

Pharmacorner

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For GPAT & NIPER JEE.

We all are knows that the GPAT paper pattern and syllabus was changed from this year and all question are asked in logical manner. And syllabus is too lengthy to prepare for an examination in one year it is too tough.

By taking above consideration and for the benefits of the students we have prepared a GPAT material which consists of four modules as per GPAT syllabus and we tried to complete 95% of GPAT syllabus in our material and it has total 1500 pages and in this pages consists of very concise material which is really helpful for student and also save their time for preparation.

- ✓ We provide Model Papers & Notes.
- ✓ All Materials Prepared By NIPER (TOP 50 Ranker)
- ✓ Entrance Exam Alerts.
- ✓ So leave 25 books (15000 pages) of pharmacy and read only our 1000-1500 pages and get grand success.
- ✓ For GPAT
(15 Model Paper + notes)
 - Notes includes imp tables
 - Model Paper according to GPAT Syllabus covered all subjects.
 - **GPAT-2012 Postal Material -Total 1500 pages covered full syllabus for GPAT**
 - **Module-1 -Pharmaceutics**
 - **Module-2 -Pharmaceutical Chemistry**
 - **Module-3 -Pharmacognosy**
 - **Module-4 -Pharmacology**
 - Key Notes
 - Question Bank for imp subjects.

- ✓ For NIPER JEE
(5 Model Paper + imp materials by mail)
 - Research Articals. (More than 50)
 - USFDA drugs
 - NIPER Notes (all imp topics for NIPER JEE)
 - All imp notes for Organic Chemistry, Pharma. Analysis, Management
 - NIPER JEE Previous Question Papers
 - Imp software
 - Other info.
 - CDs of pharma books etc
- ✓ SMS join Type “ ON Pharmacorner” send to 9870807070.
- ✓ For Sample Papers & Notes mail .
- ✓ Fess :(2800/-)

It is our request to all of you that buy one copy of our material and qualify GPAT & NIPER with good rank.

It's our challenge not a proud.....

Contact US :

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Sample GPAT /NIPER Study Material

Size separation

Particle Size separation by different method

Size separation method	Particle diameter (micron)
Sieving	5-10000
Sedimentation	
(a) Gravitational	5-1000
(b) Centrifugal	0.1-5
Elutrition	
(a) Water and Air gravitational	10-500
(b) Centrifugal	0.5-50
Cyclone separation	2-50

Standards of powder:

Grade of powder	Sieve through which all particle must pass	Sieve through <40% particle pass
Coarse	10	44
Moderately coarse	22	60
Moderately fine	44	85
Fine	85	120
Very fine	120	-
Microfine	350 (90% pass)	-

Superfine	90%pass through 10 micron	-
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Types of Binders

TABLE. CLASSIFICATION OF BINDERS

SUGARS	NATURAL BINDERS	SYNTHETIC/SEMISYNTHETIC POLYMER
Sucrose	Acacia	Methyl Cellulose
Liquid glucose	Tragacanth	Ethyl Cellulose
	Gelatin	Hydroxy Propyl Methyl Cellulose (HPMC)
	Starch Paste	Hydroxy Propyl Cellulose
	Pregelatinized Starch	Sodium Carboxy Methyl Cellulose
	Alginic Acid	Polyvinyl Pyrrolidone (PVP)
	Cellulose	Polyethylene Glycol (PEG)
		Polyvinyl Alcohols
		Polymethacrylates

TABLE. COMMONLY USED BINDERS

BINDER	CATEGORY	MANUFACTURER
Starch 1500	Partially Pregelatinized Maize Starch	Colorcon
Methocel	Hydroxy Propyl Methyl Cellulose	Dow Chemicals
Walocel	Hydroxy Propyl Methyl Cellulose	Wolff-Cellulosics Natural Starch and Chemical Company
Luvitec	Polyvinylpyrrolidone	BASF Company
Luvicross	Polyvinylpyrrolidone	BASF Company
Luvicaprolactam	Polyvinylcaprolactam	BASF Company

3.Lipids

Saponification value

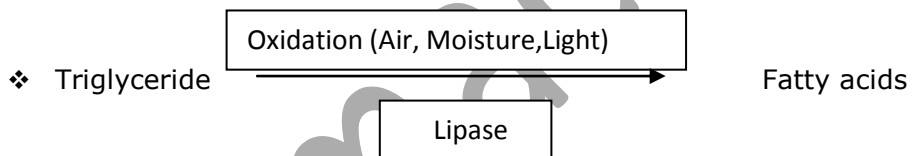
- ❖ Saponification is the base-catalyzed hydrolysis of an ester. mgs of KOH required to saponify 1 g of fat.
- ❖ Products of the reaction are- An alcohol and An ionized salt which is a soap
- ❖ **Acid Value**
- ❖ Number of mgs of KOH required to neutralize the Free Fatty Acids in 1 g of fat, that number indicate degree of rancidity

Iodine Value

- ❖ Number of iodine (g) absorbed by 100 g of oil.
- ❖ Molecular weight and iodine number can calculate the number of double bonds. 1 g of fat adsorbed 1.5 g of iodine value = 150.

Rancidity

- ❖ Due to long exposure to air, a foul odour or smell comes known as rancidity.



Specially C₄ butyric acid and other short chain fatty acids in butter are the real problem.

Fatty Acids	No. of Carbons (Double bonds)
Palmitic acid	16(0)
Stearic Acid	18(0)
Oleic acid	18(1)
Myristic acid	14(0)
Linoleic acid	18(2)
Linolenic acid	18(3)
Arachidonic acid	20(4)
Lauric Acid	12(0)
Capric Acid	10(0)

Types of Density

True Density	Helium pycnometer (Porous solid) Liquid displacement (Non Porous solid)	M/V_t
Granule Density	Mercury displacement method	M/V_g
Bulk Density	Graduated cylinder method based on Tapping the powder from 1 inch height Thrice in 2 min interval	M/V_b

CARR'S INDEX

% Compressibility	Flow
5-15	Excellent
12-16	Good
18-21	Fair
23-28	Poor
28-35	Poor
35-38	Very poor
> 40	Extremely poor

HAUSNER Ratio

HAUSNER Ratio	Type of Flow
Less than 1.25	Good flow
1.25- 1.5	Moderate
More than 1.5	Poor Flow

ANGLE OF REPOSE

ANGLE OF REPOSE	Type of Flow
<25	Excellent
25- 30	Good
30-40	Passable
> 40	Poor Flow

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PHARMACEUTICAL CALCULATIONS

Calculations of Doses for Children:

The following are used for calculation of doses for children:

1. **Young Formula:** Age (Years) X Adult Dose = Dose of the Child

$$\frac{\text{Age}}{\text{Age} + 12}$$

2. **Dilling's Formula:** Age (years) X Adult dose = Dose of the child

$$\frac{\text{Age}}{20}$$

3. **Cowling's Formula:** Age (years) x Adult dose = Dose of the child

$$\frac{\text{Age}}{24}$$

4. **Fried's formula:** Age (Months) x Adult dose = Dose of the child

$$\frac{\text{Age}}{150}$$

5. **Clarke's formula**

6. **Bastedo's formula:** Age (years) + 3 X Adult dose = Dose of child

$$\frac{\text{Age} + 3}{30}$$

7. **Calculation based on body surface area:**

$$\frac{\text{Body surface area of the child (sq. m.)}}{\text{Body surface area of adult (sq. m.)}} \times \text{Adult dose} = \text{Dose for the child}$$

Usually the body surface area of an adult is taken as 1.73 sq. m.

ALKALOID

True alkaloids: contain **heterocyclic Nitrogen which is derived from amino acid** and always basic in nature due to presence of lone pair of electrons on nitrogen.

Proto alkaloids: are simple amines in which **Nitrogen is not heterocyclic**. E.g. ephedrine, Colchicine, mescaline

Pseudo alkaloids: they are **not derived from amino acids** but they show positive test for alkaloids. E.g. purines (caffeine), steroidal and terpenoidal alkaloids Conessine, solanidine, protoveratrine, aconine.

Volatile alkaloids: coniine, nicotine, sparteine

Colored alkaloids: Berberine (yellow), Betanidin (Red)

- Some of proto and pseudo alkaloids show higher solubility in water e.g. Colchicine, caffeine, quinine HCl are freely soluble in water. So solubility of alkaloid is also employed for extraction procedures.

Alkaloids with Primary amine Nitrogen:

Mescaline Alkaloids with Secondary amine

Nitrogen: Ephedrine Alkaloids with

Tertiary amine Nitrogen: Atropine

Alkaloids with **Quaternary Nitrogen:**

Tubocurarine Chemical test:

- i. Mayer's reagent test (K^+ mercuric iodide solution) → Cream colored ppt
- ii. Dragendroff's reagent (K^+ bismuth iodide solution) → Red brown ppt
- iii. Wagner's reagent (iodine K^+ iodide solution) → Red brown ppt
- iv. Hager's reagent (Picric acid) → Yellow colored ppt
- v. Picrolonic acid → Yellow colored ppt

Classification:

- a. Pyrrole and Pyrrolidine ring: Hygrine, Cocoa
- b. Pyridine and piperidine : Coniine, Arecoline, Lobeline
- c. **Quinoline : Camptothecin (Anticancer)**, Quinine, Cinchonine
- d. **Isoquinoline: D-Tubocurarine (Skeletal muscle relaxant), Morphine, Berberine, Emetine**
- e. **Indole:** Ergot, Reserpine, Vinca, Strychnine, Physostigmine
- f. **Imidazole:** Pilocarpine
- g. Quinazoline: Vasaka (antitussive & expectorant)

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NIPER JEE Syllabus Analysis

Some very important topics and questions

- Ramachandran plot, HANz plot, structure of proteins, Docking
- Definition of software COMFA – MOLECULAR MECHANICS , MOLECULAR DYNAMICS QSAR, HAMMETT EQUATION

- **NAME REACTIONS**

- **MBA** : PRIVATE FUND, BANK ACCOUNT, PUBLIC ACCOUNT, CREDIT AND DEBT, MUTUAL FUND, number. of members in public, private and government company. Cooperative and joint sector, BSE & NSE

- **STEREOCHEMISTRY** : CHIRALITY, ASSYMETRIC , DYSSMETRIC, ENANTIOMERS, DIASTEROMERS, D,L CONFIGURATION, ERYTHRO, AND THREO AND • BASIC CONCEPT OF DNA AND RNA, PROTEIN , LIPIDS

- **ANALYTICAL CHEMISTRY**: GRAPH OF THERMAL (DSC, DTA, TGA), POTENTIOMETRY, NMR – PROTON AND CARBON 13 NMR, IR ETC.

- BASIC CONCEPT OF CARBONYL CHEMISTRY INCLUDING NUCLEOPHILIC ADDITION, SINGLE ELECTRON TRANSFER, ENOLATE CHEMISTRY

- **PHARMACY PRACTICE AND PHARMACOLOGY**: CAUSITIVE ORGANISIM AND DRUGS USED FOR TREATMENT OF TUBERCULOSIS, LISHMANIASIS, MALARIA, DIABETES, DRUG INTERACTIONS DELAYED AND RAPID. INFECTIOUS DISEASES, NEWER DRUGS APPROVED IN 2009 AND DRUGS WITHDRAWN. REGULATORY BODIES IN INDIA, (DR. Surinder singh) DCGI OF INDIA. CDSCO. CLINICAL TRIALS BASICS. visit WHO india AND ICH guidelines Full forms and www.whoindia.org,

- **PHARMACEUTICS**: superdisintegrants, liposomes, NDDS, IP USP regulations for coated tablet, plain tablet, chewable tabs- time taken to disintegrate. Tablets, capsules, aerosols propellants.

- **BIOTECHNOLOGY**: fermentation of penicillin , cephalosporins organisms used, organic acid production.

- Search www.niper.ac.in for respective department work search syllabus of niper on net. IUPAC nomenclature, R and S nomenclature, E and Z isomerism, atropisomerism,

Conformations

Hybridization, aromaticity, Huckel's rule reaction mechanisms- Electrophilic, Nucleophilic, SN1, SN2, SNi, Elimination E1 E2 etc. Ester hydrolysis, Aac1 Aac2.....all eight mechanisms (Jerry march) Markovnikov's rule, Bredt's rule, Stereoselectivity, stereospecificity, regioselectivity, chemoselectivity, chirality, stereochemistry, conformations, rearrangements, acids and bases. Imine-enamine Tautomerism, keto-enol tautomerism, pericyclic reactions, racemic mixture, resolution methods. Amino acids proteins, various methods for amino acid detection, Ninhydrin test, peptide sequencing, structures of amino acids, essential and nonessential amino acids, Introduction to thermal methods of analysis like, TGA, DSC, DTA etc. Carbohydrates classification, osazone test, mutarotation, etc, Various Heterocycles, Heterocycle synthesis, reactions.

Introduction to Redox reactions.

Spectroscopy: (basics specially): Very very IMP topic. NMR, and C-NMR ranges from Morrison & Boyd or Pavia Mass -Basic concepts about various peaks M+1, molecular ion, base peak etc. (Silverstein) IR - Frequencies of various groups specially carbonyls. UV Chromatography: Details of every chromatographic method. Reaction kinetics, first second third and pseudo first order reactions, radio labeling for determination of mechanism. Common condensation reactions like Aldol, Claisen Perkin, Dickmann, Darzen etc. Other reactions like Cannizarro's reaction, Prins reaction, especially reactions of carbonyl compounds.

References:

1. Jerry March
2. Morrison and Boyd (ESPECIALLY Peptide and Carbohydrate chemistry)
3. I. L. Finar Vol-I and Vol-II (Heterocyclic chemistry and organic synthesis)
4. Eliel

Natural Products:

In natural products more stress should be given on phytochemistry part rather than biological aspects. Methods of extraction, isolation and characterization of natural products. Various separation techniques used for isolation of natural products.

Biosynthetic pathways.

Primary metabolites, their examples. Secondary metabolites, various classes of secondary metabolites (e.g. Alkaloids, glycosides, tannins, lignans, saponins, lipids, flavonoids, coumarins, anthocyanidines etc.). Here most imp. Part is chemistry of these classes. Important therapeutic classes: antidiabetics, hepatoprotectives, immunomodulators, nutraceuticals, natural products for gynecological disorders, anti-cancer, anti-viral (mainly anti-HIV), adaptogens etc. Dietary antioxidants, Marine natural products, Plant growth regulators. Spectroscopy: Basic concepts of UV, NMR, IR and Mass spectroscopy. Give more stress on IR and NMR.

Stereochemistry: Basic concepts.

Fischer, sawhorse and newman projection formulae. Biological sources of important classes of natural products. (Selected ones only) Standardization of natural products. What is difference between natural products and pharmacognosy?

References:

1. For various therapeutic classes: Trease and Evans
2. For spectroscopy: Silverstein, Pavia, Kemp.
3. For stereochemistry: I.L. Finar vol-II

Pharmacology and toxicology:

Pharmacokinetics, pharmacodynamics, pharmacological effect, desired, undesired, toxic, adverse effects. Bioavailability, bioequivalence, various factors of ADME. (From Bramhankar)

Drug metabolism: various pathways and other details. Drug interactions, agonist, antagonist, partial agonist, protein binding, drug distribution, distribution volume, excretion pathways etc.

Pharmacological screening: general principles, various screening models, screening methodologies (in vitro and in vivo tests). Mechanism of drug action, drug-receptor interaction. Various adrenergic, cholinergic and other receptors Detailed study of CNS pharmacology Study of basis of threshold areas of work in NIPER in pharmacology dept. mentioned in brochure.

Diseases: study of the pharmacology of the diseases and drugs used with mode of action especially of diabetes, malaria, leishmaniasis, TB, hypertension, myocardial ischemia, inflammation, and immunomodulation. Chemotherapy and pathophysiology- knowledge of antibiotics, their mode of action and the microorganisms responsible for various common diseases. Bioassay methods, various requirements. Brief knowledge of the statistical tests.

References:

1. Rang and Dale (ALL CHEMOTHERAPY CLASSES OF DRUGS. IF YOU READ THE WHOLE BOOK, then nothing else is needed)
 2. F. S. K. Barar
 3. Wilson and Griswold (for Mechanism)
 4. Kasture (for Bioassay and Screening)
- Pharmaceutics and formulation (Pharmaceutical Technology)

Drug delivery systems (DDS): NDDS models, osmotic pumps, various release patterns eg. Controlled release, delayed release. Sustained release etc., order of release. Oral controlled DDS, factors affecting controlled release.

Carriers in DDS: polymers and their classification, types, carbohydrates, surfactants, proteins, lipids, prodrugs etc. Transdermal drug delivery systems (TDDS): principles, absorption enhancers, evaluation of TDDS. Parenterals: requirements, advantages, disadvantages, release pattern, route of drug delivery. Drug targeting: microspheres, nano particles, liposomes, monoclonal antibodies, etc.

Preformulation detailed.

Complexation, solubilization, polymerization, viscosity measurements. Dosage form development- stages, implications of dosage form. Additives of formulation, types, examples, advantages, disadvantages, drug excipient interaction, incompatibility, various types of incompatibilities. Dosage forms: solid (tablets, capsules, pills etc), liquid (emulsion, suspension etc), sterile (injectables), aerosols. Principles, advantages, disadvantages and problems.

Coating - in detail.

Packaging: materials, labeling etc. Types of containers (e.g. Tamper-proof containers) In process controls, Product specification, documentation. Compartmental modeling. (From Bramhankar) Bioavailability, bioequivalence studies. Methods of improvement of oral bioavailability. Evaluation of formulation, principles and methods of release control in oral formulations.

References:

1. Lachmann (ALL new and old techniques in Pharmaceutical Industry)
2. Alfred Martin (ALL physical chemistry BASICS)
3. Remington's Pharmaceutical Sciences
4. **Notes of Dr. D.K.Majumdar Sir (Most important)**
5. Banker series.
6. other: Bramhankar, , Liberman Series

Pharmaceutical analysis:

Stability testing of pharmaceuticals, various stability tests, kinetic studies, shelf life determination, thermal stability, formulation stability. Various analytical techniques

Tests: physical and chemical tests, limit tests, microbiological tests, biological tests, disintegration and dissolution tests. Spectroscopic methods; UV, NMR, IR, MS, FT-IR, FT-NMR, ATR (Attenuated Total Reflectance), FT-Raman- basics and applications. Thermal techniques: DSC, DTA, TGA, etc.

Particle sizing: law of diffraction.

Electrophoresis: capillary electrophoresis. Chromatography- detailed.

QA and QC: GLP, TQM, ISO system. Preformulation, cyclodextrin inclusion compounds

Solubility: pH, pka, surfactant HLB values, Rheology.

Crystallinity, polymorphism, solvates and hydrates, crystal habits, porosity, surface area flow properties. Dosage forms, Stages of dosage form development Osmolality, osmolarity, osmotic pressure, conductivity, Preservatives, Media for bioassay.

References:

1. Willard
2. Silverstein (Mass Spectroscopy)
3. William Kemp (NMR)
4. Pavia (for spectroscopy)
5. Others like Alfred Martin, Chatwal (UV), Garry Christen (Chemical Methods)

Biotechnology: Pharmaceutical technology biotechnology

Genetic Engg: Gene expression, mutation, replication, transcription, translation, recombination, bacteriophages.

Cloning: methods, isolation of nucleic acids, enzymes in cloning (restriction endonucleases, DNA ligase, DNA gyrase, polymerases etc...), functions of these enzymes, Pallindromes.

Fermentation: fermenters, fermentation process, its regulation, conditions, bioprocessors, various enzymes in fermentation technology. Fermentation of Antibiotics, vitamins, amino acids, hydroxy acids such as lactic acid etc. Chemical engg. aspects related to fermentation

Gene therapy: methods and applications. Monoclonal antibodies, insulin, interferons, enkephalins, angiotensin analogues and other peptides.

References:

1. Vyas and Dixit
2. IP Appendices

Practice of Pharmacy: The best part for the preparation for this best reference for this would be Remington's Pharmaceutical Sciences. This branch is quite new here, so till dates students of branch used to do case study of prescriptions in Fortis hospital, PGI Chandigarh and govt. college chd... This is much like pharmacology and drug-drug interactions and different interactions are emphasized. Diabetes, heart diseases are main area of study.....

Pharmacoinformatics:

Terminologies related with new emerging informatics e.g. proteomics, genomics, QSAR (2D, 3D, regression, correlation).

References:

Foye, Williams and Lemke, Medicinal chemistry, 5th/6th edition, chapter 1-6. (Computational drug design and molecular modeling).

Others: Statistics, general mathematics and aptitude questions. Use MBA entrance test books like CET or CAT in MBA. Additionally some general awareness questions.

NIPER's thrust areas are: Microbial and viral diseases: Yeast, and fungi.

Parasitic and tropical diseases: Malaria, Leishmaniasis, amoebiasis, etc. Metabolic Disorders: Diabetes Strokes Peptide and carbohydrate chemistry.

Genomics and proteomics: yeast and fungi

Hormonal disorders: TRH related diseases

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