

# RAJASTHAN UNIVERSITY OF HEALTH SCIENCE

## D. Pharm I<sup>st</sup> Year Syllabus

### PHARMACEUTICAL CHEMISTRY – THEORY (ER20-12T)

| Chapter No.                                                                                                                                                                                                                                              | TOPICS                                                                                                                                                                                                                          |                                                                                                                                                                                                    |
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| 1                                                                                                                                                                                                                                                        | <b>Introduction to Pharmaceutical Chemistry:</b> Scope and objectives                                                                                                                                                           |                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                          | <b>Sources and Types of Errors:</b> Accuracy, precision, significant figures                                                                                                                                                    |                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                          | <b>Impurities in Pharmaceuticals:</b> Source and effect of impurities in Pharmacopoeial substances, importance of limit test, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals and arsenic. |                                                                                                                                                                                                    |
| 2                                                                                                                                                                                                                                                        | <b>Volumetric Analysis:</b> Fundamentals of volumetric analysis, Acid-base titration, non-aqueous titration, precipitation titration, complexometric titration, redox titration                                                 |                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                          | <b>Gravimetric Analysis:</b> Principle and method.                                                                                                                                                                              |                                                                                                                                                                                                    |
| 3                                                                                                                                                                                                                                                        | <b>Inorganic Pharmaceuticals:</b> Pharmaceutical formulations, market preparations, storage conditions and uses of                                                                                                              |                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                          | 3.1                                                                                                                                                                                                                             | <b>Haematinics:</b> Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron                                                                                  |
|                                                                                                                                                                                                                                                          | 3.2                                                                                                                                                                                                                             | <b>Gastro-intestinal Agents:</b> Antacids: Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics |
|                                                                                                                                                                                                                                                          | 3.3                                                                                                                                                                                                                             | <b>Topical Agents:</b> Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate                                              |
|                                                                                                                                                                                                                                                          | 3.4                                                                                                                                                                                                                             | <b>Dental Products:</b> Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes                                                                                      |
|                                                                                                                                                                                                                                                          | 3.5                                                                                                                                                                                                                             | <b>Medicinal Gases:</b> Carbon dioxide, nitrous oxide, oxygen                                                                                                                                      |
| 4                                                                                                                                                                                                                                                        | Introduction to nomenclature of organic chemical systems with particular reference to heterocyclic compounds containing up to Three rings                                                                                       |                                                                                                                                                                                                    |
| Study of the following category of medicinal compounds with respect to classification, chemical name, chemical structure (compounds marked with*) uses, stability and storage conditions, different types of formulations and their popular brand names- |                                                                                                                                                                                                                                 |                                                                                                                                                                                                    |
| 5                                                                                                                                                                                                                                                        | <b>Drugs Acting on Central Nervous System</b>                                                                                                                                                                                   |                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                          | 5.1                                                                                                                                                                                                                             | <b>Anaesthetics:</b> Thiopental Sodium*, Ketamine Hydrochloride*, Propofol                                                                                                                         |
|                                                                                                                                                                                                                                                          | 5.2                                                                                                                                                                                                                             | <b>Sedatives and Hypnotics:</b> Diazepam*, Alprazolam*, Nitrazepam, Phenobarbital*                                                                                                                 |
|                                                                                                                                                                                                                                                          | 5.3                                                                                                                                                                                                                             | <b>Antipsychotics:</b> Chlorpromazine Hydrochloride*, Haloperidol*, Risperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone                                                                   |
|                                                                                                                                                                                                                                                          | 5.4                                                                                                                                                                                                                             | <b>Anticonvulsants:</b> Phenytoin*, Carbamazepine*, Clonazepam, Valproic Acid*, Gabapentin*, Topiramate, Vigabatrin, Lamotrigine                                                                   |
|                                                                                                                                                                                                                                                          | 5.5                                                                                                                                                                                                                             | <b>Anti-Depressants:</b> Amitriptyline Hydrochloride*, Imipramine Hydrochloride*, Fluoxetine*, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram, Fluvoxamine, Paroxetine              |

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| <b>6</b>  | <b>Drugs Acting on Autonomic Nervous System</b>                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                             |
|           | <b>6.1</b>                                                                                                                                                                                                                                                                                                                                      | <b>Sympathomimetic Agents:</b> <ul style="list-style-type: none"> <li>• <b>Direct Acting: Nor- Epinephrine*</b>, Epinephrine, Phenylephrine, <b>Dopamine*</b>, Terbutaline, Salbutamol (Albuterol), <b>Naphazoline*</b>, Tetrahydrozoline.</li> <li>• <b>Indirect Acting Agents:</b> Hydroxy Amphetamine, Pseudoephedrine.</li> <li>• <b>Agents With Mixed Mechanism:</b> Ephedrine, Metaraminol</li> </ul> |
|           | <b>6.2</b>                                                                                                                                                                                                                                                                                                                                      | <b>Adrenergic Antagonists:</b> <ul style="list-style-type: none"> <li>• <b>Alpha Adrenergic Blockers:</b> Tolazoline, Phentolamine Phenoxybenzamine, Prazosin.</li> <li>• <b>Beta Adrenergic Blockers:</b> <b>Propranolol*</b>, <b>Atenolol*</b>, Carvedilol</li> </ul>                                                                                                                                     |
|           | <b>6.3</b>                                                                                                                                                                                                                                                                                                                                      | <b>Cholinergic Drugs and Related Agents:</b> <ul style="list-style-type: none"> <li>• <b>Direct Acting Agents:</b> <b>Acetylcholine*</b>, Carbachol, And Pilocarpine.</li> <li>• <b>Cholinesterase Inhibitors:</b> <b>Neostigmine*</b>, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide Bromide, <b>Dicyclomine Hydrochloride*</b></li> </ul>                        |
|           | <b>6.3</b>                                                                                                                                                                                                                                                                                                                                      | <b>Cholinergic Blocking Agents:</b> <ul style="list-style-type: none"> <li>• <b>Atropine Sulphate*</b>, Ipratropium Bromide</li> <li>• <b>Synthetic Cholinergic Blocking Agents:</b> Tropicamide, Cyclopentolate Hydrochloride, Clidinium</li> </ul>                                                                                                                                                        |
| <b>7</b>  | <b>Drugs Acting on Cardiovascular System</b>                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                             |
|           | <b>7.1</b>                                                                                                                                                                                                                                                                                                                                      | <b>Anti-Arrhythmic Drugs:</b> Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*, Lidocaine Hydrochloride, Lorcaïnide Hydrochloride, Amiodarone and Sotalol                                                                                                                                                                                                                       |
|           | <b>7.2</b>                                                                                                                                                                                                                                                                                                                                      | <b>Anti-Hypertensive Agents:</b> <b>Propranolol*</b> , <b>Captopril*</b> , Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine,                                                                                                                                                                                                                            |
|           | <b>7.3</b>                                                                                                                                                                                                                                                                                                                                      | <b>Antianginal Agents:</b> Isosorbide Dinitrate                                                                                                                                                                                                                                                                                                                                                             |
| <b>8</b>  | <b>Diuretics:</b> Acetazolamide, <b>Frusemide*</b> , Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>9</b>  | <b>Hypoglycemic Agents:</b> Insulin and Its Preparations, <b>Metformin*</b> , <b>Glibenclamide*</b> , Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>10</b> | <ul style="list-style-type: none"> <li>• <b>Analgesic And Anti-Inflammatory Agents:</b> Morphine Analogues</li> <li>• <b>Narcotic Antagonists</b></li> <li>• <b>Nonsteroidal Anti-Inflammatory Agents (NSAIDs) - Aspirin*</b>, Diclofenac, <b>Ibuprofen*</b>, Piroxicam, Celecoxib, Mefenamic Acid, <b>Paracetamol*</b>, Aceclofenac</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>11</b> | <b>Anti-Infective Agents</b>                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                             |
|           | <b>11.1</b>                                                                                                                                                                                                                                                                                                                                     | <b>Antifungal Agents:</b> Amphotericin-B, Griseofulvin, Miconazole, <b>Ketoconazole*</b> , Itraconazole, <b>Fluconazole*</b> , Naftifine Hydrochloride                                                                                                                                                                                                                                                      |
|           | <b>11.2</b>                                                                                                                                                                                                                                                                                                                                     | <b>Urinary Tract Anti-Infective Agents:</b> Norfloxacin, Ciprofloxacin, <b>Ofloxacin*</b> , Moxifloxacin,                                                                                                                                                                                                                                                                                                   |
|           | <b>11.3</b>                                                                                                                                                                                                                                                                                                                                     | <b>Anti-Tubercular Agents:</b> <b>INH*</b> , Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, <b>Pretomanid*</b>                                                                                                                                                                                                                                                    |
|           | <b>11.4</b>                                                                                                                                                                                                                                                                                                                                     | <b>Antiviral Agents:</b> Amantadine Hydrochloride, Idoxuridine, <b>Acyclovir*</b> , Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir                                                                                                                                                                                                                                                               |

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| <b>11</b> | <b>11.5</b> | <b>Antimalarials:</b> Quinine Sulphate, <b>Chloroquine Phosphate*</b> , Primaquine Phosphate, <b>Mefloquine*</b> , Cycloguanil, Pyrimethamine, Artemisinin                                                                                         |
|           | <b>11.6</b> | <b>Sulfonamides:</b> Sulfanilamide, Sulfadiazine, Sulfamethoxazole, <b>Sulfacetamide*</b> , Mafenide Acetate, Cotrimoxazole, <b>Dapsone*</b>                                                                                                       |
| <b>12</b> |             | <b>Antibiotics:</b> Penicillin G, <b>Amoxicillin*</b> , Cloxacillin, Streptomycin<br><b>Tetracyclines:</b> Doxycycline, Minocycline<br><b>Macrolides:</b> Erythromycin, Azithromycin,<br><b>Miscellaneous:</b> <b>Chloramphenicol*</b> Clindamycin |
| <b>13</b> |             | <b>Anti-Neoplastic Agents:</b> <b>Cyclophosphamide*</b> , Busulfan, Mercaptopurine, <b>Fluorouracil*</b> , Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, <b>Cisplatin*</b> , Dromostanolone Propionate              |