SYLLABUS FOR GRADE-V OF MIZORAM ANIMAL HUSBANDRY & VETERINARY SERVICE (VETERINARY OFFICER) EXAMINATION UNDER ANIMAL HUSBANDRY and VETERINARY SCIENCE DEPARTMENT-2019

General English Paper - I (3 hours duration)

ESSAY TYPE

(Full Marks : 100)

(a) Essay Writing. ..... 25 Marks
(b) Précis Writing. ..... 15 Marks
(c) Letter Writing ..... 15 Marks
(d) Idioms & Phrases ..... 15 Marks
(e) Expansion of passages ..... 15 Marks
(f) Comprehension of given passages ..... 15 Marks

General English Paper - II (*2 hours duration*)

OBJECTIVE TYPE (MCQ)

(Full Marks : 100)

(a) Grammar: ..... 40 Marks
Parts of Speech, Nouns, Adjective, Verb, Adverb, Preposition, etc.

(b) Composition ..... 30 Marks

i) Analysis of complex and compound sentences
ii) Transformation of sentences
iii) Synthesis of sentences

(c) Correct usage and vocabularies ..... 30 Marks

AH&Vety Paper – I (200 marks)
1. Livestock Production Management
2. Animal Genetics and Breeding
3. Animal Nutrition
4. Veterinary and Animal Husbandry Extension Education
5. Livestock Products Technology

AH&Vety Paper – II (200 marks)
1. Veterinary Microbiology
2. Veterinary Pathology
3. Veterinary Parasitology
4. Veterinary Pharmacology and Toxicology
5. Veterinary Public Health & Epidemiology
6. Veterinary Physiology & Biochemistry

AH&Vety Paper – III (150 marks)
1. Veterinary Anatomy
2. Veterinary Surgery and Radiology
3. Veterinary Medicine
4. Veterinary Gynaecology and Obstetrics

APTITUDE (50 marks)

AH&VETY PAPER – I

LIVESTOCK PRODUCTION MANAGEMENT

UNIT-1

Demographic distribution of livestock and role in Indian economy. Problems and prospects of livestock industry in India. Common animal husbandry terms. (glossary) Body conformation and identification. Transportation of livestock and wild or zoo animals. Common farm management practices including disinfection, isolation, quarantine and disposal of carcass. Introduction to methods of drug administration. Common vices of animals. Livestock production systems. Animal holding and land holding patterns. Organic livestock production. Judging and BCS for body parts of livestock. Preparation of animals for show. Culling of animals. Selection and purchase of livestock. Importance of grasslands and fodder in ivestock production. Agronomical Practices for fodder production. Important leguminous and non-leguminous fodders in different seasons. Soil and Water conservation and drainage of water for fodder production. Fodder production for small livestock units. Structures for storage of feeds and fodders. Scarcity fodders and preservation of green fodder. Recycling of animal washings and wastes in fodders production and use of recycle waste.

UNIT-2

Housing systems, layout and design of different buildings for animals. Selection of site. General principles affecting the design and construction of building for housing for various livestock species. Arrangements of the building with special reference to Indian conditions. Utilization of local materials. Building materials used for construction of wall, roof and floor of animal houses, their characteristics, merits and demerits. Breeds of cattle and buffalo and descriptions of important breeds. Economic traits of cattle and buffaloes. Draught ability of cattle and buffaloes. Raising of buffalo males for meat production. Routine animal farm operations and labour management. Animal farm accounts and records. Breeds of sheep and

goat and their descriptions. Important economic traits for meat, milk and fibre. Weaning and fattening of lambs and kids.

UNIT-3

Indian poultry industry. Classification of poultry. Production characters of other avian species. Description of indigenous fowls and their value in rural farming. Specific strains developed for rural poultry production. Brooding management. Housing of poultry. Scavenging system of management. Deep litter management. Cage management. Management of growers and layers. Management of broilers and breeders. Stress management. Poultry judging. Egg structure – Physical and chemical composition. Bio-security and principles of disease prevention management. Health care for common poultry diseases. General principles of poultry medication. Principles of incubation and hatchery management practices. Factors affecting fertility and hatchability, selection and care of hatching eggs and hatchery hygiene. Candling, sexing, grading, packing and disposal of hatchery waste. Economics of hatchery business –Poultry waste management, pollution and environmental issues. Organic and hill farming. Mixed or integrated poultry farming Management of ducks, geese, turkeys, Japanese quails, guinea fowls etc.

UNIT-4

Importance and selection of laboratory animal, care and housing standards of mice, rats, hamster and guinea pigs. General considerations on feeding and breeding of laboratory animals. Concept of production of specific pathogen free and germ free laboratory animals. Scope of rabbit farming in the country, breeds and their distributions in India. Selection, care and management of breeding stock for commercial purpose. Identification, care and management of kindling animals. Care of new born, growing stock. Breeding and selection techniques for optimal production of rabbit. Feeds and feeding for rabbit production. Hygienic care and Housing for rabbit production. Disposal, utilization and recycling of waste etc. Important breeds of dogs, cats and pet birds. Feeding of dogs, cats and pet birds. Utility of dogs. Taxonomy of important wild zoo animals. Status and conservation practices of wild life in India. Basic principles of habitat and housing of various classes of wild zoo animals. Size and space requirement (dimension) of cubicles, enclosures of important wild zoo animals. Management of livestock in fringe areas, in and surrounding the breeding areas. Feeding habits, feeds and feeding schedules of captive animals. Restraining, capture, handling, physical examination of captive animals. Classification of zoos, management of sanctuaries, national parks etc

UNIT-5

Introduction and scope of swine farming in the country. Demography of swine population. Selection and breeding techniques in swine. Important breeds (exotic and indigenous) & their characteristics. Housing and feeding of swine. Management of different categories of swine for optimal production. Equine population of India. Horses, donkeys and mules and their utility. Identification of breeds of horses. Dentition and ageing of horses. Care and routine management of equines. Doping and its detection. Colic and its prevention. Common breeds of camel in India and their utility, peculiarities in camel. Feeding schedule of camel, rutting symptoms in camel, Vices of camel. Care of breeding in camel, pregnancy and parturition of camel. Population statistics and utility, peculiarities of yak. Feeding and breeding of Mithun or Yaks. Yak × cattle crossing, hybrids from Mithun or Yaks and their adaptation to high altitude, milk composition of Mithun or Yaks.

ANIMAL GENETICS AND BREEDING

UNIT-1

Biostatistics: Introduction and importance of statistics and biostatistics, Classification and tabulation of data. Parameter, Statistic and Observation. Graphical and diagrammatic representation of data. Concepts of computer networks, internet & e-mail. Animal Genetics: History of Genetics. Mitosis vrs Meiosis. Chromosome numbers and types in livestock and poultry. Overview of Mendelian principles. Modified Mendelian inheritance. Pleiotropy, Penetrance and expressivity. Multiple alleles; lethals; sex-linked, sex limited and sex influenced inheritance. Sex determination. Linkage, crossing over and construction of linkage map. Mutation, Chromosomal aberrations. Cytogenetics, Extra-chromosomal inheritance. Molecular genetics, nucleic acids-structure and function. Gene concept, DNA and its replication. Introduction to molecular techniques.

Population Genetics: Introduction to population genetics; individual vrs population. Genetic structure of population: Gene and genotypic frequency. Hardy - Weinberg law and its application. Forces changing gene and genotypic frequencies (eg Mutation, migration, selection and drift). Quantitative vrs qualitative genetics; concept of average effect and breeding value. Components of Variance. Concept of correlation and interaction between Genotype and Environment. Heritability and Repeatability. Genetic and Phenotypic Correlations.

UNIT-2

Livestock and Poultry Breeding: History of Animal Breeding. Classification of breeds. Economic characters of livestock and poultry and their importance. Selection, types of selection, response to selection and factors affecting it. Bases of selection. Method of selection. Classification of mating systems. Inbreeding, outbreeding, etc. Systems of utilization of heterosis; Selection for combining ability (RS and RRS). Breeding strategies for the improvement of dairy cattle, buffalo, sheep, goat, swine and poultry. Sire evaluation. Open nucleus breeding system (ONBS). Development of new breeds or strains. Current livestock and poultry breeding policies and programmes in the state and country. Methods of conservation- livestock and poultry conservation programmes in the state and country. Application of reproductive and biotechnological tools for genetic improvement of livestock and poultry. Breeding for disease resistance. Breeding of pet, zoo and wild animals: Classification of dog and cat breeds. Pedigree sheet, selection of breeds and major breed traits. Breeding management of dogs and cats. Common pet birds seen in India and their breeding management.

ANIMAL NUTRITION

UNIT-1

History of animal nutrition. Importance of nutrients in animal production and health. Composition of animal body and plants. Nutritional terms and their definitions. Nutritional aspect of carbohydrates, protein and fats. Role and requirement of water, metabolic water. Importance of minerals (major and trace elements) and vitamins in health and production, their requirements and supplementation in feed. Common feeds and fodders, their classification, availability and importance for livestock and poultry production. Measures of food energy and their applications. Direct and indirect calorimetry, carbon and nitrogen balance studies. Protein evaluation of feeds - Measures of protein quality in ruminants and non-ruminants, biological value of protein, protein efficiency ratio, protein equivalent, digestible crude protein. Calorie protein ratio. Nutritive ratio. Introduction to feed technology- Feed industry; Processing of concentrates and roughages. Various physical, chemical and biological methods for improving the nutritive value of inferior quality

roughages. Preparation, storage and conservation of livestock feed through silage and hay and their uses in livestock feeding. Harmful natural constituents and common adulterants of feeds and fodders. Feed additives in the rations of livestock and poultry and their uses.

UNIT-2

Importance of scientific feeding. Feeding experiments. Digestion and metabolism trial. Feeding standards, their uses and significance, merit and demerits of various feeding standards with reference to ruminants. Balanced ration and its characteristics. Nutrient requirements and methods for assessing the energy and protein requirements for maintenance and production in terms of growth, reproduction, milk, meat, wool and draft purpose. General principles of computation of rations. Formulation of rations and feeding of dairy cattle and buffaloes during different phases of growth and production (neonate, young, adult, pregnant, lactating and dry animals; breeding bull) and working animals. Formulation of ration and feeding of sheep and goat during different phases of growth and production (milk, meat and wool). Feeding of high yielding animals and role of bypass nutrients. Metabolic disorders and nutritional interventions. Use of NPN compound for ruminants.

UNIT-3

Nutrient requirements in poultry, swine and equine - Energy and protein requirement for maintenance and production. Methods adopted for arriving at energy and protein requirements for maintenance and production in terms of growth, reproduction and production (egg, meat and work). Feeding standards for non-ruminants and poultry Formulation of rations as per BIS and ICAR specifications. Feeding of swine, equine, and poultry with conventional and unconventional feed ingredients. Feeding of ducks, quails, turkeys and laboratory animals. Nutrient requirements of mice, rat, rabbit and guinea pig. Diet formulation, preparation and feeding of rabbits and laboratory animals. Nutrient requirement and feeding of different categories of dogs and cats; peculiarities of feeding cats. Feeding of wild animals and birds in captivity. Metabolic disorders and nutritional intervention.

VETERINARY AND ANIMAL HUSBANDRY EXTENSION EDUCATION

UNIT-1

History of domestication and their social dimensions. Evolution and relationship between agriculture and animal husbandry. Farming and characteristics of farming in India. Classification of farming. Role of animals in the contemporary society. Early extension efforts in India. Extension education: Concept, levels, objectives and dimensions. Principles, philosophy and functions of extension education. Teaching learning process and steps in extension teaching. Concept of need and its types. Rural development and importance of rural development programmes for poverty alleviation. Problems and Issues in development. Panchayati Raj System. Concept of sociology and rural sociology in animal husbandry extension. Culture. Basic sociological concepts. Rural society. Characteristics and differences among tribal, rural and urban communities. Social control. Social stratification. Social institutions in rural society. Social change and Social groups. Leadership and their role in the animal husbandry extension. Gender and animal husbandry. Salient features of recent livestock census, livestock insurance scheme, national livestock mission. Sustainability.
Introduction to environmental consequences of livestock rearing. Introduction to animal welfare, ethics and rights.

UNIT-2

Communication and its functions. Types of communication. Elements of communication. Barriers of communication. Individual contact methods, Group contact methods, Mass

contact methods. Selection and use of extension teaching methods. Strengths and limitations of ICTs application in livestock sector and farmers capacity building. Information kiosk, E-learning, CAD, virtual class room, virtual reality, multi-media etc. Cyber extension- problems and prospects in livestock extension. Computer networking. Technology- Concept, generation process, application, merits and de-merits. Adoption and diffusion of innovations. Programme planning. Evaluation of extension programme, constraints in the adoption of scientific animal husbandry practices. Role of extension agents in diffusion of livestock innovations. Cattle and buffalo improvement programmes. Dairy development programmes. Concept of cooperation, Rochdale principles of cooperation, objectives of cooperative, Amul pattern of dairy cooperative system and Operation Flood. Transfer of technology projects of ICAR, KVK, ATIC, ATMA, NAIP, RKVY, etc. Different ongoing central and state government animal husbandry development programmes being run related to sheep, goat, poultry, piggery, fodder production etc.

UNIT-3

Introduction to Economics and Livestock Economics: definition and scope. Important features of land, labour, capital and organization. Theories of demand, supply and cost. Theories of production. Concept of market. Market price and normal price, price determination under perfect competition in short and long run. Marketing functions. Marketing agencies, institutions and channels for livestock and livestock products. Government interventions and role in marketing of livestock and livestock products. External trade in livestock products, recent policies on trade and international trade agreements and their implications in livestock sector. Definition of entrepreneur, entrepreneurship, enterprise and manager. Theories of entrepreneurship. Types, characteristics and functions of an entrepreneur. Introduction to financial management. Project appraisal. Business plan for enterprise. Institutions promoting entrepreneurship in India. Entrepreneurship development programmes. Personnel management. Resource management.

LIVESTOCK PRODUCTS TECHNOLOGY

UNIT-1

Milk industry in India. Layout of milk processing plant and its management. Composition and nutritive value of milk and factors affecting composition of milk. Physico-chemical properties of milk. Microbiological deterioration of milk and milk products. Collection, chilling, standardization, pasteurization, UHT treatment, homogenization, bactofugation. Dried, dehydrated and fermented milk. Preparation of cream, butter, paneer or channa, ghee, khoa, lassi, dahi, ice-cream, mozzarella cheese and dairy byproducts. Common defects of milk products and their remedial measures. Packaging, transportation, storage and distribution of milk and milk products. Good manufacturing practices and implementation of HACCP in milk plant. Organic milk products. Food safety standards for milk and milk products. Cleaning and sanitation in milk plant. Dairy effluent management.

UNIT-2

Layout and management of rural, urban and modern abattoirs. HACCP concepts in abattoir management. FSSAI standards on organization and layout of abattoirs. Animal welfare and pre-slaughter care, handling and transport of meat animals including poultry. Procedures of Ante-mortem and post mortem examination of meat animals. Slaughtering and dressing of meat animals and birds. Evaluation, grading and fabrication of dressed carcasses including poultry. Abattoir byproducts. Skin and hides. Treatment of condemned meat and carcasses. Management of effluent emanating from abattoir. Introduction to wool, fur, pelt and specialty fibers with respect to processing industry. Glossary of terms of wool processing. Basic

structure and development of wool follicle. Post shearing operations of wool, classification and grading of wool, physical and chemical properties of wool. Impurity of wool, factors influencing the quality of wool.

UNIT-3
Prospect of meat industry in India. Structure and composition of muscle (including poultry muscle). Conversion of muscle to meat. Nutritive value of meat. Fraudulent substitution of meat. Preservation of meat and poultry; drying, salting, curing, smoking, chilling, freezing, canning, irradiation and chemicals. Ageing of meat. Modern processing technologies of meat and meat products. Packaging of meat and meat products. Formulation and development of meat; kabab, sausages, meat balls or patties, tandoori chicken, soup, pickles. Fermentation of meat products. Physico-chemical and microbiological quality of meat and their products. Basics of sensory evaluation of meat products. Nutritive value, preservation, packaging of egg and egg products. Laws governing national or international trade in meat and meat products. Organic and genetically modified meat and poultry products.

AH&VETY PAPER – II

VETERINARY MICROBIOLOGY

UNIT-1
Introduction and history of Microbiology; Classification and nomenclature of bacteria; Microscopy and Micrometry; Bacterial stains and techniques; Structure and morphology of bacteria; Growth and nutritional requirement of aerobic and anaerobic bacteria; Normal, opportunistic and saprophytic bacterial flora: Types and sources of infection, method of transmission of infection. Pathogenicity, virulence, determinants of virulence, Epizootic and enzootic diseases, bacteremia, septicaemia and toxaemia, endotoxins, exotoxins,antitoxins, toxoids; Bacterial genetics (Mutation, Transformation, Transduction and Conjugation), plasmids and antibiotic resistance. Study of important pathogenic bacteria in relation to isolation, growth, cultural, morphological, biochemical and antigenic characteristics, epidemiology and pathogenesis, pathogenicity, diagnosis, prevention and control of bacterial diseases. Emerging, reemerging and transboundry bacterial pathogens.

UNIT-2
History of Virology; Introduction to viruses; Structure of Viruses; Classification of Viruses; Viral Replication; Genetic and Nongenetic viral interactions; Virus-Cell Interactions; Viral Pathogenesis, Oncogenesis, latency and immunopathology. Studies onGeneral Properties, Antigens, Cultivation, Pathogenesis, Epidemiology, Clinical Signs, Diagnosis, Prevention and Control of Viruses and Prions Causing Diseases in Livestock and Poultry. Introduction, classification, general properties of fungi; Growth and Reproduction of fungi; Studies on isolation, growth, morphological, cultural, biochemical and antigenic characteristics, epidemiology, pathogenesis, diagnosis and control of livestock fungal diseases. Mycotoxicoses

UNIT-3
History of Immunology; Lymphoid organs, tissues and Cells: Types of Immunity. Antigens & Antibody. Theories of antibody production. Major histocompatibility complex (MHC). Antigen processing and presentation. Complement system. Cytokines. Hypersensitivity. Autoimmunity; Immunotolerance; Concept of Immunity to Microbes, Vaccines and other

biological. Basic concepts and scope of Recombinant DNA technology; Gene cloning, Cloning vectors and expression vectors; Transformation and transfection; Southern, Northern and Western blotting; Bioinformatics, Gene banks; Application of molecular and biotechnological techniques: Polymerase chain reaction, Nucleic acid hybridization, DNA library, DNA sequencing and DNA fingerprinting; IPR. Ethics and regulatory issues in Animal Biotechnology

VETERINARY PATHOLOGY

UNIT-1

Introduction and scope of Veterinary Pathology. Causes of disease. Haemodynamic disorders. Glycogen overload, amyloidosis and fatty changes. Cell injury- degenerations, necrosis and its types, apoptosis, differences between post-mortem autolysis and necrosis, gangrene and its types. Pigments and calcification. Photosensitization. Disturbances in growth. Inflammation. Wound healing. Immunopathology. Animal Oncology- Definitions, general characteristics and classification of neoplasms.. Pathology of various types of tumours in domestic animals. Veterinary Clinical Pathology: Haematology, Urinalysis, etc. Biopsy and cytology. Necropsy. Pathological changes affecting Digestive, Respiratory, Musculoskeletal, Cardiovascular, Haematopoietic, Lymphoid, Urinary, Reproductive, Nervous, Endocrine systems, Skin and Appendages, Ear and Eye.

UNIT-2

Pathology of viral infections: Pathogenesis, gross and microscopic pathology of viral infections. Pathology of prion diseases. Pathology of bacterial infections: Pathogenesis, gross and microscopic pathology of bacterial infections. Pathogenesis, gross and microscopic pathology of fungal infections and mycotic diseases. Pathogenesis, gross and microscopic pathology of parasitic infections. Pathological changes of nutritional imbalances (in brief) due to carbohydrates, proteins, fats, minerals and vitamins and metabolic diseases. Gross and microscopic pathology in (brief) of toxicities of metals & non-metals; insecticide or pesticide poisoning, plant poisoning (braken fern, gossypol, ratti and lantana). Pathology of important diseases of rabbits, rats, mice, and guinea pigs. Gross and microscopic pathology of important diseases of wild animals.

UNIT-3

Avian Inflammation. Pathogenesis, gross and microscopic pathology of poultry viral diseases. Pathogenesis, gross and microscopic pathology of poultry bacterial diseases. Pathogenesis, gross and microscopic pathology of Mycoplasma infections, chlamydiosis. Pathogenesis, gross and microscopic pathology of fungal and mycotic diseases. Gross and microscopic pathology (in brief) of helminthic diseases (flukes, cestodes, nematodes), protozoal diseases (coccidiosis, histomoniasis), ectoparasites. Gross and microscopic pathology of nutritional imbalances due to carbohydrates, proteins, minerals and vitamins. Miscellaneous diseases and common vices.

VETERINARY PARASITOLOGY

UNIT- 1

Introduction & important historical landmarks in parasitology. Types of parasites. Types of hosts and vectors. Types of animal associations. Modes of transmission of parasites and methods of dissemination of the infective stages of the parasites. Immunity against parasitic infections or infestations and immune evasion by parasites. General harmful effects of parasites including various tissue reactions caused by parasites. General control measures against parasites. Characters of various phyla of parasites.

UNIT-2

Trematodes: Introduction, general account and classification, general life cycle of trematodes with morphological features of their developmental stages. Important morphological features, life cycles, modes of transmission, pathogenesis, epidemiology, diagnosis and general control measures of the trematode parasites. Cestodes: Introduction, general account and classification, general life cycle of cestodes with morphological features of their developmental stages (Metacestodes). Important morphological features, life cycles, modes of transmission, pathogenesis, epidemiology, diagnosis and management of cestode parasites. Nematodes: Introduction, general account and classification, general life cycle of nematodes with morphological features of their developmental stages. Important morphological features, life cycles, modes of transmission, pathogenesis, epidemiology, diagnosis and management of nematode parasite. Study of anthelmintic resistance and its types.

UNIT-3

Arthropods: Introduction, general account and classification, general life cycle of arthropods with morphological features of their developmental stages. Important morphological features, general bionomics, life cycle, vector potentiality, pathogenesis and control of arthropods affecting animals and birds. Study of insecticide or acaricide resistance. Protozoology: Introduction, general account and classification, general life cycle of protozoa with morphological features of their developmental stages. Important morphological features, life cycles, modes of transmission, pathogenesis, epidemiology, diagnosis and general control measures of the protozoan parasites of veterinary and zoonotic importance.

VETERINARY PHARMACOLOGY AND TOXICOLOGY

UNIT-1

Introduction, historical development, branches and scope of Pharmacology. Sources and nature of drugs. Pharmacological terms and definitions, nomenclature of drugs. Principles of drug activity: Pharmacokinetics & Pharmacodynamics. Adverse drug reactions, drug interactions. Drugs acting on digestive system. Rumen pharmacology. Drugs acting on cardiovascular system. Drugs acting on respiratory system. Drugs acting on urogenital system. Pharmacological basis of fluid therapy. Pharmacotherapeutics of hormones. Drugs acting on skin and mucous membranes.

UNIT-2

Neurohumoral transmission, Pharmacology of neurotransmitters. Autacoids pharmacology. Classification of drugs acting on CNS. History, mechanism and stages of general anaesthesia. Inhalant, intravenous and dissociative anaesthetics. Hypnotics and sedatives; psychotropic drugs, anticonvulsants, opioid analgesics, non-steroidal anti-inflammatory drugs, analeptics and other CNS stimulants. Drugs acting on somatic nervous system: Local anaesthetics, muscle relaxants. Euthanizing agents.

UNIT-3

Introduction and historical developments of chemotherapy. Antimicrobial agents: Classification, general principles in antimicrobial chemotherapy, antimicrobial resistance, combined antimicrobial therapy. Antitubercular drugs. Antifungal agents. Antiviral and anticancer agents. Anthelmintics. Antiprotozoal agents. Ectoparasiticides. Antiseptics and disinfectants. Pharmacology of drugs of abuse in animals. Pharmacology of indigenous medicinal plants.

UNIT-4

General Toxicology: Definitions, history of toxicology, fundamentals and scope of toxicology. Sources and classification of toxicants, factors modifying toxicity, general approaches to diagnosis and treatment of poisoning. Toxicity caused by metals and non-metals. Poisonous plants. Toxicity caused by Agrochemicals. Fungal and bacterial toxins. Venomous bites and stings. Toxicity caused by food additives and preservatives. Drug and pesticide residue toxicology. Environmental pollutants. Concept of radiation hazards.

VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY

UNIT-1

Aims and scope of Veterinary Public Health. One Health concept and initiatives. Principles and concepts of food hygiene and safety. Milk hygiene. Hygienic and safe milk production practices. Microbial flora of milk and milk products. Milk plant and dairy equipment hygiene. Quality control of milk and milk products. Milk hygiene practices in India and other countries. Elements of meat inspection and meat hygiene practices. Pathological conditions associated with the transport of food animals. Hygiene in abattoirs and meat plants. Detection of conditions or diseases and judgements during ante mortem and post mortem inspection. Meat as a source of disease transmission. Sources of contamination of meat and methods of carcass decontamination. Speciation of meat. Animal welfare and public health issues. Classification of low risk and high risk material generated in an abattoir and its hygienic disposal. Inspection of poultry for human consumption. Occupational health hazards in abattoir and meat plants. Foodborne infections and intoxications associated with foods of animal origin. Toxic residues (pesticides, antibiotics, metals and hormones) in foods and associated health hazards. Types of biohazards. Hazard analysis and critical control points (HACCP) system. Importance of ISO 9000 and 14000 series in meat industry. Risk analysis, assessment and management. International food safety standards: OIE, WTO agreements and Codex Alimentarius Commission. Sanitary and phytosanitary measures in relation to foods of animal origin. Food Safety and Standards Act and Regulations. Role of FSSAI, BIS, etc.

UNIT-2

Epidemiology- Principle, definition of epidemiological terms, application of epidemiological measures in the study of diseases anddisease control. Epidemiological features of air, water and food borne infections. OIE regulations, WTO, sanitary and phytosanitary measures. Animal disease forecasting. Strategies of disease management: prevention, control and biosecurity. National and international regulations on livestock diseases. Zoonosis-Definition, history and socio-economic impact of zoonotic diseases. Classification, prevention and control of zoonoses. Emerging, re-emerging and occupational zoonoses. Role of domestic, wild, pet and laboratory animals and birds in transmission of zoonoses. Bioterrorism. Epidemiology, clinical manifestations and management of zoonoses.

UNIT-3

Scope and importance of environmental hygiene. Ecosystem: Components structure and functions. Biodiversity. Natural resources. Environmental contaminants in food chain - bioaccumulation, biomagnifications and persistent organic pollutants. Environmental pollution. Rural and urban pollution. Air pollution. Airborne diseases. Water contamination. Water qualities. Water purification methods. Waterborne diseases. Soil, marine and thermal pollution. Noise pollution. Nuclear hazards or radiological hazard. National rules and legislations related to environmental pollution and role of pollution control board in India. Biosafety. Disaster management and mitigation. Solid and liquid waste management at farms and biomedical waste management. Sanitation and disinfection of farm and hospital environment in veterinary public practice for infection control. Global warming and

greenhouse effect. Management of waste from animal industries. Stray and fallen animal management and carcass disposal. Vector and reservoir control.

VETERINARY PHYSIOLOGY & BIOCHEMISTRY

UNIT- 1

Blood & its constituents. Hemoglobin. Heart. Cardiac Cycle. Electro Cardio Graph and its significance in Veterinary Sciences - Echocardiography. Haemorrhage. Haemostasis. Haemodynamics of circulation. Muscle Physiology. Organization of nervous system. Major function system. Neuron structure, type- functional characteristics of sub-units of neuron. Membrane potential. Degeneration and regeneration of nerve fibre. Synaptic and junctional transmission. Functions of nervous system-reflexes-control of posture and movements, autonomic nervous system and visceral control. Higher function of neurons system. Sense organs and receptors physiology of special senses. Morphological characteristic of mono gastric and poly gastric digestive system. Prehension, rumination; defecation; vomition; regulation of secretory function of saliva, stomach, intestine, pancreas; bile secretion; hunger, appetite control, developmental aspects of digestion; luminous, membranous and microbial digestion in rumen and intestine; permeability characteristics of intestine, forces governing absorption, control intestinal transport of electrolyte and water, enzymatic digestion in monogastric and fermentative digestion in rumen, modification of toxic substances in rumen. Digestion in birds. Functional morphology of respiratory apparatus. Mechanics of breathing. Transport of blood gases, foetal and neonatal oxygen transport, dissociation curves, pressures, recoil tendency, elasticity, surfactants, pleural liquid, compliance, exchanges of gases in lungs and tissues, neural and chemical regulation of breathing, diffusion, perfusion, hypoxia. Frictional resistance to air flow, airways smooth muscle contraction, respiratory muscle work, panting, adaptation of respiration during muscle exercise, high altitude hypoxia, Non respiratory lung functions. Respiration in birds.

UNIT-2

Excretion-Structure and function of kidney. Formation of urine. Methods of studying renal function. Fluid, water balance, fluid therapy, dehydration, water concentration mechanisms. Acid base balance and H+ regulation, correction and evolution of imbalances, total osmotic pressure. Formation and excretion of urine of Birds. Cerebrospinal fluid & synovial fluids. Joints. Regulation of bone metabolism and homeostasis. Endocrine glands-Functional disorders their symptoms and diagnosis. Synthesis of hormones, mechanism and control of secretion- hormonal receptors-classification and function. Male and Female reproductive organs, their components and functions. Functional and metabolic organization of mammary glands. - structure and development; effect of estrogens and progesterone; hormonal control of mammary growth; lactogenesis and galctogenesis; biosynthesis of milk constituents secretion of milk, and metabolism, prolactin and lactation cycle. Biochemical and genetic determinants of growth, regulation of growth, metabolic and hormone interactions, factors affecting efficiency of growth and production in ruminants and single stomach animals. Growth in meat producing animals and birds, growth curves. Recombinant gene transfer technologies for growth manipulation- advantages and limitations. Protein deposition in animals and poultry. Heat balance, heat tolerance, hypothermia, hyperthermia, thermo-regulation in farm animals, role of skin, responses of animals to heat and cold, fever, body temperature and hibernation. Temperature regulation in birds. Climatology. Effect of different environmental variables like temperature, humidity, light, radiation, altitude on animal performance. Acclimation, acclimatization - general adaptive syndrome. Clinical aspects of endocrine - reproductive functions, circadian rhythm. Neurophysiology of behaviours, types of behaviour, communication, Learning and memory behavioural plasticity.

UNIT-3

Scope and Importance of Biochemistry. Structure of Biological Membranes and Transport across Membranes. Donnan Membrane Equilibrium. Dissociation of Acids, pH, Buffer Systems, Henderson-Hasselbalch Equation. Biochemistry of Carbohydrates. Biochemistry of lipids. Fat indices. Structure and functions of prostaglandins. Biochemistry of proteins. Amino acids. Biochemistry of nucleic acids. : Chemistry of purines, pyrimidines, nucleosides and nucleotides. Biological significance of nucleosides and nucleotides. Structures and functions of deoxyribonucleic acid (DNA) and a typical ribonucleic acid (RNA).

UNIT-4

Enzymes: Definition and classification. Properties. Specificity of enzyme action. Factors influencing enzyme action. Enzyme units. Enzyme inhibition. Biological oxidation. Respiratory chain or electron transport chain, oxidative phosphorylation, inhibitors, uncouplers and other factors influencing electron transport chain. Carbohydrate metabolism. Lipid metabolism. Protein metabolism. Deamination, transamination and decarboxylation of amino acids. Ammonia transport and urea cycle. Nucleic acid metabolism. DNA and RNA biosynthesis and regulation. Regulation and Integration of metabolism. Disorders of Carbohydrate Metabolism: Diabetes mellitus, Ketosis, Bovine Ketosis, Pregnancy toxemia, hypoglycaemia in baby pigs, hyperinsulinism in Dogs. Hormonal control of carbohydrate metabolism and regulation of blood sugar. Biochemical tests for the detection of disturbance in carbohydrate metabolism. Plasma Proteins and clinical significance.. Acute Phase proteins. Lipid Profile in disease diagnosis. Clinical Enzymology. Liver function tests. Biochemical tests of renal function. Disturbance in acid base balance and its diagnosis. Biochemistry of digestive disorders. Biochemistry of oxidative stress and shock. Biochemical basis of fluid therapy. Detoxification in the body.

AH&VETY PAPER – III (200 marks)

VETERINARY ANATOMY

UNIT: 1

Introduction to anatomy and branches of anatomy and descriptive terms used. General Osteology, Arthrology and Myology: Study of properties and structure of bone. Classification of skeletons, classification of bones and terms used in osteology. Introduction to arthrology, classification of joints, different diarthrodial joints, structure of diarthrodial joints and movements permitted. Introduction to myology, classification of muscles, etymology of muscles. Description of tendon, ligaments, aponeurosis, synovial bursa and synovial sheath. General Angiology, Neurology and Aesthesiology: Introduction to angiology. Structure of heart. General plan of systemic and pulmonary circulations, lymphatic and venous systems. Introduction to neurology and parts of central, peripheral and autonomic nervous system and sense organs. Different surface regions, joint regions, Palpable Bony areas or prominences of the body of the animal. Palpable Lymph nodes and Arteries of the body and Surface veins for Venepuncture. Sites for collection of Bone marrow and Cerebrospinal fluid. General Splanchnology: Introduction, boundaries of thoracic, abdominal and pelvic cavities, topography of different organs of digestive, respiratory, urinary, endocrine, male and female reproductive systems of domestic animals and fowl. Principles and application of Radiography and Ultrasound for bones and soft tissues.

UNIT-2

Fore limb: Bones of fore limb of ox and differences. Joints, ligaments, stay apparatus, major blood vessels, nerves, veins and lymph nodes of fore limb. Sites for Radial, Median, Ulnar and Volar nerve blocks. Head and neck: Cranial and facial bones, cervical vertebrae of ox and differences. Paranasal sinuses in ox, horse, dog and pig. Articulations and special ligaments of the head and neck. Muscles of face, mastication, eye, ear, tongue, pharynx, soft palate, hyoid and larynx. Teeth, hard and soft palate, tongue, pharynx, larynx, thyroid, parathyroid and salivary glands and differences. Cranial nerves, blood vessels and lymph nodes of head and neck regions. Study of sense organs, trachea and oesophagus. Age determination by Dentition. Sites for Tracheotomy, Esophagotomy, Ligation of Stensons duct and Mental, Mandibular, Maxillary , Cornual, Infraorabital , Supraorbital (frontal) , Orbital and Auriculopalpebral nerve blocks and surgical approach to guttural pouches in horse. Importance of Cornual nerve and superficial Temporal artery in Amputation of Horn in cattle.

UNIT-3

Thorax: Thoracic vertebrae, ribs and sternum of ox and differences in horse, dog, pig and fowl. Joints, special ligaments, blood vessels, nerves, lymph vessels and lymph nodes of thorax. Organs of thorax and differences. Pleura, its reflections and mediastinum. Areas of auscultation and percussion of heart and lungs and site for ParacentesisThoracis. Abdomen: Bones of abdomen of ox and differences. Joints, special ligaments blood vessels, nerves of abdomen region. Blood and nerve supply to abdominal viscera. Peritoneal reflections, organs of digestive, urinary, male and female reproductive systems present in abdomen and differences.Mammary glands in cow and differences. Spleen of ox and differences.Major veins, lymph vessels, lymph nodes and endocrine glands of abdomen. Boundaries and Clinical importance of the flank and Para Lumbar Fossa. Sites for Liver ,Gall Bladder and Caecal Biopsies, Laparotomy, Rumenocentesis, Rumenotomy, abomasotomy, spleenectomy, Cystotomy, Caesarean Operation, enterotomy, and paravertebral block.

UNIT-4

Hind limb and pelvis: Bones of hind limb and pelvis of ox and differences in horse, dog, pig and fowl. Joints, ligaments, blood vessels, lymph nodes and nerves of hind limb, pelvis and tail region and pelvic viscera. Pelvic peritoneal reflections, organs of digestive, urinary, male and female reproductive systems present in pelvic cavity and differences in horse, dog, pig and fowl. Boundaries of the inguinal canal and structures of the spermatic cord, pre pubic tendon and its importance. External genital organs. Sites for Tibial, Peroneal, Plantar and Pudic nerve blocks, Patellar desmotomy, Urethrotomy, Castration, Vasectomy, cranial and caudal epidural anaesthesia.

UNIT-5

Cytology, cell junctions, study of basic tissues. Microscopic structures of digestive, circulatory, urinary, respiratory, nervous, lymphatic, endocrine, male and female genital systems and mammary glands of domestic animals. Microscopic structure of sense organs i.e. eye, ear and integument. Introduction to embryology, gametogenesis, fertilization, cleavage, types of eggs, morula, blastulation, gastrulation, types of implantation, twinning. Formation of foetal membranes in mammals and birds, Placenta and its classification. Different germ layers and their derivatives. Development of organs of digestive system including accessory structures i.e tongue, teeth, salivary glands, liver and pancreas. Development of organs of respiratory, urinary, circulatory, lymphatic, nervous, musculoskeletal, male and female reproductive systems. Development of endocrine glands, sense organs i.e eye and ear.

VETERINARY SURGERY AND RADIOLOGY

UNIT-1

Introduction: Historical perspective, Definitions, classification of surgery, tenets of Halsted. Pre-operative, intraoperative and postoperative considerations: History taking, physical examination, clinico-pathological testing, intraoperative and postoperative care. Sterilization and disinfection. Sutures. Treatment of acute and chronic inflammation. Haemostasis. Basic surgical affections. abscess, tumour, cyst, hernia, haematoma, necrosis, gangrene, burn and scald, frost bite and surgical affections of muscles, artery and vein, sinus and fistula. Wounds. Surgical infection; their prevention and management: Classification of infection, Introduction to biomaterials and stem cell therapy in wound management Management of surgical shock. Principles of fluid therapy in surgical patients. Veterinary anaesthesiology: Introduction: Development of anaesthesiology, Terminology, classification and indications. General considerations of anaesthesia: Pain and its management in animals. Local and regional anaesthesia. Preanaesthetics. General anaesthesia. Dissociative anaesthesia. Avian, wild, zoo, exotics and lab animal anaesthesia and capture myopathy. Anaesthetic emergencies and management, Toxicity, antidote and reversal agents.

UNIT-2

Introduction to Radiology-General terminology of radiology, Physical properties of X-Rays, Scope and uses of Radiology, Directional terms for veterinary radiology. Radiation hazards and safety measures. The statutory requirements of radiology set-up as per Atomic Energy Regulatory Board of India (AERB). Production of quality diagnostic radiograph. Recording of image- Manual and digital processing of X-ray films, storage and retrieval system. Radiographic Quality and faults. Contrast radiography. Diagnostic ultrasonography. Advanced diagnostic imaging tools- The brief introduction to the use and limits of some advanced imagingtechniques, Interventional radiology - CAT scanning, MRI, etc. Orthopedics and lameness: Body conformation of the horse in relation to lameness (trunk, fore limb and hind limb). Lameness: Definition, classification and diagnosis. General methods of therapy for lameness. Canine lameness. Bovine lameness. Fracture. Luxations. Spinal trauma, diagnosis and its management. Rehabilitation and physiotherapy of orthopaedic patients

UNIT-3

Regional Surgery of Head and Neck: Affections of lips, cleft palate, tongue, cheek, and their treatment. Affections of teeth and jaws and their treatment. Affections of nose, face, ear, head and horn and their treatment. Affections of eye and their treatment. Affections of eyelids and nictitating membrane and their treatment. Affections of lachrymal apparatus, eyeball and orbit and their treatment. Affections of cornea, iris and lens and their treatment. Affections of guttural pouch, oesophagus and their treatment. Affections of glands of head and neck and their treatment. Affections of neck and their treatment. Affections of larynx and Trachea. Management of ocular emergencies. Tracheotomy. Regional Surgery of Thorax and Abdomen: Thoracic affections: Surgical approaches, perforated wounds, pyothorax, pneumothorax, pneumocele, Diaphragmatic hernia and traumatic pericarditis in cattle. Abdominal affections : Surgical approach to the abdomen in different animal species. Surgical affections of the stomach in large animal and their management. Surgical affections of small intestines, large intestine and their management. Surgical affections of anus and perineal region and their management. Other surgical affections of abdomen and their management. Urinary system. Surgical management of equine colic. Genital system: Surgical affections of male and female genital system and their management. Applications of rigid and

flexible endoscopes in the management of surgical disorders. Integumentary system: Surgical affections of udder, teat and canine mammary neoplasms. Surgical affections of tail and tail docking. Wild or zoo animal surgery.

VETERINARY MEDICINE

UNIT-1

History and scope of Veterinary Medicine, concept of animal diseases. Concepts of diagnosis, differential diagnosis, treatment and prognosis. General systemic states, hyperthermia, hypothermia, fever, septicemia, toxemia, shock, allergy, anaphylaxis, oedema, coma, anaemia, common clinical poisonings and dehydration. Estimates of diseases, patterns of disease, disease monitoring and surveillance, herd health and quarantine.

UNIT-2

Etiology, clinical manifestations, diagnosis, differential diagnosis, treatment, prevention and control of the following diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry: Diseases of digestive, respiratory, cardiovascular, urinary, nervous, musculoskeletal, haemopoietic, and lymphatic systems, skin, sense organs including affections of peritoneum, liver and pancreas. Emergency medicine and critical care. Diagnosis and management of diseases caused by deficiency of iron, copper, cobalt, zinc, manganese, selenium, calcium, phosphorus, magnesium, iodine, vitamin A, D, E, B complex, K and C. Diseases of neonates, Alternative or integrated or ethno veterinary medicine in animal disease management. Aetiology, clinical manifestations, diagnosis, differential diagnosis, treatment prevention and control of metabolic or production and endocrine diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry.

UNIT-3

Aetiology, epidemiology, clinical manifestations, diagnosis, treatment, prevention and control of bacterial, fungal and rickettsial diseases of livestock. Aetiology, epidemiology, clinical manifestations, diagnosis, treatment, prevention and control of viral and parasitic diseases of diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry. Principles of zoo hygiene, public health problems arising from zoos. Prevention, control and treatment of infectious, parasitic, nutritional and metabolic diseases in zoo and wild animals including exotic birds. Acts and Rules related to Zoo and wild animals. National and international organizations and institutions interlinked to wild and zoo animals – role and functioning.

UNIT-4

Legal duties of veterinarians, laws related to medicine, evidence, common offences against animals and laws related to these offences. Examination of living and dead animals in criminal cases. Cruelty to animals and bestiality. Legal aspects of: Examination of animals for soundness, examination of injuries and post-mortem examination. Causes of sudden death in animals. Collection and despatch of materials for chemical examination, detection of frauds-doping, alternation of description, bishoping etc. Cattle slaughter and evidence procedure in courts. Provincial and Central Acts relating to animals. Glanders and Farcy Act 1899 (13 of 1899). Dourine Act 1910 (5 of 1910), Laws relating to offences affecting Public Health. Laws relating to poisons and adulteration of drugs. Livestock importation act, liability and insurance. Code of conduct and ethics for veterinarians - the regulations made under the Act. Animal welfare. Animal Welfare organizations and its role in animal welfare.

VETERINARY GYNAECOLOGY AND OBSTETRICS

UNIT- 1

Veterinary gynaecology. Bovine : Applied clinical anatomy and embryology of female reproductive tract - Hereditary and congenital anomalies of female reproductive tract – Puberty and sexual maturity and their endocrine control. Applied reproductive physiology and endocrinology of oestrous cycle.Transportation and survivability of gametes in female reproductive tract-Follicular Dynamics and its clinical impact on fertility improvement-ovulation and aberrations of ovulation-Incidence causes, diagnosis treatment and prevention of ovulatory failures- Fertilization. Pathological affections of ovary, uterine tubes, uterus, cervix, vagina and external genitalia. Clinical management of specific and non-specific forms of infectious infertility. Role of nutrition, climate and stress on reproductive efficiency - Infertility- Anoestrus and repeat breeding syndrome. Surgical procedures for correction of abnormalities of the female reproductive tract. Herd reproductive health management and fertility parameters in individual animals and in herds. Assisted reproductive techniques. Techniques of Pregnancy diagnosis. Phantom pregnancy- Medical termination of pregnancy – Aberrations of oestrous cycle- Medical and surgical management of affections of ovary, uterine tubes, uterus, cervix, vagina and external genitalia. Methods of Population control by medical and surgical techniques. Principle, procedure and application of ultrasonography in farm and pet animal reproduction

UNIT-2

Veterinary obstetrics. Farm and pet animals - Maternal recognition of pregnancy – Applied Endocrinology of pregnancy – Pregnancy diagnosis- Duration of pregnancy -Factors affecting gestation length- Care and management of pregnant animals- Implantation, Placentation. Wandering of ovum- Telegony- Superfetation and Superfecundation – Clinical management of specific and non specific causes of abortion, extra uterine pregnancy, dropsy of fetal membranes and fetus, mummification, maceration, cervicovaginal prolapse, uterine torsion and hysterocele. Parturition. Lactational disorders - Puerparium and factors affecting puerparium - Postpartum care of the dam and neonate in different species of farm and pet animals – Dystocia. Fetotomy. Cesarean section in small and large animals – Maternal obstetrical paralysis - Retention of fetal membranes, Total uterine prolapse and common metabolic diseases of puerperal period – Post partumhemorrhage – Sub involution of placental sites - Injuries incidental to parturition – Post partum uterine infections – Post partum resumption of ovarian activity .

UNIT–3

Veterinary andrology and A.I. Farm and pet animals - Comparative clinical reproductive anatomy and endocrinology of the male reproduction - Common congenital and genetic defects of the male reproductive tract – Puberty and sexual maturity and factors affecting them - Sexual behaviour and libido - Sperm transport, erection and ejaculation - Coital injuries and vices in male animals - Semen and ejaculate – Semen collection techniques-Structure of Spermatozoa - Semen evaluation - Semen extenders, dilution, preservation and post thaw evaluation - Artificial insemination techniques in farm and pet animals - Forms of male infertility. Affections of the scrotum, testis, accessory sex glands, penis and prepuce. Breeding soundness evaluation of bull – In vitro tests for evaluation of male fertility - Medical and surgical techniques for population control of the male reproduction – Surgical procedure on the male reproductive tract in farm and pet animals.

APTITUDE

(a) Numerical And Figurework Tests: (16 Marks)

These tests are reflections of fluency with numbers and calculations. It shows how easily a person can think with numbers. The subject will be given a series of numbers. His/Her task is to see how the numbers go together to form a relationship with each other. He/She has to choose a number which would go next in the series.

(b) Verbal Analysis And Vocabulary Tests: (14 Marks)

These tests measure the degree of comfort and fluency with the English language. These tests will measure how a person will reason with words. The subject will be given questions with alternative answers, that will reflect his/her command of the rule and use of English language.

(c) Visual And Spatial/3-D Ability Tests: (10 Marks)

These tests are used to measure perceptual speed and acuity. The subject will be shown pictures where he/she is asked to identify the odd one out; or which comes next in the sequence or explores how easily he/she can see and turn around objects in space.

(d) Abstract Reasoning Tests: (10 Marks)

This test measures the ability to analyse information and solve problems on a complex, thought based level. It measures a person's ability to quickly identify patterns, logical rules and trends in new data, integrate this information, and apply it to solve problems**.**