



MANIPAL UNIVERSITY

FIRST YEAR M. PHARM. DEGREE EXAMINATION - MAY 2017
SUBJECT: MEDICINAL CHEMISTRY - I (PCH 601T)
(SPECIALIZATION: PHARMACEUTICAL CHEMISTRY)
(2014 REGULATION)
Thursday, May 18, 2017 (10.00 - 13.00 Hrs.)

Marks: 100

Duration: 180 mins.

Answer ALL the questions.

- 1) Explain FBDD with a suitable example. Compare FBDD with HTS. (10)
 - 2) Define biotransformation and explain in detail phase II metabolic reactions. (10)
 - 3) How do you alter polarity by varying functional groups? Explain. (10)
 - 4) Explain the importance of pKa in drug design. How it is determined? (10)
 - 5) Discuss in detail about radio-ligand assays. (10)
 - 6) Discuss the drug target identification and validation. (10)
 - 7) With examples, discuss the contribution of nature in lead discovery. (10)
 - 8) Explain the mechanism of drug-drug interactions. Giving suitable examples, explain the binding role of amino group and heterocyclic rings. (10)
- (5+5 = 10 marks)

Write short notes:

- 9A) Classification of prodrugs. (5)
- 9B) Stages of clinical drug discovery. (5)

Write briefly on the following:

- 10A) Addition of polar group and alteration of biological activity. (5)
- 10B) Alteration of logP and its effect on biological activity. (5)



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FIRST YEAR M. PHARM. DEGREE EXAMINATION - MAY 2017
SUBJECT: MEDICINAL CHEMISTRY - II (PCH 602T)
(SPECIALIZATION: PHARMACEUTICAL CHEMISTRY)
(2014 REGULATION)
Saturday, May 20, 2017 (10.00 - 13.00 Hrs.)

Marks: 100

Duration: 180 mins.

Answer ALL the questions.

- 1) Explain split and Mix method, Tea Bag method and Multipin method in solid phase chemistry. Give their applications. (10)
- 2) Explain the following parameters: (10)
 - i) Lipophilicity
 - ii) Electronic effect
 - iii) Steric factor
- 3) What are biomarkers? Classify them with suitable examples. Give their applications. (10)
- 4) What is 3D pharmacophore identification? Explain with examples. List out the steps for building a homology model. (10)
- 5) How is the new chemical entity evaluated for CYP inhibition? Mention the importance of this study. (10)
- 6) The following table represents the serum cholesterol levels (mg/dl) of three groups of Swiss albino mice. Apply an appropriate statistical method to determine whether niacin and test compound have hypocholesterolemic actions. Which one of them is more efficacious? What level of significance did you choose and why? (10)

control	405	375	375	385	420	345	425	370
niacin	325	295	305	275	285	305	305	315
Test	195	205	185	175	165	190	180	175

- 7) Discuss the various steps in recombinant DNA technology. Justify, how it is used in new drug discovery. Mention the applications of protein engineering. (10)
- 8) Discuss the methods available for protecting and deprotecting the functional groups and role of coupling reagents in peptide synthesis. (10)

Write short notes:

- 9A) Benefits of patent protection. (5)
- 9B) i) CoMFA ii) MS-Whim iii) HINT (5)

Write briefly on the following:

- 10A) Methods to determine pKa of a new chemical entity. (5)
- 10B) Docking procedures. (5)



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FIRST YEAR M. PHARM. DEGREE EXAMINATION - MAY 2017
SUBJECT: PHARMACEUTICAL PROCESS CHEMISTRY (PCH 603T)
(SPECIALIZATION: PHARMACEUTICAL CHEMISTRY)
(2014 REGULATION)
Tuesday, May 23, 2017 (10.00 - 13.00 Hrs.)

Marks: 100

Duration: 180 mins.

Answer ALL the questions.

- 1) Giving examples, discuss covalent organic compounds as an additive for fine tuning of organic reactions and discuss the effect of aging of reagents on reagent reactivity. (10)
- 2) Discuss the various mechanisms proposed for liquid-liquid PTC, solid-liquid PTC and PTC in the presence of bases? (10)
- 3) Discuss various methods used for protection and deprotection of phenols and carbonyl groups. (10)
- 4) Briefly comment on the following: (10)
 - i) Environmental problems associated with the classical work-up procedures.
 - ii) Principles of chemical process safety.
- 5) Define polymorphism with an example. How it can be identified in a drug substance? (10)
- 6) Discuss the pharmaceutical and biological effects of salt forms. (10)
- 7) Discuss the effect of solvent and presence of impurities on recrystallization process. (10)
- 8) Explain how enzymes are used in the following reactions: (10)
 - i) Hydrolysis
 - ii) C-C bond formation
 - iii) Reduction

Write short notes on:

- 9A) Effect of inclusion and occlusion on crystallization. (5)
- 9B) Methods for purification of ionic liquids. (5)

Write briefly on the following:

- 10A) Different types of insoluble solid supports and different ways of preparing supported reagents. (5)
- 10B) Regulatory aspects of salt forms. (5)



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FIRST YEAR M. PHARM. DEGREE EXAMINATION - MAY 2017

SUBJECT: ADVANCED ORGANIC CHEMISTRY (PCH 604T)

(SPECIALIZATION: PHARMACEUTICAL CHEMISTRY)

(2014 REGULATION)

Thursday, May 25, 2017 (10.00 - 13.00 Hrs.)

Marks: 100

Duration: 180 mins.

Answer ALL the questions.

- 1) Write the structures, synthetic uses and disposal of Lawesson's reagent, Sodium hydride and LDA. (10)
- 2) Discuss the method of preparation and reactions of purines. Write the tautomeric forms and their stability of purines. (10)
- 3) Write two synthetic methods and reactions of Quinolines. Compare the oxidation of quinoline by potassium permanganate with that of isoquinoline. (10)
- 4) Explain the retrosynthetic analysis of Ethambutol indicating the synthetic equivalents and write its forward synthesis. (10)
- 5) Describe the mechanisms involved in Wittig rearrangement and Clemmensen reduction. (10)
- 6) Explain the chiral catalyst induced aldehyde alkylation and explain the asymmetric desymmetrization of meso epoxides. (10)
- 7) Explain the importance of chiral building blocks in asymmetric synthesis with two specific examples. (10)
- 8) What are retro Diels-alder reaction and asymmetric transfer hydrogenation? (10)
- 9) **Write short notes on:** (10)
 - i) Formylation of aromatic rings.
 - ii) Ugi reaction.
- 10) **Write briefly on the following:** (10)
 - i) Aza-indolizines.
 - ii) Affinity chromatography.




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FIRST YEAR M. PHARM. DEGREE EXAMINATION - MAY 2017
SUBJECT: SPECTRAL AND CHROMATOGRAPHIC TECHNIQUES (PCH 605T)
(SPECIALIZATION: PHARMACEUTICAL CHEMISTRY / PHARMACOGNOSY)
(2014 REGULATION)
Saturday, May 27, 2017 (10.00 - 13.00 Hrs.)

Marks: 100

Duration: 180 mins.

Answer ALL the questions.

- 1) Explain the following in ^1H NMR spectroscopy: (10)
i) Anisotropic effect.
ii) Coupling constant and splitting pattern.
iii) Double resonance effect.
- 2) Mention the advantages of 2D NMR over 1D NMR and explain the steps in 2D NMR experiment with a spectral representation. (10)
- 3A) Assign ^{13}C chemical shift values from the data given to the appropriate carbons in the following structures: (6)
i) δ : 167.44, 153.15, 130.99, 23.61 (neglect other atoms) to Paracetamol.
ii) δ : 146.6, 144.03, 137.9, 55.84, 111.28, 131.94, 39.92 to Eugenol (neglect all other atoms)
iii) δ : 18.15, 181.35, 140.93, 137.02 in Ibuprofen (neglect the other atoms).
- 3B) List out the differences between: (4)
i) HMBC and HMQC technique.
ii) APT and DEPT.
- 4A) Explain the preparation of capillary and gel electrophoresis equipment for carrying out the experiment. (5)
- 4B) Discuss in detail about APCI. (5)
- 5A) Write a note on natural abundance of stable isotopes of elements and the usefulness in interpretation of mass spectrum. (5)
- 5B) Discuss in detail about alpha cleavage (radical site initiation). (5)
- 6A) Write in detail about silylation as GC derivatisation technique including advantages and disadvantages. (5)
- 6B) What are the qualities of an ideal GC detector? (5)
- 7A) Calculate λ_{max} for the following: (6)
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- i) $\text{CH}_3\text{-CH=CH-CH=CH CH}_3$
- 7B) Write the expected IR peaks for -Naphthol and Benzamide. (4)
- 8) Write a note on HPLC column design and its importance. (10)
- Write short notes on:**
- 9A) The role of shift reagents in the structural determination of flavonoids. (5)
- 9B) Hydrogen bonding and electronic effects in IR spectroscopy. (5)

Write briefly on the following: