

ANNEXURE-II

Broad Outlines of Syllabus for JET 2023

Syllabus

Objective of such type of Entrance Test is to select the best candidates; therefore, no syllabus can be prescribed, however, broad outlines are given as follows:

AGRICULTURE

Unit-A:

(15 Questions)

Food production and its importance in the economy and nutritional security. History of Indian agriculture, branches, importance and scope. **Weather and Climate**- Definition, elements, effects on crops, general introduction to weather related equipments- Rain gauge, maximum minimum thermometer, dry and wet hygrometer, wind vane, and anemometer. **Irrigation**- Requirement, time and quantity, methods of irrigation. Concept of precision and pressure irrigation- drip and sprinkler irrigation. **Weed**- Definition, peculiarities, classification, harmful effect, extension, methods of multiplication, weed control (mechanical, chemical & biological), **Arid Agriculture**- Definition, importance & principle, **Crop rotation**- Definition, importance and principle.

Soil- Definition, composition, structure, texture, soil water, air, soil temperature, soil porosity and factors affecting it. Saline, acidic and alkali soil and their management, soils of Rajasthan. Soil samplings and its methods. Introduction to soil pH and organic carbon. **Nutrient fertilizer**- Essential plant nutrients, importance and deficiency symptoms, importance of fertilizer, type (NPK) and methods of application. **Irrigation** - Importance of irrigation, sources of irrigation, water requirement of crops. **Water drainage**- Definition, need, importance, water logging, need of water conservation and methods (well, water recharge, water harvesting), **Introduction to agriculture machinery**- Definition and type of tillage, deshi plough, harrow, cultivator, combine harvester, seed cum fertilizer drill, planter, MB plough. **Seed**- Definition, type & quality of seed, seed production, seed dormancy.

Role of Genetics and Plant breeding in self and cross-pollinated crops improvement, methods of breeding in field crops-introduction, Selection, Hybridization, Mutation.

Agricultural Economics, Cooperative system in Agriculture, Crop insurance. Kisan Credit Cards. Marketing of Agricultural products (supply chain, retailing, wholesale), haats.

Agronomy- Definition, importance and scope, soil fertility and productivity- Factor affect soil erosion & conservation. **Crop production**- Study of following crops under Rajasthan climate condition in following points: botanical name, family, importance, climate, soil, preparation of field, improved varieties, seed rate, seed treatment, time of sowing, sowing method, manure & fertilizers, irrigation, intercropping plant protection & harvesting, threshing, yield and post-harvest management: **Cereal**- Rice, maize, sorghum, pearl millet, wheat & barley. **Pulses**- Black gram, green gram, mothbean, gram, pigeonpea, and cowpea. **Oilseed**- Mustard & rapeseed, groundnut, soybean, linseed and sunflower. **Fodder**- Lucerne and berseem, **Cash crops**- Sugarcane, potato, and cluster bean, **Fiber crops**- Cotton and sunhemp.

Organic farming: Definition, importance, concept, history, present status and future scope of organic farming, contribution in national economy, important food products grown organically. Organic manure and their utility, farm yard manure. Bio-fertilizer - Type & methods of application. Biological control of insect & diseases. Preparation of bio-pesticides (plant based). General introduction to sustainable agriculture.

Unit-B:**(15 Questions)**

Importance and scope of fruit and vegetable crops, present position and future scope. **Orchard management-** Selection of site, planning, layout, pit filling, plantation, adverse weather condition- Frost, hot wind, hailstorm, drought, dust storm, heavy rainfall and their remedies. Unfruitfulness and their remedies. Alternate bearing in orchard and their solution. Application of plant growth regulators in orchards. **Study of following important fruit crops with special reference to-** Botanical name, family, importance, climate, soil, improved varieties, plant propagation, planting, manure & fertilizer, irrigation, weeding & hoeing, yield and plant protection of- Mango, citrus (orange mandarin and lime), banana, guava, pomegranate, papaya, grapes, aonla, ber, date palm, & bael. **Vegetable-** Classification of vegetable, on the basis of season and vegetable parts used, type of vegetable cultivation- Commercial & kitchen gardening. **Nursery-** Definition, importance, soil preparation and layout, sowing, transplanting, plant propagation- sexual and asexual.

Vegetable cultivation- Botanical name, family, importance, climate, soil & field preparation, sowing, seed rate and treatment, improved varieties, manures & fertilizer, irrigation, weeding and hoeing, plant protection, yield- Tomato, brinjal, chilli, cauliflower, cabbage, pea, okra, carrot, radish, spinach, onion, garlic, round gourd, bitter guard, bottle guard, ridge guard, pumpkin. **Ornamental gardening-** Type of garden (formal and informal), private, public and school garden, **Study of ornamental plant-** trees, bush, climbers, and seasonal flower. **Flower cultivation-** Botanical name, importance, climate, soil, field preparation, plant propagation, improved varieties, planting, manure & fertilizer, care, picking & yield of rose, marigold, chrysanthemum and gladiolus. **Spices-** Cumin, coriander, fenugreek & fennel. **Introduction and utility of medicinal plant-** Safed musali, Guggal, sanay, isabgol, Ashwagandha. **Mushroom-** Its nutritional status and methods of production. Beekeeping and its importance, uses and importance of honey, wax and royal jelly. **Post-harvest-** Importance, scope and future of post-harvest management of fruits, vegetables and flowers. Status of food processing in our country. Packaging, quality standards and their marketing including export. **Preservation of fruits and vegetable-** Present position of fruit and vegetable preservation, principle & methods of fruit preservation. Canning of fruit & vegetable, jam, jelly, marmalade, preserve, sauce, ketchup, pickle and squash. **Flowers and their harvesting-** Important processed flower products, packaging, storage and their marketing.

Unit-C:**(10 Questions)**

Importance of Livestock in Indian economy. Determination of age by teeth, horn, hoof and body condition of animals and weight- by using Shafer formula, **Animal Breeding-** Identification of heat, introduction to reproductive organs, natural & artificial insemination. General test of pregnancy. Care and management of pregnant & calving animals. **Animal nutrition-** General principle of animal feeding. **Determination of feed for-** Pregnant & milking cow and bullock. **Feed preservation-** Hay and silage- Definition, importance, method for preparation. **Animal health-** Identification of healthy & suffering animals. Identification of general disease & treatment- Wounds, eczema, sprain, itching, inflammatory, indigestion, bloat, diarrhoea, dysentery & food poisoning. Parasite- Lice & kilni. **General medicine for animals and their utility-** Phenyl, potassium permanganate, magnesium sulphate, alcohol, copper sulphate, tincher iodine, carboxylic acid, laizol, castor oil, kapoor, phenovis, alum, turpentine oil. **Milking methods-** By hand and machine, **Poultry:** Importance and scope, breeds of poultry & their classification. Study of poultry breeds- White leghorn, rod island red, red carnish, ply mouth rock breeds. Structure of egg. Poultry feed and housing management. Important disease of poultry (cause, symptoms and treatment). Characteristics and utility of following animal breeds **Cow-** Gir, Tharparkar, Haryana, Nagori, Malvi, Mewati, Rathi, Jersey and Holstein Friesian. **Buffalo-** Murrah, Bhadawari, Surti, Neeli, Jafrabadi and Mehsana. **Sheep-** Marwari, Chokla, Malpuri, Marino, Karakul, Avivastra, Adikalini and Jaisalmeri. **Camel-** Bikaneri & Jaisalmeri, management of

camel. **Animal diseases-** Rinderpest, foot & mouth disease, black quarter, anthrax, Hemorrhagic septicaemia, mastitis, tick fever, milk fever, enterotoxaemia, salmonellosis, bird flu, fowl pox, and Ranikhet trypanosome & itching. **Dairy science-** Milk and milk products- Curd and ghee. Development and dairy industry in India- White revolution and operation flood.

Bio-Waste Management and Government: Utilization of animals in Bio-wastes and Biogas plant, Important government schemes for development of livestock dairy and poultry in India. Their important features and eligibility criteria.

BIOLOGY

Definition, branches, study area and importance in agriculture.

Section-I Botany

(25 Questions)

Unit- A

Taxonomy and classification of plants: Genus, species, binomial nomenclature, brief history of classification. Salient features and classification of plants into major groups- Algae, Bryophyta, Pteridophyta, Gymnospermae and Angiospermae, Angiosperms- Classification upto class, characteristic features and examples.

Morphology and anatomy of angiosperm plant- Morphology and modifications, internal morphology of different parts of flowering plants: root, stem, leaf, inflorescence, flower, fruit and seed. **External morphology of angiosperm Plant-** Root, stem, leaf, inflorescence, flower, fruit, seed and modification. **Anatomy of flowering plants-**Anatomy and functions of different tissues. **Plant tissue-** Definition, character & classification, meristematic tissue- Type and character. Tissue system- Epidermal, ground and vascular tissue system, internal structure of root, stem and leaf, secondary growth of root & stem. Permanent and special tissue.

Sexual reproduction in flowering plants- Flower structure, development of male and female gametophytes, pollination - Types, agencies and examples, outbreeding devices, pollen-pistil interaction, double fertilization, post fertilization events- Development of endosperm and embryo, development of seed and formation of fruit, special modes- Apomixis, parthenocarpy, polyembryony, significance of seed dispersal and fruit formation.

The Cell: The unit of life- Definition, cell theory and cell as the basic unit of life. Electron Microscopic structure of cell. Prokaryotic and eukaryotic cells. Plant and animal cells. Cell organelles and their functions- Nucleus (including DNA and RNA structure), mitochondria, chloroplast, endoplasmic reticulum, golgi complex, lysosomes, microbodies, microfilaments, ribosomes, centriole, cell wall, cilia and flagella, vacuoles, cell inclusions- starch grains, mineral crystals. **Cell division-** Amitosis, mitosis and meiosis. Comparison of mitosis and meiosis. Significance of meiosis, cell cycle.

Genetics- Mendel's experiments with pea and the reasons for his success. Mendel's laws of inheritance, mono and dihybrid crosses. Chromosome structure and morphology, chromosomes and genes, chromosome hypothesis. Linkages and crossing over. Mutations. Sex determination, genetic code, transcription and translation. Chromosomal disorder.

Plant Physiology: (i) **Transport in Plants-** Movement of water, gases and nutrients; cell to cell transport, diffusion, facilitated diffusion, active transport, plant water relation, semi permeable membranes, osmosis, diffusion, diffusion pressure deficit (DPD), water potential, plasmolysis. Transpiration-Types, factors affecting rate of transpiration. Guttation. Absorption of water, active and passive absorption of water and minerals. (ii) **Ascent of sap-** Path of ascent of sap, theories explaining ascent of sap. (iii) **Mineral nutrition-** Role of minerals in plant growth, macro and micro nutrient, trace elements and their importance. (iv) **Enzymes-** Introduction, enzymes as bio-catalysts, nature, classification and mode of enzyme action. (v) **Respiration-** Definition, comparison of respiration and fire. Types of respiration- Aerobic, anaerobic and fermentation processes. Respiratory substrate, respiratory quotient,