BIOL 4374/BCHS 4313 Cell Biology Exam #1 February 13, 2001

SS#	Name	
This ex parenthe	am is worth a total of 100 points. The number of points each question is worth is shown in eses. Good luck!	
1.(2)	 The base in the wobble position of a codon: answer - b a) is the 5' (first) base. b) is the 3' (third) base. c) is the second base. d) often contains adenine. 	
2. (4)	The enzyme aminoacyltransferase pairs tRNA with the	
	properamino acid	
3.(2)	The following mRNA would encode a protein containing <u>9</u> amino acids.	
5' GAU	CACCCACCAUGGUACAUCUACAUACAUUACAGGACUGACAUGUAAUAG 3'	
4. (2)	What enzyme within the ribosome is responsible for making peptide bonds? Peptidyl transferase	
5.(2)	During the initiation of translation, the mRNA is associated with the <u>small</u> ribosomal subunit.	
6. (2)	During the elongation phase of translation, the growing peptide chain bound to the	
	tRNA in the <u>P</u> site is donated to the aminoacyl-tRNA in the <u>A</u>	
	site through the formation of a peptide bond.	

- 7. (2) Monomeric proteins do not contain a: answer d
 - a) primary structure
 - b) secondary structure
 - c) tertiary structure
 - d) quaternary struucture
- 8. (2) Chaperones assist in the: answer a
 - a) proper folding of proteins
 - b) degradation of unfolded proteins
 - c) transport of proteins outside the cell
 - d) formation of peptide bonds
- 9. (2) What molecule constitutes a signal that targets proteins to be degraded in the proteasome?

Ubiquitin

- 10. (2) All of the following statements about enzymes are true except: answer b
 - a) enzymes lower the activation energy of a reaction
 - b) enzymes typically react with many different substrates
 - c) enzymes catalyze reactions in aqueous solutions
 - d) enzymes increase the rate of a reaction
- 11. (2) The activity of which protein in regulated by allosteric release of catalytic subunits?

answer - d

- a) α-chymotrypsin
- b) budding yeast cdk
- c) aspartate transcarbamoylase
- d) cAMP-dependent protein kinase
- e) hemoglobin
- 12. (4) Label the phospholipid below .



13. (3) Name three other constituents of membranes other than phospholipids.

Sphingomyelin, proteins, glycolipds, cholesterol

14. (2) Phospholipids with short or unsaturated fatty acyl chains <u>d</u>.a) cause biomembranes to become thicker

- a) cause biomembranes to become t
- b) decrease membrane fluidity
- c) allow hydrophilic molecules to diffuse across the membrane
- d) increase membrane fluidity
- 15. (4) In the experiment in which heterokaryons were made by fusing mouse and human cells, (1) what happened to the mouse and human membrane proteins after several hours and (2) what property of membranes did this demonstrate?

They intermixed and became homogeneous around the membrane
 That they were fluid

16. (3) Match the organelle with the statement that best describes its function.

d	Golgi apparatus	a) degrades cellular components using acid hydrolases
e	mitochondria	b) catalase containing organelle that oxidizes fatty acids
b	peroxisomes	c) surrounded by a membrane that is continuous with the ER
a	lysosomes	d) responsible for targeting membrane and secreted proteins
C	nucleus	e) uses glucose and fatty acids to generate ATP
<u>f</u>	ER	f) where membrane and secreted proteins are synthesized
17.(2)	Which of the following molecules has the highest rate of diffusion across a phospholipid bilayer?answer - da) ATPb) lysinec) K^+ d) O_2 e) glucose	
18.(2)	Uniport transporters of concentration gradier	can only transport molecules <u>along/with/down</u> their nts.

19. (4) If the plasma membrane were permeable to the ions below, indicate whether they would move into or out of the cell.

Ca^{2+}	in	Na^+	in	
K ⁺	out	Cl ⁻	in	

20.(2)	Assuming normal ionic concentrations inside and outside of the cell, the membrane		
	potential would be <u>d</u> if the membrane were permeable to Na^+ rather		
	than K^+ . a) -70mV b) -100mV c) 0mV d) +60mV		
21.(2)	The sarcoplasmic reticulum Ca^{2+} ATPase is a P-class ATPase pump with Ca^{2+} binding sites on both its cytosolic and luminal sides. The relative binding affinity of these sites for Ca^{2+} is: answer - c		
	a) equal b) lumenal higher than cytosolic c) cytosolic higher than lumenal		
22. (2)	Cystic fibrosis is caused by a defective: answer - b a) P-class pump b) ABC pump c) V-class pump d) F-class pump e) uniport		
23.(2)	The symport that transports glucose into the cell uses energy from the simultaneous		
	transport of <u>sodium ions</u> into the cell.		
24. (4)	In pulmonary capillaries, an antiporter uses the energy from <u>chloride</u> ions		
	moving into the cell to transport bicarbonate out of the cell. Bicarbonate is then		
	converted into <u>carbon dioxide</u> by the enzyme carbonic anhydrase.		
25.(2)) Epithelial cells use <u>tight</u> junctions to restrict membrane proteins to the		
	apical or basal faces of the cell.		
26.(2)	Which protein is used to transport glucose from the lumen if the intestine into intestinal epithelial cells?		
	2 sodium ion/glucose symport		
27. (2)	 Aminopterin is present in HAT medium when fusing TK- and HGPRT- cells: a) To overcome the effect of a TK- mutation b) To force cells to use the salvage pathways answer - b c) As a compound supporting the growth of hybrid cells d) To overcome the effects of the HGPRT- mutation 		
28.(2)	 A cell line refers to: a) The first cells that emerge from organ culture. b) A stable culture of immortalized cells. c) Hybrid cells without heterokaryons. d) Cells that only grow in HAT medium. 		

29.(2)	The envelop of a virus like the rabies virus:a) Contains receptor binding glycoproteins coded by the viral genomeb) Contains components of the host membrane	
	c) Two of the above answer - cd) None of the above	
30. (2)	 When establishing a master plate for the purpose of isolating novel auxotrophs by replica plating, it would be best to use: a) Minimal medium in agar b) Rich medium in agar c) Rich medium in broth d) Serum-containing medium in agar 	
31. (4)	MPF in <i>Xenopus</i> is comprised of a regulatory subunit called <u>cyclin B</u> and a catalytic subunit called <u>cyclin dependent kinase</u> .	
32. (4)	A destruction box is present in all <u>cyclins</u> , and triggers their degradation in proteasomes by adding <u>ubiquitin</u> to lysine residues.	
33. (2)	 Phosphorylation of Thr-161 on MPF of fission yeast: a) inhibits MPF activity b) is carried out by weel protein answer - c c) is required for MPF activity d) is required along with phosphorylation of Tyr-15 for MPF activity. 	
34. (4)	During M phase, phosphorylation of lamin by <u>MPF</u> results in breakdown of the <u>nuclear envelope</u> .	
35.(3)	In budding yeast, pre-replication complexes formed during <u>G1</u> phase are inhibited from forming during <u>S</u> phase by <u>SPF/cdc28-Clb</u> .	
36. (3)	In mammals, the cell cycle restriction point (or cell division commitment point) occurs at the end of <u>$G1$</u> phase. As the cell passes the restriction point,	
	<u>Rb</u> is phosphorylated by Cyclin D-Cdk4/6 and Cyclin E-Cdk2, which	
	releases the <u>E2F</u> transcription factor.	

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<u>b</u>	G1 arrest	a) unreplicated DNA
a	S arrest	b) DNA damage
C	M arrest	c) Improper spindle formation
<u>b</u>	G2 arrest	
38. (4)	In the absence of trophic factors, <u>apop</u>	otosis is triggered when Bad binds to
	Bcl proteins and allows <u>bax</u>	to form channels and let ions move

37. (4) Match the cell cycle checkpoint with the correct cause for arrest at that checkpoint.

into the mitochondria. This ion flux leads to both the release of

<u>cytochrome C</u> from the mitochondria and its binding to Apaf1 and

the activation of <u>caspase</u> effector proteins.