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Code Number 44/2



INDIAN SCHOOL MUSCAT
SECOND TERM EXAMINATION
SUBJECT : BIOLOGY

CLASS: XI

Sub.Code: 044

Time Allotted: 3 Hrs.

29.12.2017

Max.Marks: 70

General Instructions:

SECTION A

- 1 Brain is the controlling centre of the body. Different parts of the brain carry out different functions. 1
Give the technical term of the canal that passes through the midbrain.
Cerebral aqueduct
- 2 Roots obtain oxygen from air in the soil for respiration. In the absence or deficiency of oxygen, root 1
growth is restricted or completely stopped. How do plants growing in marshlands or swamps obtain
their oxygen required for root respiration?
Pneumatophores project above the level of soil and exchange gases
- 3 Amino acids can be classified based on their variable group, nature etc. Give two examples of 1
aromatic amino acids.
tyrosine, phenylalanine, tryptophan
- 4 Calcium is an important ion needed for muscular contractions. Name the store house of calcium ions 1
in skeletal muscles.
Sarcoplasmic reticulum
- 5 Alexander Fleming discovered antibiotics which are chemicals that can prevent bacterial growth. 1
Identify the structure in a bacterial cell that helps bacteria to possess antibiotic resistance.
plasmids

SECTION B

- 6 You have heard about several insectivorous plants that feed on insects. Nepenthes or pitcher plant is 1+1
one usually grows on shallow water or in marshlands. What part of the plant is modified into a
'pitcher'. How does this modification help the plant for nutrition even though it can photosynthesize
like any other green plant?
leaves, nitrogen is obtained from the insects.
- 7 Differentiate between glycosuria and ketonuria. 1+1
glycosuria – presence of glucose in the urine
Ketonuria – presence of ketone bodies in urine.

OR

What is JGA? Write its significance in kidney function.

Juxta Glomerular Apparatus formed by afferent arteriole and distal convoluted tubule.

A fall in GFR activate the JG cells to release renin which can stimulate the glomerular blood flow and thereby GFR back to normal.

8 Name the following related to a cell: ½ x

- a) Non membraneous organelle only found in animal cell - centriole 4
- b) Substance that makes up middle lamella - Pectin
- c) Starch storing plastid - Amyloplast
- d) Outermost layer of bacterial envelope - Glycocalyx

9 What are the characteristic differences found in the vascular tissue of gymnosperms and angiosperms. 1+1

Gymnosperm	Angiosperm
xylem vessels absent	xylem vessels present
sieve cells and albuminous cells present	sieve tubes and companion cells present

10 Define stroke volume. What is its volume? 1+1

The blood pumped by each ventricle during the cardiac cycle. It is approximately 70ml.

SECTION C

11 a) Tendrils of grapevines are homologous to the tendrils of pumpkins but are analogous to that of pea. Justify the above statement. 1+1

tendrils of grapevines and pumpkins are stem modification, in pea tendril is stem modification.

- b) What do you mean by radial arrangement of vascular bundle.
Xylem bundle alternates with the phloem bundle, arranged in alternate radii.

12 a) What are phospholipids? Give one example. 1+1

lipids having phosphorus or phosphorylated organic compound in them.

Lecithin

+
1/2
+ ½

- b) Write two secondary metabolites of plants.
tannin, resin, rubber (any two correct options).

13 Give examples of the following

- a) Quarternary structure of protein. - Haemoglobin
- b) Homopolysaccharide – starch/cellulose/ glycogen/ inulin (any one)
- c) Polysaccharide that forms the exoskeleton of arthropod - chitin

14 Distinguish between 3x1

- a) Exarch and Endarch condition of xylem

exarch	endarch
protoxylem towards outside	protoxylem towards inside
found in roots	stem

- b) Interfascicular cambium and intrafascicular cambium

interfascicular cambium	intrafascicular cambium
cambium formed between two vascular bundles	cambium formed between xylem and phloem of a single vascular bundle

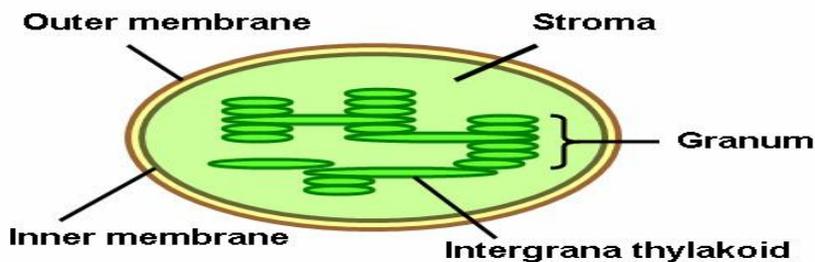
c) Open and closed vascular bundles

open	closed
cambium present between xylem and phloem	cambium absent between xylem and phloem
found in dicots	monocots

- 15 Complete the following statements: 4x1
- a) In Cockroach grinding of food particles is formed by _____gizzard_____. /2
- b) Malpighian tubules help in removal of _____nitrogenous wastes_____.
- c) Hindgut of cockroach is differentiated into __ileum, colon and rectum_____.

- 16 Explain how thoracic chamber is a closed chamber. Why is such a set up necessary? 1x3
- The thoracic chamber is formed dorsally by the vertebral column, ventrally by the sternum, laterally by the ribs and on the lower side by the dome-shaped diaphragm. The anatomical setup of lungs in thorax is such that any change in the volume of the thoracic cavity will be reflected in the lung (pulmonary) cavity. Such an arrangement is essential for breathing, as we cannot directly alter the pulmonary volume.

- 17 Describe the structure of chloroplast with the help of a labeled diagram. 3
- The chloroplasts are double membrane bound. Of the two, the inner chloroplast membrane is relatively less permeable. The space limited by the inner membrane of the chloroplast is called the stroma. A number of organised flattened membranous sacs called the thylakoids, are present in the stroma . Thylakoids are arranged in stacks like the piles of coins called grana (singular: granum) or the intergranal thylakoids. In addition, there are flat membranous tubules called the stroma lamellae connecting the thylakoids of the different grana. The membrane of the thylakoids enclose a space called a lumen.



OR

What is activation energy? What effect does an enzyme have on activation energy?

The difference in average energy content of 'S' from that of this transition state is called 'activation energy'. (1)

Enzymes eventually bring down this energy barrier (1)making the transition of 'S' to 'P' more easy (1).

- 18 Who discovered the ribosomes? Differentiate between the ribosomes of eukaryotes and prokaryotes. What is the basis of this difference?

George Palade

The eukaryotic ribosomes are 80S while the prokaryotic ribosomes are 70S. Here 'S' stands for the sedimentation coefficient; it indirectly is a measure of density and size.

- 19 Briefly describe starch digestion in human body till it forms monosaccharides. 3
- Starch \longrightarrow Maltose (in the mouth with the help of salivary amylase. (1)
- Polysaccharides (starch) \longrightarrow Disaccharides (by pancreatic amylase) (1)
- Maltose \longrightarrow Glucose + Glucose (Maltase)
- Lactose \longrightarrow Glucose+Galactose (Lactase)
- Sucrose \longrightarrow Glucose + Fructose (sucrase) all three correct -1

- 20 List various functions of epithelial tissue.
lining for body cavities, ducts, and tubes

protective function

forming a diffusion boundary

secretion and absorption

move particles or mucus in a specific direction over the epithelium

- 21 What are cell junctions? Name the different types of cell junctions.

In animal tissues, specialised junctions provide both structural and functional links between its individual cells. Three types of cell junctions are found in the epithelium and other tissues. These are called as tight, adhering and gap junctions. Tight junctions help to stop substances from leaking across a tissue. Adhering junctions perform cementing to keep neighbouring cells together. Gap junctions facilitate the cells to communicate with each other by connecting the cytoplasm of adjoining cells, for rapid transfer of ions, small molecules and sometimes big molecules.

- 22 Draw a standard ECG and explain the different segments in it. 3

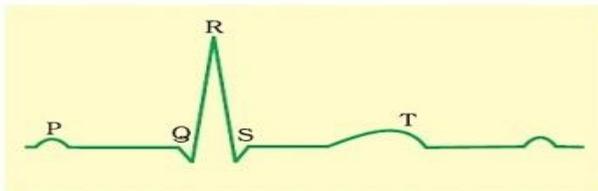


Figure 3. Diagrammatic presentation of a standard ECG

(1)

The P-wave represents the electrical excitation (or depolarisation) of the atria, which leads to the contraction of both the atria.(1/2)

The QRS complex represents the depolarisation of the ventricles, which initiates the ventricular contraction.(1)

The T-wave represents the return of the ventricles from excited to normal state (repolarisation). The end of the T-wave marks the end of systole.(1/2)

SECTION D

- 23 Sanjay was reading that the pairing of homologous chromosomes at zygotene of meiosisI is called 'Synapse'. His mother being a biology teacher corrected him and explained the terminologies related to Prophase I of cell division. 4x1

- a) What was the correction done by Sanjay's mother?
Synapsis instead of synapse.
- b) At what stage crossing over takes place?
Pachytene
- c) What happens during diplotene stage?
The beginning of diplotene is recognised by the dissolution of the synaptonemal complex and the tendency of the recombined homologous chromosomes of the bivalents to separate from each other except at the sites of crossovers. These X-shaped structures, are called **chiasmata**.
- d) What value is shown by Sanjay's mother?
scientific temperament, knowledge, care for her son, attitude towards learning any one

SECTION E

24

- a) List main differences between mitosis and meiosis.
- b) Write the significance of mitosis.
- c) What is interkinesis?

2+2
+1

Mitosis	Meiosis
Dividing cells can be diploid or haploid	Dividing cells are diploid
Occurs in somatic cell in all parts of the body	Only in sexual reproduction cell, gamete cell
DNA replicates once during the S phase of interphase, and nucleus divides once.	DNA replicates once during S phase of interphase but there are two successive nuclear division.
Chromosomes do not associate during prophase.	Homologous chromosomes associated to form bivalen during prophase I.
Chiasma are never formed and crossing over never occurs.	Chiasma form and crossing over occurs during prophase I.

Significance of Mitosis

- Mitosis results in the production of diploid daughter cells with identical genetic complement usually.
- The growth of multicellular organisms is due to mitosis.
- A very significant contribution of mitosis is cell repair.
- The cells of the upper layer of the epidermis, cells of the lining of the gut, and blood cells are being constantly replaced.
- Mitotic divisions in the meristematic tissues – the apical and the lateral cambium, result in a continuous growth of plants throughout their life.

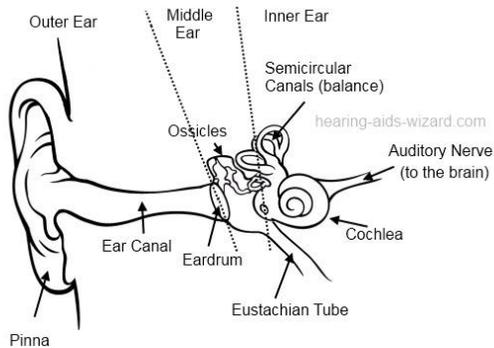
short gap between meiosis I and II.

OR

Enlist the 4 steps involved in the catalytic action of an enzyme. Give examples of a metal ion co factor.

- First, the substrate binds to the active site of the enzyme, fitting into the active site. 1x5
2. The binding of the substrate induces the enzyme to alter its shape, fitting more tightly around the substrate.
 3. The active site of the enzyme, now in close proximity of the substrate breaks the chemical bonds of the substrate and the new enzyme- product complex is formed.
 4. The enzyme releases the products of the reaction and the free enzyme is ready to bind to another molecule of the substrate and run through the catalytic cycle once again.
 - zinc is a cofactor for the proteolytic enzyme carboxypeptidase. Catalytic activity is lost when the co-factor is removed

25 Draw a neat labeled diagram of human ear and label 10 parts in it. 10x



1/2

OR

How many vertebrae in all, do we have? Categorize them on the basis of their location and give the specific number in each category. 1x5

Spinal Column

- **Composed of 33 vertebrae**
 - 7 cervical
 - 12 thoracic
 - 5 lumbar
 - 5 sacrum (fused)
 - 4 coccyx (fused)

26 Explain the process of secondary growth in the stems of woody angiosperms. 1x5

In dicot stems, the cells of cambium present between primary xylem and primary phloem is the intrafascicular cambium.

- The cells of medullary cells, adjoining these intrafascicular cambium become meristematic and form the interfascicular cambium. Thus, a continuous ring of cambium is formed.
- The cambial ring becomes active and begins to cut off new cells, both towards the inner and the outer sides. The cells cut off towards pith, mature into secondary xylem and the cells cut off towards periphery mature into secondary phloem.
- The cambium is generally more active on the inner side than on the outer. As a result, the amount of secondary xylem produced is more than secondary phloem and soon forms a compact mass.
 - The primary and secondary phloems get gradually crushed due to the continued formation and accumulation of secondary xylem.

OR

Describe the internal structure of dorsio-ventral leaf with the help of labeled diagram.

- The epidermis which covers both the upper surface (adaxial epidermis) and lower surface (abaxial epidermis) of the leaf has a conspicuous cuticle.
- The tissue between the upper and the lower epidermis is called the mesophyll. Mesophyll, which possesses chloroplasts and carry out photosynthesis, is made up of parenchyma.
- It has two types of cells - the palisade parenchyma and the spongy parenchyma.
- There are numerous large spaces and air cavities between these cells.
- Vascular system includes vascular bundles, which can be seen in the veins and the midrib. The vascular bundles are surrounded by a layer of thick walled bundle sheath cells.