UNIVERSITY OF TEXAS AT ARLINGTON

DEPARTMENT OF BIOLOGY

HUMAN PHYSIOLOGY (Biol 3345)

Dr. David G. Bernard

SECOND INTRASESSIONAL EXAMINATION

March 22, 2007

3

First Name SMITA	Last Name: SHARMA	UTAID# 1000389323

There are 55 items in this booklet; 50 are multiple choice questions and the remainder are either short essay questions or diagrams to be labeled. Be careful not to overlook any pages in the examination booklet. You have 80 minutes to complete these questions.

During the course of the examination students will remain in their assigned seats. If assistance is needed, the student should raise his/her hand and a proctor will attend the individual needs of that student.

Upon completion of the exam, each student is to remain seated, raise her/his hand, and the exam materials will be collected by a proctor. At no time is the student to leave his/her seat and carry the exam materials to the proctors or other areas of the room.

After collection of exam materials, the student is to immediately, quietly, and promptly leave the Examination Room.

NO EXTRA TIME WILL BE ALLOWED AT THE END OF THE EXAMINING PERIOD FOR ANSWERS TO BE TRANSFERRED.



DIRECTIONS: Each of the numbered items or incomplete statements in this section is followed by answers or completions of the statement. Select the ONE lettered answer or completion that is BEST in each case and write your selection in the left margin beside the question. Each multiple choice question is worth 2 points. YOU DO NOT HAVE TO ATTEMPT ALL THE QUESTIONS TO EARN 100 POINTS. The subdural space separates the arachnoid mater from the pia mater separates the pia mater from the dura mater separates the dura mater from the brain contains cerebrospinal fluid is between the vertebrae and the dura mater 2. The motor end plate is: a folded area of muscle cell membrane with ACh receptors clustered at the top of each fold B. the same as the neuromuscular junction C. the same as the synaptic cleft D. formed by the membrane of enlarged axon terminals, or boutons, that lie on the surface of skeletal muscle cells E. a special fibrous matrix whose collagen fibers hold the axon terminal in proper position 3. The role of acetylcholinesterase is to: act as a transmitting agent amplify or enhance the effect of ACh destroy ACh a brief period after its release by the axonal endings stimulate the production of acetylcholine inhibit the release of acetylcholine 4. How does blocking the ability for retrograde flow in an axon affect the activity of a neuron? The neuron is unable to produce neurotransmitters. B. The neuron is unable to produce action potentials. The soma is unable to export products to the synaptic knobs. (\mathbb{D}) The soma is unable to respond to changes in the distal end of the neuron. E. The neuron is unable to depolarize when stimulated. 5. Each of the following is a function of the nervous system, **EXCEPT**: providing sensation of the internal and external environments В. integrating sensory information coordinating voluntary and involuntary activities directing activities that continue for extended periods such as growth and pregnancy regulating or controlling peripheral structures and systems 6. Which statement is **TRUE** about sleep? It is an easily reversible state of inactivity. В. It is characterized by lack of interaction with the external environment. C. Sleep is now considered an active state, requiring neuronal activity. D. During a sleep cycle a person alternates between REM sleep and deep wave sleep. Œ.) All of these statements are true. 7. On which lobe would one expect to find the primary sensory cortex? Frontal (B.) Parietal Occipital D. Temporal. 8. Select the statement that is most correct. Ganglia are collections of neuron cell bodies in the CNS that are associated with efferent fibers. В. Efferent ganglia are not associated with the autonomic system. C. The dorsal root ganglion is a motor only structure.

The spinal cord has grey matter on the: 9.

D.,

E)

outside, white matter on the inside, and a dorsal motor root inside, white matter on the outside, and a ventral motor root inside, white matter on the outside, and a dorsal motor root

Ganglia exist outside the spinal cord. **

The cell bodies of afferent ganglia are located in the spinal cord.

10.	At re A. B. C. D. E.	sting membrane potential: the membrane is more permeathe membrane is more permeathe Cl is at its equilibrium potent both A and C above Both B and C above	able to N	∵ than to la⁺ than t	Na⁺ o K⁺			
11.	distin	ien retrieved alive from a crashe et but similar structure to epiner nses in humans administered a p st?	hrine ha	s been is	olated, an	d named uf	o-epi. Whic	ch of the following
	A. E.	constriction of respiratory tub increase in fatty acids in the b decreased heart rate			B. D.	localized sv		lood glucose)
12.	Nicot A. B. C. D E.	inic receptors bind ACh and open monovale are found on skeletal muscles are identical throughout the ne A and B A, B, and C	at the ne	euromuse	s. cular junct			
13.	The ir A. C. E.	nterior of the cell becomes less n Action potential Absolute refractory period Relative refractory period	egative o	due to an B. D	influx of Repolar Depolar	ization	S.	
14.	Becau A. B. C. D E.	se of the presence of both activa be closed but capable of openi Be activated be closed and not capable of o All of the above answers are c None of these answers.	ng pening	inactiva	tion gates	, voltage-ga	ted Na [⊤] cha	nnels can:
15.	Which A D.	term below best describes an ex polarized repolarized	ccitable t	issue wh B. E.	en a resti depolari nonpola	zed	ne potential C.	is present? hyperpolarized
16.	The ou	ntermost connective tissue cover endoneurium epineurium	ing of sp B. E.	inal nerv endom epimys	ysium		, C.	perineurium
17.	Branch A. D.	nes that sometimes occur along the teleodendria hillock	he length	of an az B. E.	kon are ca synaptic synapse		(°C.)	collaterals
18.	An IPS A. B. C. D. E.	P is associated with: a change in sodium ion permea hyperpolarization opening of voltage-gated chanr lowering the threshold for an a All of these are correct answers	nels ction pot	tential to	occur			
19.	The all A. B. C. D. E.	or-none principle states that: all stimuli will produce identica all stimuli great enough to bring the greater the magnitude of the only sensory stimuli can activate only motor stimuli can activate	g the me e stimuli te action	inbrane to the great potential	o thresho iter the in Is			
20.	Major o	centers concerned with autonomics are located in the	ic contro	ol of brea	thing, blo	od pressure	, heart rate,	and digestive
	A. D.	medulla oblongata diencephalon		B. E.	pons cerebellu	m	C.	mesencephalon

21.	Which statement regarding CSF production and flow is correct? A. CSF is produced along the spinal cord? B. CSF is produced by meningeal cells./ C. CSF enters the meningeal layer through the cerebral aqueduct CSF flows inferiorly along the dorsal subarachnoid space of the spinal cord. CSF does not flow through the meningeal layers.
22.	In which of the following would the rate of impulse conduction be the greatest? A a myelinated fiber 20 microns in diameter B. a nonmyelinated fiber 20 microns in diameter C. a myelinated fiber 2 microns in diameter D. a nonmyelinated fiber 2 microns in diameter E. a nonmyelinated fiber 25 cm long
23.	In a condition known as hypocalcemia, the level of calcium ions in the blood and interstitial fluid is lower than normal. How would this condition affect the function of the nervous system? A. Cholinergic synapses would be more active. B. Neurons would generate action potentials spontaneously. C. Less neurotransmitter would be released in response to an action potential. D. Depolarizing events would occur more frequently at the postsynaptic membrane. E. Potassium channels would fail to open.
24.	The dorsal root ganglia contain: A. axons of motor neurons C. cell bodies of motor neurons E. C and D B. axons of sensory neurons cell bodies of sensory neurons
25.	Astrocytes: A. induce formation of the blood-brain barrier B. are important in the repair of brain injuries and in neural scar formation C. take up excess K ⁺ from the brain ECF D. physically support neurons E. All of these answers are correct.
Mato	A. Dura mater C. Arachnoid E. Ventricles B. Pia mater D. Subarachnoid space
26.	The innermost layer of the meninges, delicate, contains many blood vessels.
27.	The weblike, spidery middle meningeal layer.
28.	The difference between electronic and saltatory conduction is that: Saltatory conduction requires the presence of myelin / B. during electronic-conduction-only-subthreshold-depolarizations are conducted — C. saltatory conduction is a graded event — D. in electronic conduction the amplitude of the signal gets smaller E. saltatory conduction only occurs near the cell body
29.	The cranial nerves that are involved in controlling eye movements are: A. I, II, and III (B) III, IV, and VI (C. II, III, and IV) D. II and VI (E. III and V)
30.	Which of these has a higher concentration in cerebrospinal fluid than in the blood? A. K ⁺ D. HCO ³ Ca ²⁺ Ma C. Ca ²⁺
31.	During the rising phase of the action potential: A. K ⁻ permeability is much greater than Na ⁺ permeability B. Na ⁺ permeability is much greater than K ⁺ permeability C. K ⁻ permeability is the same as Na ⁺ permeability D. Na ⁺ efflux occurs E. Two of these answers are correct.
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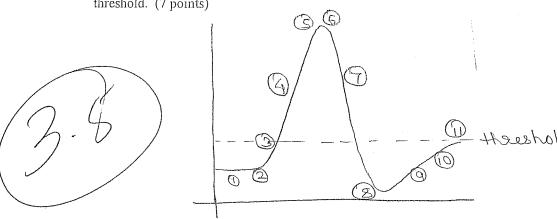
32.	The A. D.	third and fourth ventricles are central canal interventricular foramina	linked by B. E.	the: lateral ventricle medulla oblong		mesei	ncephalic aqueduct
33.	Exce A. D.	ess cerebrospinal fluid is draind jugular veins falx cerebri	ed into the (B. E.	: dural sinus cranial vein	(c.)	super	ior sagittal sinus
34.	Whice A. B. C. D. E.	ch of the following nerve fiber, an unmyelinated nerve fibe an unmyelinated nerve fibe a myelinated nerve fiber th a myelinated fiber larger th it is impossible to determin	r with con r smaller to e same siz an the ner	iduction velocity = 0 than the nerve fiber to as the nerve fiber we fiber in A	0.35 m/sec in A in A		
35.	Moto nerve	r innervation of the voluntary	swallowin	ng muscles and intri	nsic laryngeal	muscles	is by way of the
	(D.)	abducens hypoglossal	B. E.	vestibulocochlea vagus	a	C .	spinal accessory
36.	A sec A B. C. D.	ond nerve impulse cannot be g the membrane potential has the Na ions have been pump the K ions have been pump All of the above are correct	been rees bed back in ed back ou	tablished nto the cell			
37.	Grade A. B. C. E.	ed potentials: are local changes in membra serve as short-distance signa serve as long-distance signa both A and B both A and C	als>	ial that occur in var	ying degrees o	f magni	tude
38.	The ic A. D.	on needed to initiate the release sodium chloride	e of acetyl	choline into the syn B. potassiun E. HCO ³⁻		(C)	calcium
39.	Interned A. B. C. D. E.	eurons: are found only in the central carry only sensory impulses carry only motor impulses only connect motor neurons are found between neurons	to other n	notor neurons			
40.	The br A. B. C. D. E.	ainstem consists of the: cerebrum, pons, midbrain, a midbrain, medulla, and pons pons, medulla, cerebellum, a midbrain only diencephalon, midbrain and	nd midbra				
41.	Target A. B. C. D. E.	receptor for preganglionic ner acetylcholine norepinephrine cholinergic nicotinic recepto adrenergic receptor cholinergic muscarinic recep	r				
₹ 2.	Motor i	innervation of the voluntary sv	vallowing	muscles and intrin	sic laryngeal m	nuscles i	s by way of the
`	A. D.	abducens hypoglossal	В. Е.	vestibulocochlea vagus		C.	spinal accessory

43.	If the suppl A. B. C. D. E.	e ventral root of a spina lies? complete loss of sen a complete loss of v loss of neither sensa a complete loss of so only loss of sympath	sation oluntary moveme tion nor moveme ensation and mov	ent ent but on			sue or 1	egion that 1	nerve ·
44.	The to A. B. C. D. E.	wo divisions of the effe somatic motor neuro somatic motor neuro the sympathetic and voluntary nervous sy visceral nervous syst	ns and voluntary ns and autonomi parasympathetic estem and somatic	neurons c neurons divisions c motor n	S X eurons X				
45.	Myeli A. B. C. D.	the myelin insulates channels only have to voltage is not lost throf saltatory conduction. All of these answers	the axon o open at the nod ough and along i	es					
46.	Postga A. C. (E)	anglionic fibers of autor myelinated located in the brain unmyelinated	nomic neurons an B. D.	· larger	: than preganglio d in the spinal c		5		
47.	Pregar C.N.:	nglionic fibers of parasy	mpathetic neuro	ns can be	found in all of	the follo	wing cr	anial nerve	s, <u>EXCEPT</u>
	A. D.	III X	B. E	VII			C.	IX	
48.	Membra A B. C. D. E.	rane potential: refers to a separation and - charges in the E is measured in units o is less at the equilibric cannot be measured e All of these answers	CF and ICF. f millivolts with im potential for	the sign :	always designat	ing the cl	narge o		
19.	A. B. C. D. E.	natic motor neuron fire acetylcholine is releas a skeletal muscle is trithe response is always A and B A, B and C	ed from the axor ggered to contra excitatory	i termina ct	1 				
0.	Each pe	eripheral nerve provide motor A and/or B	s innervat	ion to spe B. E.	ecific structures sensory B and/or C		C.	tactile	

Short Answer Questions

Please answer these questions briefly. Label diagrams correctly, with lines pointing to the proper structures. Partial credit will be given where appropriate. Write legibly!! You can use the back of the last page to continue any question. Number them, please!!

51. Draw and completely label a graph showing what would happen to the resting membrane potential if the sodium/potassium pumps were made non-functional and immediately after the nerve was stimulated to threshold. (7 points)



- 1 Resting Membrane potential
- @ depolarising stimulus
- 3 threshold
- (gniecologed) yetre + all @
- 3 Isopotential
- toalseavo @
- (prisicolagos) tuo + A @

- noiteire la personation (+00 desubru)
- G absolute repartory period
- (10) relative refractory period
- 1 threshold stimulus
- You are walking to class, pondering the intricacies of physiology, when you trip over an uneven place in the sidewalk, and fall. Unhurt but embarrassed and angry, you jump up and glance around to see if anyone is watching. From your knowledge of neuroanatomy and function, explain how the following areas of the brain might be involved in this scenario: (3 points)
 - a. cerebrum -
 - b. cerebellum -
 - c. limbic system -
 - a) cerebrum didn't see the unever place in sidewalk brain cannot communicate about that place and fall.

b) Cerebellum - jump up

c) limbic system-embassised and angry (emotions)

Please answer only ONE of the following (A OR B). Circle the one you are answering. (3 points each)



Write out the Nernst equation and explain its significance. What is the equilibrium potential for an ion?

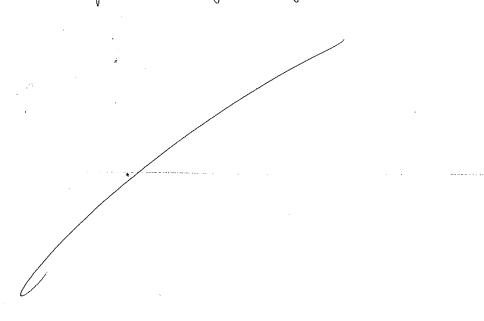
B. In multiple sclerosis, there is progressive and intermittent damage to the myelin sheath of axons of the central nervous system. One symptom is poor motor control of the affected area. Why does destruction of the myelin sheath affect motor control?



Z is the electrical charge of an ion.

Nearst equation gives the equilibrium potential at which an ion isnot permeable to enter the cell.

Equilibrium potential is the potential in which the potential of ions inside and outside will be equal. No flow of ions outside and inside.



54. List the anatomic and functional categories of neurons. (3 points)

Anatomic

Pseudounipolar

Sensory

bipolar

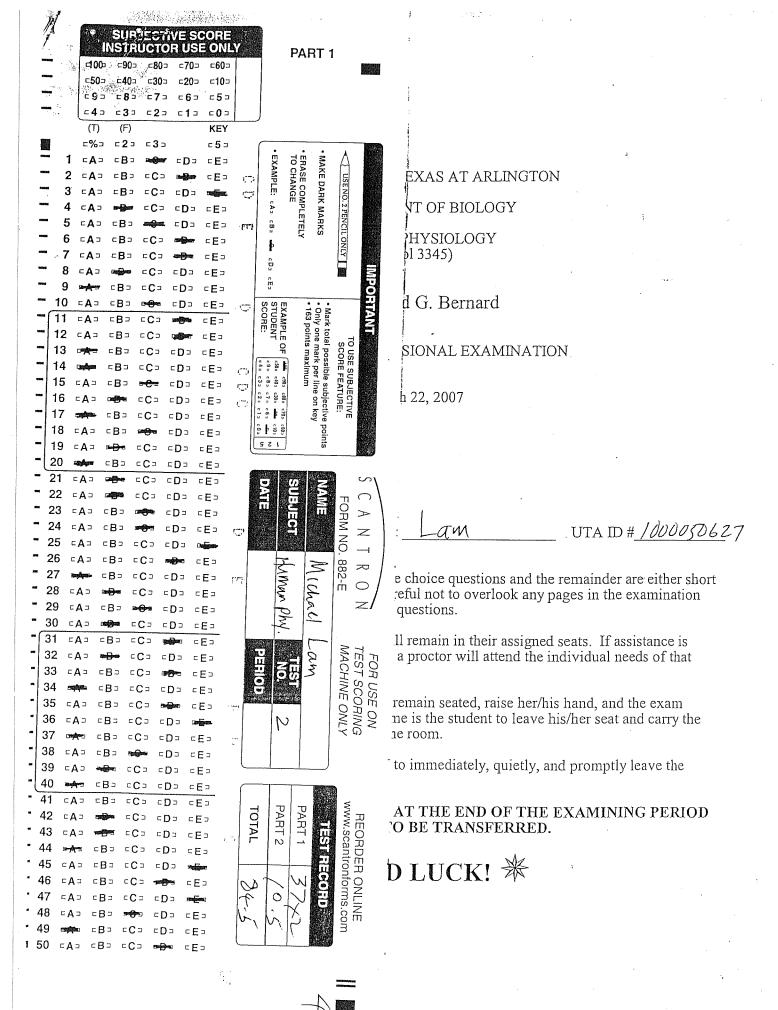
anoxomic

Multipolar

Superent neurons

55. Using ions, describe two ways a cell can become hyperpolarized. (2 points)

O Graded potential (kt influx)
Potential of



by answers or completions of the statement. Select the ONE lettered completion that is BEST in each case and write your selection in the lef beside the question. Each multiple choice question is worth 2 points. YO NOT HAVE TO ATTEMPT ALL THE QUESTIONS TO EARN 100 POI Branches that sometimes occur along the length of an axon are called: teleodendria synaptic knobs D. collaterals hillock synapse Amalien retrieved alive from a crashed UFO has had a thorough medical examination. A hormone with a distinct but similar structure to epinephrine has been isolated, and named ufo-epi. Which of the following responses in humans administered a physiological dose of ufo-epi would indicate it is indeed an epinephrine A. constriction of respiratory tubes hyperglycemia (high blood glucose) increase in fatty acids in the blood localized sweating decreased heart rate 3 Nicotinic receptors bind ACh and open monovalent cation channels. В. are found on skeletal muscles at the neuromuscular junction. are identical throughout the nervous system. A and B A, B, and C If the ventfal root of a spinal nerve were cut, what would be the result in the tissue or region that nerve complete loss of sensation a complete loss of voluntary movement loss of neither sensation nor movement but only autonomic control a complete loss of sensation and movement only loss of sympathetic information induce formation of the blood-brain barrier are important in the repair of brain injuries and in neural scar formation take up excess K- from the brain ECF physically support neurons All of these answers are correct. 6. The outermost connective tissue covering of spinal nerves is the: endoneurium В. endomysium C. perineurium epineurium E. epimysium 7.61. Graded potentials: are local changes in membrane potential that occur in varying degrees of magnitude serve as short-distance signals serve as long-distance signals both A and B both A and C 8. On which lobe would one expect to find the primary sensory cortex?
A. Frontal (B) Parietal C. Occ Occipital D. Temporal. The difference between electronic and saltatory conduction is that: saltatory conduction requires the presence of myelin during electronic conduction only subthreshold depolarizations are conducted C. saltatory conduction is a graded event D. in electronic conduction the amplitude of the signal gets smaller E. saltatory conduction only occurs near the cell body

Each of the numbered items or incomplete statements in this section

DIRECTIONS:

ich statement regarding CSF production and flow is correct? CSF is produced along the spinal cord CSF is produced by meningeal cells CSF enters the meningeal layer through the cerebral aqueduct CSF flows inferiorly along the dorsal subarachnoid space of the spinal cord CSF does not flow through the meningeal layers he dorsal root ganglia contain: axons of motor neurons axons of sensory neurons - on nerves CFfinel, cell bodies of motor neurons cell bodies of sensory neurons C and D 12. The interior of the cell becomes less negative due to an influx of sodium ions. Action potential В. Repolarization Absolute refractory period Depolarization Relative refractory period Which term below best describes an excitable tissue when a resting membrane potential is present? polarized depolarized В. hyperpolarized repolarized E. nonpolarized he third and fourth ventricles are linked by the: central canal lateral ventricles mesencephalic aqueduct interventricular foramina E. medulla oblongata 15 The subdurat space separates the arachnoid mater from the pia mater separates the pia mater from the dura mater separates the dura mater from the brain contains cerebrospinal fluid is between the vertebrae and the dura mater 16. Excess cerebrospinal fluid is drained into the: jugular veins dural sinus superior sagittal sinus D. falx cerebri cranial vein 17. A second nerve impulse cannot be generated until: the membrane potential has been reestablished B. the Na ions have been pumped back into the cell C. the K ions have been pumped back out of the cell All of the above are correct.. 18 In a condition known as hypocalcemia, the level of calcium ions in the blood and interstitial fluid is lower than normal. How would this condition affect the function of the nervous system? Cholinergic synapses would be more active. Neurons would generate action potentials spontaneously. Less neurotransmitter would be released in response to an action potential. Depolarizing events would occur more frequently at the postsynaptic membrane. Potassium channels would fail to open. 19. Which of these has a higher concentration in cerebrospinal fluid than in the blood? Ca2-HCO3-D. 20 Membrane potential: refers to a separation of charges across the membrane or to a difference in the relative number of + and - charges in the ECF and ICF. B. is measured in units of millivolts with the sign always designating the charge on the outside C. is less at the equilibrium potential for K than at resting membrane potential D. cannot be measured easily All of these answers

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21. The A B C. D. E.	all-or-none principle states that all stimuli will produce ide all stimuli great enough to the greater the magnitude of only sensory stimuli can accord motor stimuli can activities.	ntical action bring the mage of the stimutes the stimutes the stimutes action to the stimut	nembrane ili, the gr	to threshold will peater the intensity o	roduce iden f the action	tical action potential
Match each A. C. E.	with its function (Questions 22 Dura mater Arachnoid Ventricles	to 23):	B. D.	Pia mater Subarachnoid spa	ıce	
<i>Option</i> in the	innermost layer of the meninger	s delicate	contains	many blood years	P ,	
	weblike, spidery middle mening		C	**	· · · ·	with the second
***************************************			00	t + + + + + + + + + + + + + + + + + + +	V GVS	+
24 Moto	rinnervation of the voluntary s	wallowing				
A.	abducens — work — hypoglossal — torque	B.	vestibu vagus	llocochlea - hear - where organs		spinal accessory
25 Which A. B. D.	h statement is <u>TRUE</u> about sleet it is an easily reversible state. It is characterized by lack of Sleep is now considered an a During a sleep cycle a person All of these statements are tr	of inactive interaction of interaction of interaction of internates of internates of internates of inactive states of inactive	n with the	g neuronal activity		еер.
*26 Which A. B. C. E.	n of the following nerve fibers an unmyelinated nerve fiber an unmyelinated nerve fiber a myelinated nerve fiber the a myelinated fiber larger than it is impossible to determine	with condu smaller tha same size a n the nerve	action velun the ner as the ner as the ner	locity = 0.35 m/sec ve fiber in A ve fiber in A A	ity?	·
27 Postgr	inglionic fibers of autonomic no myelinated located in the brain unmyelinated	B.	larger th	nan preganglionic fi in the spinal cord	ibers A p~s	Ĕ
28. The tw A. B. C. D. E.	o divisions of the efferent side somatic motor neurons and vesomatic motor neurons and at the sympathetic and parasymp voluntary nervous system and the visceral nervous system and the sympathetic and parasympathetic and parasy	oluntary ne utonomic no athetic div somatic m	eurons eurons visions notor neu	rons		Sometic Sutisfic.
=29 The ion	needed to initiate the release of	of acetylch	oline into	o the synaptic cleft	is:	
A. D.	sodium chloride		В. 1	potassium HCO³-	F(C.)	calcium
30. A. A. C. D.	nal cord has grey matter on the outside, white matter on the in inside, white matter on the out inside, white matter on the out outside, white matter on the in	: side, and a side, and a side, and a	a dorsal n a ventral a dorsal n	notor root motor root notor root		
B.	es blocking the ability for retro The neuron is unable to produc The neuron is unable to produc The soma is unable to export p The soma is unable to respond The neuron is unable to depola	ce neurotra ce action p roducts to to change	insmitter: otentials: the syna s in the d	s. ptic knobs. istal end of the neu		on?

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		Arsi	PSP is associated with							
	,A1	A	a change in sodium ion p	ermeability						
		Z(B)	hyperpolarization							
		C. D.	opening of voltage-gated lowering the threshold for	channels						
, '		E.	All of these are correct a	r an action p nswers.	otenna	to occur				
	ำ	T								
	33.	A.	of the following is a function providing sensation of the	on of the nerv	ous sys	tem, EXCEPT:				
′		В.	integrating sensory information	mation	u exteri	iai environinents				
		Company	coordinating voluntary ar	nd involuntar	y activi	ties				
		·W/-	directing activities that co	ontinue for e	xtendec	periods such as g	growth a	and preg	nancy	
		1	regulating or controlling	peripheral st	ructures	and systems				
	34.		notor end plate is:							
		B.	a folded area of muscle co the same as the neuromus	ell membran	e with	Ch receptors clus	stered a	t the top	of each fold	
		C.	the same as the synaptic of	eleft						
		D.	formed by the membrane	of enlarged	axon ter	minals, or bouton	s, that l	ie on the	e surface of skeletal	
		E.	muscle cells							
			a special fibrous matrix w							
	35.	Prega C.N.:	nglionic fibers of parasympa	thetic neuro	ns can l	be found in all of t	he follo	owing cr	ranial nerves, EXCE	27
		A	Ш	B.	VII			C.	IX	
		(D.)	X		XII					
	36	ar. If a so	matic motor neuron fires an	action poten	itial the	en				
		Α.	acetylcholine is released f	rom the axor	ı termir	al .				
		B. C.	a skeletal muscle is trigge	red to contra	ct					
		D.	the response is always exc A and B	паюту						
		(E.)	A, B and C							
	37.	At res	ting membrane potential:							
		(A.)	the membrane is more pen	meable to K	than to	Na ⁻	Ac	ه مل = ـ	linergic	
	•	B	the membrane is more pen	meable to Na	ī than t	o K-	,. –		·	
		i D	Cl is at its equilibrium pot both A and C above	tential		0	− (:ö			
			Both B and C above				• ,-			
d.	3 8 :5:5:	≈ Target	recentor for preganationia							
•		A.	receptor for preganglionic racetylcholine	B.	noren	inephrine (cholin	ergic nicotinic recept	t O 1
		D.	adrenergic receptor	Ē.		ergic muscarinic	recepto	г	orgio intotime recept	.01
	3.9	The cra	anial nerves that are involve	d in controlli	n a 01/0	maramanta ana				
1240		A.	I, II, and III	(AB.)	ing cyc III. IV	and VI 3		C/	II, III, and IV	
		D	II and VI		III and	iv		7.	11, 111, 1111 1	
_	10	Maior o	centers concerned with autor	nomic contro	d of bro	athing blood pro	30.000 ls	aart vata	and disporting	
	24.20.000	activiti	es are located in the	nonne contre	or or ore	aumig, blood pres	ssure, n	earriate	e, and digestive	
	6	(A.	medulla oblongata		В.	pons		C.	mesencephalon	
1	,	D.	diencephalon		E.	cerebellum				
Y) A	1.	Major o	centers concerned with autor	nomic contro	l of bre	athing, blood pres	sure, h	eart rate	, and digestive	
		activitie A.	es are located in the							
		D.	medulla oblongata diencephalon		B. E.	pons cerebellum		C.	mesencephalon	
	2		./		، ساد	cerebenam				
4	2.		the rising phase of the action		. -	- a la 11 i 4a :				
	T T	(B)	K permeability is much gre Na permeability is much gr	cater than Na reater than K	perme	eability eability				
	*	C.	K permeability is the same	as Na perm	eability	· · · · · · · · · · · · · · · · · · ·				
		D. E.	Naf efflux occurs Two of these answers are or	-						
			- 1 VV (1 (1) LUCSE SILVADEC 970 07	M CF-C-1						

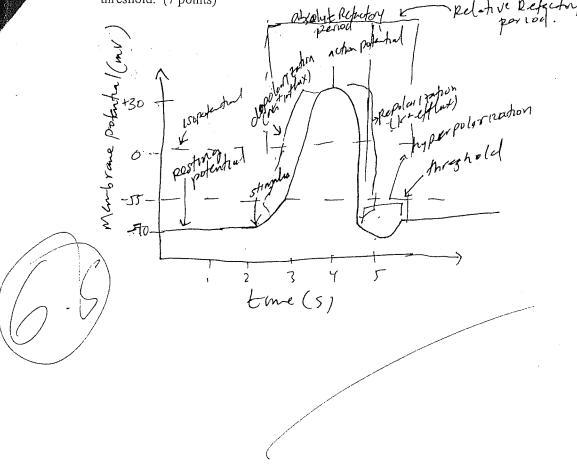
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		dugst tray!				9	
43.	Paras	1 Vinpathetic blocking agents wou		ul in t	eating:		
	A. D.	heart failure A and C	(B.) E.	high All o	blood pressure f the above	LC.	dian
44.	E.	nich of the following would the ra amyelinated fiber 20 microns a nonmyelinated fiber 20 micros i a myelinated fiber 2 micros i a nonmyelinated fiber 2 micro a nonmyelinated fiber 25 cm lo	in diamer ons in dia n diamete ns in dian	ter imeter r		atest?	
45	Myeli A. B. C. D.	nated axons conduct impulses methe myelin insulates the axon channels only have to open at a voltage is not lost through and of saltatory conduction All of these answers are correct	the nodes along my				pagent .
46.	B.	se of the presence of both activated be closed but capable of opening Be activated be closed and not capable of or All of the above answers are convolved.	ng pening	nactiva	ntion gates, voltage-ş	gated Na⁺ ch	annels can:
47.	Selection A. B. C. D. E.	the statement that is most correct Ganglia are collections of neuro Efferent ganglia are not associa The dorsal root ganglion is a m The cell bodies of afferent gang Ganglia exist outside the spinal	on cell bo ated with to otor only glia are lo	the aut struct	onomic system. ure.	ssociated wi	th efferent fibers.
48	A. B. D. E.	e of acetylcholinesterase is to: act as a transmitting agent amplify or enhance the effect of destroy ACh-a-brief period after stimulate the production of acet inhibit the release of acetylcholi	its releas	se by t	he axonal endings		
49	D.	are found only in the central ner carry only sensory impulses carry only motor impulses only connect motor neurons to o are found between neurons and the connect motor services.	ther moto	or neur	ons		
50.	A.	ripheral nerve provides in motor A and/or B		3.	ecific structures sensory B and/or C	C.	tactile

Short Answer Questions

ennswer these questions briefly. Label diagrams correctly, with lines pointing to proper structures. Partial credit will be given where appropriate. Write legibly!! on use the back of the last page to continue any question. Number them, please!!

Draw and completely label a graph showing what would happen to the resting membrane potential if the sodium/potassium pumps were made non-functional and immediately after the nerve was stimulated to threshold. (7 points)



52 You are walking to class, pondering the intricacies of physiology, when you trip over an uneven place in the sidewalk, and fall. Unhurt but embarrassed and angry, you jump up and glance around to see if anyone is watching. From your knowledge of neuroanatomy and function, explain how the following areas of the brain might be involved in this scenario: (3 points)

- a. cerebrum -
- b. cerebellum –
- c. limbic system -

Cerebrum - Involve in pondering about physiology

- involve of being emburrhosed because Dart of Cerebral
cortex required information about the fall of the frontal lobe
- involve in getting up because the sometomotor of the frontal lobe
(is being activated.

Cerebellum: Involve in movement as you wink + manning position

c) limbic system: also involve of per obtaining information of physiology from memory (combal gy, us)

Please answer only ONE of the following (A OR B). Circle the on 53. answering. (3 points each)

Write out the Nernst equation and explain its significance. What is the equilibrium potent

Be lumultiple selerosis, there is progressive and intermittent damage to the myelin sheath of axons central nervous system. One symptom is poor motor control of the affected area. Why does destruction of the myelin sheath affect motor control?



E = le 61 leg [won] out

[ron] in determines the charge inside

the cell + allow an idea of wh

equilibrium potential for

a stimulus is depolar 12cs the

Nat 15 - 90 mV

Cell + when repolar 12astron DILUIS.

Anatomic

Anatomic

O dendrifes

O cell bodies

O AXON

AXON

AXON

Axon ferminds

Anatomic

Functional

Functional

O receive incoming messages

O news integrate information to makes profein which genes it to axon

O convert signal Etal

Otherical—7 & locational

O there action potation

O selease newstangmenters

to supaptic cleft.

1) Efflux of kt: when kt become permeable, efflux of let make cell more negative.

(2) or influx of CI - making inside of cell more negative, thus hyperpolarized.

UNIVERSITY OF TEXAS AT ARLINGTON

DEPARTMENT OF BIOLOGY

HUMAN PHYSIOLOGY (Biol 3345)

Dr. David G. Bernard

SECOND INTRASESSIONAL EXAMINATION

March 22, 2007

3

First Name Masser	Last Name:	UTA ID #
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There are 55 items in this booklet; 50 are multiple choice questions and the remainder are either short essay questions or diagrams to be labeled. Be careful not to overlook any pages in the examination booklet. You have 80 minutes to complete these questions.

During the course of the examination students will remain in their assigned seats. If assistance is needed, the student should raise his/her hand and a proctor will attend the individual needs of that student.

Upon completion of the exam, each student is to remain seated, raise her/his hand, and the exam materials will be collected by a proctor. At no time is the student to leave his/her seat and carry the exam materials to the proctors or other areas of the room.

After collection of exam materials, the student is to immediately, quietly, and promptly leave the Examination Room.

NO EXTRA TIME WILL BE ALLOWED AT THE END OF THE EXAMINING PERIOD FOR ANSWERS TO BE TRANSFERRED.



DIRECTIONS: Each of the numbered items or incomplete statements in this section is followed by answers or completions of the statement. Select the ONE lettered answer or completion that is BEST in each case and write your selection in the left margin beside the question. Each multiple choice question is worth 2 points. YOU DO NOT HAVE TO ATTEMPT ALL THE QUESTIONS TO EARN 100 POINTS. The subdural space separates the arachnoid mater from the pia mater separates the pia mater from the dura mater separates the dura mater from the brain contains cerebrospinal fluid is between the vertebrae and the dura mater The motor end plate is: a folded area of muscle cell membrane with ACh receptors clustered at the top of each fold the same as the neuromuscular junction the same as the synaptic cleft formed by the membrane of enlarged axon terminals, or boutons, that lie on the surface of skeletal muscle cells E. a special fibrous matrix whose collagen fibers hold the axon terminal in proper position 3. The role of acetylcholinesterase is to: act as a transmitting agent Α. amplify or enhance the effect of ACh destroy ACh a brief period after its release by the axonal endings D. stimulate the production of acetylcholine E. inhibit the release of acetylcholine How does blocking the ability for retrograde flow in an axon affect the activity of a neuron? 4. The neuron is unable to produce neurotransmitters. The neuron is unable to produce action potentials. The soma is unable to export products to the synaptic knobs. The soma is unable to respond to changes in the distal end of the neuron. The neuron is unable to depolarize when stimulated. 5. Each of the following is a function of the nervous system, EXCEPT: providing sensation of the internal and external environments integrating sensory information coordinating voluntary and involuntary activities directing activities that continue for extended periods such as growth and pregnancy regulating or controlling peripheral structures and systems Which statement is **TRUE** about sleep? It is an easily reversible state of inactivity. → B. It is characterized by lack of interaction with the external environment. C. Sleep is now considered an active state, requiring neuronal activity. During a sleep cycle a person alternates between REM sleep and deep wave sleep. All of these statements are true. 7. On which lobe would one expect to find the primary sensory cortex? B. Parietal Frontal C. Occipital D. Temporal. Select the statement that is most correct. Ganglia are collections of neuron cell bodies in the CNS that are associated with efferent fibers. Efferent ganglia are not associated with the autonomic system. The dorsal root ganglion is a motor only structure. The cell bodies of afferent ganglia are located in the spinal cord. Ganglia exist outside the spinal cord.

9. The spinal cord has grey matter on the:
outside, white matter on the inside, and a dorsal motor root inside, white matter on the outside, and a ventral motor root inside, white matter on the outside, and a dorsal motor root outside, white matter on the inside, and a ventral motor root

10.	At re	esting membrane potential: the membrane is more permea the membrane is more permea Cl' is at its equilibrium potenti both A and C above Both B and C above	ble to N	C⁻ than t Ja⁺ than	o Na ⁺ to K ⁺			
11.	An a distir	lien retrieved alive from a crashed not but similar structure to epineplonses in humans administered a plast? constriction of respiratory tube	arine ha aysiolog es	is been i	solated, an	id named u oi would in hyperglyc	fo-epi. Wh: dicate it is i emia (high l	ich of the followin
	(E.)	increase in fatty acids in the bl decreased heart rate	ood		' D.	localized s	sweating	
12.	Nicot A. B. D.	binic receptors bind ACh and open monovalen are found on skeletal muscles a are identical throughout the ner A and B A, B, and C	it the ne	euromus	ls. cular junct	tion.		
13.	The ir A. C. E.	nterior of the cell becomes less ne Action potential Absolute refractory period Relative refractory period	gative o	lue to ar	n influx of Repolar Depolar	ization	1S.	
14.	Becau A. B. C. D. E.	se of the presence of both activate be closed but capable of openin Be activated be closed and not capable of op All of the above answers are con None of these answers.	g ening	inactiva	ition gates,	, voltage-ga	ated Na ⁺ cha	annels can:
15.	Which A. D.	term below best describes an exc polarized repolarized	itable t	issue wl B. E.	nen a restir depolariz nonpolar	zed	ne potential C.	is present? hyperpolarized
16.	The ou		g of sp B. E.	inal nerv endom epimys	ysium		C.	perineurium
17.	Branch A. D.	es that sometimes occur along the teleodendria hillock	e length	of an <u>a</u> B. E.	xon are cal synaptic synapse		C.	collaterals
18.	An IPS B. C. D. E.	P is associated with: a change in sodium ion permeable hyperpolarization opening of voltage-gated channe lowering the threshold for an act All of these are correct answers.	ls	ential to	occur			
19.	A. B. C. D.	or-none principle states that: all stimuli will produce identical all stimuli great enough to bring the greater the magnitude of the s only sensory stimuli can activate only motor stimuli can activate	the mer stimuli, action	nbrane t the grea potentia	o threshol	d will prod ensity of th	uce identica e action po	al action potentials tential
20.	Major c	enters concerned with autonomic s are located in the	control	of brea	thing, bloc	od pressure	, heart rate,	and digestive
	<u>A.</u>	medulla oblongata diencephalon		B. E.	pons cerebellur	n	C.	mesencephalon

21.	Which A. B. C. D.	statement regarding CSF pro CSF is produced along the s CSF is produced by mening CSF enters the meningeal la CSF flows inferiorly along t CSF does not flow through	pinal cord eal cells ependy yer through the co the dorsal subarac	wan erebral aqueduct hnoid space of the spina	ıl cord	j
22.	In whi A. B. C. D.	ch of the following would the a myelinated fiber 20 micror a nonmyelinated fiber 20 mi a myelinated fiber 2 microns a nonmyelinated fiber 2 mic a nonmyelinated fiber 25 cm	ns in diameter crons in diameter s in diameter rons in diameter		<u>:t</u> ?	
23.	In a co normal A. B. C. D. E.	ndition known as hypocalcem . How would this condition a Cholinergic synapses would Neurons would generate acti Less neurotransmitter would Depolarizing events would o Potassium channels would fa	ffect the function be more active. on potentials sport be released in resocur more frequent	of the nervous system? ntaneously. sponse to an action pote	ntial.	uid is lower tha
24.	The do A. C. E.	rsal root ganglia contain: axons of motor neurons cell bodies of motor neurons C and D	. (B. axons of send cell bodies o	sory neurons f sensory neurons	D-aff
25.	Astrocy A. B. C. D.	rtes: induce formation of the blood are important in the repair of take up excess K ⁺ from the br physically support neurons All of these answers are corre	brain injuries and ain ECF	l in neural scar formatio	n ·	
Matc	A. C.	n its function (Questions 26 to Dura mater Arachnoid Ventricles	27): B. D.	Pia mater Subarachnoid space	-	
26.	The inn	ermost layer of the meninges,	delicate, contains	many blood vessels.	Pib I	5
27.	The web	like, spidery middle meninge	al layer.			
28.	(A.) B.	erence between electronic and saltatory conduction requires during electronic conduction is a grade a grade on electronic conduction the analtatory conduction only occupations only occupations.	the presence of m only subthreshold ed event nplitude of the si	yelin depolarizations are cor gnal gets smaller	ducted	
29.	A. I	ial nerves that are involved in , II, and III (I and VI		and VI	C. II, III,	and IV
30.	A. F	Tthese has a higher concentrat C ⁺ ICO ³⁻	tion in cerebrospi B. • E.	nal fluid than in the blo HD Na ⁺	od? C. Ca ²⁺	
31.	A. K B. N C. K D. N	te rising phase of the action portion permeability is much greated are permeability is much greated permeability is the same as lated after the same as lated as late	er than Na ⁺ perme ter than K ⁻ perme Na ⁺ permeability			

Dr. Bernard - Human Physiology Exam 2-3 - Spring $2007 - Page\ 3$ of 8

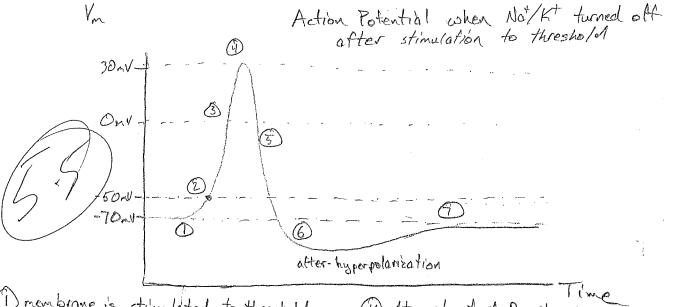
32.	The A. D.	third and fourth ventricles are lincentral canal interventricular foramina	nked by ti B. E.	he: lateral ventricles medulla oblongata	C.	mesencephalic aqueduc	t
33.	Exce D.	ess cerebrospinal fluid is drained jugular veins falx cerebri	into the:	dural sinus cranial vein	C.	superior sagittal sinus	•
34.	Whice A. B. C. D. E.	ch of the following nerve fibers an unmyelinated nerve fiber an unmyelinated nerve fiber a myelinated nerve fiber the a myelinated fiber larger than it is impossible to determine	with conc smaller th same size n the nerv	luction velocity = 0.35 in an the nerve fiber in A as the nerve fiber in A e fiber in A	velocity? m/sec		
35.	Moto nerve	or innervation of the voluntary sv	vallowing	g muscles and intrinsic l	aryngeal n	nuscles is by way of the _	
	A. D.	abducens hypoglossal	, B. €.	vestibulocochlea vagus		C. spinal accessory	,
36.	A sec A. B. C. D.	the membrane potential has be the Na ions have been pumped the K ions have been pumped All of the above are correct	een reesta d back in	ablished to the cell		magnitude V	e g
37.	Grade A. B. D.	ed potentials: are local changes in membran serve as short-distance signals serve as long-distance signals both A and B both A and C	3	al that occur in varying	degrees of	G V	e.
38.	The ic A. D.	on needed to initiate the release of sodium chloride	of acetylc	holine into the synaptic B. potassium E. HCO ³⁻	cleft is:	C. calcium H	ora to
39.	Interne B. C. D. E.	eurons: are found only in the central n carry only sensory impulses carry only motor impulses only connect motor neurons to are found between neurons and	other mo	otor neurons			
40.	The br A. B. C. D. E.	ainstem consists of the: cerebrum, pons, midbrain, and midbrain, medulla, and pons pons, medulla, cerebellum, and midbrain only diencephalon, midbrain and me	> 1 midbrai	n			
41.	Target A. B. C. D. E.	receptor for preganglionic neuro acetylcholine norepinephrine cholinergic nicotinic receptor adrenergic receptor cholinergic muscarinic recepto		Ach 1	112		
42.	Motor i	innervation of the voluntary swa	llowing 1	nuscles and intrinsic lar	yngeal mu	iscles is by way of the	
1	A. D.	abducens hypoglossal	В. Е.	vestibulocochlea vagus		Spinal accessory	

	If the ventral root of a spinal nerve were cut, what would be the result in the tissue or region that nerve supplies? A. complete loss of sensation a complete loss of voluntary movement loss of neither sensation nor movement but only autonomic control D. a complete loss of sensation and movement E. only loss of sympathetic information	•
	The two divisions of the efferent side of the peripheral nervous system are: A. somatic motor neurons and voluntary neurons Somatic motor neurons and autonomic neurons the sympathetic and parasympathetic divisions D. voluntary nervous system and somatic motor neurons E. visceral nervous system and the involuntary nervous system	rct ina
	45. Myelinated axons conduct impulses much faster because: A. the myelin insulates the axon Channels only have to open at the nodes C. voltage is not lost through and along myelinated areas of saltatory conduction E. All of these answers are correct	
	46. Postganglionic fibers of autonomic neurons are usually: A. myelinated B. larger than preganglionic fibers C. located in the brain D. located in the spinal cord unmyelinated	
7	Preganglionic fibers of parasympathetic neurons can be found in all of the following cranial nerves, EXCE C.N.: A. III notes E. XII notes Soundic	<u>PT</u>
	48. Membrane potential: A. refers to a separation of charges across the membrane or to a difference in the relative number of + and - charges in the ECF and ICF. B. is measured in units of millivolts with the sign always designating the charge on the outside C. is less at the equilibrium potential for K ⁺ than at resting membrane potential D. cannot be measured easily E. All of these answers	
	49. If a somatic motor neuron fires an action potential, then A. acetylcholine is released from the axon terminal B. a skeletal muscle is triggered to contract C. the response is always excitatory D. A and B E. A, B and C	
	50. Each peripheral nerve provides innervation to specific structures A	
000 THAF V65	S S M III Occulomotor Eye Agail M	
FU6V	S Salivar S Salivar	(
ŠI.	Dr. Bernard - Human Physiology Exam 2 - Spring 2007 - Page 5 of 8	

Short Answer Questions

Please answer these questions briefly. Label diagrams correctly, with lines pointing to the proper structures. Partial credit will be given where appropriate. Write legibly!! You can use the back of the last page to continue any question. Number them, please!!

51. Draw and completely label a graph showing what would happen to the resting membrane potential if the sodium/potassium pumps were made non-functional and immediately after the nerve was stimulated to threshold. (7 points)



(1) membrone is stimulated to threshold Not/K purps turned off

@ At peak of A.P. We channels are inactivetop Kt channels are open

(2) at threshold potetial, there is a depolarization of trigger zone, Not channels activate and action potential starts

@ Repolarization Kchaunds start classing 6 After hyperpolonization - Kchannels closed Not channels reset to their resting position

Overshoot Not channels start closing inactivation of membrane returns to resting potential Kt channels start epents.

52. You are walking to class, pondering the intricacies of physiology, when you trip over an uneven place in the

sidewalk, and fall. Unhurt but embarrassed and angry, you jump up and glance around to see if anyone is watching. From your knowledge of neuroanatomy and function, explain how the following areas of the brain

might be involved in this scenario: (3 points) a. cerebrum

b. cerebellum

c. limbic system

Walking movement utilizes are bellen for ballance and amygdala in getem for muscle nemory". Folling sends information from proprioceptors and corebellum to track your position in space. Your feelings of emborssment and anger are centered in limbil system (onger specificall in any goldla). accesses cerebrum for planned action then transfers into to corebellum. arround also requires correbrum to process visual information. Dr. Bernard - Human Physiology Exam 2 - Spring 2007 - Page 6 of 8

- Please answer only ONE of the following (A OR B). Circle the one you are answering. (3 points each)
 - A. Write out the Nernst equation and explain its significance. What is the equilibrium potential for an ion?
 - B. In multiple sclerosis, there is progressive and intermittent damage to the myelin sheath of axons of the central nervous system. One symptom is poor motor control of the affected area. Why does destruction of the myelin sheath affect motor control?

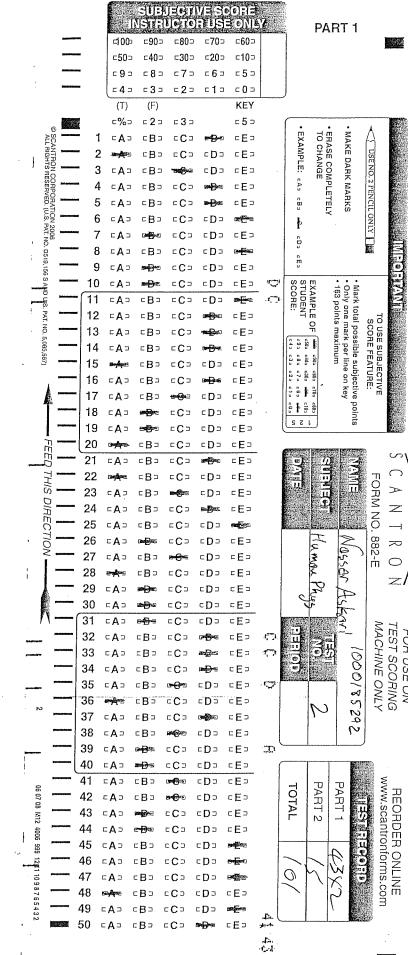


- $E = \left(\frac{GI}{Z}\right) \log \frac{[Ion]_{out}}{[ion]_{i}}$
- . The nemest equation is used to find the equilibrium potential of an ion. (Fion)
- Eion is the membrane potential at which the force due to the concentration gradient acting on an ion is equal to the force due to the electrical gradient.

54. List the anatomic and functional categories of neurons. (3 points) Anatomic Functional Bipolar Sensory Afteront neuron Unipolar Interneurona Pseudounipolar Motor Efferent neuron: Anakonic Multipolar 55. Using ions, describe two ways a cell can become hyperpolarized. (2 points) A cell can become hyperpolarized if there is · a net efflux of Kt ions o a net influx of CI ions (like in an IPSP)

51 continued

· Inactivating Not/K' pumps has no immediate effect on neurons ability to conduct an action potential.



UNIVERSITY OF TEXAS AT ARLINGTON

DEPARTMENT OF BIOLOGY

HUMAN PHYSIOLOGY (Biol 3345)

Dr. David G. Bernard

SECOND INTRASESSIONAL EXAMINATION-2

March 13, 2008

First Name Dicole	Last Name: Khalibi	UTA ID # <u>1000 54 6</u> 162
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There are 64 items in this booklet; 58 are multiple choice questions and the remainder are either short essay questions or diagrams to be labeled. Be careful not to overlook any pages in the examination booklet. You have 80 minutes to complete these questions.

During the course of the examination students will remain in their assigned seats. If assistance is needed, the student should raise his/her hand and a proctor will attend the individual needs of that student.

Upon completion of the exam, each student is to remain seated, raise her/his hand, and the exam materials will be collected by a proctor. At no time is the student to leave his/her seat and carry the exam materials to the proctors or other areas of the room.

After collection of exam materials, the student is to immediately, quietly, and promptly leave the Examination Room.

NO EXTRA TIME WILL BE ALLOWED AT THE END OF THE EXAMINING PERIOD FOR ANSWERS TO BE TRANSFERRED.



DIRECTIONS:

Each of the numbered items or incomplete statements in this section is followed by answers or completions of the statement. Select the ONE lettered answer or completion that is BEST in each case and write your selection in the left margin beside the question. Each multiple choice question is worth 1.5 points. YOU DO NOT HAVE TO ATTEMPT ALL THE QUESTIONS TO EARN 100 POINTS.

1.	The term that describes a neural pat	hway who	ere a single neuron is stir	nulated :	and synapses with many
	neurons, resulting in multiple responds. A. convergence D. polysynaptic	nses, is:	divergence reflex	C.	feedforward
2.	The fourth ventricle is associated wind A. interventricular tube both B and C	ith the: B. E.	medulla oblongata None of these.	C.	pons
3.	The region of the brain that is involved			lectual fi	unction as well as processing
	somatic sensory and motor information A. medulla oblongata D. diencephalon	ion is the: B. E.	: pons cerebrum	C.	mesencephalon
4.	Which term below best describes an A polarized D. repolarized	excitable B. E.	tissue when a resting me depolarized nonpolarized	embrane C.	potential is present? hyperpolarized
5.	These carry primarily efferent signal A. gray matter descending tracts	s from the B. E.	e brain: white matter propriospinal tracts	C.	ascending tracts
6.	The structure that separates the cochl A. tectorial membrane D. membranous labyrinth	lear duct (B E.	(scala media) from the ty basilar membrane stapedius	mpanic C.	duct (scala tympani) is the: bony labyrinth
7.	Receptors on postganglionic neurons A. muscarinic D. adrenergic	of the sy.	mpathetic nervous system nicotinic acetylcholine	ns are? C.	Both A and B
8.	The third and fourth ventricles are lin A. central canal D. interventricular foramina	iked by th B. E.	ie: lateral ventricles medulla oblongata	0	mesencephalic aqueduct
9.	Branches that sometimes occur along Collaterals D. axon hillocks	the lengt B. E.	h of an axon are called: axon terminals synapses	C.	dendrites
10.	The central nervous system-interprets stimulus intensity D. divergence	signal _é fré B. E.	equency, as: stimulus importance a reflex	C.	convergence
11.	The auditory cortex is located in the A. frontal lobe D. occipital lobe	B. E.	parietal lobe limbic lobe	(C)	temporal lobe
12.	Which of the following is NOT a targ A. smooth muscle adipose tissue All of the above are autonomic		nomic neurons? B. cardiac muscle D. exocrine gland		
13.	The interior of the cell becomes less not A. Action potential. C. Absolute refractory period E. Relative refractory period	egative d	ue to an influx of sodiun Repolarization Depolarization	n ions.	

14.	The primary motor cortex is located in the region A. temporal lobe D. cingulate gyrus	on of the B precentral gyrus E. corpus callosum	C.	postcentral gyrus
15.	After suffering a stroke, Mary find that she canndamage is in the area of the lobe. A. right frontal D. left temporal	not move her right arm. This left frontal occipital	s would sug	gest that the stroke
16.	Transduction involves: A. a stimulus altering the permeability of a B. changes in the transmembrane potential C. production of a receptor potential D. generation of an action potential that can All of the above are correct.	of the sensory receptor	ed by the C	NS
17.	Some of the fibers that form the spinothalamic to This type of injury would affect: A. motor function on the same side as the d B. motor function on the opposite side from C. sensory function on the same side as the D. Sensory function of the opposite side from E. Both A and C	amage n the damage damage.	ey decussate	e (cross) the midline.
Mato	ch each with its function (Questions 18 to 19): A. Action potential B. Depolarization C. Absolute refractory period D. Repolarization E. Relative refractory period			
18. 19.	The interior of the cell becomes less negative due. The specific period during which potassium ions permeability.			ge in membrane
20.	Which statements apply to the parasympathetic di A. It is dominant during "resting and digesting B. Its ganglia are nearby, within or on their to Epinephrine is the primary neurotransmit A and B E. A, B and C	ng." \ target organs.		
21.	Cerebrospinal fluid: A. is secreted by the arachnoid villi. B. enters the four ventricles after filling and is secreted mostly by the ependymal cells is formed mostly by the choroid plexuses E. is found beneath the pia mater	circulating through the suba ling the brain./	arachnoid s	pace
22.	The sympathetic nervous system is characterized by A. organs and by short postganglionic fibers B. organs and by long postganglionic fibers spinal cord and by short postganglionic fibers spinal cord and by long postganglionic fibers only involves one neuron	bers	he:	
23.	If the ventral root of a spinal nerve were cut, what supplies? Complete loss of sensation. A complete loss of voluntary movement. Loss of neither sensation nor movement by D. A complete loss of sensation and movement	/ ut only of autonomic contro		ion that nerve

24.	Sympathetic fibers leave the spinal cord in the: A. craniosacral regions, and the postganglionic fibers secrete norepinephrine B. thoracolumbar region and the post ganglionic fibers secrete acetylcholine C. craniosacral region and the postganglionic fibers secrete acetylcholine thoracolumbar region and the post ganglionic fibers secrete norepinephrine
(25.	An alien retrieved alive from a crashed UFO has had a thorough medical examination. A hormone with a distinct but similar structure to epinephrine has been isolated, and named ufo-epi. Which of the following responses in humans administered a physiological dose of ufo-epi would indicate it is indeed an epinephrin agonist? A. constriction of respiratory tubes B. hyperglycemia (high blood glucose) increase in fatty acids in the blood D. localized sweating E. decreased heart rate
26.	The site of origin of the preganglionic fibers of the parasympathetic nervous system is: A. The thoracolumbar region of the spinal cord. B. The higher brain centers. C. The sympathetic chain. The brain stem and the sacral region of the spinal cord.
27.)	If a neuron were experimentally placed in conditions where intracellular potassium were depleted, which of the following is a logical consequence? 1. The neuron would hyperpolarize. 2. There would be a reduction in the membrane potential. 3. The neuron would spontaneously "fire." A) 1 only B. 2 only C. 3 only D. 1 and 3
28.	Membrane potential: refers to a separation of charges across the membrane or to a difference in the relative number of + and - charges in the ECF and ICF. B. is measured in units of millivolts with the sign always designating the charge on the outside c. is less at the equilibrium potential for K ⁺ than at resting membrane potential cannot be measured easily E. All of these answers
29.	The motor end plate is: a folded area of muscle cell membrane with ACh receptors clustered at the top of each fold the same as the neuromuscular junction the same as the synaptic cleft formed by the membrane of enlarged axon terminals, or boutons, that lie on the surface of skeletal muscle cells a special fibrous matrix whose collagen fibers hold the axon terminal in proper position
30.	A shallow groove on the surface of the cortex is called a: Sulcus B. fissure C. gyrus D. furrow
31.	At resting membrane potential: A. the membrane is more permeable to K [*] than to Na [*] B. the membrane is more permeable to Na [*] than to K [*] C. Cl [*] is at its equilibrium potential both A and C above Both B and C above
32.	The brainstem consists of the: A. cerebrum, pons, midbrain, and medulla midbrain, medulla, and pons C. pons, medulla, cerebellum, and midbrain D. midbrain only E. diencephalon, midbrain and medulla

33.	
	A. an action potential may be initiated
	B. they may depolarize the membrane to the threshold voltage
	C. they may hyperpolarize the membrane
	D. they may be called EPSPs or IPSPs
	D. they may be called EPSPs or IPSPs All of these are true.
34.	
	A. larger the stimulus needed to stimulate a sensory receptor >
	B. fewer sensory receptors there are
	harder it is to discriminate the exact point of stimulation
	\vec{D} . larger the area of the somatosensory cortex in the brain that deals with the area χ
	E. closer together the receptor cells X
)
(35.,	Lystra is in an automobile accident and injures her spinal cord. She has lost feeling in her right hand and her
	doctor tells her that it is the result of swelling in spinal cord. Which part of her cord is likely to be
	compressed?
	A. the anterior gray horns
	B. the gray commissure x
	an ascending tract a descending tract
	D. a descending tract
	E. the anterior white commissure
36.	Which of the following is an important similarity between the endocrine system and the nervous system?
	A. The transmitters from both cause a change in target cells throughout the body
	B. Both involve both electrical and chemical aspects. X
	C. The speed of response is about the same ×
	D. Both transmit their compounds into the bloodstream.
	Both synthesize messenger compounds which are released outside the cell.
	Down by microstate measuringer compounds which are released outside the cen.
37.	Which is NOT true of a synapse?
5,.	A. Neurotransmitters affect postsynaptic neurons.
	(B) Neurotransmitters are released from dendrites.
	Neurotransmitters are released from dendrites. Many neurons may be involved.
	E. Receptors for neurotransmitters are located in the postsynaptic membrane.
(38.)	The cell bodies of motor neurons are located:
(30)	in the gray matter of the spinal cord
~	in the brain
	C. outside the spinal cord
	D. in the muscles
	E. next to the sensory terminals
\sim	E. next to the sensory terminals Frequence
(20)	We are able to penalize the
{ 39.//	We are able to perceive the <u>pitch</u> of a sound because:
Lange Contraction	A. the hammer, anvil, and stirrup vibrate at different speeds different parts of the basilar membrane vibrate at different frequencies of sound
	different parts of the basilar membrane vibrate at different frequencies of sound
	C. different parts of the tectorial membrane vibrate at different frequencies of sound
	D. the basilar membrane is stiff and narrow at the away from the oval window X E. the tympanic membrane vibrates more strongly at high pitches
	E. the tympanic membrane vibrates more strongly at high pitches
40	Tangahasantan f
40.	Target receptor for preganglionic neurons contain:
	A. acetylcholine
	B. norepinephrine
	C) cholinergic nicotinic receptor
	D. adrenergic receptor
	E. cholinergic muscarinic receptor
4.1	
41.	The ventral root ganglia:
	A. contain axons of motor neurons
	B. contain axons of sensory neurons
	C. contain cell bodies of motor neurons
	D. contain cell bodies of sensory neurons
	(E) do not exist

42.	A. are found at the neuromuscular junction of skeletal muscles B. may be located on the postganglionic fibers of the sympathetic nervous system C. are found in the parasympathetic nervous system D. bind ACh and open monovalent cation channels
	A, B, and C
(43. <i>j</i>	When compared to the spinal cord, the arrangement of white and gray matter in the medulla is similar, yet there are also significant differences. These differences include all of the following, EXCEPT: A. the arrangement of tracts and nuclei B. tracts passing through nuclei a lack of clear functional organization of the nuclei the absence of distinct regions of gray matter tracts crossing, merging, and branching
44.	The primary purpose of the auditory ossicles is: A. to equalize pressure in the middle ear to dampen vibration to amplify vibration to transmit otitis media
	E. None of the above are correct.
45.	What structures monitor rotational movements of the head? Cristae and the semicircular canals E. maculae of the saccule C. maculae of the utricle D. B and C E. All of the above are correct.
(46.)	Our perception of the pull of gravity and linear acceleration is the result of: A. changes in the pressure exerted by the cupula on hair cells: B. vibrations of the tectorial membrane striking hair cells: the pressure exerted by the otolithic organ on hair cells of the maculae: the movement of the otolithic organ within the ampullae of the semicircular canals None of the above are correct.
47.	The afferent and efferent axons together form the: A. central nervous system B. autonomic division system c. somatic motor division of the nervous system peripheral nervous system E. visceral nervous system
48.	Varicosities: A. are found the autonomic division B. are enlarged regions found along the axon C. store and release neurotransmitters D. A and B All of these answers are correct.
49.	The term axonal transport refers to: A. the release of neurotransmitter molecules from the axon the transport of microtubules to the axon for structural support vesicle transport of proteins and organelles down the axon the movement of the axon terminal to synapse with a new postsynaptic cell None of these are correct answers.
50.	In a condition known as hypocalcemia, the level of calcium ions in the blood and interstitial fluid is lower that normal. How would this condition affect the function of the nervous system? A. Cholinergic synapses would be more active. B. Neurons would generate action potentials spontaneously. Less neurotransmitter would be released in response to an action potential. Depolarizing events would occur more frequently at the postsynaptic membrane. E. Potassium channels would fail to open.

31.	A. providing sensation of the internal and external environments B. integrating sensory information C. coordinating voluntary and involuntary activities directing activities that continue for extended periods such as growth and pregnancy regulating or controlling peripheral structures and systems
52.	The difference between electronic and saltatory conduction is that: saltatory conduction requires the presence of myelin during electronic conduction only subthreshold depolarizations are conducted saltatory conduction is a graded event in electronic conduction the amplitude of the signal gets smaller saltatory conduction only occurs near the cell body
53.	Which statement regarding CSF production and flow is correct? A. CSF is produced along the spinal cord X B. CSF is produced by meningeal cells X C. CSF enters the meningeal layer through the cerebral aqueduct X CSF flows inferiorly along the dorsal subarachnoid space of the spinal cord CSF does not flow through the meningeal layers
Matc	h each with its function (Questions 54 to 57): A. This is a true statement only for the sympathetic division of the nervous system B. This is a true statement only for the parasympathetic division of the nervous system C. This is a true statement only for both of these divisions of the nervous system D. This is not true for either of these divisions of the nervous system
54.	The targets include smooth muscle, cardiac muscle, many exocrine glands, a few endocrine glands and some adipose tissue.
55.	Contains cholinergic neurons.
56.	Pathways have a single neuron originating in the CNS and projecting its axon to the target tissue.
57.	All axons are myelinated.
58.	If the dorsal root of a spinal nerve were cut, what would be the result in the tissue or region that nerve supplies? A. complete loss of sensation B. a complete loss of voluntary movement C. loss of neither sensation nor movement but only autonomic control D. a complete loss of sensation E. only loss of sympathetic information
-	· · · · · · · · · · · · · · · · · · ·

Please answer these questions briefly. Label diagrams correctly, with lines pointing to the proper structures. Partial credit will be given where appropriate. Write legibly!! You can use the back of the last page to continue any question. Number them, please!!

Imagine a neuron which has several hundred axonal knobs impinging on it. The majority of these axonal knobs are shown to be "firing." However, the neuron in question does not transmit an impulse. Give a valid explanation of why this could occur. (5 points)

it might be not to reach the threshold of the action Potential doesn't take place. 2nd, there are inhibitory interneuron inside He Spiral cord that decrease the transmission of impulse to go up to the cerebral

to identify.

Neurons are treated with a drug that instantly and permanently stops the Na,K-ATPase pumps. What happens to the resting membrane potential immediately and over time? (4 points)

if the Na, K-ATPase Pump Stops workings as we know the Concentration of Xtinside He cell is much more than outside and conc. of Nat is much more outside He can and less inside. Nai-katpase use ATP to move this ions Opposite to Heir Conc. gradient = immidiatly the kt diffuge our side He cen and No + diffuse inside He cell => inside He cell be an much non positive
61. Describe the paths a preganglionic sympathetic fiber may take to reach its synapse point with the post ganglionic neuron. (3 points)

the cell body of preganglionic symapathethic Riber is located in Spinal Lord the ganglion is placed outside the spinal cord the proganglion is short, and the post ganglionic sympathetic is long and anyeling and released Ach

and release no repinephine or epinephineal He target.

62. List the anatomic and functional categories of neurons. (3 points)

Anatomic

multipolar Bipolar

Hnaxonic

Pseudounipolar

Functional

Afferent (Sendory) efferent (motor)

intermedian neuron (interneuron)

63. NAME the cranial nerves that are purely sensory and NAME those that are involved with eye movement. (5 points) Sensory Eye Movement Olfactory I To oculamobor OPTIC I IV Trochlear VI Abducen Vesti boly each lear VIII 64. Contrast the somatic and autonomic nervous systems; mention at least three characteristics of each. (6 points) Acetylcholive is the neurotransmit it Blants from the CNS and good smail to target organ Some hic skeleral! musde autonomic nervous system short Preg. Pier -long Posting. Then

Para sympatheric rest or dige long preg. Fibr - Short Rest. g. In Reganglionic Piper Smooth muscle, andbarine gland, heart muscle Post ganglionic Pibu Synapse det 60 mich more Positive than resting membrane potential. and the cell going to Action parential.
after a while by phasic receptors the number of AP decrease but still the mip doesn't proceed.

2N

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RECTIONS:

Each of the numbered items or incomplete statements in this section is followed by answers or completions of the statement. Select the ONE lettered answer or completion that is BEST in each case and write your selection in the left margin beside the question. Each multiple choice question is worth 1.5 points. YOU DO NOT HAVE TO ATTEMPT ALL THE QUESTIONS TO FARN 100 POINTS.

1		· O ILL I EIVIN	ALLTHE	QUESTIONS TO	EARN 100 POIN
1.	The brainstem consists of the:				
,	cerebrum none midbasi	.			
F	cerebrum, pons, midbrai midbrain, medulla, and p	1, and medulla			
8	none medula caraballa	ons			
•	D. pons, medulla, cerebellu D. midbrain only	n, and midbrain		•	
	E. diencephalon midbrain a	•	and the second	- श्राहर क्षेत्रपुर 🔭 🔭	
· · · · · · · · · · · · · · · · · · ·	E. diencephalon, midbrain a	nd medulla		eral succ	
2. F	a b of the following is a family			* 5	
·	esh of the following is a function providing sensation of the	of the nervous	system, EXCE	PT	
В	0		ernal environm	ents	•
0	coordinating volume	ation			
	coordinating voluntary an	1 involuntary act	tivities		
Ĕ.	directing activities that co regulating or controlling p	TIPELLA Comment		as growth and pro	egnancy Chorm
3. Th	motor	Eligina l. 1. l.	•		•
B A.	motor	Anich pr	ings informatio	n to the central ner	TVOUS system is:
D.	autonomic	-	·	C. effe	
			natic	•	stent SA
4. <u>A</u> s	hallow groove on the surface of	the comment		tingt with w	ME
, (A,	sulcus anallow groote	THE COMEX IS CALL	ed at 1000		/
e.	gyrus Alatean	P/V VISS	ure do	i grows	
	gyrus platter ynov	z D. furr	ow -doey	groove	
datch each	with its function (Questions 5 to				L'
A.	Action potential	o):			
B.	Depolarization		ė.	* * * ₁	
C.	Absolute refractory period			9 - 11 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
D.	Repolarization				
E.	Relative refractory period				
/	•				
The i	interior of the cell becomes less i		2:1	``	
/	and cell becomes less i	egative due to a	n influx of sod.	ium ions. B Dr.	ornanahri
The s	pecific period during which pota	•			Mary J
perme	ability of the same which pota	ssium ions diffu	se out of the ne	uron due to a cham	
•	eability. D Reparament	. !		are to a chan	ige in membrane
<i>j</i>				All the developments of the second	
/ The al	leor none - in the				
Α.	l-or-none principle states that				
(a)	all stimuli will produce identic	al action potentia	ale		
And the second					Add (5), a suppose of (6) is a suppose of (6) in the suppose of (6
C.	the greater the magnitude of the	Stimuli the gra	to micsuoid M	III produce identica	al action potentials
D.	Will achair Sumuli can action	.,		ty of the action poi	rential
E.	only motor stimuli can activate	action note:	115	• • • • • • • • • • • • • • • • • • •	
	· · · · · · · · · · · · · · · · · · ·	action potentials			
Major c	enters concerned with autonomics are located in the	n			
act, vitle	es are located in the	control of brea	thing, blood pr	essure, heart rate	ligaction
CAN	medulla oblongata		•	, 4 3 W.\$34.	ligestive
-	diencephalon	පී. pons	and the second	_	

cerebe m

	1.	A. C.	Dh			±
1		7. Bernard - Human			Page 2 of 7	7
/ / / •	/ The	primary motor cortex is loca	ited in the region of the			
1/2	A.	temporal lobe		precentral gyrus	C posta	and the second of the second o
	D.	cingulate gyrus	E.	corpus callosum	c. postc	entral gyrus
1	,		The second secon			
10.	Whic	h statements apply to the pa	rasympathetic division	As the manual and	_	
	A					Λ.,
	B	Its ganglia are nearby, wi	thin or on the		+	7
\mathcal{D}	C	Eninenhrine is the ariman	min or on meir rarget	organs. John pic stir	t post c	. N /
,	D.	Epinephrine is the primar A and B	y neurogransmitter of	the parasympathetic div	vision.	>1 \(\to \)
	D.		- P	- arel	genoline	
	E.	A, B and C				
11.	Th				0.51	-41.6
11.*	ine st	ibdural space				
	A.	separates the arachnoid m	ater from the pia mater	thin mala,	•	_
		separates the pla mater fro	m the dura mater	The transfer and the Market and the	· · · · · · · · · · · · · · · · · · ·	on and a second
		separates the dura mater fr	om the arachnoid may	4 675 1.2 av - 621 5	F.	
1	(D)	contains cerebrospinal flui	q Saparalyn. 1	er piamana	\mathcal{A}	e standing of
	E.	is between the vertebrae ar	nd the diver mater			
/			W. the Gibia Higiel			•
12	The spi	inal cord has grey matter on	the			
(6)	X	outside white matter on the	uic;	<i>)</i>		
(80)	B .	outside, white matter on the inside, white matter on the inside, white matter on the	inside, and a dorsal r	notor root. / 🔩 🦳		** ** 1
	78	inside white matter on the	outside, and a ventral	motor root. V. Je do	rsal sens	iony rout
9	8/	inside, white matter on the	outside, and a dorsal n	notor root.		3
ئر.		outside, white matter on the	inside, and a ventral	motor root.	*	•
△ 13.		brospinal fluid:	2.54			
	A	is constant huid:				
	0 7	is secreted by the arachnoid	villi.	d	$lpha \sim \epsilon / \sin \gamma$	
	7	enters the four ventricles aft is secreted mostly by the end	er fillimg and circulating			•
<u>Q</u>		is secreted mostly by the epers formed mostly by the char	endymal cells ling the	braint /	moiu space	e Marine
	ا نور	s formed mostly by the chor	oid plexuses			
14. V If						
17. 11	me ver	ntral root of a spinal nerve w	ere cuit, what would b	e the result in the ticen	a or regional .	kt vivit
A.	upplies?				c of region that n	ierve
8		complete loss of sensation.		Vano		
₩ ¥	<i>, P</i>	complete loss of voluntary	movement.	Marie 18 1	T.	
C.	- 1	oss of neither sensation nor	movement but only a	autonomic control	146	
D.	. А	complete loss of sensation	and movement	autonomic control.	• •	
<i> </i>	lect the	statement that is most corre	ct:			
''' A.	ͺ G:	anglia are collections of neu ferent ganglia can be associ	ron celli bodica i- 45-	CATO		
(B)	∅ Ef	ferent ganglia can be associ	ated with the and	COS that are associated	d with efferent fi	ibers.
C.	Th	e dorsal root ganglion is a n	notes and the autonom	ic system.	AMIE	ere en la
>₽<	Th	e cell bodies of afferent con	olio only structure,	, .		
- '	_	e cell bodies of afferent gan	giia are located in the	spinal cord.		
16. Syn	nnatheti	C nervous system !- !		a a		
A.	Orn	c nervous system is character	erized by peripheral ga	anglia near the:	•	
n		The Public Dostyanging	Onic tithare		Dargon	m is close
$\overline{\mathcal{V}}$. urg	ans and by long postganglio	nic fibare	ord Pregnists	Legit Ord Ch	4
	spu	ial cord and by short postpa	nglionic fiber	lova position	(D)	m is closu
D	spir	nal cord and by long postgan	glioniic fibers			CIECC
1 m) —		\-	•		(A)	,
17. Rece	eptors of	n postganglionic neurons of	the sympathetic	311m manual -	1 AGN	
	MUS	carinic	D DELA		1 July	<i>y</i>
J		A and B	nicot	1.12-1.11	ACOV.	- 100 m
E.		1 2 .	adrer	ergic	والمراجع والمستخدمين والمراجع والمراع والمراجع والمراع والمراع وال	\mathbb{Z}_{Λ}
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All the continue	V 1	- pregenation = c	bolinos	within in	13.30	MISUM =
1 31 T		M. Sinh The A	Arms American	Chin	$\cdot P_{i}$	In Willy
* * * * * * * * * * * * * * * * * * * *	•	and the second second	4. PW.		10, 4 × 4 ±	THE SCOUNT

		Or. Bernard - Human Physiology Spring 2003 Exam 2 - Page 3 of 7
D	Syr A. B. C.	npathetic fibers leave the spinal cord in the: craniosacral regions, and the postganglionic fibers secrete norepinephrine thoracolumbar region and the post ganglionic fibers secrete acetylcholine craniosacral region and the postganglionic fibers secrete acetylcholine thoracolumbar region and the post ganglionic fibers secrete norepinephrine
19.	In a norm A. B. C. D. E.	condition known as hypocalcemia, the level of calcium ions in the blood and interstitial fluid is lower than nal. How would this condition affect the function of the nervous system? cholinergic synapses would be more active cholinergic synapses would be more active cholinergic synapses would generate action potentials spontaneously less neurotransmitter would be released in response to an action potential depolarizing events would occur more frequently at the postsynaptic membrane potassium channels would fail to open
20. · D	The A. B. C.	outermost connective tissue covering of spinal nerves is the: endoneurium endomysium perineurium epineurium
21.	Whice	ch of these effectors is NOT directly controlled by the autonomic nervous system? smooth muscle B. cardiac muscle skeletal muscle D. most glands
22.V 	A sec A.) B. C. D.	The membrane potential has been reestablished. The Na ions have been pumped back into the cell. The K ions have been pumped back out of the cell. All of the above are correct.
23.	The re A. B. C. D.	act as a transmitting agent amplify or enhance the effect of ACh destroy ACh a brief period after its release by the axonal endings Stimulate the production of acetylcholine
24.	Which B C. D.	Stimulus strength is encoded by action poteratial amplitude. Stimulus strength is encoded by action poteratial frequency. Receptor potentials are essentially the same as IPSPs. Subthreshold receptor potentials become germerator potentials
25. D	The sit A. B. C.	The higher brain centers. The sympathetic chain. The brain stem and the sacral region of the spinal cord. The brain stem and the sacral region of the spinal cord.
· 26.	Peptide	composed of amino acids various produced by cells in the adrenal glands derived from the amino acid tyrosine valipies various to cholester 1 various v

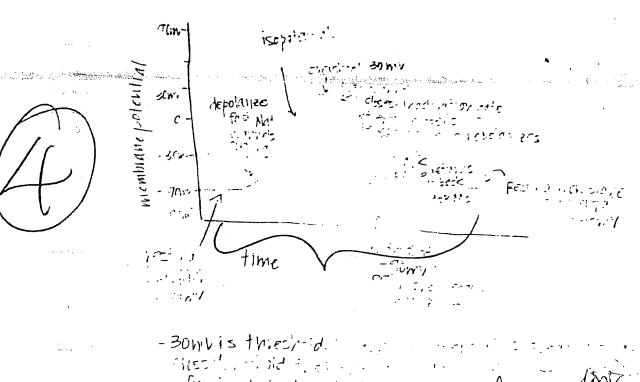
Dr. Bernard - Human Physiology Spring 2003 Exam 2 - Page 4 of 7 Each of the following statement concerning peptide hormones is true EXCEPT one. Identify the exception. peptide hormones are first synthesized as prohormones Á. prohormones can be activated before or after their release (B) C. peptide hormones remain in circulation for relatively short periods of time ~ peptide hormones are always found in the bloodstream bound to carrier proteins D. peptide hormones interact with receptors on the surface of their target cells E. Match each with its function (Questions 28 to 31): This is a true statement only for the sympathetic division of the nervous system Α. This is a true statement only for the parasympathetic division of the nervous system B. This is a true statement only for both of these divisions of the nervous system C. This is not true for either of these divisions of the nervous system D. 28. The targets include smooth muscle, cardiac muscle, many exocrine glands, a few endocrine glands and some adipose tissue. acetylcholive Contains cholinergic neurons. Pathways have a single neuron originating in the CNS and projecting its axon to the target tissue. All axons are myelinated. per pregaligioni If a somatic motor neuron fires an action potential, then acetylcholine is released from the axon terminal a skeletal muscle is triggered to contract F the response is always excitatory C. D. A and B A, B and C Hormones can alter cellular operations by changing all of the following, EXCEPT: ે 33. hormones from other endocrine glands changes in the genetic makeup of certain hypothalamic cells В. C. direct neural stimulation changes in the composition of extracellular fluid \sim D. releasing hormones from the hypothalamus E. All of the following are true of the endocrine system, EXCEPT: 34. releases chemicals into the bloodstream for distribution throughout the body Α. releases hormones that alter the metabolic activities of man different tissues and organs B. simultaneously / \mathcal{D} C, produces effects that can last for hours, days and even longer produces specific responses to internal stimuli D, ` functions to control ongoing metabolic processes & E. Which of the following is a change that may be caused by a hormonal stimulus? a change in the membrane potential the stimulation of genetic even resulting in protein synthesis В. an increase in enzymatic activity C. All of the above Cerebrospinal fluid circulates within the ventricles of the brain and in the su id space outside

the orain.

WE

Please answer these questions briefly. Label diagrams correctly, with lines pointing to the proper structures. Partial credit will be given where appropriate. Write legibly!! You can use the back of the last page to continue any question. Number them, please!!

Draw and completely label a graded potential and an action potential on a graph of membrane potential versus **37**.



for de marization of recesses severicing frequently Describe the paths a preganglionic sympathetic fiber may take to reach its synapse point with the post 38.

at nicotion cressery "listicolinic receptor is found on presi Postanting the Food lead andieleose noveticety in. in the reals All autonomi , in sories. consist of 2 no out in CNS, cickelle-

Dr. Bernard - Human Physiology Spring 2003 Exam 2 - Page 6 of 7

Neurons are treated with a drug that instantly and permanently stops the Na,K-ATPase pumps. What happens to the resting membrane potential immediately and over time? (5 points)

vesting membrane potential would not remain at -town since Na/Ft fump does not not against the natural gradest (K nigh outside cell, Na hay vaide cell). Therefore the this will eventual, 10 to C, the isopolonial to maintain equilibrium of charges at his defense to the first treath

plicin an graded potential or action potential occurs, there will be little or no effect stree the neuron is at any to begin with Even if the Nat channels open of Nat moves in, there is no concertation grades of for depotential to occur, therefore the other steps in not followers well

a 1000 or more action potentials before there will be a significant change in ion graduents.

40. Imagine a neuron which has several hundred axonal knobs impinging on it. The majority of these axonal knobs are shown to be "firing." However, the neuron in question does not transmit an impulse. Give a valid explanation of why this could occur. (5 points)

Event hough the axonal knows are firing it does not mean that

this all exchatory stimulus leps (s) Throw could also he minimized for person

yoursels from specifing on coat from closings: 11 that is the Harting Nat

41. NAME the cranial nerves that are purely sensory and NAME those at are involved with eye movement. (10 points)

Sensory

J Olfactory

I. Optic

Self
Soul'enictor

hochicar

aliduceris

III

DIRECTIONS: Each of the numbered items or incomplete statements in this section is followed by answers or completions of the statement. Select the ONE lettered answer or completion that is BEST in each case and write your selection in the left margin beside the question. Each multiple choice question is worth 2 points. YOU DO NOT HAVE TO ATTEMPT ALL THE QUESTIONS TO EARN 100 POINTS. 1. In what way does the interior surface of the cell membrane of a resting (non-conducting) neuron differ from the external environment? The interior is: positively charged and contains less sodium RNP negatively charged and contains less sodium negatively charged and contains more sodium positively charged and contains more sodium 2. If a neuron were experimentally placed in conditions where intracellular potassium were depleted, which of the following is a logical consequence? The neuron would hyperpolarize. 1. Vi low lyper ponce 2. There would be a reduction in the membrane potential. 3. The neuron would spontaneously "fire." 1 only 2 only 3 only 1 and 3 3. The spinal cord has grey matter on the: outside, white matter on the inside, and a dorsal motor root inside, white matter on the outside, and a ventral motor root inside, white matter on the outside, and a dorsal motor root D. outside, white matter on the inside, and a ventral motor root On which lobe would one expect o find the primary sensory cortex? Occipital D. Frontal Parietal Temporal. 5. The brainstem consists of the: cerebrum, pons, midbrain, and medulla midbrain, medulla, and pons В. C. pons, medulla, cerebellum, and midbrain Ð. midbrain only E. diencephalon, midbrain and medulla An IPSP is associated with: 6. cytosutition reside. A change in sodium ion permeability. Hyperpolarization — Opening of voltage-gated channels Lowering the threshold for an action potential to occur

In the autonomic nervous system: por - short post The sympathetic division is composed of short preganglionic and long postganglionic fibers. The parasympathetic division is composed of short preganglionic and long postganglionic fibers. C. The pre and psotganglionic fibers are of equal length in the sympathetic and parasympathetic divisions. The pre and postganglionic fibers are of equal length in the sympathetic division only. D.

you a ELVIN

8. Branches that sometimes occur along the length of an axon are called: collaterals В. synaptic knobs teleodendria A. E. hillock synapse D.

If the cell membrane were suddenly to become permeable to sodium ions for a brief moment: Loke Als A2+38:5 The cell would be hyperpolarized. The cell would lose positive charges. The internal concentration of Na⁺ would decrease appreciably. The membrane potential would become less negative. The difference between electronic and saltatory conduction is that: 10. Saltatory conduction requires the presence of myelin. During electronic conduction only subthreshold depolarizations are conducted. Saltatory conduction is a graded event. In electronic conduction the amplitude of the signal gets smaller. D. Saltatory conduction only occurs near the cell body. E. Match each with its function (Questions 11 to 12): Action potential 11 A. Depolarization \\ В. C. Absolute refractory period \(D. Repolarization 12 E. Relative refractory period 12 The interior of the cell becomes less negative due to an influx of sodium ions. $\rightarrow \beta$, β The specific period during which potassium ions diffuse out of the neuron due to a change in membrane K+ out permeability. 10 as may In which of the following would the rate of impulse conduction be the greatest? 13. = 500 of regular a myelinated fiber 20 microns in diameter a nonmyelinated fiber 20 microns in diameter nano - 9 109 nano. So timela a myelinated fiber 2 microns in diameter a nonmyelinated fiber 2 microns in diameter mill - 3 1000 mm E. a nonmyelinated fiber 25 cm long The ion needed to initiate the release of acetylcholine into the synaptic cleft is: 14. В. potassium calcium sodium Α. HCO3-E. chloride D. Major centers concerned with autonomic control of breathing, blood pressure, heart rate, and digestive 15. activities are located in the mesencephalon medulla oblongata pons Mills have the silver cerebellum diencephalon were to be a constant Graded potentials 16. produce an effect that increases with distance from the point of stimulation produce an effect that spreads actively across the membrane surface may involve either depolarization or hyperpolarization are all-or-none E. involve repolarization The subdural space separates the arachnoid mater from the pia mater separates the pia mater from the dura mater separates the dura mater from the brain - ? contains cerebrospinal fluid is between the vertebrae and the dura mater

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18.	If the	ventral root of a spinal nerve wer	e cut, wl	hat wou	ld be the result in t	he tissue	or regio	on that nerve	
	suppli	es?				CHAN	E		
0		complete loss of sensation					, T-:		
12	(B.)	a complete loss of voluntary mo	ovement		u antanamia aantro	VAC	Lail-	. 1	
\mathcal{D}	C.	loss of neither sensation nor mo			y autonomic contro	Ji	not 1	efferent	•
	D.	a complete loss of sensation an	a mover	nent 			V	efferent notor	
19.	In a co	ndition known as hypocalcemia,	the leve	lof calc	ium ions in the blo				
19.	norma	l. How would this condition affe	ct the fu	nction o	of the nervous system	em?			
	· A.	cholinergic synapses would be	more ac	tive	-		L S C S	ase a N7	
\int	B	neurons would generate action	potentia	ls spont	aneously				
		less neurotransmitter would be	released	l in resp	onse to an action p	otential '			
	D.	depolarizing events would occu	ir more i	frequent	ly at the postsynap	otic memb	rane		
	E.	potassium channels would fail						4 4 4	77- ·
		•							
20.	The au	ditory cortex is located in the	٠.					, (, , , , , , , , , , , , , , , , , ,	· × 3
~	A	frontal lobe	18.	parieta		C.) te	emporal	l lobe	
(')	D.	occipital lobe	E.	limbic	lobe				
		ge to the pyramidal cells of the co	orton the	t land to	the corticospinal	tract wou	ld direc	etly affect	
(21.)	Damag	ge to the pyramidal cens of the counderstand written words	исх ша	i icau ic	the cornection	traot mou	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
		perceive pain							
0	<u>(a.)</u>	performance of voluntary moto	r activit	v					
K	D.	hearing		,					
40	2E.	both A and C						•	
	Jan.	both / t and c							
22.	The all	-or-none principle states that							
۰ م	X	all stimuli will produce identica	al action	potenti	als				
13	(B.)	all stimuli great enough to bring	g the me	mbrane	to threshold will p	produce id	dentica	l action potent	tials 🗠
K	X.	the greater the magnitude of the	e stimuli	, the gre	eater the intensity	of the act	ion pot	ential	
	D.	only sensory stimuli can activate	te action	potenti	als				
	E.	only motor stimuli can activate	action p	otentia	S				
00	Coloat	the statement that is most correct	t•						
23.	V	Ganglia are collections of neuro	on cell-b	odies ir	the CNS that are	associate	d with	efferent fibers	3.
_	(B)	Efferent ganglia can be associa	ted with	the aut	onomic system.	-			
`D		The dorsal root ganglion is a m	otor onl	y structi	ire.				
		The cell bodies of afferent gang	glia are l	located	in the spinal cord.				
	200.								
24.	Sympa	thetic fibers leave the spinal core	d in the:						
	-A-	Craniosacral regions, and the p	ostgang!	lionic fi	bers secrete norep	inephrine	•		
7	В.	Thoracolumbar region and the	post gan	glionic	fibers secrete acet	yicholine	•		
	S.	Craniosacral region and the pos	stganglio	onic fibe	ers secrete acetylci	nomne. i	n a		
((D.)	Thoracolumbar region and the	post gan	glionic	fibers secrete nore	epmepmi	16.		
2.2		nnterograde transport of a neurot	ronio en	hetance	in a sensory nerve	e from the	e hand	to the cell bod	ly (a
25	Rapid	anterograde transport of a neuron	Tobic su	DStance	ill a schsoly herve	o mom cm	, ,,,,,,,		5 (
()	distanc	e of 40 cm) will take how long?		B.	2 days	Υ	-	3 weeks	
AND,	(A.	1 hour		D. B	6 months	-4	Ň.		
7	7	4 months		-Auce-	o mondio				
26	When t	wo or more graded potentials ar	rive at tl	ne trigge	er zone of a neuro	n's axon,	their e	ffects are addi	itive an

Spatial occurs.
Summation.

Please answer these questions briefly. Label diagrams correctly, with lines pointing to the proper structures. Partial credit will be given where appropriate. Write legibly!! You can use the back of the last page to continue any question. Number them, please!!

27. Define neurotransmitter. What are the different classes of neurotransmitter. Name two (2) from each class. (10 points)

* A neuvotransmitter is a substance that can elicit à the same phisiological event everytime ut is released. It should be released by the presynaptic neuron & after the post synaptic neuro The neuro hangemitter should be able to be blocked by the same natural processes it elicits The 5 clasess are H Acetylcholine - It has its one class @ Anino acids -> GABA, glycine, glutamoth Amino acid derived catecholomines (NE, E & Amines —) setatonin & Historiane Dopamine Polypeptides -> CCK, Endorphino, Brady Livian. What forces maintain a steady state "resting" membrane potential? (5 points) RMP concentration gradient for ions (Noit, ktc The membrane permeability to those ions

29. If the intracellular concentration for sodium is doubled, what would the Nernst potential for sodium be? (5 points) 66+ 2015/100 points and 115/100 points

Eion = 60+log Cout

60 log [454m] = [41.05 Mm]

150 \$ 5

30.	A drug that blocks ATPase is introduced into an experimental neuron preparation. The neuron is then repeatedly stimulated, and recordings are made of the response. What effects would you expect to observe and why? (5 points)
	the cell (neuvon) would not be
	able to completely come to
	the Deetma includes and Rotential
	1 ps har perpolarization be
+	1- 11 + ATPase Per nul That MISTONES
th	e RMP potential, so eventually motorine
31.	NAME the cranial nerves that are purely sensory and NAME those at are involved with eye movement. (10 points)
) S	Sensory Eye Movement
9. S 9. M M	Odfactory (CNI) (Oculomotor (CNIII)
T Mix	2) optic (CNII) 2 Ab Lucens (CNII)
- Mix	3) Vestibulo (CN VIII) Trock c'an
'sen 1 Mix	Ives tibulochochlear.
1 mix.	Visitor Kockless
(SALLY	(G_{1}, G_{2})
- .	
32.	How is the action of neurotransmitters terminated? (3 points) Neuro transmitters can eith er be broken
())do	wh for example Nt is broken down by
	or they can be recycled for use oragin
33.	List four (4) different types of glial cells, and briefly explain the role of each. (10 points)
Wiri	trogliaticals & are in CNS they are special immune cells to
(Q2) SA	walker cells - are in the PNS to the
I 5 Y Ulick	AND THE COURT OF THE PARTY OF T
ASV	vocytes - They supply return nutrients between the neuvons
	Dr. Rornard - Human Physiology Exam 2 - Spring 2004 - Page 5 of 6 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
C UPEI	I dy my/ cells -> cause the Blood Brain Barrier & help in man

Describe the path sound must takes to reach the inner ear. (7 points) me external pinha directs the sound wowes Anto the ear cand which passes the suphanic membrane & then causes vibrations brations through the malleus rand her reaches the stapes t Trace the path of cerebrospinal fluid from its point of production until it is reabsorbed into the blood. (5 obu points) the production of the CSF is in the thoroid plexes of the 4 ventricles, they come into contact with the blood thron the ependent cells that recycle How is grey matter different from white matter? (5 points) grey matters contains dendrites & axon the white matter has only they myetinated.

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DIRECTIONS:

Each of the numbered items or incomplete statements in this section is follow by answers or completions of the statement. Select the ONE lettered answer completion that is BEST in each case and write your selection in the left mar beside the question. Each multiple choice question is worth 2 points. YOU D NOT HAVE TO ATTEMPT ALL THE QUESTIONS TO EARN 100 POINT

		TAIL QUESTIONS TO	EARN 100 POIN
11.	In what way does the interior surface of the cell membrathe external environment? The interior is:	ane of a resting (non-conduct	ing) neuron differ fr
	Dositively charged and contains less radium	Na ⁺	3Na+ 10
(2)	(b) negatively charged and contains less sodium	***********	* * *
		X	2Kt out.
	positively charged and contains more sodium	+++	
(2) 2.	Which statements apply to the parasympathetic division	- 	
	"" " " " " " " " " " " " " " " " " " "		
	D. Its ganging are nearby, within or on their target	roant Militar in a feather	
* 5	C. Epinephrine is the primary neurotransmitter of t A and B A. B and C	he parasympathetic division	Ennishme 1
7 -			Sate Acoutrace
	E. A, B and C	Mich South Speciff	Sympathetic to
3 3.✓	If a neuron were experimentally placed in conditions wh	one factors of the transfer	0 7
	If a neuron were experimentally placed in conditions wh the following is a logical consequence?	ere intracellular potassium w	ere depleted, which (
	1. The neuron would hyperpollarize 7304	1	
	2. There would be a reduction in the memb	rone notantial	7
Λ	IN A LOUI ON WOULD SHORT SHE AND IN CASE AND THE	,	-
n	(A.) I only		
	B: 2 only		•
	D. 1 and 3	•	·
4 4.~	The spinal cord has grey matter on the:	$\mathcal{F} = \mathcal{F}^{(1)}$	
<u> </u>	outside, white matter on the inside, and a dorsal n		
(2)	inside, white matter on the outside, and a ventral inside, white matter on the outside, and a ventral inside, white	notor root	
(3)	inside, white matter on the outside, and a ventral inside, white matter on the outside, and a dorsal n	motor root	
	outside, white matter on the inside, and a ventral i	motor root	•
_ ,	·	motor root	
,5·5.V	The brainstem consists of the:		
	A cerebrum, pons, midbrain, and medulla	Social Williams	
(27)	B.) midbrain, medulla, and pons		
<i>Y</i>	C. pons, medulla, cerebellum, and midbrain D. midbrain only	- TX	
		(E 1)	
	diencephalon, midbrain and medulla		6)
6 6.✓ 7	The ion needed to initiate the release of any 11		
,	The ion needed to initiate the release of acety scholine into sodium		
) shlorida	otassium (C.)	calcium
	E. H	CO ₃ .	
77./ C	m which lobe would one expect o find the primary sensor	v aartauli	
) A			_
	C.		D. Temporal.
8. V. S	ensory receptors that monitor the position of joints are cal	lade i la consta	
- A			sensory :
(A)	/ *DXUDINGBOUGES . C	roreceptors.	cremoreceptors Hou
(13)	in appear and a stating to the	amorecebrois	Retivates
\mathcal{O}	The state of the said of the		Changen
	The state of the s		CALL AND COM

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दम्यान विभाव

J.	₹ .⁄ 1	The outermost connective	ticelle covering of china	I mamua a to at			
(8)		A. endoneurium B.	endomysium		erineurium	(5)	
and the second	<i>y</i> *	inhibitor	•	<i>F</i>			epineuriun
910	A	in IPSP is associated with	44. 超级 医特殊性髓髓病 24. 26. 26. ·	· 不可以不可以 · · · · · · · · · · · · · · · · · · ·	nen 维和他一 的名词称()。	in able of the	do mount
4	P	a change in sodium	on permeability.			DE	eri'
•	ِ	hyperpolarization	crotod who and t			Α.	
	מ	opening of voltage-	old for an action muta	• • .		: K	' '
		. Jowering the thresh	old for an action potent	ial to occur			,
LE 11.	✓ In	the autonomic nervous sy	/stem:			•	
	A	 The sympathetic div 	vision is composed of st	hort preganglion	ic and long po	etganglionia fi	
	В.	. The puresymbilities	e division is composed.	OI SHOTT bregging	rlionic and lon	a nactoonalia.	1. ~,
Δ	C.	The pro and pacigar	nglionic fibers are of eq	ual length in the	sympathetic a	nd paragramen	hetia
1,	~	divisions.	•				IICEIC .
•	· D.	The pre and postgan	iglionic fibers are of eq	ual length in the	sympathetic d	livision only.	
12.	✓ If i	the cell membrane were su	iddenly to become nem		e eduli e i i i i de	ちょうない なんななな	ALL ELONG
	A.	The cell would be hy	voemolarized	e anie to south	n ions for a ori	er moment:	, %
	∕ .B.	The cell would lose	nositive charges	· .			set.
* \(\)	C	The internal concent	ration of Na would de	rease annreaich	.1		
* /	(D.	The membrane poter	itial would become less	negative.	ny.		
(12)13.V	/ As	econd nerve impulse cann	ot be commend				
,	−> A.	The membrane noten	itial has been reestablis				
	B.	The Na ions have bee	en pumped back into the	neu. a call			
X	B. C. D.	The K ions have been	pumped back out of the	o con.		C 110	
1	, D.	All of the above are o	correct.	ic ceri.		PNS	
	,				Sov	valo ANS tem?	- Para
(13)14.	Whi	ich of these effectors is N	OT directly controlled	by the autonomi	ic nervous syst	tem?	
ſ	A.	Surcout indecte	В.	cardiac mus	scle	Se you	
ر مرآ	₽C.	skeletal muscle	D.	most glands	3	0.	n '
14 15.~	The	difference between electr	onic and saltatory cond	tiction is that			e alla alla su
	Α.	Saltatory conduction i	requires the presence of	fmuelin		•	Marchenia (*)
	В.	During electronic con-	duction only subthreshe	old denolarizatio	one are conduc	tad	
	C.	Saltatory conduction 1	s a graded event.			Acu.	
1 '	D.	In electronic conduction	on the amplitude of the	signal gets sma	ller.		**
	E.	Saltatory conduction of	only occurs near the cel	I body.			er sign
Matak	s anch w		***				
17ADICI.	A.	vith its function (Question Action potential	15 16 to 17):		No, Rel	alive	
	В.	Depolarization				.)	
	С.	Absolute refractory per	riad		Λ		
	D.	Repolarization	1100				
	E.	Relative refractory per	ind		(
~~		resident of the state of the st	IOU		R		
7 15 16.	The in	sterior of the cell becomes	s less negative due to a	n influx of sodi	um ions		E. Carrier
171							
Email 1	betwe our st	secific period during which ability.	on potassium ions diffu	se out of the ne	uron due to a d	change in mem	brane
	CONTRACTOR AND			and the state of t		MCCHTCHII) s. f. publikappy un Williamsky juliumsky symbologie	A Section Section Control of the Con
1718.	dranci A	nes that sometimes occur				·	
	Α.	teleodendria	B.	synaptic know	h-7	C. c	ollaterals
, and a second	O.	hillock	Ĕ.	synapse			. Training the first that the second

10		while of the following would be	he rate of impu	lse c	onduction be the g	reatest?	
18	V (A	a myelinated fiber 20 mic	rons in diamete	r.			
$-\mathcal{J}_{-1}$	C	a nonmyelinated fiber 20	microns in dian	neter			
	accession of	a myelinated fiber 2 micro	ns in diameter	· 沙湾特.	之为的"产业财产财产"	Aidel Clarkmi	· [編][編][4][編][4][編][4][4][4][4][4][4][4][4][4][4][4][4][4]
	D. E.	w monning of material 11001 & 111	ucrons in diama	eter			
٠.,	Æ,	a nonmyelinated fiber 25 o	ern long				
ig 20.	✓ м	gior centers concern ad wild					
. 20.	901	ajor centers concerned with auto	nomic control	of bro	eathing, blood pres	sure, heart rat	e, and digestive
,	A.						,
· 🔈			F	3.	pons	C.	mesencephalon
, <u>, , , , , , , , , , , , , , , , , , </u>	D.	diencephalon	F	Ĭ.	cerebellum		osonoopnaion
aa 21 b	/ 0-	aded potentials				,	
20 21.	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	aced potentials					•
	, A.	produce an effect that incre	ases with dista	nce f	rom the point of st	imulation	
	 С.	broamon an officer mar 20168	ius activeiv acr	nee th	sa mamhanna air C	ice	
1 () Land	C.	may myorve entited debotal.	Zation or hyper	ซรถไดเ	rization / -		
	T.	are an or none	the transfer of the second	200	· · · · · · · · · · · · · · · · · · ·		Andrew Commencer
. •	_ <u>r.</u> _	involve repolarization				**	
	4 701						
22.	The	larger the receptive field, the:				· .	
	-A.	larger the stimulus needed t	o stimulate a se	nsor	V recentor		
		icwei sensory receptors their	e are				
C	# (E.)	harder it is to discriminate the	he exact point of	of stir	nulation	Same Age	•
	D .	ialger the area of the somato	sensory cortex	in th	e brain that deals	with the area	. %
	E.	closer together the receptor	cells		The state of the s	with the area	
							* MM
21.23.7	The.	subdural space		1		D.,	.0.4
つ',	Α.	separates the arachnoid mate	r from the nia	nater		Pi'c Arc	H O
<i>~</i>	В.	separates the pla mater from	the dura mater	11401		ρ.,	The same of the sa
()	C. D E.	separates the dura mater from	n the brain	1	•	1.0	
	(D)	contains cerebrospinal fluid	•			$\sim \Delta_{r}$	ich.
	E.	is between the vertebrae and	the dura mater			1,1	
		Weddings of a					
2224	If the	ventral root of a spinal nerve wies?	ere cut, what w	ould	he the result in th	e tionus or	
	suppl	ies?	, , , , , , , , , , , , , , , , , , , ,	0414	be the result in th	e nasue or reg	ion that herve
	Α.	complete loss of sensation	1				
O i	- В.	a complete loss of voluntary	novement				
	C.	loss of neither sensation norm	novement but o	nlv s	sites mia control		
	D.	a complete loss of sensation a	nd movement	111	dior diffe control	ينه الانتيام الانتهام الانتها الانتهام الانتهام ا	end Courses
123) 25:	The ro	le of acetylcholinesterase is to:					
	A.	act as a transmitting agent					
	B.	amplify or enhance the effect	of ACh				
1	·C.	destroy ACh a brief period aft	ér its releacaiks	, the	orional and district	Fatherau Wander of the	
	D.	Stimulate the production of ac	etvicholine	unc	axonai endings	and the second second second	The second s
			7				
24 26.	The au-	ditory cortex is located in the	ing (μ4 - <i>F</i>			· 16.	·
	Â.	frontal lobe	В.	n.	arietal lobe		
market.	D.	occipital lobe	E.		mbic lobe	C. 1	temporal lobe
		•	٠	113	1101C 100C		
25 27.	Select t	he statement that is most correc	+ •				
	A.,	Ganglia are collections of	s. On colliterate		0310		
	В.	Ganglia are collections of neur	on cen bodiss i	ii the	UNS that are ass	ociated with e	fferent fibers.
		Principle Ruleira can de associa	ted with the au	tonoi	nic system.		42
	1	The dorsal root ganglion is a m	otor on y struct	ure.			
/	/ ·	The cell bodies of afferent gang	gua are located	in th	spin	* *	Notal and a
		Dr. Bernard - Human Phys	tiology Fram	7 -	19, garigore and	lan de	
and the second second second	and the second	THE PARTY OF THE P	TABLE BOOK OF THE STATE OF THE	,/	37.72.	rye y PY	

]]	Da	amage to the pyramid	al cells of the	cortex that lea	d to the corticospin	al tract would	directly	aff e ct
T.	26 \	/ A.		tten words		brain Stem -	-> Feet		
44.00 K	26	C:	perceive pain	voluntary mot	or activity	en a company			
7.		(_b.	hearing		or activity (200)	The grain what over the con-	30克5克·加尔克门尔米斯加亚亚	Medital ac	HARMAN CO. S.
e de la companya de l		E.	both A and C						
27	′29. ~		e all-or-none principl						
		A.		produce identic	al action pote	entials			
100	,	в. С	the greater the n	enough to bring a gritude of the	ig the membra	ne to threshold will greater the intensity	l produce ider	itical acti	on potentials
(A)		B. C.	only sensory sti	muli can activa	ite action por	grener me mænsig misk	y of the action	potentia	.1
		E.	only motor stim	uli can activate	action poten	tials			
28			mpathetic fibers leave						
a teach	. 5	A. Marina	Craniosacral reg	ions, and the p	ostganglionic	fibers secrete nore	pinephrine.		
4 ()		С	Craniosacral reg	ion and the not	post gangnon stoanglionic f	ic fibers secrete ace	tylcholine	· *#* :=	1 中国和政政治的第三
XV		D.	Thoracolumbar	region and the	post ganglion	ic fibers secrete nor	epimephrine.		
29 3	31.	ln a	condition known as	hypocalcemia,	the level of c	alcium ions in the b	lood and inte	rstitial fle	uid is lower th
		norn	nai. How would this	condition affe	ct the function	n of the nervous sys	stem?	(7_ 1
		A. B.	cholinergic syna _l neurons would g	pses would be:	more active	g Colores	•		-a 1/
\mathcal{C}		Č.	less neurotransm	itter would be	released in re	sponse to an action	notential		V
		D.	depolarizing ever	nts would occu	r more freque	ently at the postsyna	ptic membras	ne	
		E.	potassium channe	els would fail t	o open				
N	/atch	each v	with its function (Que	estions 32 to 3:	5):			***************************************	
		A.	This is a true stat	ement only for	the sympathe	etic division of the	nerv∞ous system	m	
		B. C.	This is a true state	ement only for	the parasymi	pathetic division of	the mervous s	vstem	
		D.	This is not true for	ement only for or either of thes	both of these	divisions of the ne f the nervous system	rvous system		
			to the energy of						
/30) 3:	2.✔	The t	argets include smoot	h muscle, card	liac muscle, n	iany exocrine gland	ls, a few endo	crine gla	nds and some
, <i>,</i>		adipo	se tissue. autom	onuc NS	Sympother	e and privas	grapathetic	١.	
(31) 3:	3.~	Conta	ains cholinergic neur	ons. both	- Sympo	thehe and p	our symp	ithetic	
(32) 34	4.	Pathw	vays have a single ne						
D	_ ^			_		, -,		. Ber #103/4	145
* (33) 35	5. 2	All ax	cons are myelinated.	none					
36	5.4	Thu en	ranial narrus that are	invaluation		nd - Her oughts on person have been god supply to make on p	_		n and the second second
el.	, .	A.	ranial nerves that are I, II, and III	involved in co	ontrolling eye B,		耳, 亚, 亚		TY 277
中的		D.	II and VI		E.	III, IV, and VI III and V		C.	II, III, and I
37	.✓	Cenera	al properties of sense	ory recention is	nclude all of	ha fallowing FVC	ייייייייייייייייייייייייייייייייייייי		
À		Á.	stimulus artifact		B,	receptor	<u>cri;</u>	С	
`*		D.	afferent pathway		E.	integrating cente	r	Ų.	transducer
33,	√	The sp	ecial senses include	all of the follow	Wino TYAT	pyr.			
		i A	pain		B.	sight	°C.	minint.	G.T.
•	Ĭ	D.	equilibrium		E.	olfaction		gustati	UII
			Dr. Bernard - H	uman Physio	logy Exam	2 - Spring 2005	-Page 4 of 3	7.	

	11							
	11:	- · · ·	anterograde transport of a neurotr	onic substance	in a sensory nerve fro	om the hand	to the c	ell body (a
/	/j9.	Rapid	anterograde transport of a neuron	opio odobiano				
- 4	/	distanc	e of 40 cm) will take how long?		2 days		C.	3 weeks
	34	A.	1 hour					
	3. 45 A. 1 45 J. 14	D.	4 months	The Mark Company of the Company of t	176 months, a course	44) Year 1 1 1 1 1		Your Talk Transport Make
₹						11 nA	. 44	do
	40	If a sor	matic motor neuron fires an action	potential, the	n	409	W. sam	/das
(35)	70.	Α.	acetylcholine is released from th	e axon termin	al	6 /	٠	age data description
		В.	a skeletal muscle is triggered to	contract		800	n. est	
		C.	the response is always excitator,	Y		000	Not a	
E				•		w.		
0		D.	A and B		· · · · · · · · · · · · · · · · · · ·			
		E.	A, B and C			1		
	Match	each wi	th its function (Questions 41 to 4.	s):				
		Α,	Dura mater					
•		B.	Pia mater					
	the late of Marie	. C.	Arachnoid					
1875	THE THE THE	A Aleksani	Subarachnoid space	in the complete the income	ing partition of the second	territoria de la composición	e virgery	5.000 15.7% 经基础
		E.	Ventricles		•			*****
	••, ÷	E. Williams III.	V CITE ICIOS	- 5 yr 35 x m				94
		701	nermost layer of the meninges, de	licate contair	s many blood vessels			
(A)	41.	ine in		illouto, comuni				2 (1)
المع			illy, the cerebrospinal fluid flows	frault from th	e ventricle then into t	the .		
. 0	42.	Norma	illy, the cerebrospinal fluid flows	neery nom m	e vonition, mon mize	,	•	
* 🗸			Subarachnord space	1				* '
_	43.	The w	eblike, spidery middle meningeal	layer.				
\mathcal{L}			Avachnod					
_						, 0		
136	44.	Which	of the following is a change that	may be cause	d by a hormonal stimi	iius?		
()-/		A.	a change in the membrane poter	ntial				
		В.	the stimulation of genetic even	resulting in pr	otein synthesis			* * *
0		Ĉ.	an increase in enzymatic activit	у				
* *		D.	All of the above	i e general				e wit
يمعان	Me Barrie	Recent	tors on postganglionic neurons of	the sympathe	tic nervous systems at	re?		gare to his his Alberta
(37	/ + 3.	A .	muscarinic	В.	nicotinic	C.	Both	A and B
140 -				E.	acetylcholine			N.
T		D.	adrenergic	22.				
			ry receptors that respond to chang	ee in blood no	essure are called:			
	46.	Sensor		cs in blood pi	- baroreceptors	C.	chen	noreceptors
(0)		Α. ΄	nociceptors	D.	thermoreceptors			
(2)		D.	proprioceptors	E.	Metinoreceptors			
					mw/mmm.			
(39)47×	Each o	of the following is a function of the	ie nervous sys	tem, <u>EACLE 1:</u>			
		Λ .	providing sensation of the inter	nal and exterr	ial environments			
,	Section of the section of	В	integrating sensory information		and the factor and the			
	. 2	C.	coordinating voluntary and inv	oluntary activ	ties			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
*D		D.	directing activities that continu	e for extended	periods such as gro	and pregr	iancy	
		E.	regulating or controlling periph	eral structure.	s and systems			
	* * .	٨.,	regulating or controlling parties	(1)			•	
	48.	ĭ 1.5120	is in an automobile accident and	injures her sr	ingleard She has	e log in	her rig	ht hand and her
	45,					,	likely	
			tells her that it is the result of sv	enus a som	as every, writibile	Q 18	iy	
		compr						
C		Α.	the anterior gray horns					
Compa		В.	the gray commissure					
		\$ 13 m	a descending tract -> A h	- 10 m	M. M.			
		D.	a descending tract -> No.	nch. H				,
		E.	the anterior white commissione					
				w +=-			~	
	2 29		Dr. Bernard - Human 'by:	oology Exar	a 3 - Sr.	or '	£ .	The second of the second of the second

49. The following are the steps involved in a reflex arc

- 1. activation of a sensory neuron
- 2. activation of a motor neuron
- 3. response by an effector
- 4. arrival of a stimulus and activation of a receptor
- information processing

The proper sequence of these steps is:

- -A. 1, 3, 4, 5, 2
- B. 4, 5, 3, 1, 2
- **4**, 1, 5, 2, 3
- D. 4, 3, 1, 5, 2
- E 3, 1, 4, 5, 2

39 50. When two or more graded potentials arrive at the trigger zone of a neuron's axon, their effects are additive a summation occurs.

temporal temporal

Each of the numbered items of incomplete statements in this section is for DIRECTIONS: by answers or completions of the statement. Select the ONE lettered answer completion that is BEST in each case and write your selection in the left many beside the question. Each multiple choice question is worth 2 points. YOU Do NOT HAVE TO ATTEMPT ALL THE QUESTIONS TO EARN 100 POINTS. 1. Membrane potential: refers to a separation of charges across the membrane or to a difference in the relative number of + and charges in the ECF and ICF. is measured in units of millivolts with the sign always designating the charge on the outside is less at the equilibrium potential for K+ than at resting membrane potential D. cannot be measured easily E. All of these answers 2. At resting membrane potential: . 90 the membrane is more permeable to K+ than to Na+ ->Β. the membrane is more permeable to Na⁺ than to K⁺ C. Cl is at its equilibrium potential both A and C above D. E. Both B and C above Which term below best describes an excitable tissue when a resting membrane potential is present? polarized Α. В. depolarized C. hyperpolarized D. repolarized nonpolarized The spinal cord has grey matter on the: outside, white matter on the inside, and a dorsal motor root inside, white matter on the outside, and a ventral motor root inside, white matter on the outside, and a dorsal motor root D. outside, white matter on the inside, and a ventral motor root 5. The brainstem consists of the: cerebrum, pons, midbrain, and medulla midbrain, medulla, and pons pons, medulla, cerebellum, and midbrain midbrain only diencephalon, midbrain and medulla The ion needed to initiate the release of acetylcholine into the synaptic cleft is: 6. sodium Α. potassium В. C. calcaum D. chloride E. HCO3-Which of the following statements concerning hormones is INCORRECT? 7. A single endocrine gland may produce multiple hormones A single target cell may be influenced by more than one hormone A single hormone can influence only one type of target cell An endocrine organ may exert monendocrine functions in addition to secreting hormoness The same hormone may be secreted by more than one endocrine gland Astrocytes: induce formation of the blood-brain barrier are important in the repair of brain injuries and in neural scar formation take up excess K+ from the brain ECF physically support neurons 9 Graded potentials: are local changes in membrane potential that occur in varying degrees of magnitude A. В. serve as short-distance signals serve as long-distance signals

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both A and B both A and C

2	An II	PSP is associa	ted with:							
PAA /		a change in	sodium ioi	n permeability		_				
	(B)	hyperpolari	ization					• • •		
	\mathcal{C} .	opening of	voltage-gat	ed channels						
1/4/2	D.	lowering th	e threshold	for an action po	otential to	occur				
· f · ·	E.	All of these	are correct	t answers.			and the	;		
11	0	1 . 1 . 1					•			
11.		nich lobe wou	ld one expe	ct to find the pr	imary sens	ory cort	tex?			
	Α.	Frontal	B .),	Parietal		C.	Occipital		D.	Tempora 1
12.	A sec	and nerve imp	ulse cannot	be generated u						1
,,	(A)	the membra	ne rotentia	l has been reest	uu. ahliakad					
	(A) B.	the Na ions	have heen i	pumped back in	to the cell					
	C.	the K ions h	ave been n	umped back out	to the cell					
	Ď.	All of the ab	YOVE are co	miiped back om	oi me cen					
		· m or mo no	ove are con	ncci.						
13.	Hormo	ones are classi	fied into the	e following type	es.					
	(\mathbf{A})	amines, pepi	ndes, and s	teroids						
	A) B. C.	amines, stere	oids and ph	ospholipids						
	C .	amines, free	fatty acids.	and peptides						
	D.	free fatty aci	ids, peptide	s, and steroids						
	E.	amines, phos	spholipids,	and steroids						
14.	The di-	(C omous a 1 - 4								
17.	A.	es restators	en electron	ic and saltatory	conduction	is that	•			
	R.	during electr	conic condu	uires the preser	ice of myel	in .				
	Õ	caltatory con	ome conque	ction only subth	reshold dep	oolariza	ttions are con	ducted		
	B. C D.	in electronic	conduction	graded event	C 13 ·					
	Ē.	saltatory con	duction onl	the amplitude of	of the signa	l gets si	maller			
				y occurs near th	_					
15.	Which	of the followin	ig statemen	ts concerning p	entide hom	ones is	INCODDE	CT 9		
	∆ .	- opades norr	nones are 2	YULLESIZEU DV II	ie emaonias	mic ret	roulum Calai	CI!		
	B) C.	PEROU HOLL		MIL MIPCIVIBRI	THE TEN THIS CT	nn nrata	0 Pmb n	Complex	c system.	
	<u>C</u> .	repudes nom	nones bind	to surface recer	store of the	t toran	+ n=11=			
	D. E.	* chages norn	nones exem	meir effect larg	elv hv mes	ne of co	acond man-	ioer svete	em c	
	E.	Peptides horn	nones are re	eleased by exoc	ytosis upon	approp	priate stimula	tion.	orrig.	
16.	Graded	potentials:								
	A.	produce an ef	fect that inc	reases with dia	tanaa Ga	41				
	<u>B</u> .	produce an ef	fect that so	creases with dis reads actively a	cross the	the por	nt of stimular	tion		
	Ĉ) D.	may involve e	ither depola	arization or hyp	emolarizat	iemorar	ne surface			
	Ď.	are all-or-none	e	от дур	orporarizat	iOii				
17.	The sets									
17.	A.	of acetylcholi	nesterase is	s to:						
	R. R	act as a transn	niting ager	ot Constant				•		
	B. O D.	amplify or enh	hance the er	lect of ACh						
	b	stimulate the n	roduction	d after its relea	se by the a	xonal ei	ndings			
		inhibit the rele	ase of acets	of acetylcholine						
			-							
- 18.	In which	of the following	ng would th	ne rate of impul	se conducti	on he ti	he grantost?			
	\ 7 -	- my ormanion 11	טעג בט זווונ	rous in marnere	r		ne greatest?			
		a nonmyelinate	xd fiber 20 i	microns in dian	neter					
	C. Z	a myelinated h	ber 2 micro	ons in diameter						
	D. a	a nonmyelinate	xd fiber 2 m	icrons in diame	ter					
	E. a	nonmyelinate	d fiber 25 o	cm long						
19.	Somatom	redins are rele-	seed from 4	he liver in respo						
,	A. is	ncreased plasn	na ozovaty h	ne nver in respo	onse to:					
,	√B. ii	ncreased plasm	ia somatod 1a somatod	tatin levels						
		lecreased plasti	na orowak i	normone levels						
		ecreased plasm	na somator	tatin levels						
		levated levels	of blood en	menni igagis						
			UIUUU 311.							

20.	Duri	ng the rising phase of the action potential:
	A	K ⁺ permeability is much greater than Na ⁺ permeability
	(<u>B</u> .	Na ⁺ permeability is much greater than K ⁺ permeability
	C.	K ⁺ permeability is the same as Na ⁺ permeability
·	\mathbf{D}_{\cdot}	Naf efflux occurs
	E.	Two of these answers are correct.
Mate	ch each v	with its function (Questions 21 to 22):
1.777.	A.	Action potential
	B.	Depolarization
	Ċ.	Absolute refractory period
	D.	Repolarization
	E.	Relative refractory period
21.	The in	nterior of the cell becomes less negative due to an influx of sodium ions.
22.		pecific period during which potassium ions diffuse out of the neuron due to a change in membrane
	perme	eability.
23.	Branc	hes that sometimes occur along the length of an axon are called:
	Α.	teleodendria B. synaptic knobs C collaterale
	D.	hillock E. synapse
24.	The	abdural space
۷٦.	A.	separates the arachnoid mater from the pia mater
	B.	separates the pia mater from the dura mater
	Č.	separates the dura mater from the brain
	D.	contains cerebrospinal fluid
	E.	is between the vertebrae and the dura mater
25.	If the	wontrol root of a second or
23.	Δ me ·	ventral root of a spinal nerve were cut, what would be the result in the tissue or region that nerve supplies? complete loss of sensation
	(B)	a complete loss of voluntary movement
	C.	loss of neither sensation nor movement but only autonomic control
	\mathbf{D}_{\cdot}	a complete loss of sensation and movement
27	771	
26.	The po	esterior pituitary:
	/ ↑. D ~	is composed of nervous tissue
/	(F)	stores anterior pituitary hormones, which are released into the blood upon hypothalarnic stimulation
,	D.	synthesizes and secretes vasopressin and oxytocin Both A and C above are correct.
	E.	All of these are correct answers.
	_	
27.	Select t	the statement that is most correct.
	A	Ganglia are collections of neuron cell bodies in the CNS that are associated with efferent fibers.
Market Market State of the Stat	B.	bitoront gangita are not associated with the althonomic system
	D.	The dorsal root ganglion is a motor only structure
9	E.	The cell bodies of afferent ganglia are located in the spinal cord.
2.		Ganglia exist outside the spinal cord.
28.	In the p	process of negative feedback:
	Α. ΄	TSH inhibits thyroid hormone secretion by the thyroid gland
	В.	unyroid hormone inhibits TSH secretion by the anterior pituitary
	C.	my rold normone directly inhibits further thyroid hormone secretion by the thyroid alond
	D.	TRH inhibits TSH secretion by the anterior pituitary
29.	Muslim	
. ヺ.	Iviyeima	the muslin involutes the aver-
الشنتع	$\frac{A}{B}$	the myelin insulates the axon
\rightarrow	Time !	channels only have to open at the nodes
<u> </u>	T T	voltage is not lost through and along myelinated areas of saltatory conduction
٠	E .	All of these answers are correct
		· ··· or areas and wors are correct

en e	A.B.C.D.E.	all stimuli will produce identical action potentials all stimuli great enough to bring the membrane to threshold will produce the greater the magnitude of the stimuli, the greater the intensity of the action potentials only motor stimuli can activate action potentials	identical action potent	etion potentials ial	•
31	In a norr A. B. C. D. E.	condition known as hypocalcemia, the level of calcium ions in the blood and in al. How would this condition affect the function of the nervous system? Cholinergic synapses would be more active. Neurons would generate action potentials spontaneously. Less neurotransmitter would be released in response to an action potential Depolarizing events would occur more frequently at the postsynaptic mem Potassium channels would fail to open.	,	fluid is lower than	3
32.	Which A. B. C. D. E.	ch of the following nerve fibers will have the highest conduction velocity? an unmyelinated nerve fiber with conduction velocity = 0.35 m/sec an unmyelinated nerve fiber smaller than the nerve fiber in A a myelinated nerve fiber the same size as the nerve fiber in A a myelinated fiber larger than the nerve fiber in A it is impossible to determine with the information provided			
33.	The o A. D.	ranial nerves that are involved in controlling eye movements are: I, II, and III II and VI E. III and V	С. ІІ,	, III, and IV	
34.	Becau A. B. C. D. E.	be closed but capable of opening Be activated be closed and not capable of opening All of the above answers are correct. None of these answers.	. ⁺ channels	can:	
35.	An IP A B. C. D. E.	SP is: produced by increased Na ⁺ permeability and K ⁺ permeability produced by increased K ⁺ permeability or increased Cl ⁻ permeability a depolarization of the postsynaptic cell Both A and C Both B and C			
36.	If a son	matic motor neuron fires an action potential, then acetylcholine is released from the axon terminal a skeletal muscle is triggered to contract the response is always excitatory A and B A, B and C	7 Ach		
37.	Which A: B: C D E.	statement regarding CSF production and flow is correct? CSF is produced along the spinal cord CSF is produced by meningeal cells CSF enters the meningeal layer through the cerebral aqueduct CSF flows inferiorly along the dorsal subarachnoid space of the spinal cord CSF does not flow through the meningeal layers	V		
38.	B. C. D.	by hypophysiotropic hormones from the hypothalamus directly by neural innervation of anterior pituitary cells by negative-feedback action of target-tissue hormones Both A and C above All of these answers			

	are 100	cated in the medulla oblongata diencephalon		B .	pons cerebellum			mescacephalon
40.	The sp A. B. C. D. E.	specialized hormones is due specialized hormone secret molecular rearrangement a specific binding of hormon specialization of target-cell mactivation of hormones by	ion t the site of act es to plasma po receptors	ion	e se se se se e e e e e e e e e e e e e	* years v	41.	
41.	Which A. B. C. D. E.	of the following is a change a change in the membrane p the stimulation of genetic ev an increase in enzymatic ac mitosis All of the above	ootential ven resulting in			mulus"?		
42.	Each of A. B. C. D. E.	f the following is a function of providing sensation of the in integrating sensory informat coordinating voluntary and directing activities that cont regulating or controlling per	nternal and extriction myoluntary actinue for extending	emal en tivities led perio	vironments ods such as oro		pregnan	cy \
43.	B. C. D.	of the following represent lon cortisol inhibits CRH secretic CRH inhibits ACTH secretic ACTH inhibits CRH secretic ACTH inhibits cortisol secretic ACTH inhibits cortisol secretic	on on on ction	e feedba	ack in the CRH	-ACTH-	cortisol	system?
Matcl	A. C.	its function (Questions 44 to Dura mater Arachnoid Ventricles	o 45): B D		ia mater ubarachnoid sp	pace		
44. 45.		rmost layer of the meninges,			y blood vessels	s. Pic	 (man commences
	THE WED.	like, spidery middle meninge	al layer.	ach				
46.	B. 0	ons: The found only in the central is arry only sensory impulses arry only motor impulses only connect motor neurons to be found between neurons are	o other motor	neurons		V	\	
47.	B. T /C. T	s blocking the ability for retro he neuron is unable to produ- he neuron is unable to produ- he soma is unable to export he soma is unable to depol- he neuron is unable to depol-	ice neurotransi ice action pote products to the I to changes in	mitters. ntials. synapt the dist	ic knobs.		neuron	
48. 	Each perig	pheral nerve provides otor and/or B		specific	structures	C. t	actile	
19.	A/B - T/F	Aldosterone is a mine	ralocorticoid p			gland an	d the m	ost abundant I
50.	A/B - T/F						1110	osi abulualli.
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Please answer these questions briefly. Label diagrams correctly, with lines pointing to the proper structures. Partial credit will be given where appropriate. Write legibly!!

You can use the back of the last page to continue any question. Number them, please!!

List the anatomic and functional categories of neurons. (5 points)

Anatomic

Sometric Sensory neurons Bipolar

Sometric motor neurons Pseudounipolar

Anatomic

Multipolar

Intermedial neurons

52. Case Study - 1 (8 points)

An 18-year-old woman was well until 3 years ago, when she suddenly lost sight in her right eye. Her vision then gradually improved. Then 2 years ago, she developed a hearing loss in her right ear lasting 3 weeks. A month later, she experienced numbness and tingling in her right leg, which improved over 2 weeks. A neurological examination revealed no significant abnormalities. However, 2 months later, she developed blurred vision and on examination, had weakness of the adductor muscles of the left eye and nystagmus. Some 6 months ago she became weak in the left leg. Currently, she is experiencing normal eye movements but a left-sided weakness, a left-sided facial weakness, and hyperactive phasic stretch reflexes in the left arm and leg; Babinski's sign was elicited on the left. The results of blood and spinal fluid chemical analysis were normal.

Which nervous system cell type is most likely to be affected in this patient? Circle your answer.

A astrocyte B. motor neuron C. oligodendrite

pyramidal cell

E. Schwann cell

Explain your answer to the above.

What is the basic defect caused by disrupted function of this cell type?

abnormal axonal transport

blockade or slowed conduction velocity of axons

chromatolysis

failure of synaptic transmission D.

degeneration