

Name: _____ Points: _____

Prof. K. C. Nicolaou

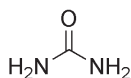
Midterm Exam

CHEM 151 - Molecules that Changed the World

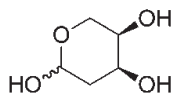
January 28, 2010

ANSWER ALL SIX [6] QUESTIONS

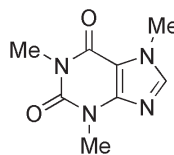
1. Match the following names of natural or synthetic molecules with their molecular structures: thymine, ribose, estrone, urea, caffeine, acetylsalicylic acid (Aspirin®), ibuprofen (e.g. Advil®), thromboxane A₂, arachidonic acid, camphor, cocaine, Tyrian purple, carminic acid, quinine, codeine, strychnine, leukotriene D₄, montelukast sodium (Singulair®), erythromycin B, monensin (40 points).



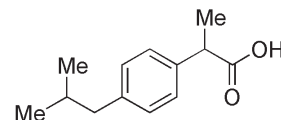
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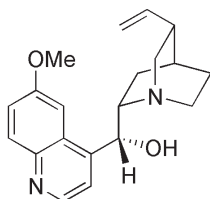
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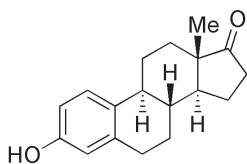
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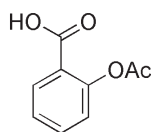
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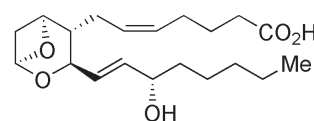
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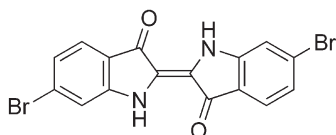
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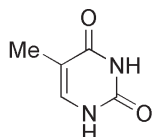
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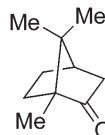
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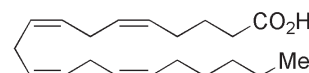
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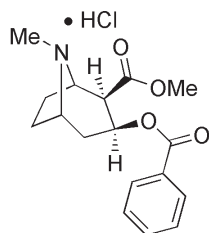
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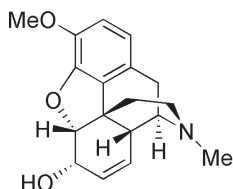
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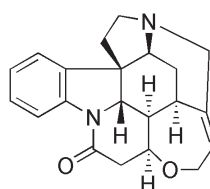
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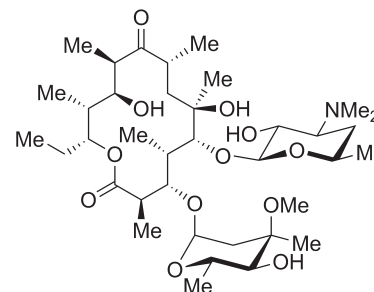
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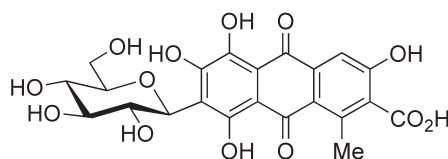
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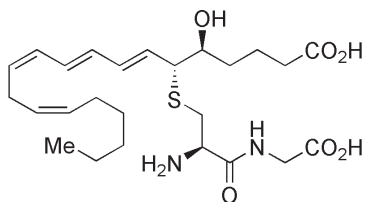
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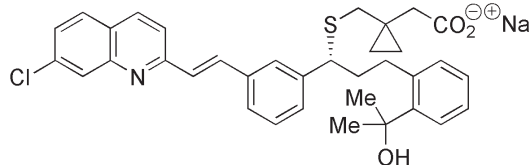
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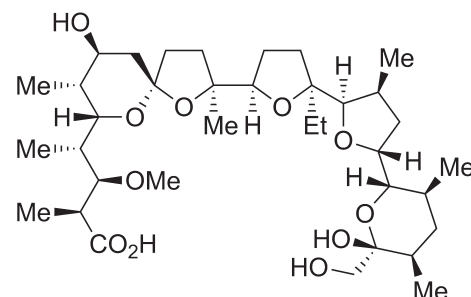
18. _____



17. _____



19. _____



20. _____

2. Match the following names with the appropriate discovery or achievement: Hermann Kolbe, Felix Hoffmann, Henry Perkin, Jr., Carl Wilhelm Scheele, Marshall Gates, Mark E. Russell, Charles J. Pedersen, Selman A. Waksman, James Lind, Robert Woodward, Albert Eschenmoser (20 points).

1. The total synthesis of vitamin B₁₂: _____

2. The discovery of 18-crown-6: _____

3. The discovery of streptomycin, the first antibiotic effective against tuberculosis: _____

4. The discovery of oxygen (O₂), chlorine (Cl₂), tungsten (W) and molybdenum (Mo): _____

5. The first total synthesis of morphine: _____

6. The first total synthesis of acetic acid and salicylic acid: _____

7. The chemical synthesis of progesterone from diosgenin (occurring in the Mexican yam): _____

8. The discovery of Aspirin®: _____

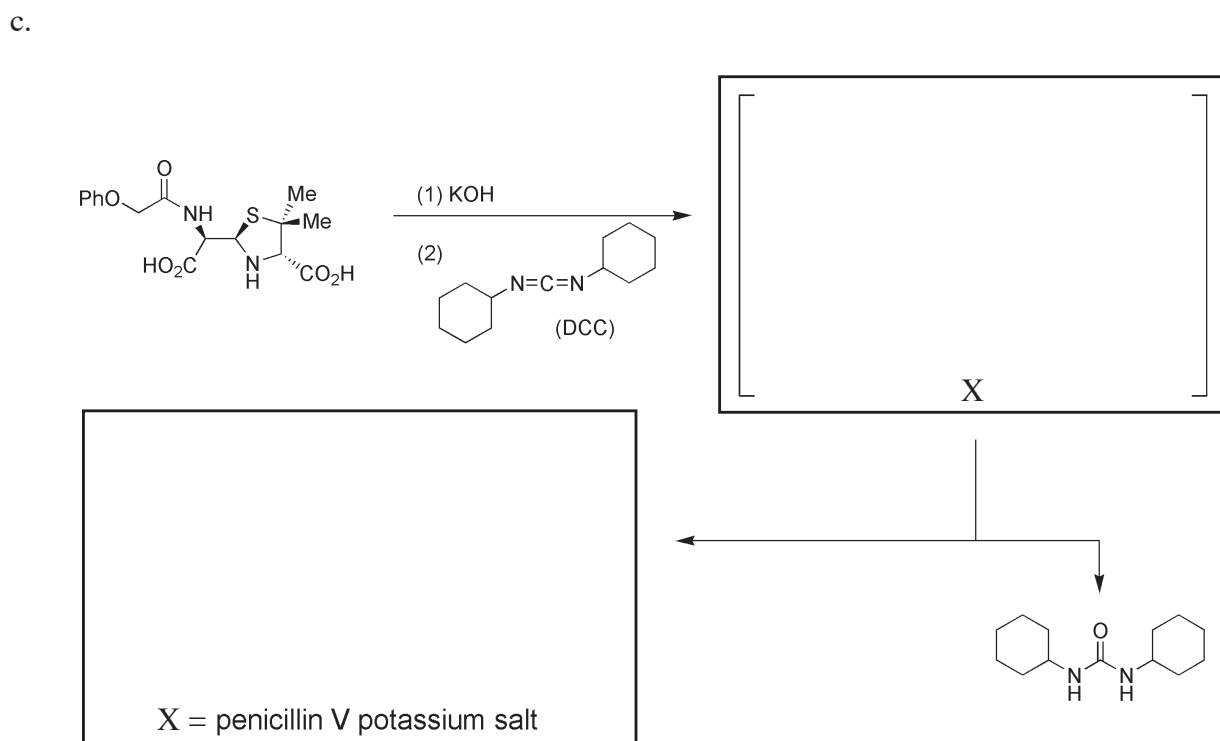
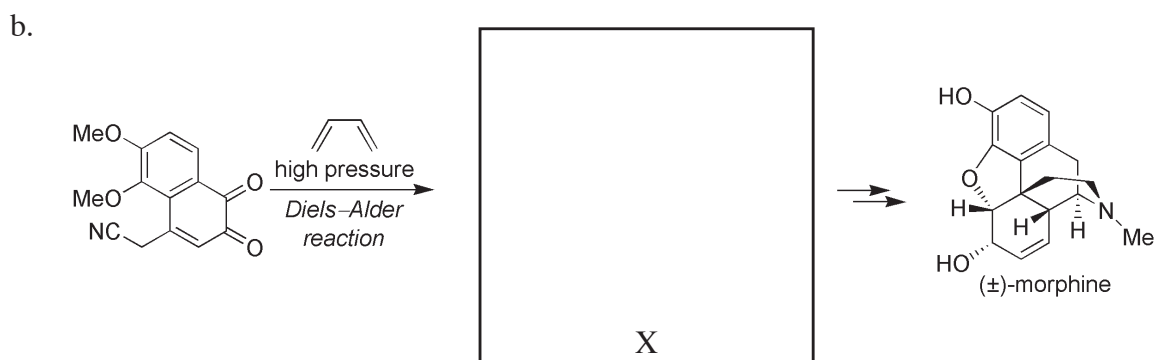
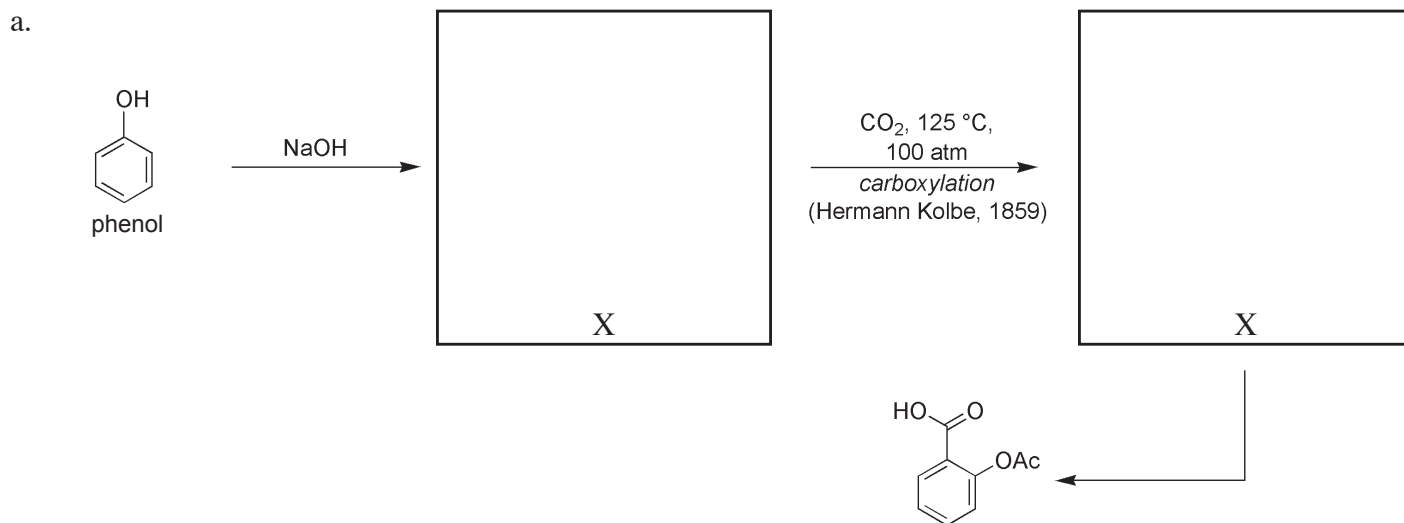
9. The first total synthesis of terpineol: _____

10. The discovery that oranges and lemons (vitamin C) heal the disease scurvy: _____

3. Name the winner(s) of the Nobel Prize in Chemistry, or the Nobel Prize in Physiology or Medicine for the following discoveries or accomplishments (20 points).

1.		“in recognition of the extraordinary services he has rendered by his work on sugar and purine syntheses”
2.		“in recognition of his services in the advancement of organic chemistry and the chemical industry, through his work on organic dyes and hydroaromatic compounds”
3.		“for the discovery of the so-called Grignard reagent, which in recent years has greatly advanced the progress of organic chemistry”
4.		“for the services rendered through his research into the constitution of the sterols and their connection with the vitamins”
5.		“for his researches into the constitution of haemin and chlorophyll and especially for his synthesis of haemin”
6.		“for the discovery of penicillin and its curative effect in various infectious diseases”
7.		“for his investigations on plant products of biological importance, especially the alkaloids”
8.		“for their discovery and development of the diene synthesis”
9.		“for his outstanding achievements in the art of organic synthesis”
10.		“for their discoveries concerning prostaglandins and related biologically active substances”

4. Fill in the gaps [X] with structures in the following reactions (20 points).



5. Write a short essay (150 words or less) on morphine and its impact on medicine and society (history, discovery (name person), structure, good properties, bad properties, total synthesis (name person) (20 points).

6. Write short notes (25 words or less) on the *medical indication* and *mechanism of action* of the following molecules (20 points).

erythromycin A

vitamin B₁₂

montelukast sodium
(Singulair®)

penicillin