
2011

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Part I

Question: 1

1. Give one significant difference between each of the following:

[5]

a. Growth and Development

Answer:

Growth	Development
An increase in the size of irreversible dry weight of a plant.	It is the process of diversification of tissues to form different structures.

b. Muscle twitch and Tetanus

Answer:

Muscle Twitch	Tetanus
It is a single contraction by a muscle.	In it a muscle fibre which has been stimulated in rapid succession by many nerve impulses, remains in a state of sustained contraction.

c. Heartwood and Sapwood

Answer:

Heartwood	Sapwood
It is the central dark coloured wood consisting of dead cells.	It is the outer light coloured wood having living cells.

d. Leghaemoglobin and Hemoglobin

Answer:

Leghaemoglobin	Haemoglobin
It is the oxygen scavenger found in the root nodules of leguminous plants.	It is the oxygen carrier found in erythrocytes of mammals.

e. Collateral vascular bundle and Concentric vascular bundle

Answer:

Collateral vascular bundle	Concentric Vascular bundle
In these, xylem and phloem lie together on the same radius, with xylem on the inner and phloem on the outer side.	In these, one type of tissue (xylem or phloem) surrounds the other.

2. Give reasons for the following :

[3]

a. Adrenaline is referred to as emergency hormone.

Answer:

At the time of emergency adrenaline is poured in blood in more amounts. It increases heartbeat, breathing, blood pressure, glucose in blood. It dilates most of the blood capillaries. In this ways of more energy is produced in the muscles to face the emergency, hence its name.



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- b. Despite availability of plenty of water, leaves of certain plants wilt during the day and recover in the evening.

Answer:

During the day the rate of transpiration increases more than the rate of water absorption of roots. The plant cells become flaccid and the leaves wilt. In the evening as transpiration decreases, the cells retain water and become turgid. The leaves also recover.

- c. Hybrid seeds should be raised every year.

Answer:

Hybrids should be raised every year to get still better variety and prevent the regression of species.

- d. The wing of a bat is said to be homologous to the wing of a bird and analogous to the wing of an insect.

Answer:

Wing of bat is homologous to the wing of a bird as both are different in function but have the same embryonic origin and development. Bats' wing is analogous to insect's wing as both perform the same function but have different origin.

- e. Symptoms of deficiency of certain nutrients appear in the old leaves first.

Answer:

Older leaves first show deficiency symptoms as they need more of that nutrient and is not getting it for a longer time.

3. Give scientific terms for each of the following:

[2]

- a. The development of more than one embryo in a seed.

Answer:

Polyembryony

- b. The process of growing old

Answer:

Ageing

- c. Method of inducing early flowering in plants by pre-treatment of their seeds at lower temperatures.

Answer:

Vernalization

- d. Determination of the age of a tree by counting the number of annual rings.

Answer:

Dendrochronology

- e. The type of growth in which the volume of the body increases without the increase in the number of body cells.



Answer:

Auxetic growth

- f. A condition when the muscles deteriorate and the person becomes an invalid.

Answer:

Muscular dystrophy

4. Mention the most significant role of each of the following :

$[2\frac{1}{2}]$

- a. Fovea centralis

Answer:

It is the place of clearest and sharpest vision.

- b. Lymphocytes

Answer:

They produce antibodies to destroy the pathogens which enter the body.

- c. Bundle of His

Answer:

It transmits impulse from the AV node to the ventricles

- d. Calyptra

Answer:

It is the hood like covering of moss capsule.

- e. Bulliform cells

Answer:

During dry season loss in turgidity of these cells cause the leaves to roll upward and inward. This in turn reduces transpiration.

- f. Quiescent centre

Answer:

See topics on 'Quiescent centre'

5. State the best known contribution of the following scientists:

$[2\frac{1}{2}]$

- a. Earnest Hackel

Answer:

Gave the 'recapitulation theory' or the 'biogenetic law'.

- b. Carl Landsteiner

Answer:

Discovered Rh-factor.

- c. Robert Koch



Answer:

Proposed 'Koch's postulate' or the 'germ theory of disease'.

- d. Hensen

Answer:

Discovered the disease leprosy.

6. Expand the following:

[5]

- a. G-6PD

Answer:

Glucose 6 phosphate dehydrogenase

- b. DPD

Answer:

Diffusion pressure deficit

- c. MRI

Answer:

Magnetic resonance imaging.

- d. SAN

Answer:

sinu atrial node

Part II

Section A (Answer any three questions)

Question: 2

1. What are guard cells? Explain their role in transpiration.

[4]

Answer:

Guard cells are specialized epidermal cells which bound the stomatal pore. These cells are of various shapes and sizes. Usually, they are kidney shaped. The wall of guard cell near the pore is inelastic and thick, while the outer wall is thin, elastic and semipermeable. Plasmodesmata interconnects the adjacent cells. The guard cells contain chloroplasts.

2. Explain tunica corpus theory of origin of shoot apex.

[4]

Answer:

The tunica corpus theory was proposed by Schmidt in 1924 for apical meristem. According to this theory, there are two zones of tissues in the apical meristems the tunica consisting of one or more peripheral layers of cells and the corpus a mass of cells enclosed by the tunica.



The layers of tunica show anticlinal divisions while the corpus show irregular planes of cell division. The tunical layer contributes to the epidermis and leaf primordial and cortical tissues. The corpus is responsible for the production of the cortex and vascular tissues.

3. Give one function and one deficiency symptom of each of the following in plants: [2]

a. Magnesium

Answer:

Function: It is essential part of chlorophyll hence important for photosynthesis.

Deficiency: Intervenal chlorosis and necrotic spots on leaves.

b. Calcium

Answer:

Function: In synthesis and stability of pectic substances.

Deficiency: Yellowing of leaf margins, malformation of young leaves and hooking of young leaves.

c. Molybdenum

Answer:

Function: Required in reduction of nitrates, synthesis of ascorbic acid

Deficiency: Chlorosis, mottling of lower leaves.

Question: 3

1. Describe the development of female gametophyte in Angiosperms. [4]

Answer:

See topics on 'Female gametophyte'.

2. Explain the mass flow hypothesis of transport food. [2]

Answer:

See topics on 'Munch hypothesis'.

3. Differentiate between cyclic and non-cyclic photophosphorylation. [1]

Answer:

See topics on 'Cyclic' and 'Non-cyclic'.

Question: 4 **

1. Explain in detail the digestion of carbohydrates, as food passes through the alimentary canal. [4]

2. Describe step by step what happens in the different phases of the cardiac cycle in human beings. [3]

3. Write the effects of cytokinins on plants. [3]

Question: 5 **

1. Write about the chemical changes which occur during contraction of skeletal muscles. [4]



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2. Draw a neat labeled diagram of the L.S of a kidney. [3]
 3. What is chloride shift? [2]

Question: 6

1. Explain how the human ear helps in hearing ** [4]
2. Briefly describe the events that occur during the proliferative phase of the menstrual cycle.[4]

Answer:

Proliferative phase begins with the end of menstruation. In this phase growth and rapid division of the walls of uterus, fallopian tube occurs.

Changes in uterus: The endometrium which had become thin during menstruation, its glands start growing, the epithelial cells divide and grow rapidly, growth of endometrial stroma occurs and the blood vessels grow. The endometrium gradually becomes 3-5 mm thick. The myometrical contractions becomes more strong and secretion of the glands at the cervix of uterus increases.

Changes in the ovary: These occur simultaneously with the changes in the uterus. In the ovary the immature follicle changes into a mature Graafian follicles.

3. Mention the site of secretion and function of the following hormones. [2]
 - a. Glucocorticoids

Answer:

Site of secretion: zona fasciculata of Adrenal Cortex

Functions: Important for metabolism of proteins, carbohydrates lipids and purine. They have anti-inflammatory effect and help to cope with stress. They also effect mood and behavior.

- b. Calcitonin

Answer:

Site of secretion: Calcitonin- From thyroid

Function: It lowers the level of calcium in blood and prevents bone resorption.

- c. Glucagon

Answer:

Site of secretion: From alpha cells of islets of Langerhans of pancreas

Function: Increase blood sugar level.

Section B

Question: 7

1. Explain the evolution of the long neck of giraffe according to Darwin and Lamarck. [4]

Answer:

See topics on 'Lamarckism'.

2. Explain briefly: [4]



-
- a. Environmental resistance

Answer:

See topics on 'Environmental resistance'.

- b. albinism

Answer:

See topics on 'Albinism'.

- c. Plant introduction

Answer:

See topics on 'Plant introduction'.

- d. Palaeontology

Answer:

See topics on 'Palaeontological evidence'.

- 3. Write two uses of each of the following:

- a. *Emblica officinalis*

Answer:

See topics on '*Emblica officinalis*'.

- b. *Adhatoda vasica*

Answer:

See topics on '*Adhatoda vasica*'.

Question: 8

- 1. Give four applications of tissue culture in crop improvement.

[4]

Answer:

It is a technique of growing plant cells, tissues or organs in sterilized culture medium under controlled conditions. The part of the plant or plant material used is called explants. This technique is important to those crops where artificial cross-pollination is difficult to accomplish. It aims at the cultivation of new hybrid plant that are resistant to diseases, predators and drought, have greater yield and able to grow without fertilizers and pesticides.

- 2. What do you understand by the term population growth? Give three ways of discouraging population growth.

[4]

Answer:

Population growth refers to the total number of increase in the organisms occupying a certain area.

The various methods to discourage population growth are:

- i. The marriage age should be increased. It will decrease reproductive span.



ii. People should be educated about the overpopulation by Government agencies like radio, television, newspaper, magazines, posters etc.

3. Define: [3]

a. Coacervates

Answer:

Coacervates are aggregates or clusters of large, complex organic molecules capable of growth and replication which are supposed to have given rise to cell like structures.

b. Gene bank

Answer:

Gene bank is a place where valuable plant material likely to become irretrievably lost in the wild or in cultivation is preserved in a viable condition.

Question: 9

1. Explain the role of Rh factor in blood incompatibility. [2]

Answer:

See topics on 'Rh factor'.

2. State the main morphological changes that occurred in the ancestors of modern man. [4]

Answer:

See topics on 'Early human ancestors'.

3. Describe briefly the functions of the following: [3]

a. CT Scan

Answer:

See topics on 'Computerised Tomographic Scanning'.

b. External prosthesis

Answer:

See topics on 'External prosthesis'.

c. Pacemaker

Answer:

See topics on 'Pacemaker'.

Question: 10

1. Explain the role of a genetic counsellor. [4]

Answer:

A genetic counselor provides:

i. Provides advice on genetic problems.

ii. Advises couples who have in their family history a birth defect of genetic disorder.



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- iii. Advises couples who plan to have children at a late age of 35 years or so have had spontaneous abortions.
 - iv. The genetic counselor identifies ethnic disorders like sickle cell anaemia and can advise accordingly.

2. Write the causative agent and the main symptoms of the following diseases:

- a. Poliomyelitis

Answer:

See topics on 'Polio(Poliomyelitis)'.

- b. Tuberculosis

Answer:

See topics on 'Tuberculosis (T.B)'.

- c. Typhoid

Answer:

See topics on 'Typhoid'.

- d. Cholera

Answer:

See topics on 'Cholera'.

3. State two similarities between the chromosomes of man and apes.

[2]

Answer:

See topics on 'Hominid (Ape-human)'.

*** Out of syllabus. Answer will be provided up on request*

