Course No: DNTS 1204
Course Title: Cell Biology
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Time: 2 hours
Using Calculator (No)

University of Palestine

Final term Exam
2013/2014
Total Grade:60)

Instructor Name:Dr. Essam Elzatma
Student No.: _____
Student Name: _____
College Name: _____
Dep. / Specialist: Dentistry
Using Dictionary (No)

Question one: Circle the best corresponding answer (20 marks)

1- In a resting cell, which of the following is closest to the resting potential?
A) +50 mV B) 25 mV C) -70 mV D) -100 mV

2- During an action potential, the flow of Na^+ through voltage-gated channels stops when the membrane potential reaches approximately…
A) -70 mV B) +30 mV C) 0 mV D) +60 mV

3- When human immunodeficiency virus (HIV) attaches to a host cell what genetic material is released into the cell's cytoplasm?
A) chromosome B) RNA C) DNA D) ligand

4- Steroid hormones are secreted by
A) the adrenal medulla. B) the gonads. C) the thyroid gland

5- Hormone that is responsible for production of milk in mammary glands:
A) oxytosin B) estrogen C) prolactin D) progesterone

6- Which one of the following disease results from endocrine disorder?
A) lung infection B) goiter C) jaundice D) typhoid

7- Which of the following is mismatched?
A) oxytocin—hypothalamus B) insulin—pancreas
C) glucagon—pancreas D) thyroid hormone—pituitary gland

8- Movement of the axon membrane potential from -70mV to -90mV would be called a(n)
A) Action potential B) Threshold potential C) Depolarization
D) Hyperpolarization E) Excitatory local potential

9- The membrane voltage level at which an action potential is triggered is called the
A) Refractory period B) Hyperpolarization C) Threshold of excitation
D) Rate level E) Equilibrium point

10- Neurotransmitter molecules are secreted from the _____ in response to the arrival of an action potential.
A) Glial cell B) Dendrite C) Axon terminal D) Mitochondrion

11- The _____potential is the electrical potential at which there would be no net diffusion of an ion across the plasma membrane.
A) Action B) Resting C) Receptor D) Equilibrium

12- Which of these statements about the hormone insulin is true?
A) It is secreted by Beta cells in the islets of Langerhans.

B) It is secreted in response to low blood glucose.
C) It stimulates hypoglycemia.

13- Which of these terms best describes the interactions of insulin and glucagon?
A) Synergistic B) Permissive C) Antagonistic D) Cooperative

14- Hyposecretion of which hormone causes cretinism:
A) Parathyroid hormone B) Thyroxin C) Thyarocalcitonin D) Prolactin

15- During emergencies, the "fight-or-flight" response
A) decreases the heart rate. B) is caused by hormone secretions in the adrenal medulla.
C) is stimulated by cortisol. D) is the result of aldosterone causing faster blood flow.

16- Since steroid hormones are lipids, they
A) attach only to lipid receptor molecules. B) cannot enter target cells.
C) activate only fat cells. D) pass through the lipid bilayer of cell membranes.

17- Which of the following scenarios increases a person's risk of developing cancer?
A) your friend sneezed on her in Biology class. B) you are drinking lots of water.
C) a person inhaled a number of carcinogens. D) none of the above.

18- By definition, which of the following is cancer?
A) a group of cells that grow and divide. B) tumor that are present in certain organs.
C) cells that divide uncontrollably. D) discolored cells that are infected with bacteria.

19- The strength or intensity of a neuronal signal is determined by
A) the size of the action potential B) the rate of firing of a neuron
C) the type of receptor that is activated D) the type of' neuron that is activated
E) the particular neurotransmitter(s) that are released

20- In its resting state, a neuron is said to be
A) polarized B) depolarized C) hypopolarized D) hyperpolarized

21- Which of the following factors is the most important for the presence of the absolute refractory period of action potentials?
A) Na^+ channel activation. B) Na^+ channel inactivation.
C) K^+ channel activation. D) K^+ channel inactivation.

22- During an action potential…
A) K^+ flows into the cell, then Na^+ flows out. B) Na^+ flows out of the cell, then K^+ flows in.
C) Na^+ flows into the cell, then K^+ flows out. D) K^+ flows out of the cell, then Na^+ flows in.

23- During the action potential, when does sodium permeability increase rapidly?
A) during repolarization B) during hyperpolarization

C) during the rising phase of the action potential

24- Synaptic potentials differ from action potentials in which of the following ways?

A) synaptic potentials are initiated by changes in voltage-dependent conductances.
B) synaptic potentials in the mammalian CNS are typically all-or-none events.
C) at onset, synaptic potentials can be either depolarizing or hyperpolarizing.
D) at onset, synaptic potentials can arise from increases in either gNa or gCl.
E) (C) and (D).

25- Brown eye is a dominant trait over green eye, that means

A) one brown allele and one green allele produce green eye color
B) one brown allele and one green allele produce brown eye color
C) two brown alleles should be present to produce brown eye color
D) one brown allele and one green allele produce blue eye color

26- Glands in the endocrine system

A) produce hormones that are secreted into the digestive tract.
B) release hormones into the blood stream or the fluid around cells.
C) release hormones as rapidly as nerve impulses are transmitted.
D) none of the above.

27- Negative feedback is a process that

A) always reduces the amount of a hormone present in the blood.
B) keeps conditions near their normal state.
C) lowers the body temperature below normal.
D) none of the above.

28- Neuronal signals are carried across the synapse by

A) direct electrical connections between the two cells.
B) the secretion of transmitter molecules into the synapse.
C) th 'transfer of' proteins from one cell to another.
D) an inhibitory effect of a transmitter molecule on the presynaptic membrane.

29- What happens to the the acetylcholine (ACh) released by the motor neuron at the neuromuscular junction?

A) Most of the ACh is hydrolyzed in the synaptic cleft by acetlycholinesterase.
B) Most of the ACh diffuses out of the synaptic cleft and dilutes into the extracellular solution.
C) Most of the ACh is taken up intact by the postsynaptic receptors via an active-transport process.
D) Most of the ACh is taken up intact by the presynaptic nerve terminal via an active-transport process.

30- In one cycle of neural communication, which is the correct order of events?

A) Neurotransmitter release > action potential > threshold of excitation reached > inhibitory or excitatory post synaptic potential.

B) Threshold of excitation reached > action potential > neurotransmitter release > inhibitory or excitatory post synaptic potential
C) Threshold of excitation reached > neurotransmitter'release > action'potential > inhibitory or excitatory post synaptic potential
D) Inhibitory or excitatory post synaptic potential > neurotransmitter release > threshold of excitation reached > action potential.

31- Which of the following will neutralize the effect of an EPSP (Excitatory postsynaptic potential?
A) Further opening of a sodium channel. B) Allowing intracellular anions to leave the cell.
C) Closing a potassium channel. D) Opening a chloride channel.

32- Spermatogenesis is initiated by:
A) Testosterone B) FSH (Follicle Stimulating Hormone) C) Inhibin D) Enterokinine

33- Which of the following play a role at the checkpoints to control the cell cycle?
A) mitosis B) p53 C) cyclin and chromatin

34- Which of the following events is usually associated with necrosis?
A) Membrane blebbing (formation of multiple protrusions of the plasma membrane).
B) Rapid lysis of the cell membrane followed by an inflammatory response.
C) Cleavage and fragmenting of DNA by nucleases.
D) Engulfment of the apoptotic cell body by macrophages.

35- In lymphoid cells Fas/FasL interaction can trigger
A) Hyperproliferation B) Gene duplication C) DNA rearrangement
D) Apoptosis E) gene conversion

36- This protein serves to inhibit apoptosis.
A) Bax B) p53 C) cytochrome C D) Bcl-2

37- Tumor-suppressor genes
A) are frequently overexpressed in cancerous cells.
B) are cancer-causing genes introduced into cells by viruses.
C) often encode proteins that stimulate the cell cycle.
D) can encode proteins that promote DNA repair.

38- A serum sample obtained from blood contains all the following EXCEPT:
A) albumin B) α_1-globulin C) α_2-globulin D) fibrinogen E) γ-globulin

39- Axons of the nerve cells
A) contain the nucleus.
B) are numerous extensions from each neuron.
C) have a distal portion that branches to form the presynaptic terminals or terminal boutons.

D) do not have a resting membrane potential.

40- Synaptic vesicles contain neurotransmitter are present in the

A) dendrites. B) cell body. C) axolemma. D) presynaptic terminals.

Question two: Indicate the following sentences are true (T) or False (F). 20 marks

1- An influx of sodium into the presynaptic neuron at a chemical synapse causes the vesicles to fuse with the cell membrane and release their contents into the synaptic cleft. **(T / F)**

2- Acetylcholine can act as an excitatory or an inhibitory neurotransmitter. **(T / F)**

3- Under resting conditions, there is more K+inside the cell than outside the cell. **(T / F)**

4- During the absolute refractory period, a second action potential couldbe triggered if a stronger stimulus is applied. **(T / F)**

5- An IPSP is a hyperpolarization of the post-synaptic cell membrane. **(T / F)**

6- Apoptosis is triggered when there is irreversible damage to cellular DNA. **(T / F)**

7- Neutrophils have multilobed nuclei. **(T / F)**

8- Macrophages Are derived from blood neutrophils. **(T / F)**

9- p^{53} is the site of the commonest mutation in human cancers. **(T / F)**

10- Cytochrome C is important activators of apoptosis. **(T / F)**

11- Bcl_2 protein blocks release of cytochrome C from mitochondria. **(T / F)**

12- At a chemical synapse between two neurons, the neuron receiving the signal is called the presynaptic neuron, and the neuron sending the signal is called the postsynaptic neuron. **(T / F)**

13- Voltage-gated channels open in response to changes in membrane potential. **(T / F)**

14- Chemical-gated channels open due to the presence of specific chemicals. **(T / F)**

15-The frequency of impulses and number of activated sensory neurons encodes differences in stimuli intensity**. (T / F)**

16- Neurotransmitters are removed from the synaptic cleft by enzymatic breakdown. **(T / F)**

17- hypothalamic-releasing hormones stimulate the secretion of specific hormones from the anterior pituitary. **(T / F)**

18- Insulin stimulates the production of glycogen and fat. **(T / F**)

19- Steroid hormones are secreted by the thyroid gland. **(T / F)**

20- the interactions of insulin and glucagon is cooperative. **(T / F)**

21- Melatonin has a primary role in many circadian rhythm. **(T / F)**

22- Exchanges between blood and tissue fluid occur across the walls of venules. **(T / F)**

23- Platelets release chemicals that stimulate vasoconstriction. **(T / F)**

24- Antibodies against both type A and type B antigens are found in the plasma of a person who is type AB. **(T / F)**

25- Production of which of Lymphocytes blood cells is stimulated by a hormone secreted by the kidneys. **(T / F)**

29- Erythrocytes production is stimulated by erythropoietin. **(T / F)**

30- Inflammation is a characteristic of apoptosis. **(T / F)**

31- The activation of caspase-8 results in fragmented mitochondria during apoptosis**. (T / F)**

32- Apoptosis can be initiated by cytochrome c release from the mitochondria. **(T / F)**

33- The apoptosome complex constructed FasL and FADD. **(T / F)**

34- Axons are the neuron processes that normally receive incoming stimuli. **(T / F)**

35- An action potential involves the influx of negative ions to depolarize the membrane. **(T / F)**

36- Immediately after an action potential is propagated, potassium ions rapidly diffuses out of the cell into the tissue fluid. **(T / F)**

37- A neurotransmitter is released at axonal endings to propagate a nervous impulse. **(T / F)**

38- Hormones make it possible for neurons to communicate. **(T / F)**

39- An EPSP is a hyperpolarization of the post-synaptic cell membrane. **(T / F)**

40- During an action potential K^+ flows into the cell, then Na^+ flows out. **(T / F)**

Question 3: Place the following events in a chemical synapse in the correct order. (3.5 marks)

_____ Release of neurotransmitters into the synaptic cleft.

_____ A rrival of nerve impulse at the presynaptic neuron's synaptic end.

_____ Either depolarization or hyperpolarization of postsynaptic membrane.

_____Inward flow of Ca^{2+} through activated voltage-gated Ca^{2+} channels in the synaptic end

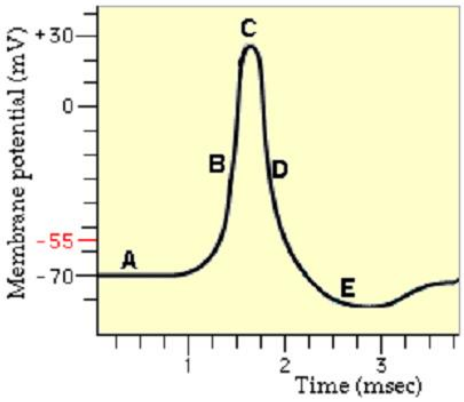
_____ Exocytosis of synaptic vesicles,

_____ Opening of ligand-gated channels on the postsynaptic plasma membrane,

_____ Binding of neurotransmitters to receptors in the postsynaptic neuron's plasma membrane.

Question 3:Which part of the graph in the right corresponds to: (5 marks)

_____ time when voltage-gated sodium channels are inactivated, then reset to the closed state. Potassium channels continue to open.



_____ time when voltage-gated sodium and potassium channels are closed.

_____ time when voltage-gated sodium channels begin to inactivate and voltage-gated potassium channels begin to open.

_____ time when some voltage-gated potassium channels remain open, resulting in movement of potassium out of the cell.

_____ time when voltage-gated sodium channels open rapidly, resulting in movement of sodium into the cell.

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Question 4: Short answers. (10 marks)

1- Explain why the anterior pituitary is sometimes referred to as the "master gland

2- Mention two hormones that are produced by the hypothalamus and explain the function of one of them?

3- What is the importance of gaps (G_1 and G_2) for the cell cycle?

4- What will happen to the cell cycle in case of P_{53} mutation?

5- **Explain the meaning of the absolute and the relative refractory periods in the action potential?**

GOOD LUCK