

# MT

2018 \_\_\_\_ 1100

MT - SCIENCE & TECHNOLOGY - II (72) - SEMI PRELIM - I : PAPER - 6

Time : 2 Hours

(Model Answer Paper)

Max. Marks : 40

<b>A.1.</b>	<b>(A) Fill in the blanks:</b>											
(1)	<b>Asexual</b> type of reproduction occurs without fusion of gametes.	1										
(2)	An enzyme <b>RUBISCO</b> present in the plant chloroplasts is most abundant protein found in nature.	1										
<b>A.1.</b>	<b>(B) Match the columns:</b>	2										
	<table border="1"><thead><tr><th>Column 'A'</th><th>Column 'B'</th></tr></thead><tbody><tr><td>(1) Amoeba</td><td>(c) Binary fission</td></tr><tr><td>(2) Yeast</td><td>(d) Budding</td></tr><tr><td>(3) Bryophyllum</td><td>(b) Vegetative propagation</td></tr><tr><td>(4) Mucor</td><td>(e) Spore formation</td></tr></tbody></table>	Column 'A'	Column 'B'	(1) Amoeba	(c) Binary fission	(2) Yeast	(d) Budding	(3) Bryophyllum	(b) Vegetative propagation	(4) Mucor	(e) Spore formation	
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<b>A.1.</b>	<b>(C) Complete the analogy:</b> Earthworm : Annelida : Millipede : <b>Arthropoda</b>	1										
<b>A.1.</b>	<b>(D) Choose the correct alternative and rewrite the statement :</b>											
(1)	<b>Duodenum</b> is not a vestigial organ in man.	1										
(2)	<b>Evolution</b> is a gradual change occurring in living organisms over a long duration.	1										
(3)	Water content of Blood Plasma is <b>90%</b> .	1										
(4)	Number of chromosomes in diploid cell <b>2n</b> .	1										
(5)	Radial symmetry is observed in <b>Starfish</b> .	1										
<b>A.2.</b>	<b>Answer the following questions : (Any Five)</b>											
(1)		2										
	<table border="1"><thead><tr><th>Glycolysis</th><th>TCA cycle</th></tr></thead><tbody><tr><td>(i) Glycolysis occurs in the cytoplasm</td><td>(i) TCA cycle occurs in the mitochondria</td></tr><tr><td>(ii) Two molecules each of pyruvic acid, ATP, NADH<sub>2</sub> and water are formed.</td><td>(ii) Molecules of CO<sub>2</sub>, H<sub>2</sub>O, NADH<sub>2</sub> and FADH<sub>2</sub> are formed.</td></tr><tr><td>(iii) It is also called as EMP pathway.</td><td>(iii) It is also called as Kreb's cycle.</td></tr></tbody></table>	Glycolysis	TCA cycle	(i) Glycolysis occurs in the cytoplasm	(i) TCA cycle occurs in the mitochondria	(ii) Two molecules each of pyruvic acid, ATP, NADH <sub>2</sub> and water are formed.	(ii) Molecules of CO <sub>2</sub> , H <sub>2</sub> O, NADH <sub>2</sub> and FADH <sub>2</sub> are formed.	(iii) It is also called as EMP pathway.	(iii) It is also called as Kreb's cycle.			
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(2)	<p><b>Proteins :</b></p> <ul style="list-style-type: none"> <li>(i) Proteins are the macromolecules formed by bonding together many amino acids.</li> <li>(ii) Proteins of animal origin are called as first class proteins.</li> <li>(iii) We get 4 kcal of energy per gram of proteins.</li> <li>(iv) Amino acids are obtained after digestion of proteins.</li> <li>(v) These amino acids are absorbed in the body and transported upto each organ and cell via blood.</li> <li>(vi) From these amino acids, organs and cells produce various proteins necessary for themselves and the whole body. Eg. Melanin, Keratin, Ossein, hemoglobin, etc.</li> </ul>	<b>2</b>
(3)	<ul style="list-style-type: none"> <li>(i) Two parents i.e. male and female are involved in sexual type of reproduction.</li> <li>(ii) In sexual reproduction fusion of male gamete and female gamete occurs.</li> <li>(iii) Due to this, new individuals always has the recombined genes of both the parents.</li> <li>(iv) Hence the new individual show similarities with the parents for some characters and also has characters different from both parents.</li> </ul>	<b>2</b>
(4)	<p><b>Biodiversity:</b></p> <ul style="list-style-type: none"> <li>(i) Biodiversity is the richness of living organisms in nature due to presence of varieties of organisms, ecosystems and genetic variations within a species. Biodiversity occurs at three different levels. <ul style="list-style-type: none"> <li>(a) Genetic Diversity : Occurrence of diversity among the organisms of same species is genetic diversity. For example, each human being is different from the other.</li> <li>(b) Species Diversity : Innumerable species of organisms occur in nature. This is called as species diversity. Species diversity includes various types of plants, animals and microbes.</li> <li>(c) Ecosystem Diversity : Many ecosystems are present in each region. Ecosystem is formed through the interaction between plants, animals, their habitat and changes in the environment. Each ecosystem has its own characteristic animals, plants, microbes and abiotic factors. Ecosystems are also of two types, natural and artificial.</li> </ul> </li> </ul>	<b>2</b>
(5)	<ul style="list-style-type: none"> <li>(i) The animals which not only live in water but also on land and respire in both climatic conditions are called Amphibians.</li> <li>(ii) Tortoise respire through lungs but does not have a structure to respire in water.</li> </ul>	<b>2</b>

- (iii) It is adapted for locomotion in water.  
 (iv) Also, tortoise lays eggs with hard shells which is a characteristics of reptiles.  
 (v) Tortoise has a neck, whereas neck is absent in amphibian. Therefore, tortoise is not an amphibian.

(6)

Sr. No.	Body cavity	Germ layers	Phylum
(1)	<b>Absent</b>	Diploblastic	<b>Porifera</b>
(2)	<b>Absent</b>	<b>Triploblastic</b>	Platyhelminthes
(3)	<b>Pseudocoelom</b>	Triploblastic	<b>Aschelminthes</b>
(4)	<b>Present</b>	Triploblastic	<b>Arthropoda</b>

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**A.3. Answer the following questions : (Any Five)**

(1)

**Phylum - Porifera :**

- (i) These animals are with simplest body plan and are called as 'Sponges'. They bear numerous pores on their body. Those pores are called as 'Ostia' and 'Oscula'.  
 (ii) These are aquatic animals and most of them are marine, few are fresh water dwellers.  
 (iii) Most of the animals have asymmetrical body.  
 (iv) They have special type of cells called collar cells'.  
 (v) They are non-motile, attached to a solid support. Hence, referred to as sedentary animals.  
 (vi) Their spongy body is supported by spicules or spongin fibres. Spicules are made up of calcium carbonate or silica.  
 (vii) These organisms feed upon small organisms taken in their body along with water. Water is taken in through ostia and given out through oscula.  
 (viii) These animals reproduce asexually by budding or by sexual method. They also have a good ability of regeneration.  
 e.g. Sycon, Euspongia, (Bath sponge), Hyalonema, Euplectella etc.

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(2)

**Dawin's theory of natural selection :**

- (i) Charles Darwin, an English biologist published the theory of natural selection, which preaches the survival of the fittest.  
 (ii) According to him, all organisms reproduce prolifically.  
 (iii) These organisms compete with each other and only those organisms who show modification, sustain long.  
 (iv) Natural selection also plays important role because nature selects only those organisms which are fit to live and the rest perish.

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	<p>(v) These sustained and selected organisms reproduce and give rise to new species with own specific characteristics.</p> <p>(vi) This theory was widely accepted for long duration, however it had some objections to it.</p> <p>(vii) Irrespective of all these objections, Darwin's work on evolution has been a milestone.</p>	
(3)	<p>(i) Remnants and impressions of organisms which get buried remain preserved underground. These are called as fossils. Study of fossils is an important aspect of study of evolution.</p> <p>(ii) Carbon consumption of animals and plants stops after death and since then, only the decaying process of C-14 occurs continuously.</p> <p>(iii) In case of dead bodies of plants and animals, instead of remaining constant, the ratio between C-14 and C-12 changes continuously as C-12 is non-radioactive.</p> <p>(iv) The time passed since the death of a plant or animal can be calculated by measuring the radioactivity of C-14 and the ratio of C-14 to C-12 present in their body.</p> <p>(v) This is carbon dating method. It is used in determining the age of human fossils and manuscripts.</p> <p>(vi) Once the age of fossil has been determined, it becomes easy to deduce information about other erstwhile organisms. It seem that vertebrates have been slowly originated from invertebrates.</p>	3
(4)	<p>(i) Various organ systems are continuously performing their functions in human body.</p> <p>(ii) Along with the various systems like digestive, respiratory, circulatory, excretory and control system, different external and internal organs are performing their functions independently but through complete co-ordination.</p> <p>(iii) This overall system is in need of continuous source of energy.</p> <p>(iv) Besides, it is co-ordinated by the control system of the body i.e. each life process contributes in its own way in the process of energy production.</p> <p>(v) Thus, all life processes contribute to the growth and development of the body.</p>	3
(5)	<p><b>Environmental Conservation:</b></p> <p>(i) All the developed, developing and underdeveloped countries have accepted the responsibility of environment protection.</p> <p>(ii) It will be possible to answer the environmental problems only if environmental protection-conservation becomes an effective public movement.</p> <p>(iii) For this purpose, values like positive attitude and affection towards</p>	3

	<p>environment, knowledge about it etc. should be inculcated among the children since their childhood.</p> <p>(iv) Human established dominance over the nature. In an attempt to live satisfactory life, human kept on snatching from the nature as much as possible and this leads to increase in problems.</p> <p>(v) Environmental conservation is our social responsibility.</p> <p>(vi) Various laws are enacted about environmental conservation. Human has a crucial role in environmental conservation.</p> <p>(vii) These laws are to be implemented strictly and whoever is a culprit, should be severely punished.</p> <p>(viii) There should be positive attitude of human being towards the environment for welfare of the entire living world.</p> <p>(ix) A person can be a conservator, organizer, guide, or plant-friend etc.</p> <p>(6) <b>Sperm Bank/ Semen Bank :</b></p> <p>(i) There are various problems in sperm production in case of many men like absence of sperms, slow movement of sperms etc.</p> <p>(ii) So as to have children in case of such couples, new concept of sperm bank has been introduced. This concept is similar to blood bank.</p> <p>(iii) Semen ejaculated by the desired men is collected after their thorough physical and medical check-up and stored in the sperm bank.</p> <p>(iv) As per the wish of the needful couple, oocyte of woman of the concerned couple is fertilized by IVF technique using the semen from the sperm bank.</p> <p>(v) Resultant embryo is implanted in the uterus of the same woman.</p> <p>(vi) Name of the semen donor is strictly kept secret as per the law.</p> <p><b>A.4. Answer the following questions : (Any One)</b></p> <p>(1) (i) Grades of organization is the structural organization of animals whereas symmetry is whether the animals body can be divided into equal halves when cut through an imaginary axis.</p> <p>(ii) In the grades of organization, unicellular organisms have 'Protoplasmic grade organization'.</p> <p>(iii) In multicellular organisms, there are different grades of organization, namely 'Cellular grade', 'Cell-tissue grade'. In some animals, there is 'Tissue-organ grade organization', while higher animals have organ system grade organization'.</p> <p>(iv) 'Protoplasmic grade organization' - Amoeba  Cellular grade organization - Porifera  Cell-tissue grade organization - Cnidarians.  Tissue - organ grade organization - Platyhelminthes.</p>	<p>3</p> <p>5</p>
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	<p>Organ - system grade organization - All higher animals.</p> <p>(v) Depending upon symmetry, animals are Asymmetrical, Radially symmetrical and Bilaterally symmetrical animals.</p> <p>(vi) Asymmetrical - Amoeba          Radially symmetrical - Starfish          Bilateral symmetrical - Cockroach, man.</p> <p>(vii) Grades of organization is concerned with the structure of animals and this has no relation with symmetry.</p> <p>(2) (i) Information about protein synthesis is stored in the DNA and synthesis of appropriate proteins as per requirement is necessary for the body.</p> <p>(ii) These proteins are synthesized by DNA through the RNA. This is called as Central Dogma.</p> <p>(iii) mRNA is produced as per the sequence of nucleotides on DNA. Only one of the two strands of DNA are used in this process.</p> <p>(iv) The sequence of nucleotides in mRNA being produced is always complementary to the DNA strand used for synthesis. This process of RNA synthesis is called transcription.</p> <p>(v) The mRNA formed in the nucleus comes in cytoplasm. It brings in the coded message from DNA.</p> <p>(vi) The message contains the codes for amino acids. The code for each amino acid consist of three nucleotides. It is called as triplet codons.</p> <p>(vii) mRNA is made up of thousands of triplet codons.</p> <p>(viii) As per the message on mRNA, amino acids are supplied by the tRNA.</p> <p>(ix) For this purpose, tRNA has 'anticodon' having complementary sequence to the codon on mRNA. This is called as 'translation'.</p> <p>(x) The amino acids brought in by tRNA are bonded together by peptide bonds with the help of rRNA.</p> <p>(xi) During this process, the ribosome keeps on moving from one end of the mRNA to the other end by the distance of one triplet codon. This is called as 'translocation'.</p> <p>(xii) Many such chains come together to form complex proteins.</p>	<b>5</b>
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