IV/IV. B.PHARMACY (8th Semester)

801 PHARMACEUTICALCHEMISTRY –V

(NATURAL PRODUCTS)- (Theory) (75 hrs.)

Unit : 01

Carbohydrates : General aspects of mono, di and polysaccharides. Chemistry of glucose, fructose, sucrose and lactose.

Glycosides : Preparation and properties of methyl glycosides. A knowledge of the sources, chemistry and uses of cardiac glycosides and Anthra quinone glycosides, structural elucidation of amygdalin and salicin

Unit : 02

Proteins : An elementary knowledge of the classification and general characteristics of proteins, amino acids and their relationship to proteins. Chemistry of oxytocin, Chemistry and biological significance of purines, uric acid , xanthine bases and nucleic acids.

Unit : 03

Fats and Oils : The extraction, general composition, properties and analysis of fixed oils, fats and waxes.

Terpenes : Occurrence, general methods of isolation and classification of terpenes, Structural features and inter relationship of geraniol, citral, limonene, α-terpineol and menthol. General composition, properties, analysis of essential oils official in I.P. Chemistry and biological significance of flavonoids

Unit : 04

Alkaloids : Classification, general methods of extraction and determination of chemical structure. Quantitative determination of functional groups. Determination of the structures of ephedrine, nicotine and papaverine.

Unit : 05

Steroids and Hormones: Nomenclature, chemistry of ergosterol, cholesterol, bile acids and cortisone, preparation and structures of sex hormones, interrelationship of estradiol, estrone and estroil . Synthesis of progesterone, irradiation of ergosterol and preparation and properties of thyroid hormones.

Unit : 06

Vitamins : Classification, determination of structures of thiamine, riboflavin and ascorbic acid , skeleton structures of vitamins official in I.P. A study of their properties, stability and uses

IV/IV. B.PHARMACY (8th Semester)

802 PHARMACEUTICAL CHEMISTRY – V

(NATURAL PRODUCTS) (Practicals) (75 hrs.)

01*. Determination of acid value of fixed oil
02*. Determination of saponification value of a fixed oil
03. Determination of ester value of oil
04*. Determination of iodine value of oil

Volatile Oils

01*. Determination of cinnamic aldehyde in cinnamon oil
02. Determination of eugenol in clove oil
03. Qualitative analysis of natural products (Comprises of amino acids, carbohydrates, proteins, alkaloids, glycosides, steriods, flavonoids)
04. Isolation of casein from the milk
05. Isolation of piperine from black pepper powder
06*. Estimation of ephedrine hydrochloride by non aqueous titrimetry
07*. Estimation of quinine sulphate
08*. Extraction of caffeine from tea dust.

TEXT BOOKS :

01. Organic Chemistry - Vol. II by I.L.Finar
02. Organic, Pharmaceutical and Medicinal Chemistry by Wilsonand Gisvold.
03. Remington's Text Book of Pharm. Sciences.
04. Text book of Medicinal Chemistry by A.Burger
05. Rama Rao Nadendla, Pharmaceutical Organic Chemistry, (Chemistry of Heterocyclic and Natural Compounds), Vallabh Publications, New Delhi
06. Organic chemistry of natural products by Gurdeep chatwal, volume I & II.
07. Organic chemistry of natural products by O.P.Agharwal volume I & II.

IV/IV. B.PHARMACY (8th Semester)

MODEL QUESTION PAPER

PHARMACEUTICAL CHEMISTRY-VI (NATURAL PRODUCTS)

Time : 3 hours Max.Marks : 80

SECTION-A

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

1. What are alkaloids ? How are they isolated and identified ? Discuss the structural elucidation of nicotine.
2. Classify vitamins with examples and discuss the sturctural elucidation of Riboflavin.
3. Discuss the important reactions and structural features of glucose.
4. Discuss the chemical relationship between oestrone, oestradiol and oestriol and describe the synthesis of oestrone.
5. Classify terpenes with examples, State isoprene and special isoprene rules. How do you elucidate the structue of citral ?
6. Classify aminoacids with examples ? Write the relationship between aminoacids, polypeptide and proteins ? Explain how do you convert xanthine into caffene

SECTION - B

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

1. What is mutarotation and write its significance ?
2. Write a brief account on chemistry of cardiac glycosides ?
3. How do you determine methoxyl groups in papaverine ?
4. What is Isoelectric point and write its significance.
5. Write short notes on nucleic acids
6. Give a brief account on chemistry of flavanoids
7. How do you confirm the presence of pyrimidine in thiamine.
8. How Hoffmann exhaustive methylation is used to determine the structure of alkaloids.
9. What are vitamins. Write the sturcture of any three vitamins
10. Give a synthetic scheme for conversion of diosgenin to progesterone
11. Write short note on biological role of thyroid hormones.
12. How do you conform the presence of keto.enol sysemin vitamin C ?

IV/IV. B.PHARMACY (8th Semester)

MODEL QUESTION PAPER (Practicals)

802 PHARMACEUTICAL CHEMISTRY-V (Natural Products)

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

IV/IV. B.PHARMACY (8th Semester)

803 PHARMACOGNOSY- II (Theory) (75 hrs.)

Systematic pharmacognostic studies of following categories of crude drugs

Unit : 01

Glycosides : Aloes, Ammi, Brahmi, Buckwheat, Cantharides, Cascara, Chirata, Digitalis, Dioscorea, Gentian, Ginseg, Kalmegh, Liquorice, Psoralea, Quassia, Senna, Rhubarb, Squill, Strophantus, Wild Cherry bark.

Unit : 02

Alkaloids : Aconite, Belladona, Cinchona, Colchicum, Datura, Duboisia, Ephedra, Ergot, Hyoscyamus, Ipecac, Kurchi, Lobelia, Nux-vomica, Opium, Rauwolfia, Solanum khasianum, Vasaka, Vinca, Withania.

Unit : 03

Volatile oils : Bitter orange peel, Caraway, Cardamom, Cassia, Cinnamon, Citronella, Civet, Clove, Corriander, Dill, Eucalyptus, Fennel, Gaultheria, Lemonpeel, Musk, Nutmeg, Palmarosa, Peppermint, Saffron, Sandal wood, Tulsi, Vetiver.

Unit : 04

Historical development of plant tissue culture; types of cultures -a study of callus culture and cell suspension. Culture, nutritional requirements, growth and their maintenance. Applications of plant tissue culture in production of pharmaceutically important secondary metabolites.

Unit : 05

A study of the following Ayurvedic drugs, (Botanical source, chemical constituents, pharmacological actions and uses)

01. Amla (Phyllanthus emblica)
02. Bheda (Terminalia belerica)
03. Kantkari (Solanum xanthocarpum)
04. Malkangni (Celactrus panicula)
05. Tylophera(Tylophora indica)
06. Sataver(Asparagus recomosus)
07. Bhilawa(Semecarpus anacardium)
08. Kalijiri(Vernonia anthelmintica)
09. Kaner(Nerium indicum)
10. Punarnava (Bocrhaevic diffuca)
11. Sankhapushpi

Unit : 06

Lipids : Bees wax, Castor oil, Cocoa butter, Cod-liver oil, Hydnocarpus oil, Kokum butter, Lard, Linseed oil, Rice bran oil, Skark liver oil and wool fat.

IV/IV. B.PHARMACY (8th Semester)

804 PHARMACOGNOSY - II (Practicals) (75 hrs.)

I*. Study of Morphology and transverse section of the crude drugs.

a.	Fennel	b.	Clove	c.	Coriander
d.	Nuxvomica	e.	Cinnamon	f.	Cinchona
g.	Dill	h.	Ephedra	i.	Ipecac
j.	Senna	k.	Vasaka	l.	Vinca

II. Identification of powdered crude drugs based on their microscopical characters.

a.	Senna	b.	Vasaka	c.	Ginger
d.	Cinchona	e.	Cinnamon	f.	Squill
g.	Rauwolfia	h.	Kurchi	i.	Naxvomica
j.	Quassia				

III*. Identification powdered crude drugs (Listed in II) in their mixtures based on microscopical characters.

IV. Aseptic seed germination (Trigonella seeds)

V. Callus initiation and establishment (Catharantus roses leaves)

VI. Morphology of crude drugs

01.	Fennel	02.	Clove	03.	Coriander
04.	Cardamom	05.	Nuxvomica	06.	Cinnamon
07.	Cinchona	08.	Dill	09.	Quassia
10.	Ephedra	11.	Senna	12.	Vinca
13.	Datura	14.	Tulsi	15.	Nutmeg
16.	Peppermint oil	17.	Lemon peel	18.	Aconite
19.	Ashwagandha	20.	Kurchi	21.	Rauwolfia
22.	Dioscorea	23.	Arjuna	24.	Chirata
25.	Squill	26.	Gentian	27.	Ginger
28.	Turmeric	29.	Glycerrhiza	30.	Amla
31.	Ipecac	32.	Bitter Orange Peel		

TEXT BOOKS :

01. Tyler, V.C.,Brady, L.R. and Robbers, J.E. "Pharmacognosy" 8th Ed., Lea and Febiger, Philadelphia.
02. Text Book of Pharmacognosy by T.E.Wallis.
03. Trease, G.E. and Evas, W.C., "Pharmacognosy" 11th and 12th editions, Bailliere Tindall, U.K.
04. Kokate, C.K., Purohit A.P. and Gokhale, S.B., "Pharmacog nosy" Nirali Prakashan, 1990.
05. Ross, M.S.F. and Brain, K.R., "an Introduction to Phytopharmacy Pitman Medical-Kent.
06. Indian Material Medica by A.K.Nadkarni
07. Essentials of Pharmacognosy by Dr.S.H.Ansari.
08. Pharmacognosy and Phytochemistry by Ashutoshkar.

IV/IV. B.PHARMACY (8th Semester)

MODEL QUESTION PAPER

PHARMACOGNOSY-II (Theory)

Time : 3 hours Max.Marks : 80

SECTION - A

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

1. Write the method of preparation, chemical constitutents and uses of Aloes
2. Describe Ergot life cycle, chemistry and uses of the ergot alkaloids.
3. Write the systematic pharmacognostic study of Cinnamon
4. Write the establishment, measurement of growth and production of secondary metabolites in callus and cell suspension.
5. Give the biological source, chemical constituents and uses of amla and sataver.
6. Write the systematic pharmacognostic study of Castor oil

SECTION - B

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

7. Write the biological source and uses of liquorice and Cantharides.
8. Describe the chemistry of cardiac glycosides.
9. Write the chemical constituents and uses of any two crude drugs containing indole alkaloids.
10. Write the biological source and chemical test for ipecae and Colchium
11. Give the comparitive microscopy of Fennel and Coriander.
12. Write the biological source and active constituents of Ciret and Musk.
13. Enumerate nutritional requirements of plant tissue cultures.
14. Give an account on surface sterilition of an explant in plant tissue cultures.
15. Write the biological source and uses of Bhilawa and Kantakari
16. Write the chemical constituents and uses of Tylophera and Punarnava
17. Describe the physico chemical properties and identification tersfor lipids
18. Write the method of preparation and uses of woolfar.

IV. B.PHARMACY (8th Semester)

MODEL QUESTION PAPER (Practicals)

804 PHARMACOGNOSY-II

Time : 6 hours Max.Marks : 80

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

		Tota :	80 Marks

IV/IV. B.PHARMACY (8th Semester)

805 GOOD MANUFACTURING PRACTICES AND VALIDATION

(Theory) (50 hrs)

Unit : 01

Concepts and Philosophy of Good Manufacturing Practice (GMP). Brief introduction of CGMP.

Unit : 02

Concepts and Philosophy of Validation. Validation methods of equipment

Unit : 03

Validation methods of water supply systems, deionised and distilled water and water for injection.

Unit : 04

Calibration of Analytical Instruments (A brief introduction). Calibration of Spectrophotometer and HPLC instrument as per ICH guidelines.

Unit : 05

Sampling Techniques, Computer applications in GMP and GLP, Statistical quality control and control charts.

Unit : 06

Concepts and Philosophy of GLP, SOP, ICH and ISO-9000.

TEXT BOOKS :

1. Good Manufacturing practice (GMP) - Mehra
2. How to practice GMP - PP Sharma
3. Quality Assurance of Pharmaceuticals (Vol-1 and 2, Pharma Book syndicate, Hyderabad)
4. A Guide to total quality management - K Maitra and S K Ghosh
5. Quality Assurance and Quality Management in pharmaceutical Industry-Y Anjaneyulu and R.Marayya.
6. ISO 9000 and Total Quality Management - S K Ghosh.
7. Quantitative Analysis of Drugs in Pharmaceutical Formulations-P.D.Sethi.

IV/IV. B.PHARMACY (8th Semester)

MODEL QUESTION PAPER

805 GOOD MANUFACTURING PRACTICES AND VALIDATION

Time : 3 hours Max.Marks : 80

SECTION-A

Answer any four Questions (4 x 10=40)

1. What is Good Manufacturing Practice (GMP) ? Explain in detail. Add a note on CGMP.
2. Explain the concept of Validation in Pharmacy.
3. Write a note on Validation methods of water supply systems.
4. What is meant by Calibration of analytical instruments ? Give the detailed procedure for the calibration of Spectrophotometer.
5. Write a note on sampling techniques. Explain in detail about correlation and regression and Analysis of Variance (ANOVA).
6. Write a note on any two of the following :
   (A) GLP (B) SOP (C) ICH

SECTION - B

Answer any TEN of the following . (10 x 4 = 20 marks)

7. Give the importance of GMP in Pharmaceutical Industry.
8. Write a brief note on CGMP.
9. What is Validation ?
10. Explain in brief about validation of pharmaceutical equipment.
11. How do validate deionised and distilled water systems.
12. What is water for injection ? Write briefly about validation of water for injection system.
13. What is Calibration of analytical instruments ? Explain in brief.
14. Write about the Calibration HPLC instrument as per ICH guidelines.
15. Explain precision and accuracy in detail. Give the importance of the above in Pharmaceutical Analysis.
16. Write a note on (a) t-test and (b) F-test
17. Explain in detail about ISO-9000
18. What do you mean by Standard operating procedure (SOP) ? Explain in brief.