



UNIVERSITY OF THE PUNJAB

Final Prof. A/2015

Examination: Doctor of Pharmacy
(Pharm.D.)

Roll No.

Subject: Pharmaceutical Chemistry-III (Medicinal Chemistry)
PAPER: 1

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions, Each question carries equal marks.

Q. 1: Write down the introduction, biological actions, SAR and therapeutic applications of Reserpine. (20)

Q. 2: Discuss in detail the medicinal chemistry of Local Anaesthetics. (20)

Q. 3: Discuss the medicinal chemistry of Testosterone with special reference to structure activity relationship. (20)

Q. 4: Discuss the introduction, biological action, SAR and therapeutic applications of loop diuretics. (20)

Q. 5: Discuss the medicinal chemistry of the following. (10+10=20)

a)- Vitamin-B₂ b)- Vitamin-A

Q. 6: Discuss the chemistry, mechanism of action, synthesis, SAR of 4-aminoquinoline. (20)

Q. 7: Discuss the chemistry, mechanism of action, synthesis, SAR of the followings.

Isoniazid (10)

Ethambutol. (10)

UNIVERSITY OF THE PUNJAB



Final Prof. A/2016
Examination: Doctor of Pharmacy
(Pharm.D.)

Roll No.

Subject: Pharmaceutical Chemistry-III (Medicinal Chemistry)

TIME ALLOWED: 3 hrs.
 MAX. MARKS: 100

PAPER: 1

NOTE: Attempt any FIVE questions, Each question carries equal marks.

Q.1: Discuss the chemistry, mechanism of action, synthesis, SAR of the followings (10+10)
 (i) Pyrazinamide. (ii) Isoniazid

Q. 2: Describe the medicinal chemistry of intravenous anaesthetics (20)

Q. 3: Discuss the medicinal chemistry of Alkylating agents as Anti-cancer. (20)

Q. 4: Discuss chemistry, SAR and mechanism of action of Chloramphenicol. (20)

Q. 5: Write note on the following (10+10)
 (i) Chemistry and uses of Vitamin-A
 (ii) Chemistry and uses of Ferrous Sulphate

Q. 6: Discuss the mechanism of action, synthesis, SAR of 9-aminoacredines. (20)

Q. 7: Write note on the followings. (10+10)
 (i) Furosemide (ii) Diclofenac sodium

UNIVERSITY OF THE PUNJAB



Final Prof. 2nd A/2016
Examination: Doctor of Pharmacy
(Pharm.D.)

Roll No.

Subject: Pharmaceutical Chemistry-III (Medicinal Chemistry)
PAPER: 1

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions, Each question carries equal marks.

Paper -I

Note: Attempt five questions, each question carries equal marks

Q. 1: Describe the Medicinal chemistry, including SAR and therapeutic uses of Thiazide diuretics. (20)

Q. 2: Discuss the Medicinal chemistry of Anti-Viral Drugs.(20)

Q. 3: Discuss the medicinal chemistry of beta lactam antibiotics and discuss SAR of penicillins. (20)

Q. 4 Discuss the medicinal chemistry, synthesis and SAR of Barbiturates (20)

Q. 5: Write note on the following (8+6+6)

- a- Silver sulfadiazine
- b- Formaldehyde
- c- Vitamin K

Q. 6: Discuss the mechanism of action, synthesis, SAR and uses of 4-aminoquinolines.(20)

Q. 7: Write note on the followins. (10+10=20)

(i) Isoniazid

(ii) Indomethacin



UNIVERSITY OF THE PUNJAB

Final Prof: Annual - 2017
Examination: Doctor of Pharmacy
(Pharm.D.)

Roll No.

Subject: Pharmaceutical Chemistry-III (Medicinal Chemistry)
PAPER: 1 .

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions, Each question carries equal marks.

- Q.1: Discuss the chemistry, mechanism of action, synthesis, SAR of the followings (10+10)
(i) Azathioprine. (ii) Cyclosporine
- Q. 2: Describe in detail the medicinal chemistry of the followings (10+10)
(i) Frusemide (ii) Diclofenac Sodium
- Q. 3: Discuss the medicinal chemistry of the followings Anti-cancer drugs. (10+10)
(i) Tamoxifen (ii) Methotrexate
- Q. 4: Discuss chemistry, SAR and mechanism of action of Chloramphenicol. (20)
- Q. 5: Discuss the synthesis, mechanism of action and SAR of the followings. (10+10)
(i) Isoniazid
(ii) Rifampicin
- Q. 6: Discuss the mechanism of action, synthesis, SAR of 4-Aminoquinolines. (20)
- Q. 7: Write note on the followings. (10+10)
(i) Ferrous gluconate (ii) Silver Sulfadiazine



UNIVERSITY OF THE PUNJAB

Final Prof: 2nd Annual - 2017
Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutical Chemistry-III (Medicinal Chemistry)
PAPER: 1

TIME ALLOWED: 3 hrs.
MAX. MARKS: 100

NOTE: Attempt any FIVE questions, Each question carries equal marks.

Q.1: Discuss the chemistry, mechanism of action, synthesis, SAR of the followings (10+10)
(i) Acetazolamide. (ii) Ribavirin

Q. 2: Describe in detail the medicinal chemistry of the Inhalation Anaesthetics. (20)

Q. 3: Discuss the medicinal chemistry of the followings Anti-cancer drugs. (10+10)
(i) 5-Fluorouracil (ii) 5-Mercaptopurine

Q. 4: Discuss chemistry, SAR and mechanism of action of aminoglycosides antibiotics. (20)

Q. 5: Discuss the synthesis, mechanism of action and SAR of the followings. (10+10)
(i) Ethambutol
(ii) Pyrazinamide

Q. 6: Discuss the mechanism of action, synthesis, SAR of 8-Aminoquinolines. (20)

Q. 7: Write note on the followings. (10+10)
(i) Vitamin-K (ii) Vitamin-C



UNIVERSITY OF THE PUNJAB

Final Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No.

Subject: Pharmaceutical Chemistry-III (Medicinal Chemistry)

PAPER: 1 Part – II

MAX. TIME: 2 Hrs. 30 Min.

MAX. MARKS: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Attempt any 4 questions. Each questions carry equal marks.

Q. 2: Describe the Medicinal Chemistry of 5-Fluorouracil and 6-Mercaptopurine. (10+10)

Q. 3: Discuss in detail the medicinal chemistry of Local Anaesthetics. (20)

Q. 4: Discuss aminoglycosides and describe SAR of Streptomycin. (20)

Q. 5 Describe medicinal chemistry, mechanism and therapeutic applications of the following:

i- Mefenamic acid (10)

ii- Isoniazid (10)

Q. 6: Discuss the medicinal chemistry of the following. (10+10=20)

a)- Vitamin-B₂

b)- Vitamin-A

Q. 7: Discuss the chemistry, mechanism of action, synthesis, SAR of 4-aminoquinolines. (20)



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual-2019

Subject: Pharmaceutical Chemistry-IV (Medicinal Chemistry)

Paper: 1 Part - I (Compulsory)

(New Course)

Time: 30 Min. Marks: 20

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option.

(20x1=20)

- 1- In Ruban quinolone and quinuclidine rings are linked by which of the following?
 - a. NH_2
 - b. CHOH
 - c. CH_2
 - d. C=O
- 2- Which of the following belongs to 4-aminoquinoline?
 - a. Chloroquine
 - b. Mefloquine
 - c. Quinine
 - d. Azacrine
- 3- Ethambutol has how many butanol groups?
 - a. 2
 - b. 1
 - c. 3
 - d. 4
- 4- For anti-TB action of pyrazinamide is converted into which of the following?
 - a. Pyrazinaldehyde
 - b. Pyrazenoic acid
 - c. Pyazine lactone
 - d. Pyrimethamine
- 5- Isoniazide is which of the following?
 - a. Pyrazine derivative
 - b. Piperidine derivative
 - c. Nicotinic acid derivative
 - d. Isonicotinic acid derivative
- 6- Which of the following is antidote of methotrexate?
 - a. Folinic acid
 - b. Folic acid
 - c. N-acetyl cysteine
 - d. Glutathione
- 7- Compounds which kill or prevent infection without damaging living tissues are known by which of the following?
 - a. Disinfectants
 - b. Antiseptics
 - c. Antibiotics
 - d. Pesticides
- 8- Which of the following is Benzimidazole?
 - a. Acetazolamide
 - b. Thiazides
 - c. Thiabendazole
 - d. Oxadiazole
- 9- Which of the following is correct for Biguanides?
 - a. 2 linked isoguanidine
 - b. 2 linked bisguanidine
 - c. 2 linked guanidine
 - d. 2 linked paraganidine
- 10- Which of the following drugs cause liver toxicity?
 - a. Aspirin
 - b. Paracetamol
 - c. Ibuprofen
 - d. Methylsalicylate
- 11- Which of the following alkaloids is bronchodilator?
 - a. Ephedrine
 - b. Reserpine
 - c. Morphine
 - d. Ergotamine

P.T.O.

- 12- Which of the following is correct for mefenamic acid?
- Propionic acid derivative
 - Benzoic acid derivative
 - Anthranilic acid derivative
 - Pyrimidine derivative
- 13- Which of the following is correct for streptomycin?
- Monoacidic base
 - Diacidic base
 - Triacidic base
 - Tetraacidic base
- 14- Chloramphenicol succinate is converted to chloramphenicol by which of the following?
- Esterase
 - Hydrolase
 - Hydrtase
 - Enolase
- 15- Furan ring is present in which of the following
- Furosemide
 - Acetazolamide
 - Vincristine
 - Tetracycline
- 16- Which of the following is acidic in nature? hydrochlorothiazide is which of the following?
- Ephedrine
 - Hydrochlorothiazide
 - Ampetamine
 - Reserpine
- 17- Phenoxy acetic acids are found in which of the following? Ethacrynic acid is derivative of which of the following?
- Ethacrynic acid
 - Methacrynic acid
 - Pentacrynic acid
 - Phthalic acid
- 18- Bacterial resistance to chloramphenicol arises due to which of the following?
- Acetoxytransferase
 - Aminotransferase
 - Sulfotransferase
 - Acetyltransferase
- 19- Which of the following Sulfa drugs is used in burns?
- Silver sulphadiazine
 - Sulphadiazine
 - Sulfacetamide
 - Sulfamethoxazole
- 20- Which of the following is correct for 5-fluorouracil?
- Antibiotic
 - Anticancer
 - Anti-TB
 - Anti-viral



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual-2019

Roll No.

Subject: Pharmaceutical Chemistry-IV (Medicinal Chemistry) (New Course)

Paper: 1 Part – II

Time: 2 Hrs. 30 Min. Marks: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt any *FOUR* questions. Each question carries equal marks.

Q. 2: Discuss the mechanism of action, SAR, synthesis and antidote of methotrexate

(20 marks)

Q. 3: Discuss the medicinal chemistry, synthesis, mechanism of action and SAR of Isoniazid.

(20 marks)

Q. 4: a. Describe the mechanism of action and SAR of azathioprine (10 marks)

b. Compare medicinal chemistry of Penicillins with Cephalosporins (10 marks)

Q. 5: Describe medicinal chemistry, mechanism of action, synthesis and SAR of 4-

Aminoquinolines. (20 marks)

Q. 6: Explain mechanism of action and structure activity relationship and medicinal uses of sulphonamides drugs. (20 marks)

Q. 7: Describe medicinal chemistry, mechanism of action and therapeutic applications of the following.

a)- Ibuprofen (10 marks)

b)- Furosemide (10 marks)



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual-2019

Roll No.

Subject: Pharmaceutical Chemistry-III (Medicinal Chemistry) (Old Course)

Paper: 1

Time: 3 Hrs. Marks: 100

Note: Attempt any *FIVE* questions. Each question carries equal marks.

Q.1: Write note on the following (10+10=20 marks)

a. Paracetamol

b. Para aminosalicylic acid

Q. 2: Discuss the chemistry, mechanism of action, synthesis, SAR of ethambutol. (20 marks)

Q. 3: .Classify local anesthetics, and describe the medicinal chemistry of Amides (20)

Q. 4: Discuss aminoglycosides and describe SAR of streptomycin. (20 marks)

Q. 5 Describe medicinal chemistry, Carbonic Anhydrase Inhibitors Diuretics (20)

Q. 6: Eexplain in detail the medicinal chemistry of Methotrexate. (20 marks)

Q. 7: Discuss the chemistry, mechanism of action, synthesis, SAR of 4-aminoquinolines. (20 marks)



UNIVERSITY OF THE PUNJAB

Final Prof: 2nd Annual – 2018

Examination: Doctor of Pharmacy (Pharm.D.)

Roll No. in Fig.

Roll No. in Words.

Subject: Pharmaceutical Chemistry-III
(Medicinal Chemistry)

MAX. TIME: 30 Min.

MAX. MARKS: 20

Signature of Supdt.:

PAPER: 1 Part – I (Compulsory)

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer cutting and overwriting is not allowed. (1x20=20)

1. The long half-life of mefloquine is due how many trifluoromethyl groups at position 2 and 8 of quinoline ring?
 - a. 2
 - b. 3
 - c. 1
 - d. 4
2. Rifampicin is synthesized from which of the following rifamycin?
 - a. A
 - b. B
 - c. C
 - d.
3. Cycloserine is a non-specific anti TB drug due to which of the following?
 - a- Inhibits peptidoglan
 - b- Inhibits mycolic acid
 - c- Inhibits liparabinamanan
 - d- Inhibits arabinogalactan
4. Sulfonamides are not active against TB due to which of the following?
 - a. MTB can differentiate between sulfonamides and PABA
 - b. MTB cannot differentiate between sulfonamides and PABA
 - c. MTB can differentiate between sulfonamides and folic acid
 - d. MTB cannot differentiate between sulfonamides and folic acid
5. Which of the following is correct for 4-hydroxytamoxifen and N-desmethyl-4-hydroxytamoxifen?
 - a. More affinity to the oestrogen receptor than tamoxifen
 - b. Less affinity to the oestrogen receptor than tamoxifen
 - c. No affinity to the oestrogen receptor than tamoxifen
 - d. Moderate affinity to the oestrogen receptor than tamoxifen
6. Barbituric acid is not active due which of the following?
 - a. Ionizable protons at position 5
 - b. Ionizable protons at position 4
 - c. Ionizable protons at position 3
 - d. Ionizable protons at position 2
7. Which of the following is a topical Sulphonamide?
 - a. Sulfasalazine
 - b. Mafenide
 - c. Silver sulfadiazine
 - d. Both 'b' & 'c'
8. Chemically, hexachlorophene is which of the following?
 - a. Biguanide
 - b. Furan derivative
 - c. Bisphenol
 - d. None of above
9. Drugs that help the body to get rid of parasitic worms are regarded as which of the following?
 - a. Antibiotics
 - b. Anthelmintics
 - c. Antipyretics
 - d. None of above

P.T.O.

10. Which of the following alkaloid contains nitrogen outside the ring?
- Ephedrine
 - Reserpine
 - Morphine
 - Ergotamine
11. Which of the following NSAID is used in racemic form?
- Ibuprofen
 - Diclofenac
 - Mefenamic acid
 - Indomethacin
12. Morphine contains how many rings?
- 3
 - 4
 - 5
 - 6
13. Chemical nature of hydrochlorthiazide is which of the following?
- Basic
 - Acidic
 - Neutral
 - None of above
14. Hydrochlorthiazide contains how many benzene rings?
- 1
 - 2
 - 3
 - 4
15. Which of the following statements is true regarding the properties of benzylpenicillin?
- It is a bacteriostatic agent.
 - It is active over a wide range of bacterial species.
 - It is resistant to β -lactamases.
 - Certain individuals may have an allergic response to it.
16. What role does the acetoxy group at the 3-position of cephalosporins in enhancing antibacterial activity?
- It acts as a steric shield and masks enzymatic attack at the β -lactam ring.
 - It acts as a good leaving group when the β -lactam ring is opened
 - It takes part in a transesterification reaction with the carboxylic acid group at position 4.
 - It increases the reactivity of the β -lactam ring by neighbouring group participation.
17. Which portion of penicillin is responsible for its microbicidal activity?
- The peptidoglycan
 - The thiazolidine ring
 - The beta-lactam ring
 - The variable side chain
18. Which of the following is untrue for cephalosporin group of drugs?
- Their structure is similar to that of the penicillins.
 - Their spectrum of activity is extremely narrow.
 - There are three generations of these drugs.
 - They cause fewer allergic reactions than the penicillins.
19. Streptomycin is hydrolyzed by which of the following?
- Acid
 - Base
 - Glycosidase
 - a, b, c
20. Which of the following is correct for aminoglycosides and beta lactam antibiotics?
- Chemically incompatible
 - Physically incompatible
 - Pharmacologically incompatible
 - Therapeutically incompatible



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual-2021

Roll No.

Subject: Pharmaceutical Chemistry-IV (Medicinal Chemistry)

Paper: 1 Part – II (New Course)

Time: 2 Hrs. 30 Min. Marks: 80

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Note: Attempt any *FOUR* questions. Each question carries equal marks.

Q No 2 (10+10)

- a) Discuss medicinal chemistry, mechanism and therapeutic applications of ibuprofen
- b) Discuss medicinal chemistry, mechanism and therapeutic applications of methotrexate

Q No 3 (10+10)

- a) Discuss medicinal chemistry, mechanism and therapeutic applications of hydrochlorothiazide diuretic
- b) Discuss medicinal chemistry, mechanism and therapeutic applications of acyclovir

Q No 4 (20)

Discuss synthesis mechanism, SAR and therapeutic applications of Chloramphenicol

Q No 5 (20)

How changing shape and size of carbon skeleton in a lead molecule effect the activity?

Q No 6 (20)

Describe chemistry of 8-aminoquinolines and synthesis, mechanism of action and SAR of Pamaquine

Q No 7 (10+10)

- a) Write down chemistry, structure activity relationship (SAR) and therapeutic uses of kanamycin
- b) Give chemical reactions involved in synthesis of sulfanilamide using benzene as a starting material.



UNIVERSITY OF THE PUNJAB

Doctor of Pharmacy (Pharm.D.) Final Prof: Annual-2021

Subject: Pharmaceutical Chemistry-IV (Medicinal Chemistry)

Paper: 1 Part - I (Compulsory)

(New Course)

Time: 30 Min. Marks: 20

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option.

(20x1=20)

1. Which one is called as high ceiling diuretic
 - a. Loop diuretic
 - b. Thiazide diuretic
 - c. Carbonic anhydrase inhibitors
 - d. Potassium sparing diuretics
2. The chemical nature of thiazide diuretic is
 - a. Acidic
 - b. Basic
 - c. Neutral
 - d. Amphoteric
3. How many asymmetric carbons are present in the structure of ibuprofen
 - a. 1
 - b. 2
 - c. 3
 - d. 4
4. The chemical nature of ribavirin is
 - a. Alcohol
 - b. Phenol
 - c. Amide
 - d. Ester
5. The chemical nature of spironolactone diuretics
 - a. Alcohol
 - b. Phenol
 - c. Amide
 - d. Steroidal
6. How many phenoxy groups are present in the structure of tamoxifen
 - a. 1
 - b. 2
 - c. 3
 - d. 4
7. How many azole rings are present in the structure of vincristine
 - a. 1
 - b. 2
 - c. 3
 - d. 4
8. How many benzoyl groups are present in the structure of methotrexate
 - a. 1
 - b. 2
 - c. 3
 - d. 4
9. Sulfones are the compounds which contain the group
 - a. Sulfonyl
 - b. Carbonyl
 - c. Acetyl
 - d. Alkyl
10. How many cyclohexane rings in the structure of tromantadine
 - a. 1
 - b. 2
 - c. 3
 - d. 4
11. Chloramphenicol is biosynthesized by
 - a. Streptomyces capreolus
 - b. Streptomyces venezuale
 - c. Streptomyces archidaceus
 - d. Streptomycesgrigus
12. Which one of the followings sulphonamides is used in eye infection?
 - a. Sulphanilamide
 - b. Streptomyces venezuale
 - c. Sulphadoxine
 - d. Sulphacetamide
13. One of the following statements on the amino functional group in penicillin is false
 - a. Sulphanilamide
 - b. Sulphadiazine
 - c. Methylation decreases activity
 - d. Dapsone
14. Traveler's diarrhea is treated with
 - a. Sulphadiazine
 - b. Co-trimoxazole
 - c. Dapsone
 - d. Sulphadoxine

15. Gray baby syndrome is a characteristic side effect of
- a. Penicillin
 - b. Cephalosporin
 - c. Chloramphenicol
 - d. Aminoglycosides
16. Which of the following superfamily includes nuclear receptors?
- a. Superfamily 1
 - b. Superfamily 2
 - c. Superfamily 3
 - d. Superfamily 4
17. In solid-phase synthesis, a resin-immobilized functional group that forms a cleavable coupling site is called _____.
- a. Anchor
 - b. Protection group
 - c. Pharmacophore
 - d. Auxochrome
18. _____ are the compounds which contain the embryo of the active species within their structure which is released in vivo upon metabolism.
- a. Bioprecursor prodrugs
 - b. Polymeric prodrugs
 - c. Mutual prodrug
 - d. Tripartite prodrug
19. The other name for mercapto group is
- a. Sulfonyl group
 - b. Carbonyl group
 - c. Thionyl group
 - d. Sulfhydryl group
20. How many times ibuprofen is more potent than aspirin
- a. 30 times
 - b. 35times
 - c. 40 times
 - d. 45times