
2014

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Section: A

Question: 1

Write the name of the organism that is referred to as the 'Terror of Bengal'. [1]

Answer:

Eichhornia crassipes / Water Hyacinth

Question: 2

What are 'true breeding lines' that are used to study inheritance pattern of traits in plants? [1]

Answer:

Self-pollination continuous, for several generations / homozygous.

Question: 3

Name any two types of cells which act as 'Cellular barriers' to provide Innate Immunity in humans. [1]

Answer:

Polymorpho-nuclear Leukocytes / Neutrophils / Monocyte, Natural Killer (type of lymphocyte), Macrophages

Question: 4

Mention the type of host cells suitable for the gene guns to introduce an alien DNA. [1]

Answer:

Plant cells.

Question: 5

How is 'stratification' represented in a forest ecosystem. [1]

Answer:

Trees occupy vertical strata, shrubs the second layer and herbs / grasses occupy the bottom layers // vertical distribution of species, at different levels.

Question: 6

Give an example of an organism that enters 'diapause' and why. [1]

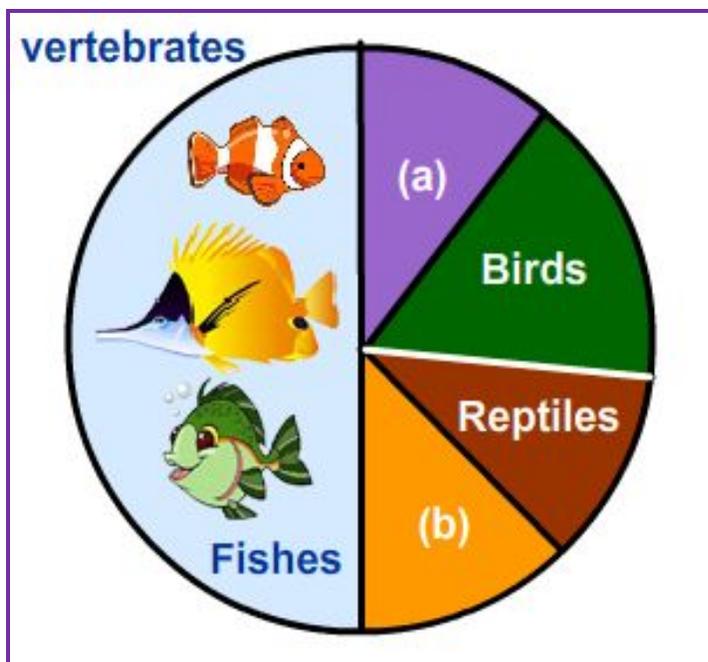
Answer:

(Many species of) Zooplankton, unfavorable condition

Question: 7

Identify 'a' and 'b' in the figure given below representing proportionate number of major vertebrate taxa. [1]





Answer:

- a. Mammals
- b. Amphibians

Question: 8

State the cause of Accelerated Eutrophication

[1]

Answer:

Pollutants from human activities / effluents from industries / effluents from home / sewage / agricultural (chemical) wastes radically accelerate the ageing process.

Section: B

Question: 9

Why do algae and fungi shift to sexual mode of reproduction just before the onset of adverse conditions?

[2]

Answer:

For survival during unfavorable conditions / Fusion of gametes helps to pool their resources for survival (hunger theory of sex) / Zygote develops a thick wall that is resistant to desiccation and damage which undergoes a period of rest before germination.

Question: 10

A cross between a red flower bearing plant and a white flower bearing plant of Antirrhinums produced all plants having pink flowers. Work out a cross to explain how this is possible.

[2]

Answer:

Snapdragon or Antirrhinum sp. is a good example for the study of incomplete dominance. In a cross between true breeding red flowered (RR) and true breeding white flowered plants (rr), the F1 (Rr) was pink. When the F1 was self-pollinated the F2 resulted in the following ratio 1 (RR) Red: 2 (Rr) Pink: 1 (rr) White.



Ratio of the genotype is same as explained by Mendelian monohybrid cross mean while phenotypic ration obtained was 3:1. Because R was incompletely dominant over r this made it possible to distinguish Rr as pink from RR (red) and rr (white).

Question: 11

How does the gene 'I' control ABO blood groups in humans ? write the effect the gene has on the structure of red blood cells. [2]

Answer:

See topics on 'modern scientific theory(chemosynthesis)'.

OR

Write the types of sex-determination mechanisms the following crosses show' Give an example of each type.

i. Female XX with Male XO

Answer:

Male heterogamety , Grasshopper

ii. Female ZW with MaleZZ

Answer:

Female heterogamety , Birds

Question: 12

Name the scientist who suggested that the genetic code should be made of a combination of three nucleotides.

Answer:

George Gamow

There are four bases and 20 amino acids (There should be atleast 20 different genetic codes for these 20 amino acids) Only possible combinations that would meet the requirement is combinations of 3 bases that will give 64 codons.

Question: 13

State the disadvantage of inbreeding among cattle. How it can be overcome ? [2]

Answer:

See topics on 'Miscellaneous outbreeding devices'.

Question: 14

Explain with the help of a suitable example the naming of a restriction endonuclease. [2]

Answer:

See topics on 'Restriction enzymes'.

Question: 15

State how has Agrobacterium tumifaciens been made a useful cloning vector to transfer DNA to plant cells. [2]

Answer:

See topics on 'Genetic transformation in plants'.



Question: 16

Construct an age pyramid which reflects a stable growth status of human population. [2]

Answer:

See topics on 'Age distribution'.

Question: 17

Apart from being part of the food chain, predators play other important roles. Mention any two such roles supported by examples. [2]

Answer:

See topics on 'Predation'.

Question: 18

How are 'sticky ends' formed on a DNA strand ? Why are they so called ? [2]

Answer:

Restriction enzymes cut the strands of the DNA, a little away from the centre of the palindromic sites, but between the same two bases on opposite strands. They form hydrogen bonds with their complementary cut counterparts.

Section: C

Question: 19

Explain any three advantages the seeds offer to angiosperms [3]

Answer:

- i. Since reproductive process such as pollination and fertilisation are independent of water, seed formation is more dependable.
- ii. Seeds have better adaptive strategies for dispersal to new habitats and help the species to colonise in other areas.
- iii. As they have sufficient food reserves young seedlings are nourished until they are capable of photosynthesis on their own.
- iv. The hard seed coat provides protection to the young embryo.
- v. Being products of sexual reproduction, they generate new genetic combinations /variations.

For further go to chapter 'Unit 1 - Chapter 2: Sexual reproduction in flowering plants'.

OR

Explain the steps in the formation of an ovum from an oogonium in human.

Answer:

See topics on 'Graafian follicle'.

Question: 20

Name and explain the role of inner and middle walls of the human uterus. [3]

Answer:

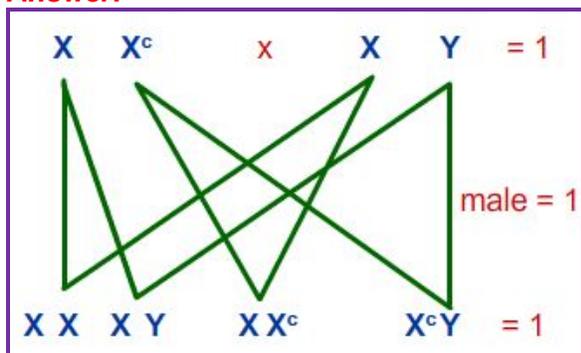
See topics on 'Fertilized Ovum'.

Question: 21

A colourblind child is born to a normal couple. Work out a cross to show how it is possible. Mention the sex of this child. [3]



Answer:



OR

Mendel published his work on inheritance of characters in 1865, but it remained unrecognized till 1900. Give three reasons for the delay in accepting his work.

Answer:

- The communication was not easy in those days and his work could not be widely publicised.
- His concept of genes as stable and discrete units that controlled the expression of traits and of the pair of alleles which did not 'blend' with each other was not accepted by contemporaries as an explanation for the apparently continuous variation seen in nature.
- Mendel's approach of using mathematics to explain biological phenomena was totally new and unacceptable to many of the biologists of his time.
- Though Mendel's work suggested that factors (genes) were discrete units, he could not provide any physical proof for the existence of factors and what they were made of.

Question: 22

Explain the increase in the numbers of melanic (dark winged) moths in the urban areas of post-industrialization period in England. [3]

Answer:

- Male produces two types of sperms (X & Y type in the ratio 1 : 1) , Female produces only one type of ovum (X type) , hence the sex of baby is determined by the type of sperm fertilizing the ovum therefore women should not be blamed // A genetic cross showing sex determination in human beings covering above value points can be considered in lieu of the explanation
- Sensitivity towards community / Social awareness / Self-discipline / Responsible behaviour / Leadership quality / Caring attitude / Responsible attitude towards society / Concern for others / Sharing of knowledge or information / Presence of mind /Being proactive / any other relevant value.

Question: 23

- Name the tropical sugar cane variety grown in South India. How has it helped in improving the sugar cane quality grown in North India ? [3]

Answer:

Saccharum officinarum , crossed with , North Indian variety (Saccharum barberi) to increase quality



b. Identify 'a', 'b' and 'c' in the following table:

No.	Crop	Variety	Insect pests
1	Brassica	Pusa gaurav	(a) _____
2.	Flat bean	Pusa Sem 2 Pusa Sem 3	(b) _____
3.	(c) _____	Pusa Sawani PUSA A-4	Shoot and fruit borer

Answer:

- a. Aphids
- b. Jassids / aphids/fruit borer
- c. Okra (Bhindi)

Question: 24

Why are beehives kept in crop field during flowering period ? Name any two crop fields where this is practiced. [3]

Answer:

To increase pollination efficiency , increase crop yield / honey yield
Sunflower , Brassica , apple , pear

Question: 25

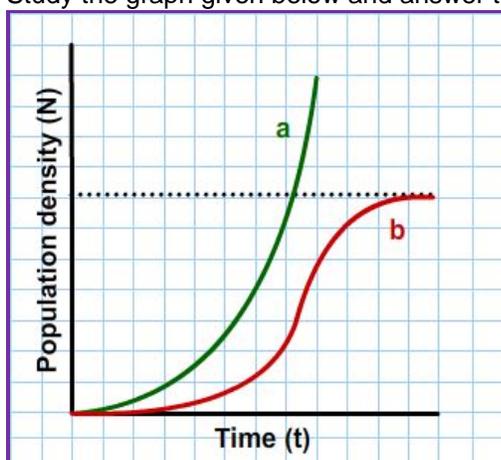
How did the process of RNA interference help to control the nematode from infecting roots of tobacco plants ? Explain. [3]

Answer:

Using Agrobacterium vectors , nematode specific genes introduced into host plant , produced sense - antisense RNA in host cells , ds RNA - initiated RNAi , silenced specific mRNA of nematode , parasite could not survive in transgenic host

Question: 26

Study the graph given below and answer the question that follow: [3]



a. Write the status of food and space in the curves (a) and (b).

Answer:

- a - unlimited food and space
- b - limited food and space



b. In the absence of predators, which one of the two curves would appropriately depict the prey population ?

Answer:
Curve a

c. Time has been shown on X-axis and there is a parallel dotted line above it. Give the significance of this dotted line.

Answer:
Carrying capacity / a given habitat has enough resources to support maximum possible number - beyond which no further growth is possible

Question: 27

[3]

i. What is primary productivity? Why does it vary in different types of eco -systems?

Answer:
See topics on 'Energy flow'.

ii. State the relation between gross and net primary productivity.

Answer:
See topics on 'Energy flow'.

Section: D

Question: 28

[3]

a. Coconut palm is monoecious, while date palm is dioecious. Why are they so called ?

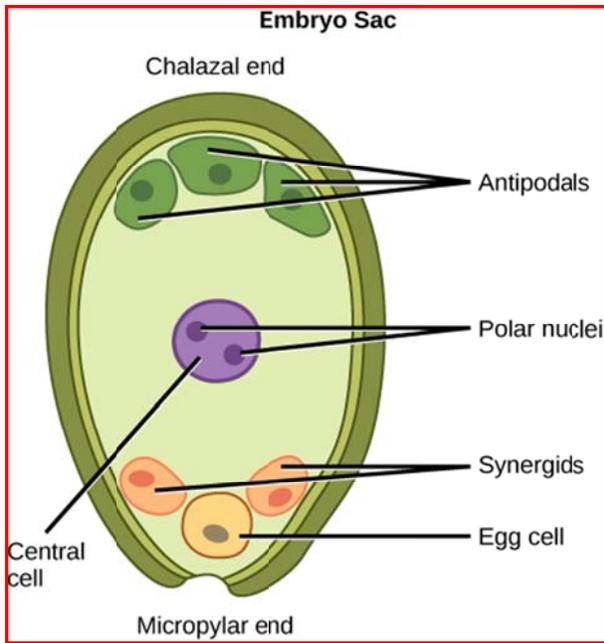
Answer:

- Coconut palm bears both kinds (sexes) of flowers on the same plant
- Date palm bears only one type (sex) / male and female flowers on different plants

b. Draw a labelled diagram of sectional view of a mature embryo sac of an angiosperm.

Answer:
See topics on 'Angiosperms'.





OR

- a. How is 'oogenesis' markedly different from 'spermatogenesis' with respect to the growth till puberty in the humans ?

Answer:

Oogenesis is initiated at the embryonic stage. Spermatogenesis begins only at puberty.

- b. Draw a sectional view of human ovary and label the different follicular stages, ovum and Corpus luteum.

Answer:

See topics on 'Histology of ovary'.

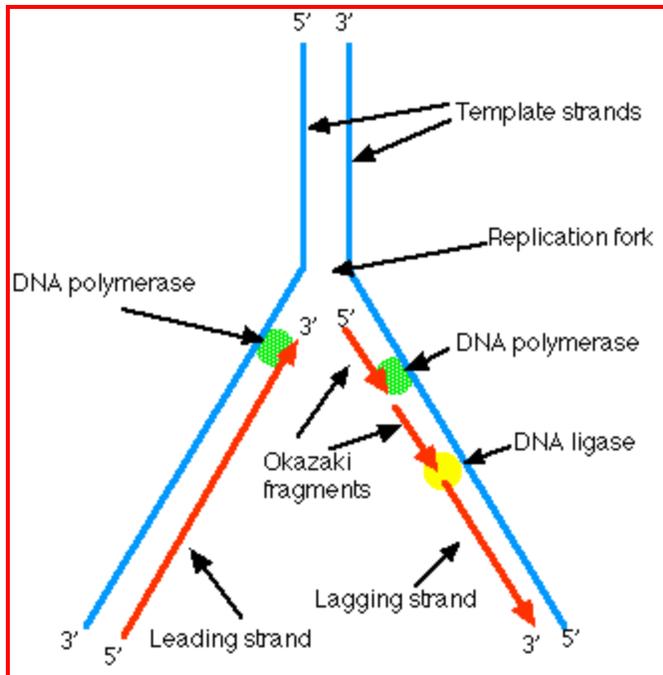
Question: 29

[5]

- a. Explain the process of DNA replication with the help of a schematic diagram.

Answer:





- b. In which phase of the cell cycle does replication occur in Eukaryotes ? What would happen if cell-division is not followed after DNA replication ?

Answer:

S phase and Polyploidy.

OR

- a. Explain Darwinian theory of evolution with the help of one suitable example. State the two key concepts of the theory.

Answer:

See topics on 'Darwinism'.

- b. Mention any three characteristics of Neanderthal man that lived in near east and central Asia.

Answer:

see topics on 'Human evolution'.

Question: 30

[5]

- a. Name the technology that has helped the scientists to propagate on large scale the desired crops in short duration. List the steps carried out to propagate the crops by the said technique.

Answer:

Tissue culture / micropropagation.

Explants, grown in a test tube , under sterile condition , in special nutrient medium / culture medium.

- b. How are somatic hybrids obtained?



Answer:

Isolated single cells, digest cell walls, to obtain protoplast from two different varieties, fusion of protoplast.

OR

a. Cancer is one of the most dreaded diseases of humans. Explain 'Contact inhibition' and 'Metastasis' with respect to the disease.

Answer:

Contact with other cells inhibits their uncontrolled growth. Tumour cells reach distant sites, through blood.

b. Name the group of genes which have been identified in normal cells that could lead to cancer and how they do so ?

Answer:

Proto oncogenes when activated under certain condition could lead to oncogenic transformation of the cells.

c. Name any two techniques which are useful to detect cancers of internal organs.

Answer:

Biopsy / radiography / CT / MRI.

d. Why are cancer patients often given -interferon as part of the treatment?

Answer:

It activates immune system, destroys tumour.

For further see topics on 'Cancer'.

