5)	<p>(i) The World Business Council for Sustainable Development (WBCSD) is a global association of about 200 international companies.</p> <p>(ii) The term eco-efficiency was coined by WBCSD.</p> <p>(iii) It works on variety of issues related to sustainable development.</p> <p>(iv) The Council provides platform for companies to explore sustainable development, share knowledge, experiences and best practices and to advocate business positions on these issues in a variety of forums, working with governments, non-governmental organizations.</p> <p>(v) It focuses on areas such as energy and climate, development, ecosystems and role of business in society.</p> <p>(vi) It also looks after specific projects on cement, urban infrastructure initiative, corporate reporting, water, energy efficiency in buildings, forest solutions, and electricity utilities.</p>	3
(6)	<p>The Water Act defines water pollution and water quality control standards. It prescribes penalties to the offenders.</p> <p>Objectives of the Act:</p> <p>(i) To prevent and control water pollution.</p> <p>(ii) To maintain or restore the wholesomeness of water.</p> <p>(iii) To establish boards for the prevention and control of water pollution.</p>	3
(7)	<p>Blood pressure :</p> <p>(i) The force exerted by the blood on the wall of a blood vessel is called blood pressure.</p> <p>(ii) This pressure is greater in the arteries than the veins.</p> <p>(iii) The pressure in the artery during ventricular contraction is called the systolic pressure and the pressure in the artery during ventricular relaxation is called diastolic pressure.</p> <p>(iv) The normal systolic pressure is 120 mm of Hg and the diastolic pressure is 80 mm of Hg.</p> <p>(v) Blood pressure is measured by an instrument called as sphygmomanometer. High blood pressure is called as hypertension.</p>	3

A.5. Answer in detail: (Any 1)

- (1) (a) Anaerobic reaction **CO₂ + Ethanol + 2 ATP.**
 (b) Reaction in human muscles **Lactic acid.**
 (c) Aerobic respiration **CO₂ + H₂O.**
 (d) Reaction in plant cell **Starch.**
 (e) Reaction in Liver **Glycogen.**

1
1
1
1
1

(2)



5

- (i) The basic filtration unit in the kidney is a cluster of thin walled blood capillaries called as a Nephron. Each kidney has approximately a million nephrons. Each nephron has a cup shaped thin walled upper end called Bowman's capsule which contains a bundle of blood capillaries called glomerulus.
- (ii) Urea formed in the liver enters the blood. When blood containing urea enters the glomerulus, it gets filtered through glomerular capillaries.
- (iii) The selectively permeable wall of the Bowman's capsule allows the water molecules and small molecules of other substances to pass through them and forms glomerular filtrate.
- (iv) The glomerular filtrate collected in the Bowman's capsule further passes through the nephron tubule where reabsorption of water and useful molecules takes place.
- (v) The remaining fluid containing the waste, forms the urine which eventually enters a long tube called the ureter. It is further stored in the urinary bladder and from there it is thrown out through the urethra.
- (vi) As the bladder is muscular, it is under the control of nerves. As a result, we can usually control the urge to urinate.

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