V I B G Y O R H I G H

Semester-1 Preliminary Examination

AY 2021-2022

BIOLOGY

Grade: X **Max. Marks : 40**

Date : 27/09/2021 **Time Allowed: 1 hour**

INSTRUCTIONS:

Time allowed: One hour (inclusive of reading time)

ALL QUESTIONS ARE COMPULSORY

The marks intended for questions are given in brackets [ ].

Select the correct option for each of the following questions.

SECTION I (15 Marks)

Question 1 **Name the following by choosing the correct option:** **[5]**

(a) A cross between two individuals with one pair of contrasting characters.

1. Crossing over
2. Monohybrid cross
3. Dihybrid cross
4. Self-fertilization

(b) The apparatus used to measure the rate of water intake by a plant.

1. Bell jar method
2. Ganong's Potometer
3. Ganong's photometer
4. Weighing method

(c) The stage of mitosis in which nuclear membrane and nucleoli reappears.

1. Prophase
2. Metaphase
3. Telophase
4. Anaphase

(d) The escape of plant sap from the ruptured or cut surfaces of the plant due to root pressure.

1. Guttation
2. Bleeding
3. Transpiration
4. translocation

(e) The condition in which the recessive gene is expressed.

1. Homozygous alleles
2. Homologous chromosomes
3. Heterozygous alleles
4. Sex chromosomes

Question 2 **Complete the following statements by choosing the appropriate option for each blank:** **[5]**

(a) Synthesis phase in the cell cycle is called so, because of the synthesis of more _____.

1. RNA and DNA
2. RNA
3. RNA and proteins
4. DNA

(b) In a monohybrid cross between two heterozygous individuals, percentage of pure homozygous individuals obtained in F1 generation will be _____.

1. 25%
2. 50%
3. 75%
4. 100%

(c) The rate of transpiration is inversely proportional to the _____.

1. Temperature
2. Light
3. Relative humidity
4. Wind velocity

(d) In complementary base pairing of DNA, guanine always pairs with _____ and adenine always pairs with _____.

1. Cytosine, Thiamine
2. Cytosine, Thymine
3. Cysteine, Thymine
4. Cysteine, Thiamine

(e) A zygote which has an X-chromosome inherited from the father will develop into a _____.

1. Girl
2. Boy
3. A boy or a girl
4. X chromosome does not influence the sex of the child.

Question 3 **Choose the correct answer from each of the four options given below:** **[5]**

(a) Which of the following crosses will give tall and dwarf pea plants in the same proportions?

1. TT x tt
2. Tt x tt
3. TT x Tt
4. tt x tt

(b) Meiosis in diploid organisms results in:

1. Reduction in the number of chromosomes
2. Production of gametes
3. Introduction of variation
4. All of the above

(c) Which of the following characters was not chosen by Mendel?

1. Pod shape
2. Pod colour
3. Location of flower
4. Location of pod

(d) Which is the correct logical sequence for cell-to-cell conduction of water from the root hair:

1. Root hair, cortex, pericycle, endodermis, xylem
2. Root hair, pericycle, cortex, endodermis, xylem
3. Root hair, cortex, endodermis, pericycle, xylem
4. Root hair, endodermis, cortex, pericycle, xylem

(e) Which of the following pairs of differences is incorrect?

1. Mitosis	Meiosis
Chromosomes duplicate twice	Chromosomes duplicate only once
2. Mitosis	Meiosis
Two diploid daughter cells are formed	Four haploid daughter cells are formed
3. Mitosis	Meiosis
Daughter cells are genetically identical	Daughter cells are genetically different
4. Mitosis	Meiosis
Takes place in tips of stems and roots	Takes place in anther and ovaries

SECTION II (15 Marks)

Question 4 **Explain the following terms:** **[5]**

(a) Photophosphorylation

1. the process of converting ATP into ADP by addition of inorganic phosphate group using the energy from photons of light
2. the process of converting ADP into ATP using the energy from photons of light
3. the process of converting ADP into ATP by addition of inorganic phosphate group
4. the process of converting ADP into ATP by addition of inorganic phosphate group using the energy from photons of light

(b) Gene

1. A gene is a specific sequence of nucleotide which codes for multiple functional polypeptides which express as a particular feature of the body.
2. A gene can be condensed during cell division to form a chromosome.
3. A gene is made up of pentose sugar, a nitrogenous base and a phosphate group.
4. A gene is a specific sequence of nucleotide which codes for single functional polypeptide which express as a particular feature of the body.

(c) Photosynthesis

1. the process by which living plant cells, produce glucose, from carbon dioxide and water, by using light energy and release oxygen as a waste product
2. the process by which living plant cells, containing chlorophyll, produce glucose, from carbon dioxide and water and release oxygen as a waste product
3. the process by which living plant cells, containing chlorophyll, produce glucose, from carbon dioxide and water, by using light energy and release oxygen as a waste product
4. the process by which living plant cells, containing chlorophyll, produce glucose, from carbon dioxide and water, by using light energy

(d) Root pressure

1. The pressure built up due to cell-to-cell osmosis in the endodermis of root tissue only.
2. The state of a cell when it cannot accommodate any more water
3. The hydrostatic pressure generated in the roots that help drive fluids and other ions out of the soil up into the xylem
4. The pressure of cell contents on the cell wall

(e) Crossing over

1. Pairing up of duplicated homologous chromosomes.
2. X shaped structure formed due to crossing over between the non-sister chromatids of paired homologous chromosome.
3. The exchange of chromatid material between the two non sister

chromatids of a homologous pair of chromosome.

4. X shaped structure formed due to crossing over between the sister chromatids of paired homologous chromosome.

Question 5 State the exact location of the following: **[5]**

(a) Guard cells

1. cell membrane of root hair cell
2. endodermis of the root
3. in the leaf epidermis surrounding the stomatal pore
4. in the veins of the leaf

(b) Hydathodes

1. special openings on the bark of old stems
2. waxy layer secreted by the two surfaces of the leaf
3. pore bearing structures present at the ends of veins on the margins of a leaf
4. found on the lower epidermis of leaves

(c) Mesophyll cells

1. in the stomatal apparatus of the leaf
2. between the two epidermal cell layers of the dicot leaf
3. in the oval bodies called chloroplasts of the leaf cells
4. at the end of the veins of dicot leaf

(d) Chlorophyll

1. in the double membrane of chloroplast
2. arranged in piles in the granum
3. in the stroma of the chloroplast
4. in the walls of the thylakoid

(e) Stomata

1. few minute openings occurring on the upper and more on lower surface of the dorsi ventral leaves
2. concentrated in the palisade mesophyll layer of the dorsi ventral leaf
3. on the surface of the root hair cell

4. on the surface of woody stem

Question 6 **State the function of the following:** **[5]**

(a) Lenticels

1. diffusion of water vapour during transpiration
2. diffusion of gases for respiration and photosynthesis
3. diffusion of gases for photosynthesis
4. diffusion of gases during translocation

(b) Centrioles

1. responsible for pulling apart sister chromatids during anaphase
2. site of crossing over to increase genetic variation
3. site at which two sister chromatids are joined together
4. site at which DNA replication begins during interphase

(c) Stroma in chloroplast

1. Site of light dependent phase of photosynthesis
2. Site of photochemical phase of photosynthesis
3. Site of light independent phase of photosynthesis
4. Site of photolysis of photosynthesis

(d) Centrosome

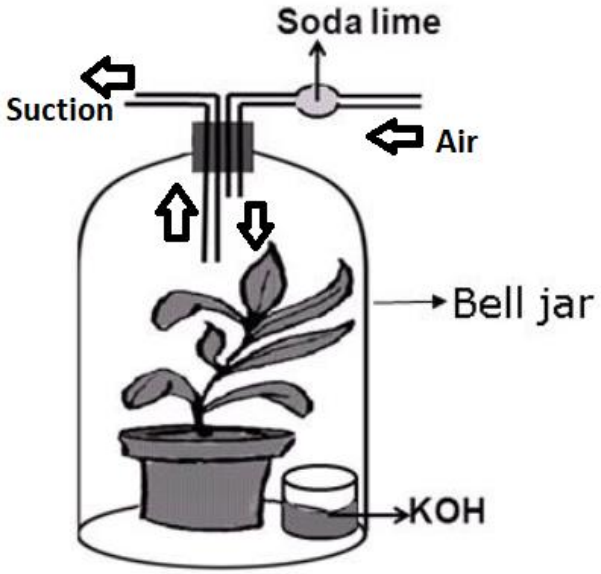
1. Microtubule organizing centre in animal cell
2. Initiates and regulates cell division
3. Forms spindle fibres with help of asters
4. All of the above

(e) Cuticle

1. prevents evaporation of water from the leaf surfaces, allows sunlight to reach mesophyll layer in leaves for photosynthesis
2. allow evaporation of water from the leaf surfaces, prevent sunlight to reach mesophyll layer in leaves for photosynthesis
3. diffusion of oxygen during photosynthesis and water vapour during transpiration
4. diffusion of oxygen and carbondioxide during photosynthesis

SECTION III (10 marks)

Question 7 **Given below is an apparatus used to study a particular process in plants. Observe the same answer the questions that follow.** **[5]**



(a) The function of KOH and soda lime is to absorb:

1. Carbondioxide gas from the air, carbondioxide gas from the bell jar
2. Carbondioxide gas from the bell jar, carbondioxide gas from the air
3. Oxygen gas from the air, carbondioxide gas from the bell jar
4. Oxygen gas from the bell jar, carbondioxide gas from the air

(b) In the above experiment for testing the leaf for presence of starch, the correct sequence of steps from the following will be:

i) Boiling leaf in alcohol.
ii) Dipping leaf in iodine solution
iii) Boiling leaf in water
iv) Rinsing leaf with water

1. iii, iv, i, ii
2. iv, i, iii, ii
3. i, iii, iv, ii
4. iii, i, iv, ii

(c) Which of the following statements shows the correct results of Starch Test performed on the leaf from the plant:

1. Colour changes from brown to blue
2. Colour changes from brown to blue black
3. No change in colour
4. Colour changes from blue black to brown

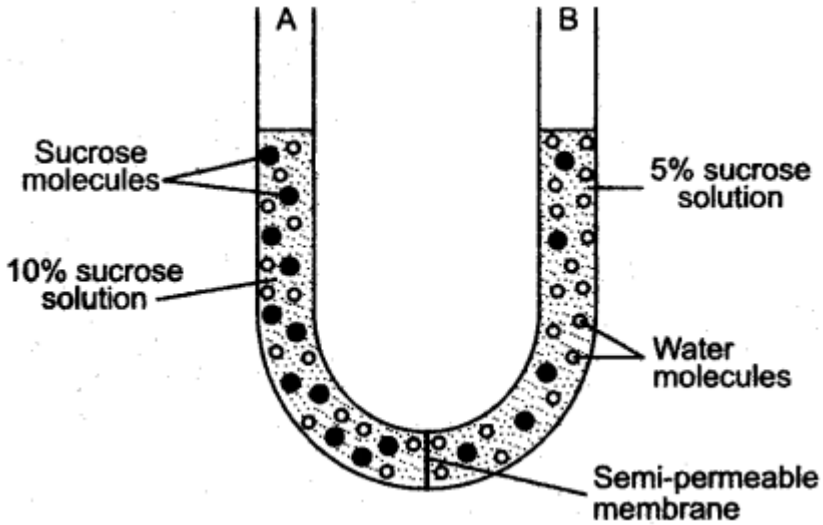
(d) While conducting the experiment, the plant under study was kept in complete darkness for a period of 48 hours. The reason for this is:

1. To dissolve the chlorophyll
2. To remove starch from the leaf
3. To destarch the plant
4. To activate the chloroplast in the plant

(e) To test the occurrence of photosynthesis in plants starch is tested instead of glucose. Why?

1. Starch is soluble in cell sap
2. Starch is end product of light independent reaction
3. Glucose produced is immediately converted to starch
4. Glucose is used for respiration

Question 8 **The diagram given below is of an experiment just at the start. Study the diagram carefully and answer the following questions:** **[5]**



(a) What changes are observed after a few hours?

1. The level of water in column A will rise and column B will fall
2. The level of water in column B will rise and column A will fall
3. The level of water remains unchanged but more sugar molecules are

seen in column B

4. There will be no change in level of water as no net movement of water molecules takes place.

(b) Which of the following statement is true?

1. Water moves from A to B, from more dilute solution to less dilute solution
2. Water molecules move from B to A, from their higher concentration to their lower concentration
3. Water moves from A to B, from hypotonic solution to hypertonic solution to
4. Water molecules moves from B to A, from more concentrated solution to more dilute solution

(c) Visking bag, Cellophane paper, Muslin cloth, Egg membrane

1. Visking bag is odd man out as the rest are semi permeable
2. Muslin cloth is odd man out as the rest are freely permeable
3. Visking bag is odd man out as the rest are freely permeable
4. Muslin cloth is odd man out as the rest are semi permeable

(d) A thin strip of epidermal cells from the fleshy scales of an onion bulb were placed in column A for some time.
What will be the condition of the cell? What would you do to bring this cell back to its original condition?

1. Deplasmolysed, keep in hypotonic solution
2. Plasmolysed, keep in hypertonic solution
3. Deplasmolysed, keep in water
4. Plasmolysed, keep in hypotonic solution

(e) Which of the following is not an example of plasmolysis in practice?

1. Salting of meat
2. Soaked seeds burst their seed coat
3. Sprinkling salt around weeds
4. Gargling with salt water to cure throat infection

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