

# MT

2017 \_\_\_ \_\_\_ 1100

MT - SCIENCE & TECHNOLOGY - II (72) - SEMI PRELIM - II : PAPER - 2

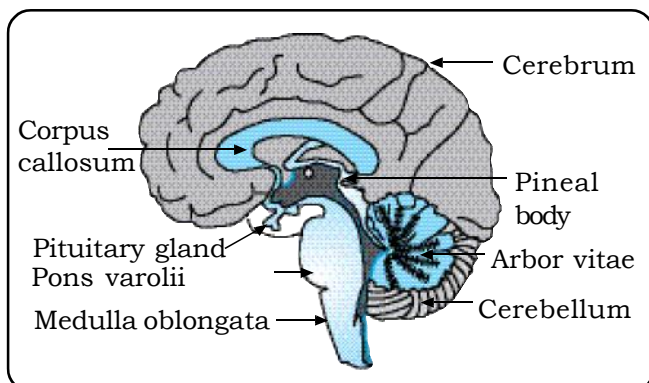
Time : 2 Hours

Model Answer Paper

Max. Marks : 40

<b>A.1.</b>	<b>(A) Fill in the blanks:</b>	
(1)	<b>Liver</b> is the largest gland in the body.	<b>1</b>
(2)	The loss of water from plants is known as <b>transpiration</b> .	<b>1</b>
(3)	Electricity generated by renewable sources of energy is called <b>Green Power</b> .	<b>1</b>
<b>A.1.</b>	<b>(B) State whether the following statements are true or false and if false, write the correct statement:</b>	
(1)	<b>False</b> - Calcium oxalate crystals present in the cells of some plants are called raphides.	<b>1</b>
(2)	<b>False</b> - Nerve impulses are rapid and of short duration and hormonal action is much slower and long lasting.	<b>1</b>
<b>A.2.</b>	<b>Rewrite the following statements by selecting the correct alternative:</b>	
(1)	(i) cytoplasm(ii) nucleus (iii) stoma (iv) chloroplast	<b>1</b>
(2)	In an experiment to test the presence of starch in a leaf, the leaf is boiled in alcohol for a few minutes using a water bath. This is an essential step in the experiment. Because alcohol <b>dissolves chlorophyll</b> .	<b>1</b>
(3)	The movement of the root system towards the stimulus of gravity is called <b>gravitropic</b> movement.	<b>1</b>
(4)	(c) by iodine test	<b>1</b>
(5)	The enzyme salivary amylase breaks down starch into the simple sugar <b>maltose</b> .	<b>1</b>
<b>A.3.</b>	<b>Answer the following in short : (Any 5)</b>	
(1)	When a plant shows movement towards a chemical it is called chemotropism. The growth of the pollen tube towards the ovule during the process of fertilization in a flower is an example of chemotropism.	<b>2</b>

(2) **Human brain :**



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(3) **Arteries and Veins :**

Arteries	Veins
(i) Arteries carry blood away from the heart to supply it to various parts of the body.	(i) Veins collect blood from different parts of the body and bring it back to the heart.
(ii) They carry oxygenated blood (except pulmonary artery).	(ii) They carry deoxygenated blood (except pulmonary vein).
(iii) Blood pressure in arteries is high.	(iii) Blood pressure in veins is low.
(iv) Walls of arteries are thick.	(iv) Walls of veins are thin.
(v) Arteries do not have valves.	(v) Veins have valves.

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- (4) (i) During vigorous exercise a lot of oxygen is used by our body to release energy from glucose.  
 (ii) This leads to lack of oxygen in our cells.  
 (iii) We take in oxygen when we breathe.  
 (iv) Hence to increase the amount of oxygen intake, there is an increase in breathing rate during exercise.

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- (5) (i) An animal living in water uses oxygen dissolved in water.  
 (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.  
 (iii) Fish take in water through the mouth and release it over the gills.  
 (iv) Gills are the site for uptake of dissolved oxygen into the blood by diffusion.

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(6)	<p><b>Autotrophic nutrition :</b></p> <p>(i) Autotrophic nutrition is the mode of nutrition in which organisms synthesize their own organic food.</p> <p>(ii) They use simple inorganic substances present in the surroundings for this process.</p> <p>(iii) Such organisms are called autotrophs. Most of the plants are autotrophs.</p>	2
(7)	<p>The fundamental duties of citizen are given in the Article 51A(g) and 51A(f) of the Constitution:</p> <p>(i) Article 51A(g) states that, "It should be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wild life and to having compassion for living creatures".</p> <p>(ii) Similarly, the Article 51A(f) states that, "it should be the duty or every citizen to value and preserve the rich heritage of our composite culture."</p>	2
<b>A.4.</b>	<b>Answer the following in brief : (Any 5)</b>	
(1)	<p>Powers of the MPCB :</p> <p>(i) Implementation of environmental laws and pollution control.</p> <p>(ii) Laying down standards and securing their compliance.</p> <p>(iii) Inspection and monitoring of all sources of pollution.</p> <p>(iv) Issuance of notices with time limit to comply with the legal requirements.</p> <p>(v) Closure of the defaulter unit in grave cases.</p> <p>(vi) Prosecution in cases of serious violation.</p>	3
(2)	<p>The human nervous system can be divided into :</p> <p>(i) <b>The Central Nervous System (CNS)</b> : It comprises of the brain and spinal cord and regulates all activities of the body.</p> <p>(ii) <b>The Peripheral Nervous System (PNS)</b> : It includes all the nerves. The nerves form a network and spread throughout the body. They are instrumental in connecting all parts of the body to the central nervous system.</p> <p>(iii) <b>The Autonomic Nervous Sytem (ANS)</b> : It comprises of all the nerves present in the involuntary organs like heart, stomach, lungs etc.</p> <p>(iv) On the basis of their function, the nerves are categorized as afferent and efferent nerves.</p> <p>(v) The nerves are composed of neurons and neuroglia. The neurons are specialized cells capable of creating and transmitting electrochemical impulses. The neuroglia are supportive cells which assist the neurons in their function.</p>	3

<p>(3)</p> <p>(4)</p> <p>(5)</p>	<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> <p>The functions of the forebrain are -</p> <p>(i) It is the main thinking part of the brain.</p> <p>(ii) It has sensory areas where information is received from sense organs.</p> <p>(iii) It has motor areas from where impulses are sent to muscles or effector organs. It controls voluntary actions.</p> <p>(iv) It has centres for visual reception, auditory reception, touch, smell, temperature etc.</p> <p>(v) It has centres known as association areas which put together the information received from other receptors as well as information that is already stored in the brain.</p> <p>(vi) It is also the site for intelligence.</p> <p>(i) The food is pushed into the stomach by peristaltic movement of the food pipe.</p> <p>(ii) As the food enters the stomach, the gastric glands present in the stomach secrete hydrochloric acid, enzyme pepsin and mucus.</p> <p>(iii) The hydrochloric acid creates the acidic pH necessary for action of pepsin.</p>	<p>3</p> <p>3</p> <p>3</p>
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	<ul style="list-style-type: none"> <li>(iv) Pepsin breaks down proteins.</li> <li>(v) Mucus secreted protects the inner lining of the stomach from the action of acids.</li> <li>(vi) The muscular walls of the stomach churn the food and help in mixing of gastric juices.</li> <li>(vii) The muscular sphincter present at the exit of the stomach releases small amounts of partly digested food into the small intestine.</li> </ul>	
(6)	<ul style="list-style-type: none"> <li>(i) Food manufactured in the cells of the leaves during photosynthesis is transported to each cell of the plant.</li> <li>(ii) Besides this, excess food is taken to the storage organs like roots, fruits and seeds.</li> <li>(iii) This process is called translocation and it takes place through the phloem in upward and downward directions.</li> <li>(iv) Translocation process requires energy and this energy is obtained from ATP.</li> <li>(v) When food material like sucrose is transferred to phloem tissue using ATP, the concentration of water molecules decreases in that area. This results in movement of water into cell due to osmosis.</li> <li>(vi) The contents within the cell thus, exert high amount of pressure on the cell wall; because of which the food materials move to the adjacent cells with low pressure.</li> <li>(vii) According to the plant's needs, the food material is moved in the phloem to the various parts of the plants like buds, roots, stem, etc.</li> </ul>	<b>3</b>
(7)	<ul style="list-style-type: none"> <li>(i) The main function of the heart is to pump blood to various parts of the body.</li> <li>(ii) It also prevents mixing of deoxygenated and oxygenated blood and pumps blood from various parts of the body to the lungs for oxygenation.</li> <li>(iii) When the muscles of the atria relax, the right atrium receives deoxygenated blood from the different parts of the body via large veins called vena cava.</li> <li>(iv) The left atrium too receives oxygen-rich blood from the lungs simultaneously through the four pulmonary veins.</li> <li>(v) The atria contract and pour the blood into respective ventricles.</li> <li>(vi) The left ventricle gets filled with oxygenated blood while the right gets filled with deoxygenated blood.</li> <li>(vii) Both the ventricles contract resulting in pumping out the blood from the heart.</li> <li>(viii) The blood from right ventricle enters the lungs through pulmonary artery and blood from left ventricle enters aorta</li> </ul>	<b>3</b>

<p>(ix) The valves present between the atria and ventricles ensure that the blood does not flow backward.</p> <p>(x) Thus deoxygenated blood enters the right part of the heart and after oxygenation it enters again into the left part of the heart.</p> <p>(xi) The blood therefore goes through the heart twice during each cycle.</p> <p>(xii) This is known as double circulation.</p> <p><b>A.5. Answer in detail: (Any 1)</b></p> <p>(1)</p>	<p>which carries it to all the parts of the body.</p> <p>(ix) The valves present between the atria and ventricles ensure that the blood does not flow backward.</p> <p>(x) Thus deoxygenated blood enters the right part of the heart and after oxygenation it enters again into the left part of the heart.</p> <p>(xi) The blood therefore goes through the heart twice during each cycle.</p> <p>(xii) This is known as double circulation.</p> <p>(i) Cellular respiration is a biochemical process in which the simple nutrients like glucose are oxidized within the cells to release energy.</p> <p>(ii) This process takes place in the mitochondria of the cells and involves a series of biochemical reactions.</p> <p>(iii) The process of cellular respiration varies greatly in different organisms yet the first step is common in all. The six carbon molecule glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>) is broken down in the cytoplasm into a three carbon molecule called pyruvate. This process is anaerobic and is called glycolysis.</p> <p>(iv) The energy released during cellular respiration is used to synthesize ATP which is used to fuel all other activities in the cell.</p> <p>(v) The energy released during aerobic respiration is more than the energy released during anaerobic respiration.</p>	<p>5</p>
	<div style="text-align: center;"> <p>In absence of oxygen (fermentation) e.g. in yeast</p> <pre> graph LR     Glucose["Glucose (6 carbon compound)"] -- "Glycolysis in the cytoplasm (no oxygen is required)" --&gt; Pyruvate["Pyruvate (a three carbon compound)"]     Pyruvate -- "In absence of oxygen (fermentation) e.g. in yeast" --&gt; Ethanol["Ethanol + carbon dioxide + energy (2ATP) (2-Carbon compound)"]     Pyruvate -- "In lack of oxygen e.g. in human muscle cells" --&gt; Lactic["Lactic acid + energy (2ATP) (3-Carbon compound)"]     Pyruvate -- "In presence of oxygen e.g. in mitochondria" --&gt; CO2["Carbon dioxide + water + energy (38ATP) (1-Carbon compound)"]             </pre> <p>(Break down of glucose by various pathways)</p> </div>	
<p>(2)</p>	<p>(i) The human heart is a muscular organ which pumps blood.</p> <p>(ii) The heart is covered by the pericardial membrane.</p> <p>(iii) It is of the size of a human fist and weighs about 360 gm.</p> <p>(iv) As oxygen and carbon dioxide both have to be transported by the blood, the heart has different chambers, the left and the right, to prevent oxygen rich blood from mixing with the blood</p>	<p>5</p>

- containing carbon dioxide.
- (v) The left half carries oxygenated blood whereas the right half carries deoxygenated blood. Such separation allows a highly efficient supply of oxygen to the body.
  - (vi) This is very essential in animals that have high energy needs, such as birds and mammals, which constantly use energy to maintain their body temperature.
  - (vii) Each half is further divided into two chambers. The upper one is called atrium and the lower one is termed as the ventricle. Therefore the human heart has four chambers.
  - (viii) There are valves between the atria and ventricles which ensure that the blood does not flow backwards.

