DETAILED SYLLABUS FOR THE POST OF LABORATORY TECHNICIAN GR.II

CATEGORY NO.614/2024

(Total 100 Marks- 10 Marks from each module)

Module 1

Basic Techniques in Parasitology

Introduction to Clinical Parasitology laboratory- Microscopy – Handling, care and maintanence of laboratory equipments routinely used in laboratory like centrifuges, weighing balances, glass and plastic ware etc. Basic concepts of molality, molarity, Preparation of stains like Hematoxylin stains, Acetic acid carmine, ZN carbol fuchsin, fixatives like 10% formalin, Schaudinn's fixative etc and mounting media like lactophenol, glycerol -safe and scientific handling of clinical samples –Techniques of collection, preservation and processing of clinical materials including faeces, blood, lymph and urine, basic safety measures to be adopted in a laboratory-acquaintance with specimen maintenance, basic immuno parasitological techniques, Lab animal inoculation

Module 2

Diagnostic Helminthology

Basic concepts in Veterinary helminthology (Aquintance with terms like defenitive host, intermediate host, direct lifecycle, indirect lifecycle, oviparous, viviparous, ovoviviparous)- General morphology and lifecycle of nematodes-General morphology and lifecycle of trematodes- General morphology and lifecycle of cestodes - General characteristics of common helminth ova seen in faecal samples of cattle, dog and poultry. Quantitative assessment of parasitism (Egg per gram method)- Methods for identification helminth larvae from blood samples (Wet film, Knott's technique), copro culture techniques, examination of urine, nasal

discharges etc. for the identification of helminths, Collection and processing of nematodes, trematodes and cestodes, Preparation of permanent mount of helminths. Micrometry as an aid to diagnosis- Anthelmintic resistance and its detection (FECRT, EHA), Harmful effects of helminths on hosts

Module 3

Diagnostic Entomology and Acarology

Introduction to entomology-arthropods-Classification of arthropods-Characters of class Insecta-life cycle of insects-morphology, pathogenicity and laboratory diagnosis of flies of veterinary importance- Nematocera (mosquitoes)- Brachycera (Tabanus)-Cyclorrapha (Musca and blow flies)-General life cycle, morphology of fleas of veterinary importance, General life cycle, morphology of lice of veterinary importance- General life cycle, morphology and clinical importance of bugs of veterinary importance- Xenodiagnosis

Introduction to acarology- general characters and life cycle of class Arachnida- Types of ticks-general characters of hard and soft ticks-life cycle of ticks- hard ticks-brevirostrate (*Rhipicephalus*, *Haemaphysalis* and *Boophilus*) and longirostrate (*Amblyomma* and *Hyalomma*)-soft tick (*Argas persicus*)-Mites-Mange mites-Scab mites-Non sarcoptiform mites- role of vectors in disease transmission- collection, processing, identification and preparation of permanent mounts of flies, fleas, lice, bugs, ticks and mites-Pathogenic effects of arthropods-Collection and storage of arthropods in the laboratory- collection, processing and examination of skin scrapings for parasitic mites

Module 4

Diagnostic Protozoology

Introduction to Protozoology, classification of protozoa. Reproduction of protozoa, General aspects of *Entamoeba*, Lumen dwelling flagellates-*Trichomonas, Giardia, Histomonas*; Haemoflagellates – *Trypanasoma, Leishmania*. General aspects of Haemoapicomplexans (*Plasmodium, Haemoproteus, Babesia* and *Theileria*); General aspects of tissue apicomplexans (*Toxoplasma, Sarcocystis*); General aspects of intestinal apicomplexans (*Coccidia,*

Cryptosporidium); General aspects of *Balantidium coli;* Diagnosis of intestinal protozoa – floatation, iodine staining, preparation of permanent preparation of protozoan cysts, Preservation of samples; Diagnosis of protozoa from throat swab; vaginal smear; Collection of blood, wet film examination, preparation of thin and thick blood smears, buffy coat smear,lymph node smear, Quantitative buffy coat system, Special diagnostic techniques – Animal inoculation

Module 5

Hematology

General introduction to hematology, Preparation of site and Collection of blood from different species. General description of anticoagulants, separation of serum, TEC, TLC, DLC, ESR, PCV, Hb, Erythrocyte indices, Reticulocytes, Platelet count, Bleeding time and Clotting time; DLC – Staining – Common stains for hematology, Manual, Semi & fully automatic analysis-Collection and preservation of blood, preparation of blood smear; Estimation of TEC, TLC, DLC, ESR, PCV, Hb, Reticulocyte count and clotting time; Calculation of erythrocyte indices.

Module 6

Clinical chemistry and Urology

Collection, Preservation & despatch of clinical materials like urine, milk and semen. Physical, Chemical and Microscopical examination of urine, milk and semen. Serum biochemistry-serum enzymes and electrolytes, blood sugar, serum proteins; Urinalysis- RE, microscopical examination of sediments, Milk –various tests for mastitis cell counts, chloride tests, white side test, CMT, milk culture and sensitivity. Preparation of semen smears, physical examination, staining and ME. Evaluation of serum enzymes like AST, ALT, ALP, Serum bilirubin, serum protein, sugar, Sodium, Potassium, Copper, Calcium, Urea etc.-Function tests of liver and kidney

Module 7

Techniques of staining, histopathology & cytopathology

General Principles of staining, Factors influencing staining –Simple stains, compound stains , Special stain, Classification of stain, Preparation of stains and slides, Staining procedures. Mounting, Labelling and Storage of slides, Inventory management of chemicals, Museum technology / preparation, Preparation of various stains - staining procedures, mounting, labelling

Techniques of Post mortem, Collection and preservation of materials from post mortem; Details on fixatives, documentation of lesions on post mortem; Biopsy& cytology; Techniques in histopathology-Processing of tissues, section cutting- Microtomy, Staining; Preparation of specimens for cytology

Module 8

Basic techniques in Microbiology

Good laboratory practices; Sterilisation- methods of sterilization, sterility check and storage; Microscopy- types of microscope- handling of microscope; staining – type of stains- preparation of stains, different staining techniques- Gram's staining, acid fast staining, Leishman's staining, Wright's staining, Lactophenol cotton blue staining etc.; Definition of culture media- ingredients of culture media- different types of media- preparation and use of culture media, inoculation of culture and incubation, preparation of bacterial smears on slides, antibiotic sensitivity tests; introduction to lab animals- handling, care and management of lab animals

Module 9

Clinical Microbiology

Definition of Clinical Microbiology; defense mechanisms of body; Bacterial infections (Anthrax, Brucellosis, Tuberculosis, Leptospirosis, *E.coli*, *Staphylococcus*); Foodborne infections (*E coli*, *Salmonella, Campylobacter, Listeria, Staphylococcus*); Viral diseases- Rabies, FMD, NCD, Lumpy skin disease, Parvo viral infection, Avian influenza Classical swine fever; Fungal diseases- Aspergillosis, Dermatophytosis, Mycotoxins; nosocomial and iatrogenic infections, zoonotic diseases; Diagnosis of common bacterial, viral and fungal diseases of animals and food microbiology,clinical samples to be collected in each disease – collection and processing of clinical samples like blood, faeces, sputum, nasal swab, vaginal swab, Isolation of bacteria from clinical samples, identification by colony morphology, staining, biochemical tests; serum separation and storage, blood collection from different species of animals including lab animals; introduction to ELISA, AGID, introduction to molecular methods like PCR- demonstration of serological and molecular techniques

Module 10

Quality control techniques

Definition, quality control, quality assurance, quality management, microbiological guidelines, specifications and standards, National agencies associated with quality control- BIS, PFA, MMPO, MFPO, AGMARK, International agencies associated with quality control, - codex alimentarius, FAO, WHO- quality control systems in food industry- HACCP, BPS, TQM, ISO series salient features, quality control tests used in food industry; Collection and processing of the sample for quality control tests, analysis of water- physical, chemical and microbiological, milk- rapid platform tests- direct and indirect quality control tests, analysis of meat- physical, chemical and microbiological, air – sampling and analysis.