

## ANNEXURE - A

### Course Syllabus and Plan of Written Examination for special recruitment to the post of Veterinary Assistant Surgeon, under Fisheries & A.R.D. Department.

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The Written examination will consist of two papers (Paper - I and Paper - II), each paper carries 400 marks.

#### **A. Plan of Examination**

Subject	Session	Duration	No. of Questions	Total Marks	Type of Questions
<u>Paper - I</u> Veterinary Science	1 <sup>st</sup>	2 ½ hrs	200	400	Objective (Multiple Choice)
<u>Paper - II</u> Animal Science	2 <sup>nd</sup>	2 ½ hrs	200	400	-do-

#### **B. Outline of course syllabus**

##### PAPER - I (VETERINARY SCIENCE)

1. Veterinary Medicine 2. Veterinary Gynaecology and Obstetrics 3. Veterinary Pharmacology and Toxicology 4. Veterinary Parasitology 5. Veterinary Anatomy 6. Veterinary Public Health 7. Veterinary Surgery and Radiology 8. Veterinary Pathology 9. Veterinary Microbiology

##### 1. Veterinary Medicine

General systemic states (Hyperthermia, fever, shock, dehydration), Diseases of various systems of Ruminants (Digestive system, Respiratory system), Infectious diseases of Animals: Bacterial diseases - HS, BQ, Enterotoxaemia, TB, JD, Anthrax, Brucellosis, Leptospirosis). Viral Diseases- FMD, IBR, Canine Parvo, Canine Distemper,. Fungal diseases - Ring Worm, Aspergillosis. Parasitic diseases -Ascariasis, Fasciolosis, Amphistomiasis, Taenia, Mange. Metabolic & Production diseases- Milk fever, ketosis, downer's cow syndrome. Nutritional deficiency diseases - Post Parturient haemoglobinuria, Avitaminosis A, E, D, B and deficiencies of Se, Cu, Fe, Co. Diseases of poultry-RD, IBD, Coli septicaemia)

## 2. Veterinary Gynaecology and Obstetrics

Puberty & sexual maturity in male and female animals. estrus cycle animals. Gestation and its various stages. Pregnancy diagnosis in different species of animals. Fertility, sterility and infertility of various nature. Anoestrus and repeat breeding. Specific and nonspecific agents affecting genital organs of female. Clinical use of hormones in female fertility management. Breeding and pseudopregnancy in bitch. Induction and synchronization of oestrus. Assisted reproductive technologies. Types and function of placenta. Diseases and accidents during gestation. Abortion. Pre and post partum complications. Uterine torsion and different types of prolapse. Dystocia, Various obstetrical operations. Post partum diseases and complications. Various forms of male infertility, its diagnosis and treatment. Impotentia foendii and impotentia generandi. Artificial insemination. Various methods of semen collection, storage and shipment and its assessment for determination of semen quality.

## 3. Veterinary Pharmacology and Toxicology

History of pharmacology and toxicology, scope of pharmacology, pharmacokinetics: absorption, distribution, metabolism of drugs, pharmacodynamics: mechanism of drug action, types of receptors, receptor action, drug interaction, drug development and designing, drugs acting on digestive system, cardiovascular system, urinogenital system, sympathetic and parasympathetic system, neuromuscular blocking agents, ganglionic stimulants and blockers, autacoids: histaminergics and antihistamines, serotonergics and 5-HT blockers, prostaglandins, bradykinins, pharmacology of neurotransmitters, theories of anaesthetics, intravenous, dissociative anaesthetics, local anaesthetics, hypnotics, sedatives, tranquillizers, psychotropic drugs, anticonvulsants, opioids, NSAIDs, antibacterial, antifungal, anthelmintic, anticancer, antiviral, antiprotozoal agents, general toxicology, toxicity of heavy metals, plant poisons, agrochemicals, zootoxins and drugs. Evaluation of toxicity, residual toxicity.

## 4. Veterinary Parasitology

Host-parasitic relationship (Parasitism, Mutualism, Symbiosis, and Commensalism). Different type of host and Parasites. Study of common parasites of ruminants. Fasciolidae, Paramphistomidae, Schistosomatidae, Moniezia, Taeniidae, Haemonchus, Thelazia, Onchocerca, Esophagostomum, Bunostomum, Dirofilaria, Ascaridae, Trypanosomatidae, Eimeriidae, Babesiidae, Theileriidae, Ixodidae. Study of common Parasites of Dog. Echinostomatidae, Taeniidae, Ancylostomatidae, Toxocara, Demodex, Sarcoptes. Study of common Parasites of Poultry –

Prosthogonidae, Syngamidae, Eimeriidae. Control of Gastro intestinal nematodes in ruminants. Control of Arthropodes. Common Anthelmintics, Insecticides and their uses.

## 5. Veterinary Anatomy

Gross Anatomy of viscera organs, heart, blood vessels, nervous system, bones of the appendicular skeleton, eye and ear. Gross study of the bones of appendicular and axial skeleton of Ox/buffalo as type species and comparison of sheep, goat, pig, horse, dog and fowl. Classification and structure of muscles, joints, ligaments and nerves of domestic animals. Histology of the visceral organs, lymphatic system and nervous system. Embryology of domestic animals and birds. Development Anatomy of visceral organs. Foetal circulation. Topographic anatomy of the thorax, abdominal and pelvic visceral organs, nerve, locks, auscultation, palpation and percussion, and sites of intramuscular injections in small and large domestic animals.

## 6. Veterinary Public Health

Meat inspection, methods of slaughter, transportation of meat animals. Meat preservation and Meat-borne diseases. Hygienic processing of milk products, sanitation and sources of contamination of milk. Milk-borne diseases, Bacteriophage and germicidal properties of milk. Objectives, Classification and methods of prevention, control and eradication of zoonotic diseases. Socio-economic condition and human health zoonoses. Sources, quality, contamination and prevention of water. Disposal of sewage, sanitation of animal house. Air pollution, prevention of air and water-borne diseases. Recycling of farm wastes.

## 7. Veterinary Surgery and Radiology

General Surgery and Anaesthesiology : Sterilization, preparation of surgical pack, bandaging, sutures, suturing materials, different knots, wound, fractures, dislocation and other affections of joints, catheterization and haemostasis. Pre-anaesthetics, general anaesthesia and different combinations used in small animal, local and regional anaesthesia, general anaesthesia in large animal. Radiology. Regional and Clinical Surgery : Types of X-ray machine, adaptation of safety measures, use of diagnostic x-ray, radiographic film processing, interpretation, ultra sound. Affection of lip, cheek, tongue, palate, nose, horn, teeth, salivary gland, eye, ear, neck and oesophagus. Regional and Clinical Surgery-II and Lameness :Surgical approach to thorax, abdomen, urogenital system. Hernia and its treatment. Affection of limbs, hoof and foot. Lameness, soundness certificate and physiotherapy.

## 8. Veterinary Pathology

Causes of diseases, haemodynamic derangements, cellular degeneration and necrosis, apoptosis, gangrene, calcification, jaundice, growth disturbances, inflammation, wound healing, autoimmune diseases, neoplasms and their classification including benign and malignant tumors. Pathological changes in digestive, respiratory, musculoskeletal, cardiovascular, haemopoetic, urinary, reproductive, nervous and endocrine systems, skin, eye and ear. Pathology of viral diseases like Foot and Mouth disease, PPR, Rabies, Canine distemper, Infectious canine hepatitis, Canine parvovirus, etc, Bacterial diseases like Tuberculosis, Johnes disease., anthrax, clostridial diseases, pasteurellosis, brucellosis, salmonellosis and colibacillosis etc, mycoplasma diseases, fungal diseases, helminthic and protozoan diseases, nutritional and metabolic diseases involving carbohydrates, protein, fat, minerals, vitamins metabolism; Toxicosis. Pathology of bacterial, viral, mycoplasmal, parasitic, fungal, nutritional diseases and vices of poultry

## 9. Veterinary Microbiology

History of Microbiology , Classification and nomenclature of bacteria, Pathogenicity, Virulence and infection, Resistance and susceptibility of host, Bacterial genetics, Plasmids, Antibiotic resistance. General properties, Replication, Cultivation and Purification of viruses. Cell-Virus interactions, Viral genetics , Interferon. Immune system, Development of humoral and cellular immune responses, Antigens, Antibodies, Major histocompatibility complex, Serological reactions. Autoimmunity and immunotolerance. Immunization of animals, Biologicals. Pathogenicity and diagnosis of bacterial and fungal diseases caused by Staphylococcus, Streptococcus, Bacillus, Clostridium, Mycobacterium, Enterobacteriaceae, (E.coli, Samonella, Yersinia, Klebsiella and Proteus), Campylobacter, Brucella, Pasteurella and Pseudomonas, Listeria, Actinobacillus, Actinomyces, Arcanobacterium and Corynebacterium, Dermatophilus, Fungi: Dermotophytes, Rhinosporidium, Candida, Mycotic mastitis and abortion, Mycotoxicoes. Various families of DNA and RNA viruses causing diseases in livestock and poultry, laboratory diagnostic techniques, immunity to viral infections.

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## **PAPER - II (ANIMAL SCIENCE)**

1. Veterinary Physiology 2. Veterinary Biochemistry 3. Veterinary and Animal Husbandry Extension  
4. Animal Nutrition 5. Livestock products Technology. 6. Livestock production and Management 7.  
Animal Genetics and Breeding.

### **1. Veterinary Physiology**

Properties of blood as body fluid, Anaemia, Immunogenic functions of leucocytes, Blood coagulation, Cardiac cycle, Regulation of cardiac output, ECG and its interpretations, Haemodynamics and Circulatory shock, Role of kidney in body homeostasis, Neuromuscular junction, Excitation – contraction coupling, Mechanism of muscle contraction, General organization of Nervous system, Propagation of impulse, Mechanism of synaptic transmission, Sensory receptors, Sense organs, Digestion in monogastric and ruminant animals, Mechanism of breathing, Transport of blood gasses, Respiration in birds, Endocrine control of body functions, Role of hypothalamo - hypophysial axis on endocrine control, Feedback mechanism of hormone secretion, Male and female reproductive hormones, Endocrine control of male and female reproductive life, Mechanism of heat and cold adaptation in domestic animals.

### **2. Veterinary Biochemistry**

Study of chemistry, properties and function of carbohydrates, lipids, proteins, vitamins, and nucleic acids. Enzyme – Definition properties, factors affecting enzyme catalysis kinetics, inhibition and regulation. Study of Metabolism of carbohydrates, lipids and proteins. Electron transport chain, energy metabolism in domestic animals. Principles of DNA recombinant technology, Embryo Transfer Technology(ETT), monoclonal antibodies. Biochemistry of hormones, source, structure and biochemical function. Biochemistry of blood and other body fluids. Role of Blood sugar, ketone bodies, proteins, enzymes, BUN in disease diagnosis. Biochemistry of respiration, renal function, detoxification in the body.

### **3. Veterinary and Animal Husbandry Extension**

Philosophy ,Principles of Extension Education. Extension teaching methods, Adoption and diffusion of livestock innovations. Leadership and role of leaders in livestock development. Extension Communication. Farming system and farming type. Livestock and livestock products marketing. Social change Social groups. Social transformation in relation to animal rearing. Animal Husbandry programme, planning and evaluation. Panchayati Raj Institutions.

Animal Husbandry Development Programmes. Information communication technologies. E-learning. Information kiosks. Economics -wants, goods, wealth, utility, price, value, real and money income. Factors of production. Demand projections of livestock produce. Consumer behaviour,demand. supply and price determination. Marketing of livestock, and perishable and non-perishable livestock products. marketing channels ,cattle fairs. Import and export of animal and animal products. Resource Management. Book keeping. Economics of a dairy unit, poultry, piggery, sheep and goat units. Livestock Entrepreneurship.

#### **4. Animal Nutrition**

Measure of feed energy, partitioning of feed energy. Energy and protein requirement for maintenance, growth, pregnancy, lactation, egg, wool and meat production, evaluation of protein quality for ruminants and non-ruminants. Non-protein nitrogen utilization in ruminants diets. Importance of minerals and vitamins in health and production, their requirement and supplementation in feed. Feed additives in rations of livestock and poultry. Preparation and conservation of fodder through hay and silage. Anti- nutritional and toxic factors present in different feed stuffs, Digestibility trials- direct, indirect and indicator methods. Feeding standard: their merits and demerit. Balanced ration and formulation of ration. Feeding of dairy cattle, buffaloes, sheep and goat in maintenance, growth, production and reproduction. Feeding of swine and poultry. Feeding of lab animals (rat, guinea pigs and rabbits). Feeding during scarcity and natural calamities.

#### **5. Livestock Products Technology**

Composition of milk, properties & factors affecting milk composition. Clean milk production, packaging of milk. Preparation of milk products and utilization of By-products. Construction of slaughter house and its sanitation. Pre-slaughter care, transport, Antemortem and post mortem examination, slaughtering and dressing techniques of food animals. Utilization of slaughter house by -products and organic wastes. Structure, composition and nutritive value of meat, poultry and egg. Different preservation techniques of meat and egg. Eating quality attributes sensory evaluation and preparation of diff meat products. Meat Food products order, meat cutting and packaging.

## 6. Livestock Production Management

Common animal husbandry terms, Livestock Production Systems, transport of livestock, organic livestock production. important breeds, feeding and management practices of calves, heifers, pregnant, lactating, dry, bulls and bullocks. Draughtability of cattle & buffalo. Housing systems. Factors affecting quality and quantity of milk production. Clean milk production. Economics of dairy farming. Sheep & goat population and breeds. Feeding and management, housing systems. Judging of cattle buffalo. Importance of grasslands and fodders in livestock production. Classification of fodder crops. Silage and hay making. Swine management. Dentition and ageing of horses. Handling, restraining, care and routine management of equines including grooming, saddling and exercise. Feeding routine for horse. Vices of horses. Doping and its detection. Care and management of mice, rats and guinea pigs. And their feeding . SPF and germ free laboratory animals. Overview of Indian Poultry Industry. Classification of poultry, common breeds of poultry including duck, quail, turkey & guinea fowl and their descriptions and their management. Backyard and semi intensive systems of rearing. Common poultry diseases. Vaccination schedule. Bio- security measures in poultry farms, vices of poultry.

## 7. Animal Genetics & Breeding

History of Genetics, Chromosome numbers and types in livestock and poultry, Mendelian principles, gene interaction; multiple alleles; lethal; sex-linked, sex limited and sex influenced traits; linkage and crossing over, Mutation, Chromosomal aberrations; Quantitative inheritance. Gene and genotypic frequency, Hardy-Weinberg law, Components of phenotypic and genotypic variance; Concept of genotype and environment interaction, Heritability, repeatability, genetic and phenotypic correlations. Classification of breeds; Economic characters of livestock and poultry, Basis of selection, Response to selection, Methods of selection, Selection for combining ability, sire evaluation, field progeny testing, Inbreeding, its merits and demerits, out breeding; crossbreeding, heterosis, open nucleus breeding system (ONBS), Conservation of germplasm, Current livestock and poultry breeding programmes in the state and country.

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