

III/IV B.PHARMACY (6th Semester)
601 PHARMACEUTICAL ENGINEERING-II
(Theory) (75 hrs.)

Unit : 01

Flow of heat:- Concept of heat flow : Conduction through single wall, layers in series and cylinders. Natural and forced convection, temperature gradient in forced convection, concept of surface coefficient, dimensional analysis to compute surface coefficient, boiling liquids, condensing vapours, temperature drop in parallel and counter-current heat exchangers, radiation, Stefan - Boltzmann law. Construction, operation and application of heat exchangers, interchangers and finned tubes .

Unit : 02

Evaporation : Theory of evaporation, heat and material balance; evaporator types : Steam jacketted kettle , horizontal, vertical tube evaporator, forced circulation evaporators, falling film and climbing film evaporators and agitated film evaporation. Capacity of multiple effect evaporators.

Unit : 03

Drying : Theory of drying , drying curves shrinkage of materials, construction , operation and application of different dryers, atmospheric and vacuum compartment dryer, rotary dryer, agitator dryer, spray dryer, freeze dryer, fluidized bed dryer.

Unit : 04

Distillation : Theory of distillation of binary miscible, immiscible mixtures . Theory of rectification, azeotropic distillation, steam distillation, simple distillation, extractive and fractional distillation, and molecular distillation design of equipment for different distillation methods.

Unit : 05

Crystallization : Mier's Theory, its limitations ,crystal growth , nucleation, caking of crystals, material and energy balances in crystallization. Construction, operation and application of batch crystallizers, agitated tank crystallizers, Swenson -walker crystallizer, Krystal crystallizer and vacuum crystallizers .

Unit : 06

Filtration : Theory of filtration , filter media construction and operation of filter press, metafilter, disk filter, rotary filter. Centrifuges - Theory, equipment and applications.

Extraction : Theory of extraction, flow diagram of oil- seed extraction equipment, Podbielniak extractor, counter current extraction, leaching of solids and equipment .

IIIIIV B.PHARMACY (6th Semester)
602 PHARMACEUTICAL ENGINEERING – II
(Practicals) (75 hrs.)

Part - A Study of the following equipments

01. Ball mill
02. Fluid energy mill
03. Colloid mill
04. Planetary mixer
05. Plate and frame filter press
06. Rotatory drum filters
07. Film evaporators
08. Multi effect evaporator
09. Spray drier
10. Fluid bed dryer
11. Freeze drying
12. Swenson-walker crystallizer
13. Recirculation magma crystallizer
14. Podbiel niak extract

Part - B

01. Determination of humidity of air
02. Determination of humidity of air by dew-point method
- 03*. Size separation by sieving method
- 04*. Size reduction by ball mill
05. Determination of moisture content by IR moisture balance
06. Effect of filter aid concentration on rate of filtration
07. Factors affecting rate of filtration
- 08*. Determination of efficiency of steam distillation
- 09*. Determination of radiation constant of unpainted glass
- 10*. Determination of radiation constant in iron.
- 11*. Determination of radiation constant of painted glass
12. Size reduction by disintegration mill.
13. Determination of over all heat transfer coefficient.
- 14*. Determination of drying rate curve for calcium carbonate
- 15*. Determination of drying rate curve for sand
16. Crystallisation.

TEXT BOOKS :

01. Introduction to chemical Engineering by Badger
02. Text Book of Pharmaceutical Engineering by K.Samba Murthy
03. Perry's Chemical Engineers Hand Book.
04. Pharmaceutical Engineering by C.V.S.Subrahmanyam
05. Bentley's Text book of Pharmaceutics.

IIIIIV B.PHARMACY (6th Semester)

MODEL QUESTION PAPER

601 PHARMACEUTICAL ENGINEERING - II (Theory)

Time : 3 hours

Max.Marks : 80

SECTION - A

Answer any four questions (4 X 10 = 40 marks)

1. Describe multipass heater along with its advantages over single pass heater.
2. Give the design and working of vertical tube and climbing film evaporator
3. Give the design and operation of a fluidised bed dryer
4. Discuss the azeotropic distillation and molecular distillation.
5. Discuss the design, principle and working of swensen-walker crystallizer and krystal onstallizer.
6. Describe the construction, working and applications of a filter for use as a continuous type.

SECTION - B

Answer any TEN questions (10 x 4 = 40 marks)

7. What are finned tubes ?
8. What is fourier's law and thermal conductivity ?
9. Write briefly on scale formation.
10. Write the theory of evaporation.
11. What is the principle involved in the freeze drying ?
12. Give the applications of spray dryer
13. What is mean free path ? Write its importance.
14. Give the types of fractionating column used in fractional distillation.
15. What is mier's supersaturation theory ? Write its limitations.
16. Write the factors influencing crystallization.
17. Write briefly on disc filters
18. Write the principle involved in filtration technique.

IIIIIV B.PHARMACY (6th Semester)

MODEL QUESTION PAPER (Practicals)

602 PHARMACEUTICAL ENGINEERING-II

Time : 6 hours

Max.Marks : 80

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|----------------------|---|----------|
| 1. Synopsis | : | 10 Marks |
| 2*. Major Experiment | : | 35 Marks |
| 3. Minor Experiment | : | 20 Marks |
| 4. Viva-Voce | : | 15 Marks |

Total: 80 Marks

IIIIIV B.PHARMACY (6th Semester)
603 PHARMACEUTICAL BIOTECHNOLOGY
(Theory) (75 hrs.)

Unit : 01

Fermentation Products :

- i. Screening methods for bioactive metabolites
- ii. Introduction to fermenter and its accessories,
- iii. Manufacture of the following : study of media , conditions, extraction and purification of
 - a) Antibiotics- Pencillin and streptomycin
 - b) Acids- Citric acid and lactic Acid
 - c) Solvents - Alcohol
 - d) Enzymes - Fungal diastase
 - e) Vitamins- Vitamin B12
 - f) Miscellaneous - Dextran and lactobacillus

Unit : 02

Test for sterility : Sterility testing , media , sampling, neutralisation of various antimicrobial substances in dosage forms. Surgical dressings, sutures and ligatures and their standards, sterilization and test for sterility.

Unit : 03

Animal products : Extraction and purification of insulin, pancreatin, pepsin, heparin and liver preparations. Blood products and plasma substitutes of I.P

Immunological Products : Manufacture of vaccines, sera, anti-toxins and diagnostic agents official in I.P

Unit : 04

Principles of Microbiological assay of vitamin-B₁₂, penicillin, streptomycin and tetracyclines. Radio Immunoassay - Principles , estimation of insulin in blood serum

Unit : 05

Microbial conversion of steroids, Enzyme immobilization : Methods of enzyme immobilization, factors affecting enzyme kinetics, study of streptokinase, penicillinase, amylase and immobilization of bacterial cells.

Unit : 06

An introduction to Recombinant DNA technology : Brief knowledge about the making of human Insulin, Interferons, monoclonal antibodies, synthetic vaccines and streptokinase.

IIIIIV B.PHARMACY (6th Semester)
604 PHARMACEUTICAL BIOTECHNOLOGY
(Practicals) (75 hrs.)

01. Nitrate reduction test
02. Hydrogen sulphide production test
03. Study of growth of stationary and rotary shake flask cultures
04. Efficiency of laminar air flow unit
05. Effect of salt concentration on the growth of micro Organisms
06. Effect of PH on growth of micro organisms
07. Indole production test
08. Citrate utilization test
09. Test for sterility of sterile water for injection.
10. Test for sterility of bentonite powder
11. Test for sterility of talcum powder
12. Microbiological assay of tifampicin
- 13*. Microbiological assay of streptomycin
14. Catalase production test
- 15*. Microbiological assay of benzyl penicillin
16. Effect of temperature on the growth of micro Organisms
17. Microbiological assay of oxytetracycline
18. Microbial testing of sterile and non sterile products
19. Microbiological assay of benzyl penicillin by cup-plate method

TEXT BOOKS :

01. Industrial microbiology by Casida.
02. Industrial microbiology by Miller
03. Industrial microbiology by Prescott and Dunn.
04. I.P./B.P.
05. Tutorial Pharmacy by Cooper and Gunn.
06. Bentley's Pharmaceutics
07. Principles of Fermentation technology by P.F.Stanbury

IIIIIV B.PHARMACY (6th Semester)

MODEL QUESTION PAPER

603 PHARMACEUTICAL BIOTECHNOLOGY

Time : 3 hours

Max.Marks : 80

SECTION - A

Answer any four questions (4 X 10 = 40 marks)

1. Define fermentation ? Explain the design and operation of fermentor with a neat sketch ? Add a note on significance of impellers, spargers and Baffles.
2. What is sterility testing ? Describe various steps involved in sterility testing. What is repeat testing ?
3. What are vaccines and sera ? Classify various types of vaccines ? Explain the preparation, standardisation, labelling and storage of BCG vaccine ?
4. Explain the principle and procedure for estimation of Insulin by Radio immuno Assay ?
5. Explain the term immobilization ? Describe the different methods of enzyme immobilization. What are its advantages and disadvantages ?
6. Define R-DNA technology ? Describe the production of synthetic vaccine Hepatitis-B by R-DNA technology.

SECTION - B

Answer any TEN questions (10 x 4 = 40 marks)

7. Write short notes on bioautography ?
8. Discuss the production of dextran with a flow diagram ?
9. Give a brief account on surgical catgut ?
10. Give a brief note on sampling methods of sterility testing ?
11. Give a brief note on extraction and purification of Heparin ?
12. Give a short notes on Dried Human Plasma ?
13. Discuss briefly about vitamin-B₁₂ Microbial assay ?
14. Write the principle involved in Microbiological assay ?
15. Write the study of enzyme immobilisation of streptokinase.
16. Write the short notes on microbial conversion of steroids.
17. Write the principle involved in production and screening of Monoclonal antibodies.
18. Explain in brief about the recombinant production of interferons.

IIIIIV B.PHARMACY (6th Semester)

MODEL QUESTION PAPER (Practicals)

604 PHARMACEUTICAL BIO-TECHNOLOGY

Time : 6 hours

Max.Marks : 80

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|----------------------|---|----------|
| 1. Synopsis | : | 10 Marks |
| 2*. Major Experiment | : | 35 Marks |
| 3. Minor Experiment | : | 20 Marks |
| 4. Viva-Voce | : | 15 Marks |

Total: 80 Marks

IIIIIV B.PHARMACY (6th Semester)
605 HOSPITAL AND CLINICAL PHARMACY
(Theory) (75 hrs.)

Unit : 01

Hospital pharmacy-Organization, personnel, location space and equipment - The Pharmacy and Therapeutic committee, Hospital Formulary, Investigational use of drugs- Developing the budget, purchasing and inventory control.

Unit : 02

The pharmacy procedural manual, Drug distribution, Dispensing to out-patients, in-patients and ambulatory patients- Dispensing of ancillary and controlled substances, procurement and distributions of alcohol

Unit : 03

Manufacturing of bulk and sterile supplies, quality control in Hospital pharmacy. Drug charges in Hospitals, Drug information centre- Professional practices.

Unit : 04

Introduction and scope of clinical pharmacy practice - Modern dispensing aspects- patient counselling and advice- Medication history.

Unit : 05

Drug Interactions-Mechanisms-A systematic study of drug interactions with suitable examples. Drug-food interactions, adverse drug reactions- Drug induced diseases.

Unit : 06

Clinical Pharmacy aspects of

- | | |
|-------------------------|-------------------------|
| a) Peptic ulcer, | b) Angina Pectoris, |
| c) Hypertension, | d) Asthma, |
| e) Tuberculosis, | f) Diabetis, |
| g) Acute renal failure, | h) AIDS, |
| l) Hepatitis | j) Rheumatoid arthritis |

IIIIIV B.PHARMACY (6th Semester)

606 HOSPITAL AND CLINICAL PHARMACY

(Practicals) (75 hrs.)

01. General dispensing procedures
02. Study of Weights and measures
03. Preparation and dispensing of prescriptions of following classes of products : Powders, Mixtures, Ointments, Large Volume Parenterals.
04. Draw the layout and workflow patterns in the dispensary of a hospital.
05. Examine and report the drug distribution methods used in a hospital.

TEXT BOOK :

01. Cooper and Gun-Dispensing for Pharmaceutical Student
02. Hospital Pharmacy by William.E.Hassan
03. Clinical Pharmacy by Tipnis Bajaj
04. Pharmacotherapeutics by Roger and Walker.

IIIIIV B.PHARMACY (6th Semester)

MODEL QUESTION PAPER

605 HOSPITAL AND CLINICAL PHARMACY

Time : 3 hours

Max.Marks : 80

SECTION - A

Answer any four questions (4 X 10 = 40 marks)

1. What is hospital pharmacy ? Explain about organization in a modern hospital and mention its functions ?
2. Enumerate various Drug distribution methods for inpatients and out patients ?
3. Explain about sterile supplies in the hospital ? Draw a neat sketch of parenterals layout in the hospital ?
4. Define clinical pharmacy ? Mention its functions ? Add a note on current status in India.
5. Define Drug interactions ? Classify different types of drug interactions ? Add a note on absorption mediated drug interactions
6. Elucidate the pathophysiology of diabetes ? Mention signs and symptoms and suggest a line of treatment ?

SECTION - B

Answer any TEN questions (10 x 4 = 40 marks)

1. Write about pharmacy and therapeutic committee and mention its functions ?
2. Write a short notes on Hospital formulary ?
3. Explain about Pharmacy procedure manual ?
4. Explain the dispensing procedure of ancillary and controlled substances
5. Write about drug information centre and its functions in Hospital
6. Explain about drug charges for inpatients & out patients in the hospital
7. Write short notes on pharmaco-economics
8. Write concept of essential drugs
9. Write short notes on drug induced diseases
10. Explain about teratogeneity
11. Explain pathophysiology of Asthma
12. Explain pathophysiology of AIDS

IIIIIV B.PHARMACY (6th Semester)

MODEL QUESTION PAPER (Practicals)

605 HOSPITAL AND CLINICAL PHARMACY

Time : 6 hours

Max.Marks : 80

1. Synopsis	:	10 Marks
2*. Major Experiment	:	35 Marks
3. Minor Experiment	:	20 Marks
4. Viva-Voce	:	15 Marks

Total:		80 Marks
