

II/IV B.PHARMACY (3rd SEMESTER)

301 PHARMACEUTICAL CHEMISTRY -II (ORGANIC-II)

(Theory) (75 hrs.)

Unit : 01 Stereochemistry :

- Stereo isomerism, tetrahedral optical activity, enantiomerism, diastereoisomerism, meso structures, elements of symmetry, chirality, chiral centers, absolute configuration, specification of D and L configuration. Nature of E and Z forms. Racemic modification and resolution of racemic mixture, conformational isomers, asymmetric synthesis.
- Geometrical isomerism :** Principles, nomenclature of isomers, determination of configuration.
- Stereochemistry of alicyclic compounds, biphenyls and oximes.

Unit : 02 Chemistry of Aromatic compounds :

- Aromaticity, structure of benzene, stability of benzene, general methods to prepare aryl halides.
- Mechanism of electrophilic aromatic substitution (nitration, sulphonation, Halogenation, Friedel Craft's alkylation, acylation), Electrophilic aromatic substitution reactions of substituted benzenes, including reactivity, orientation and influence of activating and deactivating groups, mechanisms of nucleophilic aromatic substitution and mechanisms of electrophilic and nucleophilic addition reactions of α , β -unsaturated carbonyl compounds.
- General methods of preparation and chemical reactions of amines, phenols and diazonium salts.

Unit : 03 Chemistry of polynuclear aromatic hydrocarbons :

Synthesis (Haworth's), properties and chemical reactions of naphthalene, phenanthrene and anthracene. Structure and medicinal uses of propranolol, Tolnaftate, menadione, naphazoline, phenindione, morphine and codeine.

Unit : 04 Chemistry of heterocyclic compounds :

- General classification and nomenclature of heterocyclic compounds
- Synthesis, properties and reactions of furan, pyrrole, thiophene, pyridine, quinoline and isoquinoline.
- Structures of acridine, benzopyran, pyrazole, imidazole, benzimidazole, oxazole, isoxazole, thiazole, pyrimidine, pyridazine and phenothiazine.
- Structure and medicinal uses of phenazocine, nicotinic acid, nikethamide, isoniazid, mepyramine, benzhexol, chloroquine, histamine, carbimazole, pyrimethamine, piperazine, diazepam, diethylcarbamazine citrate, sulphadiazine, metronidazole.

Unit : 05 Name reactions:

Beckmann, Fries, Schindt rearrangements; Clemmensen reduction, Oppenauer oxidation, Mannich reaction and Phillips reaction.

Unit : 06 Reagents used in organic synthesis:

Preparation and applications of N-Bromo succinimide, Lead tetra acetate and Lithium Aluminium hydride.

II/IV B.PHARMACY (3rd SEMESTER)
302 PHARMACEUTICAL CHEMISTRY-II
(Practicals) (75 hrs.)

- 01*. Qualitative analysis of organic binary mixtures containing water insoluble organic compounds (05 organic binary mixtures should be analyzed)
- 02) Preparation of methyl orange
- 03) Preparation of methanamine (Urotropine)
- 04*) Preparation of para nitro aniline
- 05*) Preparation of para bromo aniline from acetanilide.
- 06) Preparation of fluoresceine

TEXT BOOKS :

- 01. R.T.Morrison and R.N.Boyd, "Organic Chemistry", Allyn and Bacon, Inc., Boston.
- 02. I.L.Finar, "Organic Chemistry", Vol. 1, The English Language Book Society, London.
- 03. B.S.Furniss, A.J.Hannaford, V.Rogers, P.W.G.Smith and A.H.Tatchell, Vogel's Text Book of Practical Organic Chemistry The English Language Book Society.
- 04. F.G.Mann and B.C.Saunders, Practical Organic Chemistry, Longmans, Green & Co., Ltd., London.
- 05. R.M.Acheson, An introduction to the Chemistry of Heterocyclic Compounds, Interscience Publishers, New York.
- 07. Rama Rao Nadendla, Pharmaceutical Organic Chemistry, (Chemistry of Heterocyclic and Natural Compounds), Vallabh Publications, New Delhi

II/IV B.PHARMACY (3rd SEMESTER)

MODEL QUESTION PAPER

301 PHARMACEUTICAL CHEMISTRY-II (ORGANIC-II) (Theory)

Time : 3 hours

Max.Marks : 70

SECTION-A

Answer any four questions

(4 X 10 = 40 marks)

1. What do you mean by R and S configuration? Explain this with suitable examples and discuss the sequence rules that help in the determination of configuration.
2. What is aromaticity? Why is benzene called an aromatic compound?
3. What are polynuclear aromatic compounds? Discuss the method of preparation and reactions of naphthalene?
4. Write the synthesis and important reactions of pyrrole and quinoline.
5. Discuss the importance of Beckmann rearrangement in organic synthesis?
6. Discuss the use of Lithium aluminium hydride in organic synthesis?

SECTION - B

Answer any TEN questions

(10 X 3 = 30 marks)

7. Justify the statement "E & Z notation is more useful for polyolefinic compounds?"
8. Define the terms chirality and racemisation by giving suitable examples.
9. "Aromatic compounds undergo electrophilic substitutions". Justify the above statement.
10. Describe any three methods for the preparation of phenol.
11. Why is naphthalene more resistant to oxidation than anthracene and phenanthrene?
12. Give the structure and medicinal uses of morphine, propranolol and naphazoline.
13. Give the structure and numbering of acridine, benzopyran, imidazole and 1,2-diazine.
14. Give the structure, chemical name and medicinal uses of metronidazole, histamine.
15. Discuss the mechanism of Fries rearrangement.
16. Write short notes on Mannich reaction.
17. Write short notes on applications of lead tetraacetate.
18. Give the importance of N-Bromo succinamide in organic synthesis.

II/IV B.PHARMACY (3rd SEMESTER)

MODEL QUESTION PAPER (Practicals)

302 PHARMACEUTICAL CHEMISTRY-III

Time : 4 hours

Max.Marks : 70

- | | | | |
|----|------------------|---|----------|
| 1. | Synopsis | : | 10 Marks |
| 2* | Major Experiment | : | 30 Marks |
| 3. | Minor Experiment | : | 20 Marks |
| 4. | Viva-Voce | : | 10 Marks |
| | | | ----- |
| | Total | : | 70 Marks |
| | | | ----- |

II/IV B.PHARMACY (3rd SEMESTER)

303 PHARMACEUTICAL ENGINEERING-I (Theory) (75 hrs.)

Unit : 01

Introduction : Fundamental concept of material and energy balances, Units and Dimensions : Simple inter-conversions of units used in engineering calculations, dimensional analysis, Definitions of Stoichiometry, Unit operation, unit process and chemical technology, laboratory scale, pilot scale and industrial scale operations.

Unit : 02

Flow of fluids : Concepts of fluid statics and dynamics, construction of simple, differential and inclined manometers. Reynolds's number, Bernoulli's theorem and definition of head, friction losses, enlargement losses contraction losses, study of orifice meter, venturimeter, pilot tube and rotameter, simple problems on Bernoulli's theorem, friction losses and flow meters.

Transportation solids : Construction details advantages and disadvantages of belt conveyors, screw conveyors and pneumatic conveyors, bucket elevators.

Transportation of Fluids : Pipe standards, Joints fittings, cocks, globe valve, check valves, regulating valve, pumps, piston pump, plunger/pump, diaphragm pump, rotary pump, single stage suction centrifuge pump, self priming pump. Performance of reciprocating and centrifugal pumps

Unit : 03

Materials of pharmaceutical plant construction : Importance of materials in construction, the merits and demerits of different commonly used materials in plant construction such as iron, steel, copper, tin, aluminum, glass, rubber and plastic. Concept of corrosion, scale formation factors in forming corrosion, methods of reducing corrosion. Mechanical, Chemical, Electrical, Fire and Dust hazards. Industrial dermatitis, Accident Records.

Unit : 04

Humidity and air-conditioning : Definitions of humidity, relative humidity, percentage humidity, humid heat, humid volume, dew point, humidity chart, wet bulb theory, factors influencing the wet temperature, adiabatic saturation temperature. Theory of air - conditioning and description of equipment. Refrigeration principle and description of equipment.

(A.N.U. B.PHARMACY SYLLABUS WITH EFFECT FROM 2012-13 ACADEMIC YEAR)

Unit : 05

Mixing : Solid – Solid mixing- Mechanisms of Mixers-V-type, paddle and Rototube mixers- selection of mixer- Mixing of viscous masses, kneading machines and ointment mills-Liquid-Liquid equipment, impellers-their characteristics.

Unit : 06

Size reduction and Separation : Importance of size reduction. Theories of size reduction, factors Influencing size reduction, energy in size reduction, cutter mill, ball mill ,fluid energy mill, hammer mill, colloid mill-Selection of machinery. Principles of size separation, particle size distribution- Representation of screens, screening equipment, trommels, shaking and vibrating screens gyratory screens, cyclone, air and hydraulic separator, bag – filter, Cottrell precipitator, scrubber, sedimentation theory.

TEXT BOOKS :

01. Introduction to chemical Engineering by Badger and Banchemo
02. Pharmaceutical Engineering by K.Samba Murthy
03. Principles of Engineering Drawing by A.C.Parkinson
04. Pharmaceutical Engineering by C.V.S.Subrahmanyam,
05. Pharmaceutical Engineering by Dr.Girish K.Jani
06. Introduction to Pharmaceutical Engineering by Dr.A.R.Paradkar
07. Cooper and Gunns tutorial pharmacy by S.J.Carter.

II/IV B.PHARMACY (3rd SEMESTER)
MODEL QUESTION PAPER
303 PHARMACEUTICAL ENGINEERING - I

Time : 3 hours

Max.Marks : 70

SECTION - A

Answer any four questions

(4 X 10 = 40 marks)

1. Define unit operation and unit process in pharmaceutical industry with suitable examples. Distinguish between lab scale, pilot scale and industrial scale operations.
2. Explain the working of gate valve, globe valve and diaphragm valve
3. Write the importance of materials used in pharmaceutical plant construction and merits, demerits of commonly used materials.
4. Describe the basic construction of refrigeration
5. Discuss the construction, working and advantages of mixer useful for wet granulation.
6. Explain the construction, working and applications of fluid energy mill.

SECTION - B

Answer any TEN questions

(10 x 3 = 30 marks)

7. Write the significance of Reynold's number
8. What do you understand by energy and mass balance
9. Write about the check valve and its applications
10. Distinguish between reciprocating pump and centrifugal pump
11. Define the terms relative humidity, humid heat, dew point and humid volume
12. What is corrosion ? How do you minimise it ?
13. Write the applications of humidity in pharmacy
14. Write the steps involved in refrigeration cycle
15. Write briefly on V-type mixer
16. What is air binding ? How it is prevented ?
17. Give the applications of colloid mill in pharmacy
18. Write short notes on sieve analysis.

II/IV B.PHARMACY (3rd SEMESTER)
304 PHARMACEUTICAL MICROBIOLOGY
(Theory) (75 hrs.)

Unit : 01

Study of morphology, classification of bacteria, yeasts, actinomycetes, protozoa, fungi and viruses. Mutation, Mutagens, Bacterial Conjugation, Transformation and transduction.

Unit : 02

Preparation of media for bacterial, fungal and actinomycete cultures. Different methods for isolation, purification and preservation of microbial cultures. Introduction to microbiology of water, air and milk and methods of quantitative evaluation of microbial contamination.

Unit : 03

Theory of staining, Gram, acidfast, flagella, spore staining methods. Study of bacterial growth : effect of UV light, ultrasonic waves, temperature, pH, osmotic pressure, salt concentration and metal ions.

Unit : 04

An outline of theories of antimicrobial action of drugs and chemicals. Study of sterilization by moist and dry heat, construction and working of autoclave, sterilization by filtration, radiations and gases. Dynamics of disinfection, disinfectants - the mechanism of action, merits and demerits. Evaluation of bacteriocides and bacteriostatics.

Unit : 05

Principles of immunology, methods of transmission of disease carriers, vectors and reservoirs, General methods of Immunization against diseases. Fundamentals of serology : Neutralization, Precipitation, Opsonization, agglutination, complement fixation tests and ELISA.

Unit : 06

The study of etiology, diagnosis, source of infection, mode of transmission, immunization methods, prevalence and control of the following diseases: Bacillary dysentery, diphtheria, tuberculosis, leprosy, cholera, syphilis, gonorrhoea, tetanus food poisoning, rabies, polio, detrameophytes, malaria and Amoebiasis, AIDS, Hepatitis.

II/IV B.PHARMACY (3rd SEMESTER)
305 PHARMACEUTICAL MICROBIOLOGY
(Practicals) (75 hrs.)

01. General rules and procedure in microbiology lab
02. Acquaintance of equipment in microbiology lab
03. Preparation of culture medium for bacteria and potato dextrose agar medium for fungi. Cultivation of microorganisms.
04. Aseptic culture transfer techniques.
05. Simple staining
- 06*. Gram staining
- 07*. Bacterial motility
08. Acid-fast staining
00. Negative Staining
10. Oligodynamic action of copper
11. Isolation of pure cultures by streak plate method.
12. Spore Staining
13. Viable count of microbes of serial dilution method.
14. Rideal-walker test
15. Determination of antibiotic sensitivity
16. Effect of UV-rays on life of bacteria
17. Microscopic observation of fungi
18. Starch hydrolysis

TEXT BOOKS :

01. Microbiology by Pelczar
02. Text Book of Microbiology by Ananth Narayan.
03. Microbiology - An introduction by Tortora.
04. Microbiology by Prescott
05. Pharmaceutical Microbiology by Chandrakant R.Kokare
06. Immunology - by KUBY

II/IV B.PHARMACY (3rd SEMESTER)

MODEL QUESTION PAPER

304 PHARMACEUTICAL MICROBIOLOGY (Theory)

Time : 3 hours

Max.Marks : 70

PART - A

Answer any four questions

(4 X 10 = 40 marks)

1. Explain in detail various modes of reproduction in bacteria
2. Explain different isolation and preservation methods of microbial cultures.
3. Explain various factors effecting bacterial growth
4. Classify disinfectants . Explain the mechanism of action of various disinfectants.
5. Define serology. Explain the principles involved in precipitation, agglutination, opsonization and complement fixation tests.
6. Explain the etiology, diagnosis, source of infection, immunization methods and control of Amoebiasis and syphilis.

PART - B

Answer any TEN questions

(10 X 3 = 30 marks)

7. Differentiate Gram positive and Gram negative organisms along with neat diagrams
8. Classify viruses. Write about the structure of virus
9. Write two examples of differential media and selective media. Give the principle involved in use of these medias.
10. Write the quantitative evaluation methods for Milk
11. Define staining. Classify staining agents. Write the principle involved in staining.
12. Write the principle of gram's staining along with the procedure
13. Write the principle and working of autoclave.
14. Write the principle involved in sterilization by radiation and dry heat.
15. Define immunity. Write about various types of immunity.
16. Write the principle and procedure involved in different types of ELISA
17. Write the diagnosis, immunization methods and control of Tuberculosis.
18. Write diagnostic tests and control of Leprosy.

II/IV B.PHARMACY (3rd SEMESTER)

MODEL QUESTION PAPER (Practicals)

305 PHARMACEUTICAL MICROBIOLOGY

Time : 4 hours

Max.Marks : 70

- | | | | |
|----|------------------|---|----------|
| 1. | Synopsis | : | 10 Marks |
| 2* | Major Experiment | : | 30 Marks |
| 3. | Minor Experiment | : | 20 Marks |
| 4. | Viva-Voce | : | 10 Marks |
| | | | ----- |
| | Total | : | 70 Marks |
| | | | ----- |

II/IV B.PHARMACY (3rd SEMESTER)

306 ANATOMY AND PHYSIOLOGY (Theory) (75 hrs.)

Unit : 01

Introduction : Introduction to anatomical terms in relation to parts of the body, systems and organs. Elementary knowledge of the human skeleton.

Tissues of the body: Properties and functions of epithelial, connective, muscular, nervous and osseous (bone) tissues. General principles of membrane permeability, diffusion, transport membrane potentials, action potentials.

Unit : 02

Nervous system : Neuron, synapses, ganglion, plexus, physiology of nerve impulse, neurotransmission, reflex arc, central nervous system (parts and functions) and autonomic nervous system.

Unit : 03

Cardiovascular system and Blood : Heart, blood Vessels, cardiac cycle, circulation, blood pressure and its regulation and blood (composition and functions)

Unit : 04

Respiratory system : Gross anatomy of respiratory passages, physiology of respiration, nervous control of respiration.

Digestive System : Gross anatomy of alimentary canal, movement of alimentary canal, gastric secretions and the enzymes involved in digestion.

Unit : 05

Endocrine System : Physiological considerations of thyroid, pancreas, pituitary, gonads and suprarenal glands.

Urinogenital System : General disposition of organs of excretion, physiological consideration of urine formation, out put, factors controlling it.

Unit : 06

Physiology of special senses : Hearing, vision, smell, taste and structure and functions of skin.

II/IV B.PHARMACY (3rd SEMESTER)

307 ANATOMY & PHYSIOLOGY (Practicals) (75 hrs.)

1. Study of Histology slides of different tissues/organs
2. **Study of specimens and bones :**
(Human heart, Human skeleton, Human Digestive system, Human Nose, Human Skin, Human tongue, Human Respiratory system, Human Eye, Human Brain.)
3. Determination of blood pressure
4. Determination of blood groups.
5. Determination of haemoglobin content of blood.
6. Determination of R.B.C. content of blood.
7. Determination of W.B.C. content of blood
8. Determination of bleeding time.
9. Determination of clotting time.
10. Determination of differential leukocyte count of blood.
11. Determination of erythrocyte sedimentation rate of blood.
12. Recording of normal cardiogram of frog's heart.
13. Effect of heat and cold on normal cardiogram of frog's heart.

TEXT BOOKS :

01. Text book of Medical Physiology by A.C.Guyton
02. Human Physiology by A.J.Vander, J.H.Sherman and D.S.Lucion
03. Samson Wright's applied physiology by Keele and Neil
04. The Living Body - A text book in human physiology by Best and Taylor.
05. Principles of Anatomy & Physiology by Tortora and Grabowski.
06. Ross and Wilson - Anatomy and Physiology by Anne waugh and Allison Grant.
07. Human physiology by Dr.C.C.Chaterjee.

II/IV B.PHARMACY (3rd SEMESTER)

MODEL QUESTION PAPER

306 ANATOMY & PHYSIOLOGY

Time : 3 hours

Max.Marks : 70

SECTION - A

Answer any four questions

(4 X 10 = 40 marks)

1. Classify the tissues and with a neat sketch discuss the functions performed by each type of these tissues.
2. What is a synapse ? How the nerve impulses are transmitted through synapses.
3. What is the role of C.V.S. in the body ? Describe in detail the origin and conduction of heart beat.
4. What is digestion ? Draw a sketch of digestive system, label and discuss in detail the digestion taking place in the small intestine.
5. Draw a neat diagram of eye and discuss the physiology of vision.
6. What are endocrine glands ? Classify the Endocrine glands and describe the functions of various hormones released by posterior pituitary glands.

SECTION - B

Answer any TEN questions

(10 x 3 = 30 marks)

7. Write notes on transport of materials across the cell membrane.
8. Write notes on Action potential.
9. Write notes on Medulla oblongata.
10. Give notes on neurotransmitters.
11. Write about composition and functions of blood.
12. Write short notes on Anemia.
13. How the respiration is regulated ?
14. Give an account on transport of respiratory gases from lungs to tissues.
15. Write short notes on urine formation.
16. Give a brief note on role of pancreas.
17. Write short notes on skin.
18. Write short notes on ear.

II/IV B.PHARMACY (3rd SEMESTER)

MODEL QUESTION PAPER (Practicals)

307 ANATOMY & PHYSIOLOGY

Time : 4 hours

Max.Marks : 70

1.	Identification	:	10 Marks
2.	Synopsis	:	10 Marks
3*	Major Experiment	:	30 Marks
4.	Minor Experiment	:	10 Marks
5.	Viva-Voce	:	10 Marks

	Total	:	70 Marks
