Syllabus for the post of

(1) Professor, Pharmacology, Class-I (Advt. No.: 38/2019-20)

(2) Associate Professor, Pharmacology, Class-I (Advt. No.: 53/2019-20)

(3) Assistant Professor, Pharmacology, Class-I (Advt. No.: 101/2019-20)

Marks – 200 Questions-200 Medium: English

1. **General Pharmacological Principles and Applied Sciences**

   Theories and mechanism of drug action, Pharmacokinetic principles and parameters, Factors modifying drug action, Pharmacogenetics, Chronopharmacology, Adverse effects of drugs, Drug dependence, Toxicology, Dose response relationships, Structure-activity relationships, Physiological and biochemical basis of drug action, Etiopathogenesis of diseases relevant to therapeutic use of drugs, basic microbiology, Immunology and molecular biology, History of pharmacology, sources of drug information and Use of information technology.

2. **Toxicology**

   Basics of principles of diagnosis and treatment of human poisoning. Clinical features of common poisoning. Antidotes in the management of poisoning. Principles of clinical toxicology. Applied analytical toxicology and toxicovigilance.

3. **Molecular Biology in Pharmacology**

   Gene expression, Pharmacogenomics, Proteomics, techniques involved in studying receptor dynamics. PCR, No4rthern blot, Southern blot and Western blot. Protein purification. Mono, poly clonal antibodies. Molecular biology in receptor identification. Antisense oligonucleotides, molecular targets of drug action.

4. **Isolation of Compounds from Herbal Sources**

   Basic constituents of plants (chemical classification). Isolation of active constituent from plant materials. Percolation and maceration. Qualitative

constituent characterisation techniques. Utilisation of HPTLC for the constituent analysis. Estimation of marker compound in biological fluid after crude plant material administration.

5. **Wonder Discoveries in Pharmacology**

   Nobel laureates in Pharmacology and their revolutionary discoveries

6. **Systemic Pharmacology, Chemotherapy and Therapeutics**

   Autonomic nervous system, Central nervous system, Autacoids, Drugs affecting kidney function and Cardiovascular system, Drugs affecting gastrointestinal and respiratory system, Drugs affecting uterine motility, Chemotherapy of parasite infections, Chemotherapy of microbial diseases, Antineoplastic agents, Immunomodulators, Drugs acting on blood and blood forming organs, Hormones, Miscellaneous

7. **Experimental Pharmacology, Bioassay And Statistics**

   Experimental methodologies involved in the discovery of drugs (in vivo, in vitro, ex vivo). Animal handling and animal care. Methods of anaesthetising animals and methods of euthanasia. Restraining and blood collecting methods. Drug screening methods involved in the evaluation of anti-ulcer, antidepressant, antianginal, antihypertensive, antiarrhythmic, antidiabetic, anticataract, anti-platelet, anticancer, antiinflammatory, antidiarrhoeal, antiepileptic, analgesic, antithyroid, antipyretic, antiglaucoma, antihyperlipidemic antiasthmatics drugs and cough suppressants. Drug screening methods used in screening antifungal, antihelminthic, antibacterial, antiviral agents, drugs for heart failure, posterior pitutary, adrenal steroid (gluco & mineralo corticoids), testicular, parathyroid, ovarian, thyroid hormones, Methods involved in testing teratogenicity, carcinogenicity and organ toxicities in animals.

8. **Instrumentation in Drug analysis**

   Qualitative testing, titrimetric analysis. Beer and Lambert’s law. Basis and working principle of colorimeter, ultraviolet, atomic absorption spectrometers, Fluorescence spectroscopy, NMR and Mass Spectroscopy. Basics of Chromatography. Partition, adsorption and ionexchange chromatography. Column chromatography, thin layer chromatography, paper chromatography

immunoabsorbant chromatography, high performance thin layer chromatography, high performance liquid chromatography and gas Chromatography. Radio immunoassay. Processing of biological materials for drug analysis. Calculations in drug analysis. Good laboratory practice. Validation of analytical procedure.

9. Biostatistics

Calculation of basic statistical parameters (mean, median, mode, standard deviation, standard error etc.). Null hypothesis, parametric and non parametric tests (Student 't test, Wilcoxon, ANOVA etc.). Metaanalysis.

10. Clinical Pharmacology and Recent Advances

i. Pharmacokinetics

Basics of pharmacokinetics, calculation of pharmacokinetic estimates (C-max, Tmax, T1/2, AUC(0-n), AUC(0-∝), Vd, Ke, Ka etc.) Compartment models used in pharmacokinetics (oral and intravenous). Compartment fitting (one comp & two comp). Pharmcodynamic /pharmacokinetic (PK/PD) correlation.

ii. Drug Regulations

Drugs and Cosmetics Act, Drug Price Control order, Application for Investigational New Drug (IND), Application for New Drug Discovery (NDD) according to Indian Control Authority & USFDA guidelines. Conducting bio-equivalence studies. Ethical considerations in utilizing human subjects for drug discovery process. Helsinki's declaration. ICH-GCP Guidelines. Ethical guidelines in utilising animals for experimental purposes.

iii. Drug development process

Methods involved in the development of new drugs. Preclinical toxicological studies. Calculation of LD50 & ED50. Acute, subacute and chronic toxicity studies. Irwin profile test, Pre-clinilcal pharmacokinetic and dynamic studies. Lipinski's rule for drug like molecule, High throughput screening (invitro and invivo) for pre-clinical pharmacokinetic and pharmacodynamic studies.

11. Clinical Trials

Types of clinical trials, clinical trial for a new investigational drug in India. Methods involved in the assessment of drugs in human volunteers and bio-equivalence studies. Key points in drafting protocol for a large scale multicentric drug trial in India.

12. Therapeutic Drug Monitoring (TDM)

I. Basic principles of TDM. Therapeutic index. Trough level monitoring and dosage adjustments.
II. Therapeutic audit: Drug utilisation studies, essential drug concept, rational prescribing.
III. Drug delivery systems: sustained release, enteric coated formulations and liposome etc.
IV. Pharmacovigilance, Pharmacoeconomics, Pharmacogenetics and Drug Information.

13. **RESEARCH METHODOLOGY**

14. **Indian Medical Council (Professional Conduct ETIQUETTE and Ethics) Regulations, 2002.**

15. **Current Trends and Recent Advancements in the field of Pharmacology.**