

مباراة الدخول 2021 – 2022

مسابقة في العلوم الطبيعية (A Series)

عدد الصفحات: 5

المدة: ٤٥ دقيقة

1- Circle the one correct answer

- Meiosis is a double division that
 - a. Reestablishes the diploidy
 - b. Is constituted of 8 phases
 - c. Is always followed by an interphase
 - d. Occurs directly after the fertilization
- By convention, the first day of menstruation marks the beginning of the cycle because
 - a. It corresponds to the ovulation
 - b. It's the day where the level of sex-hormones is the lowest
 - c. It's the day where the level of sex-hormones is the highest
 - d. None of the above
- The principal hormone having a positive feedback on the hypothalamus and anterior pituitary is
 - a. The progesterone
 - b. The estrogen
 - c. The FSH
 - d. The GnRH
- In a unmyelinated nerve fiber
 - a. There is no axon
 - b. There is no Schwann cells
 - c. The conduction of action potential is step by step
 - d. The conduction of action potential is saltatory
- In a synapse neuron-neuron junction
 - a. IPSP add up at the axon terminals of the postsynaptic neuron
 - b. EPSP add up with IPSP in an algebraic manner at the level of axon terminals
 - c. The action potential appears at any level of the postsynaptic cell body
 - d. The action potential is at the level of the cone of implantation of the postsynaptic neuron
- GnRH:
 - a. Allows the direct control of anterior pituitary hormones
 - b. Allows the control of ovarian hormones
 - c. Is affected by the nervous receptors
 - d. All of the above

- During luteal phase
 - a. Only the estradiol has a high concentration
 - b. Estradiol and progesterone have a low concentration
 - c. Progesterone has a high concentration
 - d. There is a development of cavitory follicles

- The ovarian cycle is blocked in case of :
 - a. Intake of combined pills
 - b. Menopause
 - c. Pregnancy
 - d. All of the above

- We call homozygous for a gene when individuals :
 - a. Possess at least one dominant allele
 - b. Have the same phenotype corresponding to this gene
 - c. Possess two identical alleles of the same gene
 - d. Possess two different alleles of the same gene

- The nerve impulse of a nerve fiber
 - a. Is coded in frequency
 - b. Has a stable amplitude
 - c. Has an amplitude proportional to the number of recruited fibers by the stimulation
 - d. Answers to the law of all or none

- The situations where the risk of pregnancy is high:
 - a. 2 days after menstruation
 - b. When the woman is at menopause
 - c. Just after the menstruation
 - d. The day of ovulation

- A gene :
 - a. Exists most often under one allelic form
 - b. Exists in one copy in somatic cells
 - c. Is a well-defined sequence of DNA nucleotides
 - d. None of the above

- When a character is autosomal dominant, we expect to have:
 - a. More males than females carrying this character
 - b. Each affected person must have two affected parents
 - c. Each affected person has at least one of the two parents affected
 - d. If both parents are affected, we expect to have 100 % of children affected

- In an action potential, repolarization is the result of:
 - a. K^+ ions leaving
 - b. Na^+ ions entering inside a fiber
 - c. Cl^- ions entering
 - d. Na^+ ions leaving

- An action potential :
 - a. Is always triggered independently of the intensity of the stimulation
 - b. Is of a maximal amplitude and non-modular
 - c. Allows the coding of the intensity of the stimulation by modulating its amplitude
 - d. Is a different phenomenon at the sensitive and motor neurons

- Na^+/K^+ pumps present in the cell membrane :
 - a. Allow the simultaneous leaving of Na^+ ions and entering of K^+ ions
 - b. Consume energy
 - c. Maintain concentration gradients of Na^+ et K^+ at both sides of plasma membrane
 - d. All of the above

- DNA analyses of a father affected with hereditary disease shows that he carries the normal and the mutated alleles. This disease is :
 - a. Recessive autosomal
 - b. Dominant autosomal
 - c. Dominant X-linked
 - d. Recessive X-linked

- The differential migration of radioactive DNA fragments in a gel electrophoresis is caused by
 - a. Number of restriction sites in each fragment
 - b. The amount of radioactivity in the fragment
 - c. The total charge of each fragment
 - d. The size of each fragment

- In a synapse, the releasing of neurotransmitters in the synaptic cleft is due to the opening of
 - a. Voltage-gated potassium channels
 - b. Voltage-gated sodium channels
 - c. Voltage-gated calcium channels
 - d. Both Voltage-gated sodium and potassium channels

- A neurotransmitter
 - a. Is excitatory and inhibitory in a same synapse
 - b. Is excitatory in a synapse and inhibitory in an other
 - c. Acts by binding to presynaptic receptors
 - d. Doesn't modify the postsynaptic potential

2- Matching :

Below is the sequence of a transcript strand of a gene

TAC AAC GGA TCG CCT

1. TAC AAC AGG TCG CCT
2. TAC AAG GGA TCG CCT
3. TAC AAA CGT ATC GCC
4. TAC AAG GAT CGC CT

- a. Mutation by deletion
- b. Mutation by insertion
- c. Mutation by inversion
- d. Mutation by substitution

1 _____ 2 _____ 3 _____ 4 _____

1. Fertilization
2. Gametogenesis
3. Meiosis
4. Tetrad

- a. Reduction by half the number of chromosomes
- b. Recovery of diploid number of chromosomes
- c. Formation of gametes
- d. Comprises four chromatids

1 _____ 2 _____ 3 _____ 4 _____

3- Problem of genetics

The document represents the pedigree of a family whose certain members are albinos



- Determine if the allele is :

- a- Dominant
- b- Recessive
- c- Co-dominant

- Precise if the localization of the gene is on :

- a- The specific part of the chromosome X
- b- The specific part of the chromosome Y
- c- An autosome
- d- The common part of X and Y

- Give the possible or sure genotypes of the following individuals:

II₄ : _____ II₅ : _____ III₁ : _____

III₂ : _____ III₃ : _____

- We estimate that in human population, 1% of the individuals are heterozygous for this character.

Calculate the probability of having an albinos child in each of the following cases :

- a- 2 parents non related and non-albinos.

- b- 2 normal parents having a first child albinos.

- c- A woman non albinos and a man albinos

Good luck



Social Club
ULESP2