
2009

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Part I

Question: 1

a. Mention one significant difference between each of the following:

[5]

i. Absorption spectrum and Action spectrum

Answer:

See topics on 'Absorption'.

ii. Heart Wood and Sap Wood

Answer:

In old trees, secondary wood is differentiated into a centrally situated darker and harder wood with an outer light coloured zone called sap wood. Heart wood is darker due to deposition of tannins, resins, gums, essential oils.

Besides vessels are blocked by ingrowths of neighboring parenchyma cells. Thus heart wood cannot conduct materials. Sap wood has living parenchyma cells and unplugged vessels and act as conducting and storage tissue.

iii. Tranquillizers and Sedatives

Answer:

Sedatives are things that relax you and slow down body functions, also called depressants. They include things like alcohol and pain relievers as well as muscle relaxants like valium. Tranquillizers impair nerve communication between brain and body.

iv. Arteriosclerosis and Atherosclerosis

Answer:

Arteriosclerosis

This is hardening of the arteries. In the old age, the arteries become narrow and less flexible. The loss of elasticity is due to the thickening of fibrous tissue or deposition of cholesterol and minerals (calcium) in the wall of blood vessels. This narrows the lumen of arteries and consequently reduces blood supply to different parts of the body.

Therefore, to pump the same amount of blood to the body parts, heart has to work with more force. This increases blood pressure. The excessive high blood pressure may lead to rupturing of arteries of the brain or body causing cerebral hemorrhage or visceral hemorrhage.

Atherosclerosis

It is narrowing of the arteries and arterioles due to deposition of fats (cholesterol) on their lining. It makes inner surface of the arteries irregular. This causes clot formation or thrombosis and also obstructs the blood flow causing high blood pressure. If atherosclerosis is caused in coronary artery that will lead to heart attack and if it affects the artery carrying blood to brain, it causes a stroke.

v. Myogenic heart and Neurogenic heart

Answer:

Myogenic heart

1. Occurrence: Mollusks and vertebrates.
2. Initiation of heart beat: Under nodal tissues, so under muscular control.
3. Heart removed from body: Continues to beat for some time.

Neurogenic heart



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1. Occurrence: Crustaceans, insects and annelids.
 2. Initiation of heart beat: Under a ganglion present on the heart, so under nervous control.
 3. Heart removed from body: Stops beating.

b. Give the exact location and function of the following :

[3]

- i. Tectorial membrane **
- ii. Leydig's cells

Answer:

Testis

- iii. Stroma

Answer:

Ovary

- iv. Mast cells

Answer:

Connective tissue.

- v. Pacinian corpuscles **

c. Answer in brief :

[2]

- i. Why does skin become wrinkled in old age?

Answer:

As you age skin cell regeneration within the epidermis decreases which makes it harder for skin to repair itself un-aided. When you are younger skin takes between two to three weeks to repair cells, but as you get older your skin becomes thinner and can take four to six weeks to replace damaged cells.

- ii. Which part of soil water is available to plants for absorption by roots?

Answer:

See topic on 'Water'.

- iii. What makes the apical meristem of the root sub-terminal? **
- iv. Name the enzyme which catalyses bicarbonate formation in RBCs. **
- v. Which form of phytochrome induces flowering in SDP? **

d. Fill in the blanks :

**

[2½]

- i. The pigment in red muscle fibre is
- ii. Amount of blood pumped by heart per minute is called
- iii. Ethylene accelerates of leaves, flowers and fruits.



iv. The biological name of Tulsi plant is

Answer:

Ocimum sanctum

v. is the causative agent of Cholera.

Answer:

Vibrio comma

e. Give the contributions of the following scientists:

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

i. William Roentgen

Answer:

Wilhelm Conrad Röntgen (27 March 1845 – 10 February 1923) was a German physicist, who, on 8 November 1895, produced and detected electromagnetic radiation in a wavelength range today known as x-rays or Röntgen rays, an achievement that earned him the first nobel prize in physics in 1901.

ii. Marshall Hall

Answer:

Marshall Hall (1790–1857) was an English Physician and physiologist. His name is attached to the theory of reflex arc mediated by the spinal cord, to a method of resuscitation of drowned people, and to the elucidation of function of capillary vessels.

iii. Godfrey Houns field

Answer:

Sir Godfrey Newbold Hounsfield CBSE, FRS, (August 28, 1919 – August 12, 2004) was an English electrical engineer who shared the 1979 Nobel Prize for Physiology or Medicine with Allan McLeod Cormack for his part in developing the diagnostic technique of X-ray computed tomography (CT).

iv. Munch

Answer:

Ernst Munch(1876–1946), a plant physiologist who proposed the Pressure Flow Hypothesis to explain the mechanism of phloem translocation

v. Robert Koch

Answer:

Heinrich Herman Robert Koch (11 December 1843 – 27 May 1910) was a German physician. He became famous for isolating Bacillus anthracis (1877), the Tuberculosis bacillus (1882) and the Vibrio cholera (1883) and for his development of Koch's postulates.

He was awarded the Noble Prize in Physiology or Medicine for his tuberculosis findings in 1905. He is considered one of the founders of microbiology—he inspired such major figures as Paul Ehrlich and Gerhard Domagk.

f. Elaborate the following:

[5]



i. MRI

Answer:

Magnetic Resonance Imaging

ii. IUD

Answer:

Intra uterine device

iii. SAN

Answer:

Storage Area Network

iv. CNS

Answer:

Central Nervous system

v. IPM

Answer:

Integrated pest management

Part II

Section A (Answer any three questions)

Question: 2

- a. Give the anatomical differences between a dicot leaf and a monocot leaf. [4]

Answer:

Dicot leaf	Monocot leaf
Cuticle thick at upper epidermis and thin at lower epidermis	Uniform cuticle on both the surface
Stomata are more on lower surface	Equal number of stomata on either side
Mesophyll is differentiated into palisade parenchyma and spongy parenchyma	Mesophyll is not differentiated into palisade and spongy parenchyma
Bulliform cells are absent in the epidermis	Bulliform cells are present in upper epidermis

- b. Enlist the functions of mineral elements in the life of a plant. What do you mean by essentiality of an element? ** [4]
- c. Write the differences between nastic and tropic responses. ** [2]

Question: 3 **

- a. Describe the internal structure of the human heart. [4]



b. Explain the counter system in the nephron. [2]

c. Explain four functions of the liver. [1]

Question: 4

a. Give the different between cyclic and Non-cyclic photophosphorylation. [4]

Answer:

See topics on 'Cyclic and Non cyclic'.

b. Write the effect of cytokinins on the plant. [4]

Answer:

Cytokinins are a class of plant-specific hormones that play a central role during the cell cycle and influence numerous developmental programs. Because of the lack of biosynthetic and signaling mutants, the regulatory roles of cytokinins are not well understood. We genetically engineered cytokinin oxidase expression in transgenic tobacco plants to reduce their endogenous cytokinin content.

c. Write four advantages of cross pollination over self pollination. [2]

Answer:

See topics on 'Types'.

Question: 5

a. Draw a neat labeled diagram of a transverse section of human ovary. [4]

Answer:

See topics on 'Histology of ovary'.

b. Explain the mechanism of hearing by the human ear. ** [3]

c. Difference between: **

i. Reparative and Restorative regeneration.

ii. Capacitation and fertilization. [3]

Question: 6 **

a. What is feedback mechanism? Explain with reference to a hormone secreted from the posterior lobe of the pituitary. [4]

b. Explain briefly the movement of water from the soil across the root to the xylem vessel. [4]

c. Name the second and tenth cranial nerves and write one function of each. [2]

Section B

Question: 7

a. Explain four measures to control population explosion. [4]



Answer:

See topics on 'Controlling measures'.

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

i. Tuberculosis

Answer:

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

ii. Tetanus

Answer:

See topics on 'Tetanus'.

iii. Hepatitis

Answer:

See topics on 'Hepatitis'.

iv. Malaria

[4]

Answer:

See topics on 'common disorders'

c. Write two differences between benign tumour and malignant tumour.

[2]

Answer:

See topics on 'malaria'.

Question: 8

a. Define:

i. Vestigial organs

ii. Sympatric speciation

Answer:

When a few individuals of a species within the same geographical area suddenly become reproductively isolated from the main population it forms a new species and it is called sympatric speciation. Thus they arise in the geographical area of its parent's species. Sudden reproductive isolation can be introduced by two methods Polyploidy and Hybridization.

iii. Mutagens

iv. Biogeography

[4]

Answer:

Study and distribution of animals and plants in space or earth surface is called biogeography.

b. Archaeopteryx is considered a connecting link between reptiles and birds. Justify the statement by giving two characteristics of each group.

[4]



Answer:

The theory of evolution can best be explained by the extraordinary adaptation that the Archaeopteryx, the ancient wing, went through was the ability to take flight. It is a connecting link between reptiles, birds, and a perfect flying eating machine. It was discovered from the limestone rocks of Bavaria, in Germany of upper Jurassic period.

- c. Give two differences between natural selection and artificial selection.

[2]

Answer:

Artificial selection	Natural selection
It is the man-made selection	It is the nature-made selection
It produces varieties of organisms very different from native generations	It produces great biological diversity
It occurs in domestic population	It occurs in natural population
It is very faster process	It is a slow process

Question: 9 **

- a. Write four characteristics that have developed during human evolution. [2]
- b. What are stem cells? Write two applications of stem cell in medical treatment. [4]
- c. Mention three basic ways to conserve plant resources. [3]

Question: 10

- a. Describe the procedure of tissue culture in plants. [4]

Answer:

See topics on 'Tissue culture'.

- b. Explain natural selection on the basis of sickle-cell anaemia. [4]

Answer:

See section 'Sickle cell anemia'.

- c. Give one difference between:
- i. Intraspecific struggle and Interspecific struggle.

Answer:

See section 'Struggle for existence'.

- ii. Somatogenic variation and Blastogenic variation. **

[2]

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

