

Answer four Questions Only of the following:

Question One:

(A) Choose the correct answer for each of the following, and write it only in your answer sheet:

- 1- The interior ventral pelvic bone is
a- pubis b-clavicle c-ilium d- ischium
- 2- The secretion of the progesterone hormone begins at the day of the beginning of menstruation.
a- the first b-the fifth c-the fourteenth d- the twenty eighth
- 3- The percentage of gametes that contains the gene of hemophilia of the infected male is a-100% b-75% c -50% d-25%
- 4- The largest Female gamete in size of the following is that of
a- finch b- dog c- elephant d-man
- 5- The enzyme used in cloning DNA is
a- Deoxyribonuclease. b- Taq polymerase
c-RNA Polymerase d- Helicase

B) What is the difference between each pair of the following?:

1. Acrosome and polar body
2. Zygote of Plasmodium and zygote of Polypodium.

C) A man with a blood group (A) married a woman with a blood group (O), they had a child with a blood group (O), but this child died due to sickle cell anemia, explain on genetic basis the genotype and phenotype of the parents and the ratio of the lost offspring.

2. Explain by a labeled diagram only , the stages of genetic crossing over.

Question two:

A) Write the scientific term for each of the following:-

- 1- Genes located on the same chromosome and passed from the parents to the offspring as one unit, and inherited as one unit and do not follow the Mendel's laws .
- 2- Appendages with blood capillaries touching the blood capillaries of the endometrium.
- 3- The formation of an embryo from an ovum exposed to radiation.
- 4- A bone with a cavity at its upper side where the internal protrusion of the humerus fit.
- 5- A protein produced by the body ,resisting the duplication of viruses causing the cancer diseases.

B) Give reason for each of the following:

- 1- Spirogyra algae reproduce sexually and asexually but it is not considered as alternation of generations.
- 2- The presence of a hole at the back of the skull
- 3- The phenomenon of Polyploidy is less common in animals .
- 4- The presence of reverse transcriptase enzyme code in viruses that contain RNA genome.
- 5- The presence of cholinesterase enzyme in the neuromuscular junctions.

C) Crossing occurred between two white flowers of flowering pea plants. The offspring produced are purple and white flowers in the ratio of 1: 1, explain this case on genetic basis.

2. Explain by a labeled drawing only the mature ovule in flowering plant.

Question three:

(A) Write the following statements after correcting underlined words.

1. The ratio of males that die in the case of sickle cell anemia from two hybrid parents is 50%.
2. The largest number of vertebra is found in the sacral region

3. The gene responsible for the formation of insulin is located on chromosome number 9.
4. The endosperm is formed due to the union of one generative nucleus with the two embryo sac nuclei .
5. The best form of asexual reproduction is a reproduction by regeneration.

B) compare between:

- 1- Conjugations tube and fallopian tube..
- 2- vertebra No. 17 and vertebra 28 of the vertebral column.

C) Crossing occurred between a pure gray long wings male drosophila and with red eyes with a black vestigial wings female , and with white eyes what are the genotypes and phenotypes of offspring?

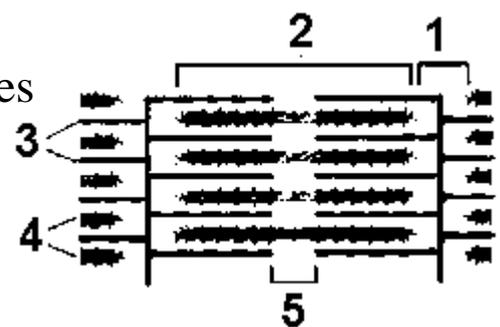
2. What are the conditions needed for the self-pollinated to occur in hermaphrodite flowers?

Question four:

A) Explain each of the following:

- 1- The restriction enzymes of the bacterium, do not attack its own DNA molecule.
- 2-the human genome has a great importance in criminology.
- 3- Blood moves in blood vessels continuously.
- 4-The production of ova in the human female is limited.

B) In the opposite Figure ,illustrates the changes that occur on each of the parts that represented by the numbers 1-2 - 3 - 4-5 during the muscle contraction.



C) 1. If you know that the number of autosomes in the somatic cell of the Locusts male wing = $2Z$,

Write the suitable chromosomal structure for each of the following cases:

- a -Somatic cell in the locust female
- b- The locust's sperm

- c- Somatic cell in the locust male d- The locust's egg
2. What are the different sources from which the sperm gets its food?

Question five:

(A) if the sequence of nitrogenous bases in a part of single strand DNA of the molecule is:

3'..... T - A - C - G - C - T - A - A - T - C - G - T - A - T - T 5'

- 1-Write the sequence of nucleotides of DNA strand that complementary with previous strand.
- 2-Write sequence of nucleotides in the mRNA molecule transcribed from this piece.
3. How many amino acids involved in the polypeptide chain resulting from its translation process.

B) What happens in each of the following cases ?

- 1- The arrival of sperms into the fallopian tube on the tenth day of the menstrual cycle?
- 2- The absence of the nucleus of pollen grain tube?
- 3-The absence of calcium ions from the neuromuscular junctions?
- 4- Mixing the extraction of the white flowers of flowering pea plant that have the genotype Aabb?
- 5- The absence of codon AUG from the beginning of mRNA?

C) 1. A chromosome carries four genes (a, b, c, d) the ratio of crossing over between (b, c) is 21% and between (a, b) is 18% and between (a, d) is 12% and between (b, d) 6%.

- Draw a chromosomal map of this chromosome .
 - Conclude the ratio of crossing over between (c, d)
 - Conclude the rate of crossing over between (b, d)
2. Mention two different cases in which test cross is not used to determine the genotype of the hereditary trait.