LEBANESE UNIVERSITY
Faculty of Agronomy

Entrance Exam of Life Science

Option : Life Sciences

2021- 2022

Put X on the right answer

Part I

1.	a	b	c	d	e
2.	a	b	c	d	e
3.	a	b	c	d	e
4.	a	b	c	d	e
5.	a	b	c	d	e
6.1.	a	b	c	d	e
6.2.	a	b	c	d	e
6.3.	a	b	c	d	e
7.	a	b	c	d	e
8.	a	b	c	d	e
9.	a	b	c	d	e
10.1	a	b	c	d	e
10.2.	a	b	c	d	e
10.3.	a	b	c	d	e
11.1.	a	b	c	d	e
11.2.	a	b	c	d	e
11.3.	a	b	c	d	e
11.4.	a	b	c	d	e
12.	a	b	c	d	e
13.1.	a	b	c	d	e
13.2.	a	b	c	d	e
13.3.	a	b	c	d	e
14.1.	a	b	c	d	e
14.2.	a	b	c	d	e
14.3.	a	b	c	d	e
14.4.	a	b	c	d	e
15.	a	b	c	d	e

16.	a	b	c	d	e
17.	a	b	c	d	e
18.	a	b	c	d	e
19.	a	b	c	d	e
20.	a	b	c	d	e
21.	a	b	c	d	e
22.	a	b	c	d	e
23.	a	b	c	d	e
24.	a	b	c	d	e
25.	a	b	c	d	e
26.	a	b	c	d	e
27.	a	b	c	d	e
28.	a	b	c	d	e
29.1.	a	b	c	d	e
29.2.	a	b	c	d	e
30.	a	b	c	d	e
31.	a	b	c	d	e
32.	a	b	c	d	e
33.	a	b	c	d	e
34.	a	b	c	d	e
35.	a	b	c	d	e
36.	a	b	c	d	e
37.	a	b	c	d	e
38.	a	b	c	d	e
39.	a	b	c	d	e
40.	a	b	c	d	e
41.	a	b	c	d	e

Part II

1.	a	b
2.	a	b
3.	a	b
4.	a	b
5.	a	b
6.	a	b

7	a	b
8.	a	b
9.	a	b
10.	a	b
11.	a	b
12.	a	b

13.	a	b
14.	a	b
15.	a	b
16.	a	b
17.	a	b
18.	a	b

19.	a	b
20.	a	b
21.	a	b
22.	a	b
23.	a	b
24.	a	b

25.	a	b
26.	a	b

Part I: choose the right answer (only one answer is right), (1.25 pts/ answer)

1. In a living cell, the ionic equilibrium is never reached because of a mechanism that:

a. pumps Na^+ actively from the inside to the outside of the cell	b. transports Na^+ passively from the inside to the outside of the cell
c. pumps Na+ actively from the outside to the inside of the cell	d. transports Na^+ passively from the outside to the inside of the cell
e. all answers are false	

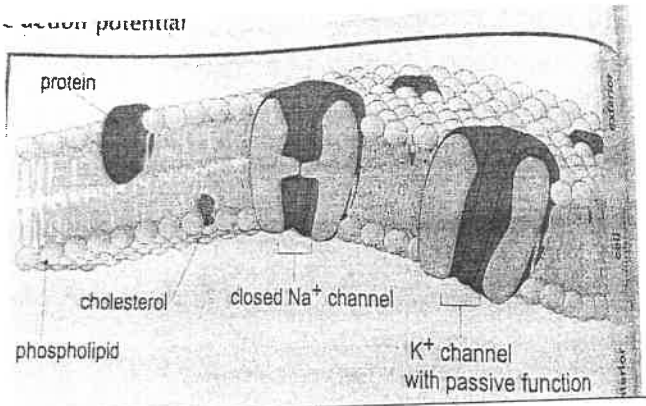
2. Concerning the system of active transport,

a. it is called Na^+/K^+ pump	b. it is called Ca^{++}/K^+ pump
c. it requires energy in the form of adenosine triphosphate	d. answers a and c are true
e. answers a and b are true	

3. The order of the action potential phases after the stimulation is:

a. depolarization and inversion of polarity, hyperpolarization, repolarization, return to resting potential	b. depolarization and inversion of polarity, return to resting potential, hyperpolarization, repolarization
c. depolarization and inversion of polarity, repolarization, hyperpolarization, return to resting potential	d. hyperpolarization, repolarization, depolarization and inversion of polarity, return to resting potential
e. hyperpolarization, return to resting potential, repolarization, depolarization and inversion of polarity	

4. Based on the document below, what can you say about the ionic interpretation of the action potential?

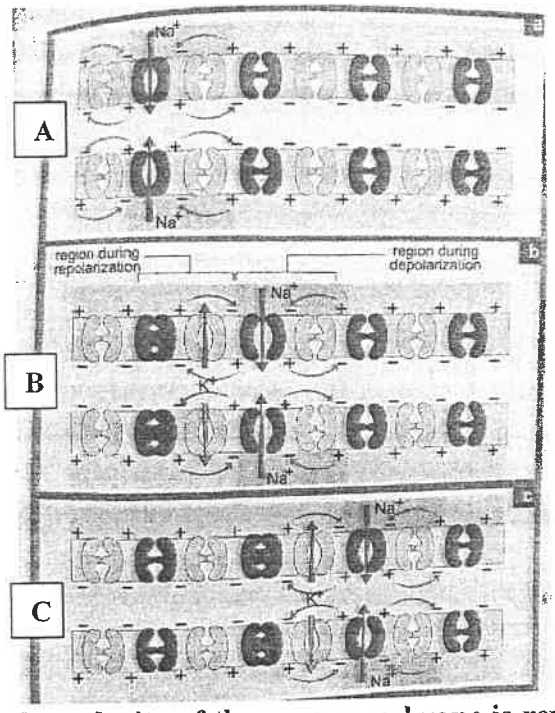


a. Protein channels are large molecule located within the cell membrane. They probably facilitate the passage of small ions and are called ion channels	b. These channels open upon stimulation and are said voltage-dependent
c. Their opening is controlled by the membrane potential	d. Answers a and b are true
e. Answers a, b and c are true	

5. What do you know about the characteristics of the nerve impulse in a nerve?

a. A nerve is made of different types of axons that are myelinated or non-myelinated and having the same diameter	b. A nerve is made of different types of axons that are myelinated or non-myelinated, of small or large diameter
c. The nerve carries the nerve impulse at the same velocity	d. In the body, there are as many non-myelinated fibers as myelinated fibers
e. Answers a, c and d are true	

6. The document below represents the propagation of a nerve impulse in a non-myelinated fiber



6.1. What happens when the polarity of the axon membrane is reversed, in a given site, due to an action potential?

a. The attraction between the positive charges only in the neighboring zone produces a local current that depolarizes the next zone that is not depolarized yet, hence making it more permeable to Na^+ ions	b. The attraction between the negative charges only in the neighboring zone produces a local current that depolarizes the next zone that is not depolarized yet, hence making it more permeable to Na^+ ions
c. The attraction between the positive and negative charges in the neighboring zone produces a local current that depolarizes the next zone that is not depolarized yet, hence making it more permeable to Na^+ ions	d. The attraction between the positive and negative charges in the neighboring zone produces a local current that polarizes the next zone that is not polarized yet, hence making it more permeable to Na^+ ions
e. The attraction between the positive and negative charges in the neighboring zone produces a local current that depolarizes the next zone that is not depolarized yet, hence making it more impermeable to Na^+ ions	

6.2. The action potential can move step by step along the axon because:

a. the polarization of this segment of the axon produces at this place a resting potential that depolarizes the segment just after it	b. the depolarization of this segment of the axon produces at this place a resting potential that depolarizes the segment just after it
c. the polarization of this segment of the axon produces at this place an action potential that depolarizes the segment just after it	d. the depolarization of this segment of the axon produces at this place an action potential that depolarizes the segment just after it
e. all answers are true	

6.3. The part C of the document allows us to say that:

a. Following the neural impulse, the K^+ ions cross the membrane to the outside, thus we have nerve repolarization	b. Following the neural impulse, the Na^+ ions cross the membrane to the outside, thus we have nerve repolarization
c. Following the neural impulse, the K^+ ions cross the membrane to the outside, thus we have nerve depolarization	d. Following the neural impulse, the Na^+ ions cross the membrane to the outside, thus we have nerve depolarization
e. all answers are false	

7. Which one of the following sentences does not apply on Pacini corpuscles?

a. They are touch receptors sensitive to variations of pressure	b. They are touch receptors resistant to variations of pressure
c. Each corpuscle consists of unmyelinated sensitive nerve ending, surrounded by a capsule made of concentric layers of connective tissue	d. The nerve fiber joining this capsule to nerve centers is a myelinated fiber
e. Answers a, c and d are true	

8. Eliminate the intruder

a. Electric synapse	b. Chemical synapse
c. Magnetic synapse	d. Effector cell
e. Junction between terminal bud of an axon of a neuron and another structure	

9. Following its binding to postsynaptic receptor, acetylcholine is

a. excitatory in a synapse and inhibitory in another	b. inhibitory when it increases the permeability of the membrane to K^+ ions
c. excitatory when it increases the permeability of a membrane to Na^+ ions	d. inhibitory when it increases the permeability of the membrane to Cl^- ions
e. all answers are true	

10. Neurotransmitters are produced in different parts of the central nervous system

10.1. About the neurotransmitters,

a. there are classical neurotransmitters and neuropeptides	b. they are classified as excitatory and inhibitory
c. GABA and glycine are exclusively inhibitory	d. GABA and glycine are exclusively excitatory
e. answers a, b and c are true	

10.2. The metabotropic neurotransmitters

a. have permanent effect	b. are also called ionotropic neurotransmitters
c. have instant effect	d. do not synthesize second messenger
e. answers b and c are true	

10.3. Acethylcholine and endorphines are involved respectively in _____ and _____. _____ interferes in regulation of emotional state whereas _____ interferes in transmission of pain messages.

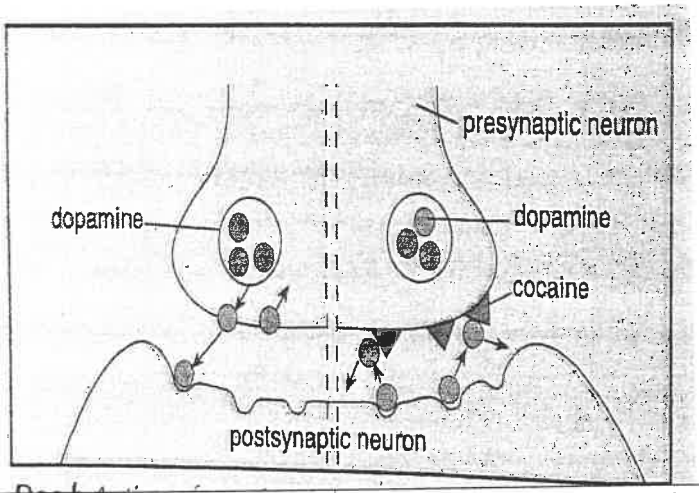
a. decrease of pain, movement, substance P, dopamine	b. inhibitory synapses, mood regulation, enkephalin, serotonin
c. mood regulation, inhibitory synapses, serotonin, enkephalin	d. movement, decrease of pain, dopamine, substance P
e. mood regulation, movement, serotonin, dopamine	

11. Drugs act at different levels in the synapse

11.1. Eliminate the intruder

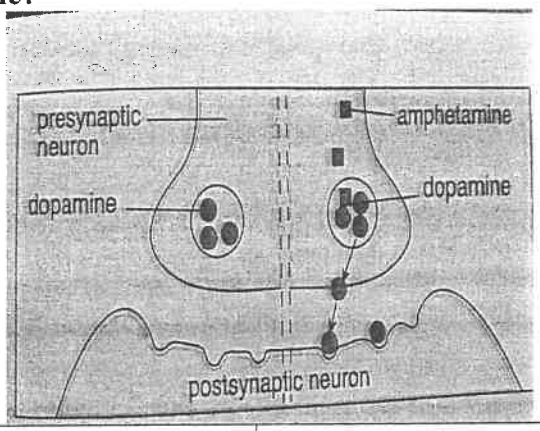
a. Drugs	b. Normal life
c. Dependance	d. Addiction
e. State of tolerance	

11.2. Based on the document below, what can you conclude about the action of cocaine on dopamine?



a. Cocaine acts on cell membrane and blocks the propagation of the nerve impulse by opposing the Na^+ ions transfer	b. Cocaine blocks the reabsorption of dopamine and noradrenaline
c. Cocaine acts on cell membrane and blocks the propagation of the nerve impulse by opposing the K^+ ions transfer	d. answers a and b are true
e. answers b and c are true	

11.3. Based on the document below, what hypothesis do you make regarding the action of amphetamine on dopamine?



a. Amphetamines stop appetite and block the release of dopamine from storage vesicles	b. Amphetamines stop appetite and release dopamine from storage vesicles
c. Amphetamines have a stimulating antifatigue effect	d. answers a and b are true
e. answers b and c are true	

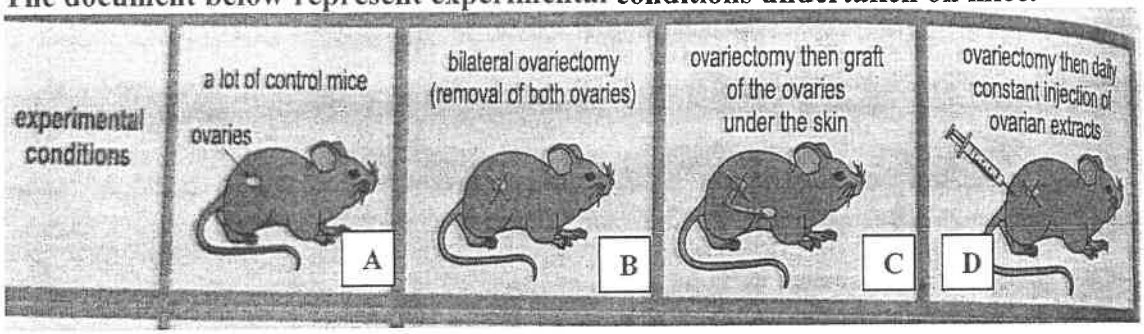
11.4. Heroine

a. is an agonist to enkephalin	b. facilitates the fixation of GABA on receptors
c. has an antagonistic effect	d. answers a and b are true
e. answers b and c are true	

12. The uterus is a muscular organ composed of _____ layers. The cervix is the _____ _____ part of the uterus. The tightly constricted cervix and the _____ form a _____ to the passage of sperm.

a. two, higher, enlarged, ovaries, duct	b. five, lower, enlarged, ovaries, duct
c. three, lower, constricted, cervical mucus, barrier	d. three, higher, enlarged, ovaries, duct
e. five, lower, enlarged, cervical mucus, barrier	

13. The document below represent experimental conditions undertaken on mice.



13.1. Ovaries and uterus are characterized by

a. cyclic modifications only	b. synchronized modifications only
c. non cyclic modifications	d. non synchronized modifications
e. cyclic and synchronized modifications	

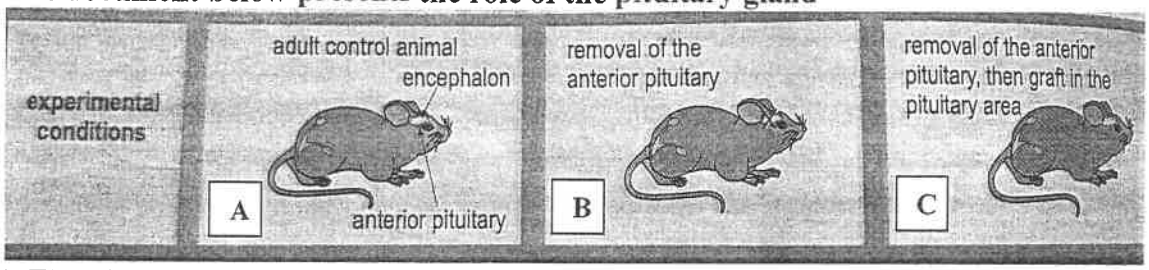
13.2. What results obtained in the uterus do you expect from experimental conditions presented in parts A and B of the above documents?

a. Result A: cyclic development of the endometrium; Result B: no development of the endometrium	b. Result A: no development of the endometrium; Result B: cyclic development of the endometrium
c. Result A: development of the endometrium with no cyclic variations; Result B: cyclic development of the endometrium	d. Result A: no development of the endometrium; Result B: development of the endometrium with no cyclic variations
e. All answers are false	

13.3. What can you conclude concerning the result obtained in uterus following the ovariectomy then the daily constant injection of ovarian extract as presented in part D of the document above?

a. The cyclic development of the endometrium	b. No development of the endometrium
c. The development of the endometrium with no cyclic variations	d. All answers are true
e. all answers are false	

14. The document below presents the role of the pituitary gland



14.1. The pituitary gland

a. is a small gland situated above the hypothalamus	b. is a small gland situated below the hypothalamus
c. is a big gland situated above the hypothalamus	d. is a big gland situated below the hypothalamus
e. is not involved in governing the ovarian secretions	

14.2. About the pituitary hormones FSH and LH,

a. they are considered as gonadotropic or gonadotropin-stimulating hormones	b. they stimulate the growth and maturation of the cavitary follicle
c. the FSH promotes the transformation of the degenerated follicle into a yellow body (corpus luteum)	d. answers a and b are true
e. answers a, b and c are true	

14.3. What happens, according to you, after the removal of the anterior pituitary as it is represented in part B of the document above?

a. there will be atrophy of the ovaries and inhibition of the cyclic activity	b. there will be a cyclic activity of the genital system
c. there will be restoration of the ovarian cyclic activity	d. all answers are false
e. all answers are true	

14.4. The removal of the anterior pituitary then the graft in the pituitary area (part C of the document above) leads to

a. an atrophy of the ovaries and inhibition of the cyclic activity	b. a cyclic activity of the genital system
c. a restoration of the ovarian cyclic activity	d. all answers are false
e. all answers are true	

15. Which one of the following sentences apply on the feedback mechanisms during the menstrual cycle?

a. At the beginning of the follicular phase, when the estrogen level is low, the level of FSH increases	b. The moderate level of estrogen provokes a decrease in the level of FSH by a negative feedback control
c. At the beginning of the follicular phase, when the estrogen level is high, the level of FSH decreases	d. The moderate level of estrogen provokes an increase in the level of FSH by a negative feedback control
e. At the end of the follicular phase, the estrogen level decreases	

16. If a cross between two individuals produces offspring's with 50% dominant character (A) and 50% recessive character (a) the genotype of parents are:

a. Aa x Aa	b. Aa x aa
c. AA x aa	d. AA x aa
e. None of the above	

17. The oocyte remains fertile for only _____ hours after ovulation:

a. 12	b. 24
c. 36	d. 48
e. 60	

18. Which term refers to an organism's observable traits?

a. Genotype	b. Allele
c. Phenotype	d. Homozygote
e. None of the above	

19. If a muscular cell in a female dog "Lucky" contains 78 chromosomes, her son "Lio" sperm cell would contain:

a. 12	b. 24
c. 32	d. 39

e. 78

20. Concerning Oogenesis:

a. it occurs in the peripheral or cortical zone of testes	b. it is a discontinuous process
c. multiplication, growth, and maturation phase take place after puberty	d. a and b are correct answers
e. b and c are correct answers	

21. The number of chromosomes in a given species is constant. In humans, this number equals to:

a. 44 chromosomes	b. 43 chromosomes
c. 46 chromosomes	d. 50 chromosomes
e. None of the above	

22. During meiosis, the diploid primary oocytes undergo:

a. two successive divisions, the first being equational and the second being reductional	b. two successive equational divisions
c. two successive reductional divisions	d. three successive equational divisions
e. none of the above	

23. Down Syndrome is

a. a sex-linked dominant disease	b. a contagious disease
c. a sex-linked recessive disease	d. a and b are correct answers
e. none of the above	

24. Why would you predict that of the human babies born will be males and half will be females?

a. Because of the segregation of the X and Y chromosomes during male meiosis	b. Because of the segregation of the X chromosomes during female meiosis
c. Because all eggs contain an X chromosome	d. Because, on average, one half of all eggs produce females
e. None of the above	

25.The direction of transfer of genetic information in most living things is:

a. Protein→DNA→ mRNA	b. DNA→mRNA → protein
c. DNA →protein → tRNA	d. Protein → tRNA → DNA
e. All of the above	

26. If there are 20 independent centromeres in an anaphase cell undergoing mitosis, how many chromosomes are there?

a. 10	b. 30
c. 40	d. 60
e. 80	

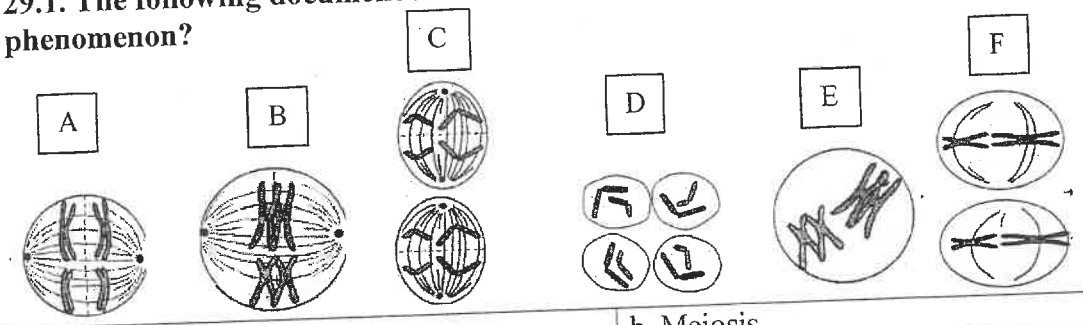
27. Concerning Duchene Muscular Distrophy, it is an X-linked sex chromosome recessive abnormality

a. it is possible for a couple with no history to suddenly have an affected son	b. a man cannot pass the affected gene to his sons
c. an affected man always passes the affected gene to his daughters	d. Answers a, b and c are all correct
e. None of the above	

28. The somatic cells are _____ and contain _____ pairs of autosomes and one pair of gonosomes (_____ in woman and _____ in man) whereas the gametes are _____ and contain _____ different chromosomes.

a. haploid, 23, XX, XY, diploid, 22	b. diploid, 22, XX, XY, haploid, 23
c. diploid, 22, XY, XX, haploid, 23	d. haploid, 23, XY, XX, diploid, 22
e. None of the above	

29.1. The following document indicates some steps of a biological phenomenon. What is this phenomenon?



a. Oogenesis	b. Meiosis
c. Mitosis	d. Implantation
e. None of the above	

29.2. Indicate the chronological order of this phenomenon steps drawn in question 29.1.

a. F C B A E D	b. C D B A E F
c. A B C D E F	d. E B A F C D
e. D A F E C B	

30. The crossing-over is a process:

a. that involves breaks and adhesions of chromosome fragments	b. that occurs during prophase of the first meiotic division
c. that occurs during prophase of the second meiotic division	d. answers a and b are correct
e. answers a and c are correct	

31. Which one of the following diseases is a disease related to sex?

a. Cystic fibrosis	b. Klinefelter syndrome
c. Huntington's Chorea	d. Answers a and b are correct
e. Answers a and c are correct	

32. Which of the following diseases is an autosomal disease?

a. Cystic fibrosis	b. Klinefelter syndrome
c. Huntington's Chorea	d. Answers a and b are correct
e. Answers a and c are correct	

33. If an individual with genotype AaBb, the probability of producing gametes with dominant genes (AB) is :

a. 1/16	b. 1/8
c. 1/12	d. 1/2
e. 1/4	

34. Down Syndrome involves trisomy

a. 5	b. 21
c. 19	d. 15
e. None of the above	

35. A gene showing codominance has?

a. Both alleles independently expressed in the heterozygote	b. One allele dominant to the other
c. Alleles tightly linked on the same chromosome	d. Alleles that are recessive to each other
e. None of the above	

36. A liver cell from a human male has:

a. 22 pairs of autosomes, two X chromosomes	b. 23 pairs of autosomes, X and Y chromosome
c. 23 pairs of autosomes, two X chromosomes	d. 22 pairs of autosomes, an X and a Y chromosome
e. None of the above	

37. In Karyotyping, individual chromosomes may be distinguished from others by:

a. a comparison of chromosome lengths	b. bands produced on chromosomes by differential staining
c. the position of centromeres	d. Answers a, b and c are correct
e. None of the above	

38. In cattle (cows), a red bull crossed a white cow yields offspring that are all roan (roan = اسمر) (a shade between red and white. A cross between roans should yield offsprings in the ration of :

a. 3 red: 1 white	b. 1 red: 2 roan: 1 white
c. 3 roan: 1 white	d. 3 white: 1 red
e. None of the above	

39. A segment of DNA has one strand with the following sequence of bases: AGCGCATAGCAA. The complementary strand of RNA would be:

a. AGCGCAUAGCAA	b. TCGCGTATCGTT
c. UCGCGUAUCGUU	d. CTATACGCTACC
e. ACGTACGTAAAC	

40. A cross between a brown round bean and red long bean seed gave 100% red oval seeds in F1 generation: What can you determine from the given cross?

a. Both parents are homozygous	b. The red allele dominates the brown allele
c. Both parents are heterozygous	d. a and b answers are correct
e. None of the above	

41. How many chromosomes does the sperm contain upon entry to the female genital tract?

a. 46 chromosomes with 2 chromatids	b. 46 chromosomes with 1 chromatid
c. 23 chromosomes with 1 chromatid	d. 23 chromosomes with 2 chromatids
e. 22 chromosomes	

Part II: Identify if the following sentences are true or false (1.25 pts/ answer)

1. The potential equality between the inside and the outside of the membrane of a non-stimulated neuron is called resting potential.
a) True b) False

2. The resting potential of a neuron is hardly disrupted by a stimulation.
a) True b) False

3. Following an axon stimulation, we observe a modification of the permeability of Na^+ and K^+ ions, determining the phases of the action potential.
a) True b) False

4. Resting potentials are elementary signals that arise from the rapid triggering of neural impulses that propagate along the nerve fibers.
a) True b) False

5. The exteroceptors are sensory receptors that receive information from external medium.
a) True b) False

6. Neuron integration corresponds to the algebraic sum of messages received by the postsynaptic membrane.
a) True b) False

7. A synapse is made of 2 elements.
a) True b) False

8. Most of the neurotransmitters are formed in the synaptic knob from blood precursors.
a) True b) False

9. A drug is a psychoactive product that affects the behavior of the person but does never cause death.
a) True b) False

10. The pituitary gland secretes, in an interrupted manner, two active hormones at the ovarian level : FSH and LH.
a) True b) False

11. The hypothalamo-pituitary axis detects, once each 24 hours, the variations in the blood vessels of ovarian hormones
a) True b) False

12. The secretion of progesterone and estradiol by the corpus luteum leads to an increase in the blood level of gonadotropic hormones during the luteal phase.
a) True b) False

13. The hormone control of female sexual cycles through the hypothalamo-pituitary axis results from the integration of several nerve and hormonal messages by the complex.
a) True b) False

14. DNA can leave the nucleus and travel through the cytoplasm.
a) True b) False

15. DNA fingerprinting is the same in non-identical twins.
a) True b) False

16. Diagnosis of chromosome abnormality of fetus is normally done by amniocentesis.
a) True b) False

17. The stage of meiosis in which chromosomes pair and cross over is Prophase I.
a) True b) False

18. Nuclear membrane and nucleolus disappear during meiosis.
a) True b) False

19. Both DNA and RNA are single stranded.
a) True b) False

20. The molecule that is synthesized during transcription is a mRNA.
a) True b) False

21. The number of alleles of a given gene that can be found in an individual is equal to five.
a) True b) False

22. Fluorescence *in situ* hybridization (FISH) is a technique for detecting and locating a specific DNA sequence on a chromosome.

a) True b) False

23. Mutations that are transmitted to offsprings occur in somatic cells.

a) True b) False

24. An example of multiple alleles is the ABO blood group system.

a) True b) False

25. Mutations in coding regions do not affect the phenotype.

a) True b) False

26. Gel electrophoresis enables you to distinguish DNA fragments of different lengths.

a) True b) False

Good luck