	(d) 1749 – 1832 A.D. (including representative writings of Goethe, Schiller, Heine, Wordsworth, Coleridge, Shelley, Keats, Scott, Rene, Lamartine, Vigny, Hugo and Musset). (e) 1832 – 1910 A.D. (including representative writings of Whitman, Baudelaire, Verlaine, Laforgue, lbsen, Balzac, Tolstoy, Maupassant and Chekhov). (f) 1910 to the Present times (including representative writings of Yeats, Eliot, Frost, Rilke, Mayakovsky, Eluard, Neruda, Hervert, Kafka, Marquez and lonesco).
AGRICULTURE :	
Paper – I :	Agro-ecological factors- plant growth and distribution. Distribution of crops according to region. Role of climate and weather of crop production, weather forecasting including modern methods. Greenhouse effect and global warming. Precision farming- Remote Sensing (RS) and Geographic Information system (GIS). Cropping pattern and cropping system-distribution, objectives, types and impact on high yielding varieties, scope and limitations. Package and practices of cereals (rice, wheat, maize), pulses (green gram, black gram, red gram, lentil and peas), oil seeds (mustard, sesamum, ground nut, linseed, sunflower); fibre crops (Jute, sunhemp, mesta); sugarcane and forage crops (Sorghum, napier, para, berseem, Lucerne, ricebean, cowpea, oat, dinanath grass). Weeds- definition, characteristics, dessimination and control. Agroforestry-Definition of forest, scope of various types of forest - social forest, rural forest, urban forest, farm forestry; forest products. Aforestation. Conservation. Soil- definition, process and factors of soil formation, soil properties and soil conservation. Soilfertility - problems of soil and their reclamation. Nutrition- essential elements, role of nutrients on plants, integrated nutrient management and biofertilizers. Water use efficiency and dryland farming- water use efficiency in relation to crops production. Criteria for scheduling irrigation. Methods and systems of irrigation. Rainwater harvesting. Dryland farming - definition, prospects and problems. Techniques for establishment and management. Farm management - scope, importance and characteristics, farm planning, farm budgeting and farm operations. Agro-economics - function and crop insurance. Agril-extension - importance and role, methods of evaluation of extension programme. Role of KVK in technology transfer. Role and scope of Information Technology in Indian Agriculture. Livelihood management through agriculture (Self Help Group in agriculture). Marketing - its channels, pricing, marketing intelligence, storage with special references to cold storage and wirehouse. Distribution- public distribution system.
Paper – II :	Crop improvement- Cell structure and functions, law of heredity, chromosome structure and aberrations, polyploidy. Mutation breeding. History of plant breeding. Mode of reproduction, selfing and crossing techniques. Crop genetic resources - conservation and utilization. Application of principles of plant breeding. Breeding methods. Heterosis,somatic hybridization. Molecular markers, DNA finger printing and genetically modified crops. Principles of plant physiology; absorption, translocation, photosynthesis and respiration (definition, process, factors affecting and significance). Growth and development, photoperiodism, plant growth substances (definition, classification and role).Stress-physiology. Seed production, testing, certification and storage. Cultivation practices of major commercial fruits, vegetables, flowers, plantation and spices, medicinal and aromatic crops. Landscaping- principles, features and designs. Postharvest technology. Protected cultivation of horticultural crops. Pests and diseases of commercially important fruit, vegetables, flowers, plantation & spices, medicinal and aromatic crops. IPM. Food and nutrient security. Scope for export of agricultural products.
ANIMAL HUSBANDRY AND VETERINARY SCIENCE :	
Paper – I :	**1. ANIMAL NUTRITION** 1.1 Livestock Feeds : Common feeds and fodder and their classification. Proximate analysis of feed stuff. 1.2 Energy Nutrition : Energy sources, Measures of food energy and their application such as Gross Energy, Digestible Energy, Metabolisable Energy, Net Energy, Total Digestible Nutrients. Energy requirement for maintenance, growth, pregnancy and lactation in milk producing livestock. 1.3 Protein Nutrition: Biological value of protein, Protein efficiency ratio, digestible crude protein. Use of NPN in ruminants, bypass protein. Protein requirements for maintenance, growth, pregnancy and lactation in milk producing livestock. Improvement of poor quality roughages. 1.4 Mineral and Vitamin Nutrition : Major and trace minerals, their sources, physiological functions and deficiency symptoms. Role of vitamins, their sources and deficiency symptoms.

1.5 Feed Additives: Role of probiotics, prebiotics, antibiotics, enzymes, antioxidants, buffers, mould inhibitors and methane inhibitors. Antinutritional and toxic factors present in livestock feed and fodder.

1.6 Storage & Conservation of Feeds and Fodders: Storage of feed ingredients. Conservation of fodder through hay and silage making and their use in livestock feeding.

1.7 Computation of Ration: Balanced ration, Formulation of ration and feeding of dairy cattle and buffaloes during different phases of growth and production (young, pregnant, lactating and dry animals). Formulation of ration and feeding of sheep,goat, pig and poultry.

2. LIVESTOCK PRODUCTION MANAGEMENT

2.1 Breeds : Various indigenous breeds of livestock including poultry; Exotic breeds experienced in India; Origin, distribution and breed descriptor of important breeds.

2.2 Farm Animal Practices : Dentition and ageing of animals. Disbudding, marking of animals, Grooming, Dipping, Castration, Isolation, quarantine, Disinfection and
disposal of carcasses. Drug administration, Vices of animals, their prevention and care.

2.3 Dairy Farming : Opportunities in dairy farming, Dairying under mixed and as specialized farming. Management of calves, heifer, pregnant, lactating and dry animals, bulls and bullocks. Housing systems, Layout and design of different buildings for dairy animals. Methods of milking and precautions. Factors affecting quality and quantity of milk. Organic Livestock Production.

2.4 Fodder Production : Importance of grasslands and fodders in livestock production. Feed and fodder requirements of individual animal. Supply of greens throughout the year. Scarcity fodder, Recycling of animal wastes and washings for fodder production.

2.5 Sheep and Goat Farming : Homestead farming vs. Commercial farming, Goat as poor man's cow.
2.6 Poultry Production : Economic Importance of commercial poultry farming, Backyard poultry farming. Brooding management. Incubation and hatching, Management of broilers, layers and breeder flock. Designer egg.

3. ANIMAL GENETICS AND BREEDING

3.1 Principles of Genetics : Mitosis and Meiosis. Mendelian inheritance, deviation to Mendelian genetics. Expression of genes. Linkage and crossing over. Sex linked, sex influenced, and sex limited characters. Cytoplasmic inheritance, chromosomal aberrations, Gene and its structure, DNA as a genetic material, genetic code and protein synthesis, Recombinant DNA technology, Transgenesis.

3.2 Population Genetics : Quantitative and qualitative traits. Gene and genotype frequency, Hardy-Weinberg Law and its application. Inbreeding and methods of estimating inbreeding coefficient. Heritability, repeatability, genetic and phenotypic correlations and environmental interaction.

3.3 Animal Breeding : Basis of selection such as individual, pedigree, family, progeny testing. Methods of Selection. Methods of breeding - Inbreeding, out breeding, upgrading, cross breeding. Crossing of inbred lines for commercial production. Sire index.

4. ANIMAL REPRODUCTION

4.1 Hormone in reproduction : Hormones related to reproduction, mechanism of action, control of secretion and negative feed back mechanism of hormonal regulation. Releasing and tropic hormones of reproduction.

4.2 Andrology : Puberty, sexual maturity and libido. Factors causing infertility in males. Components of semen, physical and chemical properties of semen. Preservation of semen and artification insemination. Deep freezing of semen.

4.3 Gynaecology : Symptoms of heat, detection of oestrus and time of insemination for optimal conception. Anoestrus and repeat breeding. Silent heat. Management of buffaloes in summer for better conception.

5. LIVESTOCK PRODUCTS TECHNOLOGY

5.1 Milk and milk products : Milk industry in India. Composition and nutritive value of milk. Physico-chemical properties of milk Quality testing of raw milk. Processing, packaging, storing, distribution and marketing of milk. Pasteurized, standardized, toned, doubled toned, homogenized, reconstituted, recombined and flavoured milk. Various milk products such as Cream, Butter, Ghee, Khoa, Channa, Cheese, Condensed, evaporated and dried milk. Preparation of cultured milk such as yoghurt, Dahi, Lassi and Srikhand.

5.2 Meat and meat products : Meat industry of India.Ante mortem care and management of food animals, stunning, slaughter and dressing. Meat inspection. Physical and chemical characteristics of meat. Method of meat preservation such as curing, canning, irradiation, packaging.

5.3 Poultry products Technology : Composition and nutritive value of poultry meat and eggs. Slaughtering techniques. Grading of eggs. Structure, composition and nutritive value of eggs.

5.4 Milk and meat hygiene : Clean milk production. Hygienic method of handling meat and meat products. Adulteration of milk and its detection. Legal standards of milk.

	6. EXTENSION EDUCATION 6.1 Concept of Sociology : Man and animal relationship, Society, Community, Association and Institution. Social groups, its types and function. 6.2 Principles of Extension : Basic philosophy, objective and concept. Methods adopted to educate farmers under rural condition, generation of technology, its transfer and feedback. Animal Husbandry Programmes for rural development.
Paper – II :	**1. VETERINARY ANATOMY, PHYSIOLOGY AND BIOCHEMISTRY** **(i) VETERINARY ANATOMY** Osteology, arthrology and myology: Classification, physical properties and structure of long bones, joints and muscle. Study of skeleton of Pectoral, Pelvic gardles, Skull and vertebral bones of ox/buffaloes. Splanchology : Gross morphology and topography of visceral organs of thoracic, abdominal and pelvic cavity. Neurology and asthesiology : Basic structural organization of nervous system (CNS, PNS, ANS), Eye and ear. Anatomy of fowl : Parts of female reproductive tracts of fowl and their role in egg formation. Organs of digestive system. **(ii) PHYSIOLOGY** Blood : Constituents of blood, blood cell formation, haemoglobin synthesis, coagulation of blood, hemorrhagic, disorders, anticoagulants. Biochemical tests for assessing liver and kidney function. Circulatory System : Haemodynamics of circulation, physiology of heart function, Cardiac Cycle, regulation of cardiac output, coronary circulation and ECG, blood pressure and hypertension, osmotic regulation, shock. Excretion : Structure and function of nephron, formation of urine. Regulation of electrolyte and acid-base balance, sweat glands and their function. Respiration: Mechanism of respiration, Transport and exchange of gases in lungs and tissues. Neural control of respiration and hypoxia. Environmental Physiology : Climate change, climatological variables and their importance in animal ecology and behaviour. Effect of environmental stress on health and production. Physiology of Milk Production : Hormonal control of mammary growth, lactogenesis and galactopoiesis. Letting down and holding up of milk. (iii) BIOCHEMISTRY Biochemistry of carbohydrate, protein, lipids, enzymes, co-enzymes, co-factors and their role in metabolism; Biochemistry of blood and body fluids. **2. PHARMACOLOGY AND TOXICOLOGY** Pharmacology : Principles of drug activity such as pharmacokinetics and pharmacodynamics. Concept of drug and receptor. Does response relationship. Adverse drug reaction, drug interaction. Biopharmaceuticals and gene therapy Antimicrobials, antifungal and principles of chemotherapy in microbial infections. Toxicology : Fundamentals and scope of toxicology. Toxicity due to insecticides, organo phosphates, heavy metals, non-metals, micotoxins and their ameliorative measures. Toxic plants. **3. BASIC VETERINARY MICROBIOLOGY, PATHOLOGY AND PARASITOLOGY** Microbiology: Marphology and classification, cultivation and identification of microbes related to animal diseases. Transmission of infections, sterilization and disinfactants. Pathology: Pathogenesis and Pathognomic lesions in important microbial diseases of livestock. Parasitology: Morphology and pathogenesis of important helminthic and protozoal diseases in livestock like ascariasis, facioliasis, Trypanosomiasis etc. **4. ANIMAL DISEASES:** Infectious diseases : Etiology, symptoms, diagnosis and control of important bacterial, protozoal and viral diseases of domestic livestock and poultry, such as Anthrax, HS, BQ, Brucellosis, FMD, Hog Cholera, PPR, Goat Pox, Rabies, RD, IBD, Trypanosomiasis, Babesiosis, Coccidiosis etc. Production/metabolic diseases : Etiology, symptoms, treatment and control of important metabolic diseases such as milk fever, ketosis, pregnancy toxaemia, hypomagnesemia of domestic animals.

	Systemic states and diseases : Fever, hyperthermia, hypothermia, toxaemia, septicaemia, bloat, impaction, diarrhoea, dehydration and snake bite. Herd health Management : Herd immunity, disease free zones, chemotherapeutics and chemoprophylaxis for herd health. Vaccination and deworming schedule of livestock and poultry. Surgical intervention : Diagnosis and surgical intervention in fracture, hernia, choking, ruminotomy, castration and Caesarian section. **5. VETERINARY PUBLIC HEALTH AND EPIDEMIOLOGY** Epidemiology : Principles and applications of epidemiological measures in the study of diseases and their control. National and international regulations on livestock diseases. Zoonoses : Socio-economic importance of zoonotic diseases. Role of animals in transmission of zoonotic diseases. Occupational zoonotic diseases. Animal Welfare and Jurisprudence : Role of veterinarian in animal welfare. Animal Welfare Board of India. Role and function of Committee for the Purpose of Controlling and Supervising Experiments in Animals (CPCSEA), Common offences against animals. Examination of living and dead animals in criminal cases. **6. WILD / ZOO / LAB ANIMAL HEALTH CARE** Method of handling and restrant of Wild animals. Conservation of wild life. Management and feeding practice and housing of Wild, Zoo and Laboratory animals.
ANTHROPOLOGY :	
Paper – I :	**1. Introducing anthropology: Meaning and scope of anthropology.** **Major branches of anthropology:** 1.1 Main branches of Anthropology, their scope and relevance : (a) Social-cultural Anthropology, (b) Biological Anthropology, (c) Archaeological Anthropology, (d) Linguistic Anthropology. 1.2 Brief outline of the growth of anthropology. Enlightenment. Colonialism and anthropology. **2. Human evolution and Hominization process :** 2.1 Theories of organic evolution. Human evolution and emergence of Man : (a) Biological and Cultural factors in human evolution, (b) Theories of Organic Evolution (Pre-Darwinian, Darwinian and Post-Darwinian), (c) Synthetic theory of evolution; Brief outline of terms and concepts of evolutionary biology. 2.2 Neutral theory of molecular evolution. 2.3 Concept of evolutionary biology: Skeletal changes, (skull, vertebral column, pelvic girdle, hind limb). 2.4 Characteristics of primates, Primate classification (general), Features and distribution of New World Monkey, Old World Monkey, Asian and African Apes. 2.5 Theories of human origin. 2.6 Geological time scale with special reference to Pleistocene epoch. 2.7 Distribution, characteristics and phylogenetic status : (a) Parapithecus (b) Dryopithecus, Sivapithecus (c) Australopithecus africanus, Australopithecus afarensis, Homo habilis (d) Homo erectus (Java Man, Peking Man) (e) Archaic Homo sapiens (f) Neanderthal Man – La-chapelle-Aux-Saints, Tabun Man (g) Anatomically Modern Homo sapiens – Cromagnon, Grimaldi, Chancelade **3. Human Genetics :** 3.1 Methods – Mendelism, Twin-study, Cytogenetics, Population genetics. 3.2 Biological basis of inheritance: DNA structure and replication, Restriction Fragment Length Polymorphism (RFLP), Variable Number of Tandem Repeat(s) (VNTRs), Short Tandem Repeat(s) (STRs) protein synthesis, gene, allele, cell division. 3.3 Concept of Human Genome : nuclear genome, mitochondrial genome, Chromosome and chromosomal aberrations in man (Numerical and structural aberrations, point mutation), Satellite DNA. 3.4 Patterns of inheritance – autosomal, sex-chromosomal, multifactorial, polygenic, sex determination, sex influenced.