Exam Total = 100 Points.

Questions #1-12. 1.5 Points Each. Circle the letter of the single best answer.

1. When epinephrine is combined with a local anesthetic, the epinephrine is added because:

A. It is an $\alpha_1$ agonist  
B. It is an $\alpha_2$ agonist  
C. It is a $\beta_1$ agonist  
D. It is a $\beta_2$ agonist  
E. All of the above

2. For a competitive receptor antagonist:

A. A 50% inhibition of agonist binding is the most that can be achieved  
B. Blockade of agonist binding can be overcome by a high concentration of agonist  
C. You get a decrease in the Kd for agonist binding in the presence of the antagonist  
D. A and B  
E. B and C

3. A patient is receiving propranolol as a treatment for hypertension. An additional drug is added to the treatment, which leads to significant cardiac depression in the patient. Indicate which drug below was the most likely to have been the one added to the propranolol treatment:

A. Furosemide  
B. Prazosin  
C. Chlorothiazide  
D. Enalapril  
E. Verapamil

4. Transmitter that carries an excitatory signal from the preganglionic to the postganglionic neuron in the autonomic nervous system:

A. Acetylcholine  
B. Norepinephrine  
C. Epinephrine  
D. A and B  
E. B and C
5. Drug A has the concentrations indicated below in the blood following intravenous administration. From these data we can conclude that the half-life ($t_{1/2}$) of drug A is:

<table>
<thead>
<tr>
<th>Time after intravenous administration</th>
<th>μg/ml of drug A in the blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 hours</td>
<td>100</td>
</tr>
<tr>
<td>6 hours</td>
<td>50</td>
</tr>
<tr>
<td>10 hours</td>
<td>25</td>
</tr>
<tr>
<td>14 hours</td>
<td>6.25</td>
</tr>
<tr>
<td>A. 0.5 hour</td>
<td>1.56</td>
</tr>
<tr>
<td>B. 1 hour</td>
<td></td>
</tr>
<tr>
<td>C. 2 hours</td>
<td></td>
</tr>
<tr>
<td>D. 4 hours</td>
<td></td>
</tr>
<tr>
<td>E. 8 hours</td>
<td></td>
</tr>
</tbody>
</table>

6. A second messenger whose synthesis is directly stimulated by nitric oxide:

A. Cyclic AMP
B. IP$_3$
C. Nitrous oxide
D. Cyclic GMP
E. PIP$_2$

7. In a study with rats, it is found that drug A has a $ED_{50}$ for decreasing heart rate of 1.0 mg/kg. Drug B has an $ED_{50}$ for this response of 3.0 mg/kg. From this we can conclude:

A. Drug A will have a greater maximal effect
B. Drug B will have a greater maximal effect
C. Drug B has a shorter half-life
D. Drug B is a partial agonist
E. None of the above

8. Drug W has a half-life of 12 hours. If a patient takes this drug by oral administration every 12 hours, what would be the earliest time point at which the patient would be regarded as having achieved a “steady state” drug concentration?

A. 24 hours
B. 48 hours
C. 72 hours
D. 96 hours
E. 120 hours
9. A definition of the *therapeutic index* of a drug:

A. The lethal dose$_{50}$ (LD$_{50}$) divided by the toxic dose$_{50}$ (TD$_{50}$)
B. The effective dose$_{50}$ (ED$_{50}$) divided by the TD$_{50}$
C. The TD$_{50}$ divided by the ED$_{50}$
D. The ED$_{50}$ divided by the LD$_{50}$
E. The ED$_{50}$ divided by the sum of the (LD$_{50}$ plus TD$_{50}$)

10. A patient being treated for congestive heart failure is being well maintained with *digoxin* therapy. *Furosemide* is added to the patient's drug regimen. The patient subsequently develops signs of *digoxin toxicity*, as manifested by *cardiac arrhythmia*. Indicate the *most likely* explanation for the development of digoxin toxicity:

A. Furosemide inhibits digoxin metabolism
B. Furosemide lowers serum potassium levels
C. Furosemide acts on the same cardiac target as does digoxin and thereby potentiates digoxin action
D. Furosemide lowers intracellular cardiac calcium levels
E. Furosemide stimulates vagal input to the heart

11. Factors that contribute to a drug being able to get into the *brain* following *peripheral* administration:

A. High lipid solubility
B. Close relationship in structure to neurotransmitters normally found in the brain
C. Ability to bind to neurotransmitter receptors
D. B and C
E. A, B and C

12. The *substrate* that nitric oxide synthase uses to form *nitric oxide*:

A. PIP$_2$
B. Nitrous oxide
C. Bradykinin
D. Arginine
E. Calmodulin
Questions #13-19. 1.5 Points Each. Match up the numbered anti-arrhythmic drugs below with the single best letter description for that drug. Each lettered description may be used once, more than once, or not at all.

13. Verapamil \( G \)
14. Flecainide \( C \)
15. Amiodarone \( A \)
16. Adenosine \( E \)
17. Quinidine \( F \)
18. Atenolol \( B \)
19. Lidocaine \( H \)

A. A drug with a half-life of greater than 20 days
B. A drug that blocks cardiac \( \beta_1 \) receptors
C. A class Ic anti-arrhythmic drug that has a slower time of dissociation compared to class Ia and Ib
D. A drug used for supraventricular arrhythmia because of its inhibition of cardiac cyclic AMP phosphodiesterase activity
E. A drug with a half-life of less than 5 minutes, used via rapid intravenous administration for supraventricular arrhythmia to mimic the effects of acetylcholine
F. A class Ia anti-arrhythmic drug with dissociation time between that of class Ib and Ic
G. A class IV anti-arrhythmic drug which blocks cardiac voltage-gated calcium channels
H. A class Ib anti-arrhythmic drug that has a quicker dissociation time compared to class Ia and Ic

Questions #20-33. 1.5 Points Each. Circle the letter of the single best answer.

20. Indicate which of the following statements concerning \textit{botulinum toxin} are CORRECT:

A. It inhibits acetylcholine release from somatic motor nerves innervating skeletal muscle \( \checkmark \)
B. It inhibits acetylcholine release from parasympathetic nerve terminals innervating intestinal smooth muscle \( \checkmark \)
C. It inhibits norepinephrine release from sympathetic nerve terminals innervating the heart
D. A and B
E. A, B and C
21. A patient has received 10 mg of drug Q. The plasma concentration of this drug (initial concentration before elimination) is found to be 200 ng/ml. What is the volume of distribution of drug D in terms of liters?

A. 1 Liter
B. 5 Liters
C. 10 Liters
D. 50 Liters
E. 100 Liters

\[
\frac{10 \text{ mg}}{V_d} = 200 \text{ ng/ml}
\]

22. Vasodilation of vascular smooth muscle produced by epinephrine is mediated via:

A. \( \beta_1 \) receptors
B. \( \beta_2 \) receptors
C. \( \alpha_1 \) receptors
D. \( \alpha_2 \) receptors
E. None of the above

23. Vasodilation of vascular smooth muscle produced by minoxidil is mediated via:

A. Inhibition of sodium permeability
B. Inhibition of calcium permeability
C. Activation of potassium permeability
D. Activation of chloride permeability
E. Activation of calcium permeability

24. A patient presents in the Emergency Room with a highly elevated blood pressure due to intravenous self-administration of a large dose of amphetamine. Indicate which of the following drugs would constitute appropriate treatment to lower the blood pressure:

A. Atropine
B. Sodium nitroprusside
C. Phentolamine
D. A and B
E. B and C

Both B and C would lower BP, but
with an amphetamine OD, this
patient may not tolerate the
hypotension of phentolamine
25. A drug with a half-life of 12 hours is being taken as a 10 mg pill by oral administration once every 12 hours. Indicate which of the following best describe the drug fluctuations that will exist in this patient once steady state is achieved:

A. The amount of drug in the body will vary between 0 and 10 mg
B. The amount of drug in the body will vary between 5 and 15 mg
C. The amount of drug in the body will vary between 10 and 20 mg
D. The amount of drug in the body will vary between 15 and 30 mg
E. The amount of drug in the body will vary between 20 and 40 mg

26. Phentolamine produces more tachycardia compared to prazosin because:

A. Prazosin doesn’t block α2 receptors
B. Prazosin doesn’t block α1 receptors
C. Phentolamine doesn’t block α2 receptors
D. Phentolamine doesn’t block α1 receptors
E. Phentolamine stimulates β1 receptors

27. An example of a ligand-gated receptor:

A. Nicotinic skeletal muscle receptors
B. GABA_A receptors in the brain
C. β1 cardiac receptors
D. A and B
E. A, B and C

28. A cell body area for the preganglionic neurons of the sympathetic nervous system:

A. Thoracic part of the spinal cord
B. Sacral part of the spinal cord
C. Brainstem
D. A and B
E. B and C

29. Drug P has a volume of distribution of 150 liters. Indicate below the implications that derive from this observation:

A. Drug P’s distribution in the body is largely confined to the plasma
B. Drug P is subject to extensive first-pass metabolism
C. Drug P’s distribution involves large amounts in body tissues
D. A and B
E. B and C
30. Organophosphate nerve gases such as Saran and insecticides such as malathion produce toxic effects in humans via:

A. Inhibition of acetylcholine release
B. Inhibition of acetylcholinesterase
C. Inhibition of acetylcholine reuptake
D. Competitive antagonism of nicotinic receptors
E. Competitive antagonism of muscarinic receptors

31. An anti-anginal agent that is the most likely to be contraindicated for treating variant (Prinzmetal's) angina:

A. Diltiazem
B. Nitroglycerin
C. Nifedipine
D. Isosorbide
E. Propranolol

32. All of the following statements concerning angiotensin converting enzyme (ACE) inhibitors are correct EXCEPT:

A. They can be given by oral administration
B. They can produce a dry cough side effect
C. They can produce a hypotension side effect
D. Their use is contraindicated in patients who have asthma
E. They are used in the treatment of congestive heart failure

33. The inotropic action of digoxin is mediated via:

A. Inhibition of cardiac cyclic AMP phosphodiesterase activity
B. Activation of cardiac voltage-gated sodium channels
C. Inhibition of cardiac Na⁺-K⁺ ATPase activity
D. Activation of a CNS-mediated increase in sympathetic tone
E. Inhibition of cardiac vagal tone
Questions #34-40. 1.5 Points Each. Match up the numbered diuretic drugs below with the *single* best letter description for that drug. Each lettered description may be used once, more than once, or not at all.

34. Furosemide  **A**
35. Spironolactone  **F**
36. Acetazolamide  **B**
37. Hydrochlorothiazide  **H**
38. Mannitol  **D**
39. Bumetanide  **A**
40. Amiloride  **F**

**A.** Action in the ascending limb of the loop of Henle makes this the most efficacious type of diuretic for inhibiting sodium reabsorption  
**B.** A carbonic anhydrase inhibitor with action in the proximal tubule  
**C.** An inhibitor of cyclic AMP production with action in the collecting duct  
**D.** An osmotic diuretic used to treat elevated intracranial pressure and acute renal failure  
**E.** A stimulator of aldosterone receptors  
**F.** A potassium-sparing diuretic  
**G.** A sodium ion chelator  
**H.** Main site of action is in the distal tubule; widely used in the treatment of hypertension  

Questions #41-55. 1.5 Points Each. Circle the letter of the *single* best answer.

41. Drug X has an *IC*$_{50}$ for inhibiting norepinephrine uptake into norepinephrine nerve terminals of 10,000 nM, and an *IC*$_{50}$ for inhibiting serotonin uptake into serotonin nerve terminals of 70 nM. Indicate the *most likely* identity of Drug X:

A. Desipramine  
B. Pheneleazine  
C. Lithium  
D. Imipramine  
E. Fluoxetine

42. When injected intravenously, a certain dosage of epinephrine produces a marked general *vasoconstrictive* response. When drug Y is added to the same epinephrine dosage, a general *vasodilation* response is produced. The most likely identity of drug Y:

A. Propranolol  
B. Atropine  
C. Phentolamine  
D. Atenolol  
E. Norepinephrine
43. All of the following statements are true EXCEPT:
   
   A. Acidification of the urine accelerates the secretion of a weak base whose pKₐ = 8.
   B. Uncharged molecules more readily cross cell membranes than charged molecules.
   C. Aspirin (pKₐ = 3.5) is 90% in its lipid-soluble, protonated form at pH = 2.5.
   D. The basic anti-schizophrenic drug promethazine (pKₐ = 9.1) is more ionized at pH = 7.4 compared to pH = 2.0.
   E. Absorption of a weakly basic drug is likely to occur faster from the intestine than from the stomach.

44. What is the half-life of a drug that has a volume of distribution of 21.0 liters and a clearance rate of 60.7 ml/min?

   A. 2 hours
   B. 4 hours
   C. 6 hours
   D. 8 hours
   E. 10 hours

45. What dosage of drug would you administer as a loading dose if you desired to have a drug steady state concentration of 0.8 µg/ml for a drug with a volume of distribution of 15 liters and a bioavailability of 0.6?

   A. 1.2 mg
   B. 2 mg
   C. 12 mg
   D. 20 mg
   E. 120 mg

46. All of the following could result from poisoning by an organophosphate nerve gas or insecticide EXCEPT:

   A. Mydriasis (pupil dilation)
   B. Excessive tear production in the eyes
   C. Diarrhea
   D. Excessive saliva production
   E. Overactive bladder
47. Indicate which of the following statements are CORRECT for a typical dose-response curve for analyzing the increase in heart rate on the y-axis as a function of norepinephrine (NE) concentration on the x-axis:

A. The potency of the NE is indicated by the maximal effect achieved
B. This plot produces an S-shaped (sigmoidal) curve
C. The potency of the NE is indicated by the concentration of NE that produces 50% of the maximal effect
D. A and B
E. B and C

48. Indicate which of the following statements concerning *Phase I metabolic drug reactions* are CORRECT:

A. Addition of a glucuronyl group is an example of a Phase I reaction
B. A major source of Phase I reactions is the cytochrome P<sub>450</sub> enzyme system located in the liver smooth endoplasmic reticulum
C. The products of Phase I reactions are usually more lipid soluble than the parent drug
D. A and B
E. B and C

49. Indicate which of the following statements concerning *benzodiazepines* (e.g., diazepam) are CORRECT:

A. Their ED<sub>50</sub> for producing respiratory depression is much higher than that of the barbiturates (e.g., phenobarbital)
B. They can be used to treat anxiety and also epilepsy
C. They potentiate the action of GABA at GABA<sub>A</sub> receptors
D. A and B
E. A, B and C

50. The combination of the monoamine oxidase inhibitor, tranylcypromine, plus a meal containing cheese is dangerous because:

A. Cheese contains compounds that will inhibit tranylcypromine metabolism
B. Cheese contains compounds that will inhibit tranylcypromine absorption
C. Cheese contains large amounts of tyramine, which will lead to an increase in blood pressure
D. Cheese contains large amounts of tyrosine, which will lead to a displacement of catecholamines from nerve endings
E. Cheese contains enzymes that will convert tranylcypromine to an amphetamine-like compound
51. Indicate which of the following statements concerning nitroglycerin are CORRECT:

A. Its administration results in an activation of cyclic GMP-dependent protein kinase
B. Headache is a major side effect resulting from its usage as an anti-anginal agent
C. To maximize its effectiveness as an anti-anginal agent, when it is administered via a transdermal patch, it is best to keep the patch on for the full 24 hours per day

D. A and B
E. A, B and C

52. Indicate which of the following statements concerning reserpine are CORRECT:

A. Historically, it was one of the first drugs shown to be effective in treating congestive heart failure
B. It inhibits the uptake of dopamine into catecholamine synaptic vesicles
C. It lowers catecholamine levels in the brain
D. A and B
E. B and C

53. Hyperkalemia is a contraindication to the use of which of the following drugs?

A. Triamterene
B. Ethacrynic-acid
C. Chlorthalidone
D. Acetazolamide
E. Hydrochlorothiazide

54. Your patient is suffering from attacks of paroxysmal atrial tachycardia. Indicate the most appropriate drug below for treating this condition on a prophylactic basis.

A. Lidocaine
B. Nifedipine
C. Verapamil
D. Procainamide
E. Adenosine
55. A 65-year-old female receives digoxin and bumetanide for congestive heart failure. After several months, she develops nausea and vomiting. Serum potassium is 2.5 mEq/L (normal range = 3.5-5.0 mEq/L). Electrocardiogram (EKG) reveals an AV conduction defect. What cellular effect is causing these new findings?

A. Increased intracellular potassium  
B. Increased intracellular calcium  
C. Increased intracellular cyclic AMP  
D. Increased intracellular nitric oxide  
E. Increased intracellular GTP

Questions #56-58. 1.5 Points Each. For each of the numbered pharmacological effects below, select the corresponding lettered mechanism of action (From A to E).

56. Vasodilation produced by sildenafil   
C

57. Contraction of the iris sphincter produced by pilocarpine  
A

58. Slowing of the heart rate by acetylcholine   
D

A. Increased inositol triphosphate (IP₃) concentration  
B. Increased cyclic AMP concentration  
C. Increased cyclic GMP concentration  
D. Decreased cyclic AMP concentration  
E. Calcium influx

Questions #59-61. 1.5 Points Each. For each of the following pharmacological effects below, select the most likely lettered causative agent (From A to F).

59. A reduction in sympathetic outflow from the central nervous system   
C

60. Bronchodilation with little effect on the heart rate  
F

61. An increase in cardiac contractility without a proportionate increase in heart rate   
B

A. Phenylephrine  
B. Dobutamine  
C. Clonidine  
D. Amphetamine  
E. Isoproterenol  
F. Albuterol
Questions #62-65. 1.5 Points Each. Circle the letter of the single best answer.

62. Which of the following drugs is LEAST appropriate for treating a patient with Stage 1 (mild) hypertension and asthma?

A. Enalapril
B. Atenolol
C. Losartan
D. Diltiazam
E. Propranolol

63. Which of the following drugs is LEAST appropriate for treating a patient with Stage 1 hypertension and congestive heart failure?

A. Verapamil
B. Prazosin
C. Hydrochlorothiazide
D. Captopril
E. Furosemide

64. Indicate which of the following statements are TRUE for a drug whose elimination from plasma shows first-order kinetics.

A. The amount eliminated per unit time is constant
B. The half-life of the drug is proportional to the drug concentration in the plasma
C. Elimination involves a rate-limiting enzymatic reaction operating at its maximal velocity
D. The rate of elimination is proportional to the plasma concentration
E. A plot of drug concentration versus time is a straight line

65. α-Methyldopa is a prodrug. Indicate below which enzymes are necessary to convert it to an active anti-hypertensive drug:

A. Dopamine-β-hydroxylase
B. Dopa decarboxylase
C. Tyrosine hydroxylase
D. A and B
E. A, B and C
Questions #66-71. True/False. 0.25 Points Each.

66. If drug A has a greater potency compared to drug B, you can predict that drug A will also have a greater efficacy.  

67. If a drug is given by intravenous administration you can predict that its bioavailability will be 1 (100%).  

68. Sertraline produces fewer anti-muscarinic side effects compared to amitriptyline.  

69. A partial agonist has the same efficacy as a full agonist, but takes longer to achieve this effect.  

70. Adding streptomycin to furosemide treatment increases the risk of ototoxicity (damage to hearing).  

71. The half-life of a drug is inversely proportional to its volume of distribution.  

72. 1 Point. Was there an area that you studied that was not covered in the exam? Here is your chance to get credit for it! Make up your own Bio 273-related pharmacology question (any format) and answer it. Caution: Your answer must be correct to receive credit.  

True or false: (PNMT) is an important antipsychotic drug  

False  

END OF THE EXAM!
BIO 273: PHARMACOLOGY EXAM #2

December 15, 2000

NAME _____________________________

Exam Total = 100 Points.

Questions #1-12. 1.5 Points Each. Circle the letter of the single best answer.

1. Indicate which of the following statements concerning anti-neoplastic therapy with cell cycle active (also referred to as cell cycle specific) drugs are CORRECT:

A. Therapeutic cytotoxicity with each round of treatment results in the killing of a constant number of cells, as opposed to the killing of a constant percentage of cells
B. Side effects are most pronounced in normal cells that undergo frequent division
C. Therapeutic cytotoxicity is more effective when a tumor is growing
D. B and C
E. A, B and C

2. Your patient is suffering from asthma attacks during the middle of the night that are interfering with sleep. Indicate an appropriate agent you can prescribe to provide long-lasting relief during the night:

A. Salmeterol
B. Albuterol
C. Terbutaline
D. A and B
E. A, B and C

3. You are seeing a patient who is being treated for tuberculosis, and who has developed sideroblastic anemia. Choose the most appropriate pairing below of the most likely anti-tuberculosis drug that can cause this condition on the left and most appropriate treatment on the right.

A. Rifampin: Folic Acid
B. Pyrazinamide: Vitamin B₁₂ (hydroxocobalamin)
C. Streptomycin: Folic Acid
D. Ethambutol: Iron
E. Isoniazid: Vitamin B₆ (pyridoxine)
4. Your patient has developed an acute Parkinsonian syndrome in response to neuroleptic (anti-psychotic) drug medication. You can diminish this neurological side effect via concurrent treatment with:

A. Reserpine
B. Benztrpine
C. Chlorpromazine
D. A and B
E. B and C

5. Indicate which of the following statements concerning heparin are CORRECT:

A. It can be administered via either an oral or intravenous route
B. It can cross the placenta
C. It increases the effectiveness of a naturally occurring protease inhibitor
D. A and B
E. B and C

6. An example of an anti-neoplastic drug that is characterized as an alkylating agent:

A. Paclitaxel (Taxol)
B. Cyclophosphamide
C. Mechlorethamine
D. A and B
E. B and C

7. Indicate which of the following statements concerning iron therapy for treating iron deficiency are CORRECT:

A. Iron is not effective therapeutically if it is given by a parenteral route of administration
B. Ferrous salts of iron are absorbed from the GI tract better than ferric salts
C. Deferoxamine is an effective oral iron delivery agent
D. A and B
E. B and C

8. Indicate the relative rates of recovery from anesthesia for the following gaseous general anesthetics (faster rate of recovery on the left):

A. halothane > nitrous oxide > ether
B. nitrous oxide > ether > halothane
C. ether > nitrous oxide > halothane
D. nitrous oxide > halothane > ether
E. halothane > ether > nitrous oxide
9. You suspect a patient is suffering from an opiate overdose. Indicate the symptoms below that would support your hypothesis:

A. Coma ✓
B. Respiratory Depression ✓
C. Dilated pupils
D. A and B
E. B and C

10. Indicate which of the following statements concerning warfarin are correct:

A. It can be given by the oral route of administration ✓
B. Its anticoagulant action is potentiated by vitamin K ×
C. It is safer for the fetus compared to heparin when used during pregnancy
D. A and B
E. A, B and C

11. An anti-neoplastic drug which does not produce significant myelosuppression:

A. Doxorubicin
B. Taxol (Paclitaxel)
C. Prednisone
D. A and B
E. B and C

12. Indicate which of the following characterize the properties associated with a Phase I human clinical trial:

A. Its purpose is to establish a dose-response curve for therapeutic effect
B. It usually does not include women of child-bearing age
C. For most drugs this phase involves administration to patients with the condition for which the drug is intended
D. A and B
E. B and C
Questions #13-38: 1.5 Points Each.

#13-20. Toxicology: Match up the numbered toxic agent with the single most appropriate lettered drug treatment to counter toxic effects. Toxic effects of drugs in the numbered list refer to overdosages of the drug. Each lettered drug treatment may be used once, more than once, or not at all.

13. Heroin
14. Organophosphate Insecticide
15. Lead
16. Cyanide
17. Acetaminophen
18. Methanol
19. Heparin
20. Insulin

A. N-acetylcysteine
B. Vitamin K
C. Pralidoxime (PAM)
D. Protamine Sulfate
E. Ethyl alcohol
F. Carbon monoxide
G. Naloxone
H. Sodium nitrite
I. Glucose
J. Calcium disodium edetate
#21-28. Anti-Neoplastic Agents: Match up the numbered anti-neoplastic drug with the single most appropriate lettered therapeutic mechanism of action. Each lettered choice may be used once, more than once or not at all.

21. Flutamide __E___
22. Vinblastine __A___
23. Tamoxifen __D___
24. 5-Flourouracil __J___
25. Methotrexate __F___
26. Carmustine __G___
27. Taxol (Paclitaxel) __B___
28. Doxorubicin __I___

A. Inhibition of microtubule polymerization
B. Inhibition of microtubule depolymerization
C. Inhibition of glucose uptake
D. Estrogen antagonism
E. Androgen antagonism
F. Inhibition of dihydrofolate reductase activity
G. DNA alkylation
H. Vitamin B6 (pyridoxal) antagonism
I. DNA intercalation and inhibition of topoisomerase II activity
J. Inhibition of thymidylate synthetase activity

#29-34. Pulmonary Drugs: Match up the numbered descriptions below with the single most appropriate lettered drug. Each drug may be used once, more than once or not at all.

29. Bronchodilator, useful in chronic obstructive pulmonary disease; least likely to cause cardiac arrhythmias __B___
30. Nonselective but very potent and efficacious bronchodilator; not active via oral route of administration __D___
31. Prophylactic agent that appears to stabilize mast cells __E___
32. Direct bronchodilator useful in asthma when given by the oral route of administration __A___
33. Parenteral form is life-saving in severe status asthmaticus; inhibits phospholipase A2 __C___
34. Overdose toxicity includes insomnia, arrhythmias, and convulsions __A___

A. Aminophylline (a salt of theophylline)
B. Ipratropium
C. Prednisone
D. Epinephrine
E. Nedocromil
35. Used primarily in severe iron deficiency and iron malabsorption syndromes \[D\]
36. Essential for the therapy of neurological defects in pernicious anemia \[B\]
37. Used in the emergency treatment of acute iron intoxication \[E\]
38. Stored in the liver in an amount sufficient for at least 2 years \[B\]

A. Folic Acid
B. Cyanocobalamin
C. Ferrous Sulfate
D. Iron Dextran
E. Deferoxamine

Questions #39-64. 1.5 Points Each. Circle the letter of the single best answer.

39. Indicate which of the following statements concerning activation of *plasminogen* to *plasmin* are CORRECT:

A. It can be reversed by administration of vitamin K
B. It is used preoperatively and during surgery in patients at risk of deep vein thromboses
C. It is produced by treatment with anistreplase
D. A and B
E. B and C

40. Indicate which of the following statements concerning *olanzapine* are CORRECT:

A. It has a higher D₄/D₂ receptor blocking potency compared to haloperidol
B. It blocks 5-HT₂ receptors in the brain
C. It produces a higher incidence of agranulocytosis compared to clozapine
D. A and B
E. A, B and C

41. When tumor cells are destroyed by anti-neoplastic drugs, there is a risk of increased uric acid production leading to gout. This risk can be reduced by administration of a *xanthine oxidase inhibitor* such as:

A. Allopurinal
B. 6-Mercaptopurine
C. 6-Thioguanine
D. A and B
E. B and C
42. Indicate which of the following pre-operative agents presents the \textit{greatest risk} of sensitization of the heart to \textit{arrhythmic} effects of catecholamines:

A. Enflurane  
B. Nitrous Oxide  
C. Isoflurane  
D. Thiopental  
E. Halothane

43. All of the following statements concerning the use of \textit{aspirin} as an inhibitor of platelet aggregation are correct \textit{EXCEPT}:

A. Aspirin inhibits cyclooxygenase activity in platelets
B. Platelets lack the ability to synthesize new cyclooxygenase molecules
C. Inhibition of platelet thromboxane synthesis occurs as a result of aspirin treatment
D. The dosage of aspirin required to inhibit platelet aggregation is similar to the aspirin dosage required to reduce pain
E. Endothelial cells have the ability to synthesize new cyclooxygenase molecules

44. Indicate which of the following statements concerning drug therapy for \textit{tuberculosis} are \textit{CORRECT}:

A. Rifampin is considered a first line drug choice for treatment
B. Single drug therapy is recommended until drug sensitivity of the organism can be determined
C. Once drug therapy is begun, it should continue for not less than 2 weeks, but not more than 1 month
D. A and B
E. A, B and C

45. \textit{Disulfiram} (Antabuse) has been used in the treatment of \textit{alcoholism} because it:

A. Reduces the absorption of alcohol from the GI tract
B. Produces a buildup of acetaldehyde following alcohol intake
C. Reduces alcohol withdrawal symptoms
D. Increases alcohol metabolism
E. Acts at alcohol receptors as a partial agonist
46. Drugs that cause bronchodilation include all of the following EXCEPT:

A. Theophylline ✓
B. Albuterol ✓
C. Ephedrine ✓
D. Cromolyn
E. Ipratropium ✓

47. If the minimal alveolar concentration (MAC) of isoflurane is 1.0%, what would be the appropriate concentration to use if isoflurane were to be the sole anesthetic agent?

A. 1.0%
B. 1.3%
C. 1.9%
D. 2.5%
E. 5.0%

48. Ondansetron is often used together with cisplatin in anti-neoplastic therapy because odanestron:

A. Inhibits undesirable metabolite formation from cisplatin
B. Increases the affinity of cisplatin for DNA binding
C. Inhibits nausea produced by cisplatin
D. Has anti-tumor activity that provides a synergistic therapeutic effect when combined with cisplatin
E. None of the above

49. Indicate which of the following statements concerning low molecular weight heparins are CORRECT:

A. They can be used as anticoagulant therapy during pregnancy ✓
B. They help antithrombin III inhibit factor Xa
C. They help antithrombin III inhibit factor IIa (thrombin)
D. A and B ✓
E. A, B and C
50. Indicate which of the following statements concerning opiate actions in the dorsal horn of the spinal cord are CORRECT:

A. Opiates activate voltage-gated calcium channels on the terminals of afferent sensory neurons
B. Opiates bind to G protein-coupled receptors on the terminals of afferent sensory neurons
C. Opiates inhibit transmitter release from afferent sensory neurons *
D. A and B
E. B and C

51. Indicate which of the following statements concerning local anesthetics are CORRECT:

A. Their primary mode of action is to inhibit voltage-gated sodium channels 
B. At therapeutic dosages they produce a selective inhibition of afferent pain fibers without affecting efferent motor fibers
C. When used for topical administration they are often combined with a vasodilator
D. A and B
E. A, B and C

52. Common toxicities associated with the use of cancer chemotherapeutic agents include all of the following EXCEPT:

A. Bone marrow depression
B. Gastrointestinal upset
C. Sedation
D. Nausea and vomiting
E. Mucocutaneous lesions

53. Indicate which of the following agents used in anesthetic procedures can produce induction of unconsciousness without producing analgesia:

A. Midazolam
B. Thiopental
C. Fentanyl
D. A and B
E. A, B and C
54. Examples of agents which are used to treat a pulmonary embolism:

A. Hirudin - thrombin inhib
B. Urokinase
C. Thromboxane A₂
D. A and B
E. B and C

55. Acute and chronic cardiotoxicity is a side effect of which anti-neoplastic drug?

A. Prednisone
B. Methotrexate
C. L-asparaginase
D. Doxorubicin
E. Vincristine

56. All of the following are common side effects of phenothiazines EXCEPT:

A. Dry mouth
B. Nausea
C. Constipation
D. Parkinsonism
E. Sedation

57. Which of the following opiates has the lowest ED₅₀ for producing analgesia?

A. Morphine
B. Codeine
C. Heroin
D. Fentanyl
E. Meperidine?
58. C.V., a 33-year-old female, presents to the clinic with a history of mild intermittent asthma and seasonal hay fever. Although asthma is generally not a problem and easily managed with metaproterenol metered-dose inhaler (Alupent), her asthma became difficult to control during her usual hay fever season last year. Her usual hay fever season is one month away. Indicate below the most appropriate treatment on the left that can be initiated early to minimize the impact of this next seasonal asthma that is matched with an appropriate explanation for this treatment on the right.

A. Oral terbutaline: for $\beta_2$ agonist activity to reduce the early asthmatic response
B. Oral theophylline: for anti-inflammatory action to reduce the late asthmatic response (LAR)
C. Intranasal or inhalation cromolyn: to reduce the late asthmatic response
D. Oral ipratropium: to reduce the late asthmatic response
E. Inhaled albuterol: for $\beta_2$ agonist activity to reduce the early asthmatic response

59. R.S., a 45-year-old male, is receiving MOPP cancer chemotherapy for Hodgkin's disease. During the period that he is receiving the treatment, he indulges in a rich cheese fondue dinner. Shortly thereafter, he experiences a pounding headache, heart palpitations, and, upon admittance to the hospital emergency room, is found to have a blood pressure of 200/120. The most likely drug in his regimen that is responsible for this reaction to the cheese fondue:

A. Mechlorethamine
B. Methotrexate
C. Oncovin (Vincristine)
D. Prednisone
E. Procarbazine

60. S.A., a 52-year-old female, is being treated with warfarin because of atrial arrhythmias. Her prothrombin time has consistently been within the desired range. She begins using another drug (Drug X) and now notices signs of bleeding (hematoma formation). Drug X could be:

A. Cimetidine (Tagamet)
B. Aspirin
C. Phenobarbital
D. A and B
E. B and C
61. W.J., a 26-year-old male, is brought to the emergency room by friends. His friends indicate that W.J. is known to self-administer psychoactive agents. W.J.’s symptoms include restlessness, tremor, talkativeness, aggressiveness and paranoid hallucinations. Vital signs include a blood pressure of 160/110 mm and a pulse of 160 beats/minute. While you are waiting for a drug screening analysis of W.J.’s blood, indicate which drug below you would evaluate as most likely to be responsible for these symptoms.

A. Heroin  
B. Valium  
C. Amphetamine  
D. Phenobarbital  
E. Nitrous Oxide

62. All of the following are true of cytosine arabinoside (cytarabine) EXCEPT:

A. It blocks pyrimidine nucleoside kinase activity  
B. It is myelosuppressive  
C. It is most effective in the S phase of the cell cycle  
D. Once converted to a nucleotide triphosphate, it blocks DNA polymerase  
E. It is used in leukemia treatment

63. Indicate which of the following statements concerning the Ames test for drug toxicology are CORRECT:

A. It makes use of salmonella cultures  
B. It tests drugs for their ability to cause a back mutation in bacteria that cannot grow without histidine  
C. The effect of drug metabolites are studied in this test by adding liver extracts of rats treated with phenobarbital  
D. A and B  
E. A, B and C

64. Important principles of current cancer chemotherapy include all of the following EXCEPT:

A. It is important to kill all of the tumor cells to get a cure  
B. Most of the current cancer chemotherapies treat the biochemical cause of the disease  
C. When using drug combinations it is desirable to use drugs whose side effects don’t overlap  
D. The maximum opportunity for a cure is during the early stages of disease  
E. Drug resistance is a major problem in cancer chemotherapy
Questions #65-72. True/False. 0.5 Point Each.

65. Erythropoietin is used to increase blood platelet counts  

66. Montelukast is a leukotriene receptor antagonist  

67. Haloperidol produces fewer motor side effects compared to olanzapine 

68. In cancer chemotherapy, the multidrug resistance gene (MDR-1) produces resistance to drug therapy by conferring the ability to metabolize several cancer drugs 

69. The Food and Drug Administration (FDA) approval system in some cases allows for a drug to come up for approval after Phase II testing instead of waiting for Phase III testing  

70. Emetine (syrup of ipecac) is used as an anti-nausea agent in conjunction with cancer chemotherapy 

71. The anemic, but not neurological, symptoms of vitamin B_{12} deficiency can be overcome by treatment with folic acid 

72. Rituximab (Rituxan) is an antibody used to treat lymphoma 

END OF EXAM: TIME TO RELAX!