	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	COURSE TITLE:	Bioelectrical phenomena		CODE: BP2112
DATE:	22, mars,2021	TERM: second	TOTAL MARK: 50	PERIOD: 2 HOURS

FIRST QUESTION :- PUT TRUE OR FALSE

1- The best way to measure an electrical potential difference is to use a voltmeter with infinite resistance
2- current flow in the bulk solution is proportional to the potential difference.
3- the Platinum electrode is irreversible but not exhaustible
4- Biological membrane are typically more than 10 nanometre thick
5- The Silver/silver chloride Platinum electrode is irreversible but electrode
6- when multiple capacitors are Connected in Parallel the total Capacitance is the sum of their individual capacitance values
7- potential differences between two points that are separated by an insulator are less than the differences between these points separated by a conductor.
8- the total conductance is simply the sum of the Conductance of the individual open channels
9- the resting membrane Potential is determined by the intracellular only.
10- when two resistors are connect in Series, the Same current Passes through each of them
11- the charge is stored in a capacitor only when there is a Change in the voltage across the capacitor
12- the equilibrium value doesn't depend on the Capacitance
13- Successful Patch recording requires a tight seal between the Pipette and the membrane
14- the quality of the measurement depends on minimizing perturbation of the cell
15- Current through the seal distort the measured Voltage or current
16- when the current is flowing in Parallel through the Seal it cause a decrease in the Standard deviations
17- Positive electric Charge is carried Primarily by sodium and Potassium ions
18- the Charging time constant increase when either the membrane capacitance or the resistance increase
19- T_System in skeletal muscle have along Charging Phase
20- Voltage Clamp offers Control over the key variable that determines the opening and closing of ion Channels
21- the Patch clamp is a special Voltage Clamp that allows one to resolve Current flowing through single ion channels
22- the characteristics of a patch Clamp are dictated by four facts
23- on a large scale the total number of positive and negative charges in biological fluids are equal
24- the most fundamental bioelectric process of life occur at the level of membranes

25- the Potassium ionic Pump within the contain equal numbers of Positive and Phospholipid structure of the cell negatively charged ions within their membrane
26- a Cellular TMP of 70 mV creates an electric field of 100 V/m across the Membrane
27- When a cell is weaken or dies by lack of oxygen its transmembrane field also vanishes.
28- electric currents in a wire always move from a Source to a sink
29- the magnitude of these current is proportional to the number of ions flowing
30- Biological tissues are generally considered to be electric Volume conductors
31- here are alot of places within the body that are rlectrically isolated from the whole.
32- there are many processes that create segregation of Charge and so produce electrical fields within cells and tissues
33- Membrane ion Pumps consist of assemblies of large macromolecules
34- The Pumps for sodium and Potassium ion are coupled and appear to be a single structure
35- the unbalance of actively transported charge causes a low intracellular sodium ion concentration
36- chloride is actively transported.
37- Selectivity Passes certain ions and blocks others
38- the Nernst Potentials arise where any kind of membrane not just living ones
39- the Nernst relationship can't be applied to living all Membranes
40- Hydrogen Carrsing a negative charge
41- the currents will decay as ionic Concentration gradients move towards equilibrium
42- repolarization is the net negative charge outside the call is restored
43- the amplitude of Potential change and time course of an action event depend on the type of excitable cell
44- Bioelectric action Currents generated in a single nerve fiber by the depolarization
45- the smallest nerve fibers are classified as c_type
46- Hydrogen has a much larger mobility than any other ion
47- Sodium tend to collect water Molecules around them
48- Diffusion Potentials result from ions in motion
49- Sustained diffusion Currents doesn't depend on the active generation of free ions
50- Skeletal muscles produce Some of the larger bioelectric signals within the body

SECOND QUESTION:- CHOOSE THE CORRECT ANSWER

1.-a cell drives it's electrical properties mostly from the electrical properties of its (proteins -membrane- lipids)
2.-a membrane in turn acquires it's properties from its lipids and proteins such as (ion channels- transports-all of them)
3.-electrical potential differences are usually denoted(V-I-R)
4.-potential differences between two points that are separated by an insulator are..... than the differences between these points separated by a conductor (larger- smaller-equal)

5.....-which is good insulator has an electrical potential difference across it(protein membrane - carbohydrate membrane- lipid membrane)
6.-the salt reach Solutions of the cytoplasm and blood are fairly
7. good.....(conductors - resistance - current)
8.....-can also measure current which is the flow of electrical charge passing a point per unit of time(electro physiological equipment-conductor- voltameter)
9.....-flow through resistors or conductors(current- resistance- power)
10.-when several..... inner membrane open simultaneously (protein channel- ion channel-all of them)
11.-the most important application of the product conductance involves(ion channel- protein channel-all of them)
12.....-is defined operationally as the voltage at which is a current change(the reversal potential - current - voltage)
13.-the reversal potential equals the (the flow current- Nernst potential- the energy of potential)
14.-the Nernst potential can be calculated by the (Nernst question-current equipment-current equation)
15.....-is divide as a potential energy inside of the membrane relating to the potential at the outer side of the membrane(the transmembrane potential- potential energy - current)
16.....-describes as steady state condition with no net flow of electrical current across the membrane (the resting membrane potential - the rest state - no one of them)
17.....-is determined by the intracellular and extracellular conditions of ions (the resting membrane- the rest state- no one of them)
18.-if 1 ionic conductance is dominant, the resting potential is..... sir Nernst potential for that ion(near-far-along)
19.....-the potential differences between two point linked by a current path with a conductance G and the current I(ohms law - cholom law-current law)
20.-when two resistors are connected in series the.....current passes through each of them (Same - higher- lower)
21.-the best way to measure and electrical potential difference is to use a voltmeter with (infinite resistance - low resistance-zero resistance)
22.-the best way to measure current is to open the bath and insert an (ammeter-voltameter-micrometer)
23.-if the ammeter has.....resistance it will not perturb the circuit since there is no i r drop across it(zero-1-2)
24.....-between potential difference and current flow applies to aqueous ionic Solutions(the linear relation -circular relation - inner relation)
25.-the current is carried by at least.....types of ions)4-3-2(
26.-current flow in the bulk solution is proportional to(the potential differences - ion difference- electronics difference)
27.current must be..... from a flow of electrons in the Cooper wire to a flow of ions in solution (transformer smoothly- no transformation- hard transformer)
28.the most common electrodes which is used is (Ag/AgCl- Na/Agcl-K/AgCl)

29. when the current pulse magnitude is increased depolarization of the membrane (increase/decrease/constant)
30. the conductance are plotted as function of clamp voltage ranging from(-30mV:60mV/-50mV:20mV/50mV:-20mV)
31. The best way to measure an electrical potential difference is to use a .....with infinite resistance (voltmeter – ammeter – meter)
32. the .....is irreversible but not exhaustible(Platinum electrode – gold – iron)
33. the equilibrium value doesn't depend on the ..... (Capacitance - voltage – current)
34. Positive electric Charge is carried Primarily by .....and Potassium ions (sodium- carbon – oxygen)
35. the quality of the measurement depends on .....of the cell (minimizing perturbation – current – voltage)
36. the quality of the measurement depends on .....of the cell (minimizing perturbation – current – voltage)
37. the charge is stored in a..... only when there is a Change in the voltage across the capacitor (capacitor – ammeter – galvanometer)
38. the Patch clamp is a special Voltage Clamp that allows one to resolve Current flowing through .....ion channels (single – double – triple)
39. Membrane ion Pumps consist of assemblies of large ..... (macromolecules – nano molecules – molecules)
40. on a .....scale the total number of positive and negative charges in biological fluids are equal (large – small – equal)
41. The Pumps for sodium and Potassium ion are coupled and appear to be a .....structure (single – double – triple)
42. .....Charge is carried Primarily by sodium and Potassium ions (Positive electric – negative electric – non electric)
43. the unbalance of actively transported charge causes a low intracellular .....concentration (sodium ion – calcium ion – chloride ion)
44. When a cell is weaken or dies by lack of .....its transmembrane field also vanishes. (oxygen – nitrogen – hydrogen)
45. Biological tissues are generally considered to be electric .....conductors (Volume – mass – current)
46. cell drives it's electrical properties mostly from the electrical properties of its (proteins -membrane- lipids)
47. a membrane in turn acquires it's properties from its lipids and proteins such as (ion channels- transports-all of them)
48. electrical potential differences are usually denoted(V-I-R)
49. potential differences between two points that separated by an insulator are..... than the differences between these points separated by a conductor (larger- smaller-equal)
50. .....-which is good insulator has an electrical potential difference across it(protein membrane - carbohydrate membrane- lipid membrane)
51. -the salt reach Solutions of the cytoplasm and blood are fairly good.....(conductors - resistance - current)
52. .....-can also measure current which is the flow of electrical charge passing a point per unit of time(electro physiological equipment-conductor- voltameter)

Best wishes

Dr. Hani Elgharbawy

	TANTAUNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		
	EXAMINATION OF 2ND YEAR BIOPHYSICS STUDENTS		
COURSE TITLE:	**Introduction to Biophysics**		COURSE CODE: BP 2110
3/3/2021	TERM: FINAL	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions:

First question:- (30 Marks)

Put true or false and correct false one(s)

1- Passive transport is divided to simple diffusion and facilitated diffusion.

2- The intracellular fluid of the cell contains K^+ions less than Na^+ions.

3- All transport across cell membranes take place by passive and active transport.

4- In some cells, oxygen combines with the breakdown products to release the energy required for cell function.

5- Plasma membrane is constitutes from the internal surface of the elemental protoplasm.

6- The peripheral proteins are such as some enzymes and some hormones.

7- Transportation of particles by way of ion pumps, ion channel and carrier proteins.

8- The membrane skeleton provides scaffolding for membrane proteins to anchor to, as well as forming organelles which extend from the cell.

9- NMR spectroscopy is an analytical technique used to determine the content and purity of a sample as well as its molecular structure.

10- The x-rays are generated by a cathode ray tube, filtered to produce monochromatic radiation and direct toward the sample.

Q2: (20 Marks)

1. The classification of the various kinetic systems found in mammalian organs and tissues.
2. The cell theory and its basic characteristics.

Q3: (20 Marks)

1. Compare between passive and active transport in living cells.
2. Compare between good and bad electrode.

باقى الأسئلة فى ظهر ورقة الاجابة

Q4: (30 Marks)

Choose one answer:

1- Facilitated diffusion depends on

a. carrier proteins b. osmosis pressure c. Na-K pumps

2- Rate of diffusion is a. dn/dx b. dn/dt c. dc/dx

3- ..... depends mainly on the depth of the immersion in the solution and the width of the microelectrode wall.

a) Resistance b) Tip potential c) The capacitance

4- Transport is depending upon the expenditure of cellular energy in the form of ATP hydrolysis

a. Active b. Passive c. a and b

5- The example of simple transit population is

a. white blood cell b. red blood cell c. neurons d. epithelial

6- Transportation of particles by way of ion pumps

a. ion channel and ion way b. ion channel and carrier proteins c. ion way and carrier proteins

7- The most composition of cells is

a. glycolipids b. steroids c. phospholipids

8- ..... of glass microelectrode arises between the electrolyte inside the capillary and the solution in which it is immersed.

a) Resistance b) Tip potential c) The capacitance

9- ..... consists of double layers of lipids.

a) The living cell membrane b) The nucleus c) Cell inclusion

10- ..... is a special term used for the diffusion of water through cell membrane.

a) Osmosis b) Active transport c) Ligand-gated channel

(Best wishes -------- Dr. Yasser Abdou)