Syllabus of
Optional AGRICULTURE (CSE Mains) Paper –II

II	Paper II Crop Science	Reading Reference
A1	**Genetics:**	
A.	Cell structure,	
B.	Cell function and cell cycle.	
C.	Synthesis, structure and function of genetic material.	
D.	Laws of heredity.	
E.	Chromosome structure,	
F.	Chromosomal aberrations,	
G.	Linkage and cross-over, and their significance in recombination breeding.	
H.	Polyploidy, euploids and aneuploids.	
I.	Mutations – and their role in crop improvement.	
J.	Heritability, Sterility and incompatibility, classification and their application in crop improvement.	
K.	Cytoplasmic inheritance,	
L.	Sex-linked, sex-influenced and sex-limited characters	
M.		
A2	**Plant Breeding:**	
A.	History of plant breeding.	
B.	Modes of reproduction, selfing and crossing techniques.	
C.	Origin, evolution and domestication of crop plants,	
D.	Center of origin,	
E.	Law of homologous series,	
F.	Crop genetic resources- conservation and utilization.	
G.	Application of principles of plant breeding,	
H.	Improvement of crop plants.	
I.	Molecular markers and their application in plant improvement.	
J.	Pure-line selection, pedigree, mass and recurrent selections,	
K.	Combining ability, its significance in plant breeding.	
L.	Heterosis and its exploitation.	
M.	Somatic hybridization.	
N.	Breeding for disease and pest resistance.	
O.	Role of interspecific and intergeneric hybridization.	
P.	Role of genetic engineering and biotechnology in crop improvement.	
Q.	Genetically modified crop plants.	
A3	**Seed Science:**	
A.	Seed production and processing technologies.	
B.	Seed certification, seed testing and storage.	
C.	DNA finger printing and seed registration.	
D.	Role of public and private sectors in seed production and marketing.	
E.	Intellectual Property Rights (IPR) issues, WTO issues and its impact on Agriculture.	
F.	Principles of Plant Physiology with reference to plant nutrition, absorption, translocation and metabolism of nutrients.	
G.	Soil water-plant relationship.	
A4	**Biochemistry and Plant Physiology:**	

A.	Enzymes and plant pigments;	
B.	Photosynthesis-modern concepts and factors affecting the process, aerobic and anaerobic respiration;	
C.	C3, C4 and CAM mechanisms.	
D.	Carbohydrate, protein and fat metabolism.	
E.	Growth and development;	
F.	Photoperiodism and vernalilzation.	
G.	Plant growth substances and their role in crop production.	
H.	Physiology of seed development and germination;	
I.	Dormancy.	
J.	Stress physiology – draught, salt and water stress.	
A5	**Horticulture:**	
A.	Major fruits, Plantation crops,	
B.	Vegetables, Spices and Flower crops.	
C.	Package practices of major horticultural crops.	
D.	Protected cultivation and high tech horticulture.	
E.	Post harvest technology and value addition of fruits and vegetables.	
F.	Landscaping and commercial floriculture.	
G.	Medicinal and aromatic plants.	
H.	Role of fruits and vegetables in human nutrition.	
A6	**Crop Protections:**	
A.	Diagnosis of pests and diseases of field crops and their economic importance	
B.	Diagnosis of pests and diseases of vegetables and their economic importance	
C.	Diagnosis of pests and diseases of orchard and plantation crops and their economic importance.	
D.	Classification of pests and diseases and their management.	
E.	Integrated pest and disease management.	
F.	Storage pests and their management.	
G.	Biological control of pests and diseases.	
H.	Epidemiology and forecasting of major crop pests and diseases.	
I.	Plant quarantine measures.	
J.	Pesticides, their formulation and modes of action	
A7	**Food Science:**	
A.	Food production and consumption trends in India.	
B.	Food security and growing population – vision 2020.	
C.	Reasons for grain surplus.	
D.	National and international food policies.	
E.	Production, procurement, distribution constraints.	
F.	Availability of food grains, per capita expenditure on food.	
G.	Trends in poverty,	
H.	Public Distribution System and	
I.	Below Poverty Line population,	
J.	Targeted Public Distribution System (PDS),	
K.	Policy implementation in context to globalization.	
L.	Processing constraints.	
M.	Relation of food production to National Dietary Guidelines and food consumption pattern.	
N.	Food based dietary approaches to eliminate hunger.	
O.	Nutrient deficiency –	

P.	Micro nutrient deficiency:	
Q.	Protein Energy Malnutrition or	
R.	Protein Calorie Malnutrition (PEM or PCM)	
S.	Micro nutrient deficiency and HRD in context of work capacity of women and children.	
T.	Food grain productivity	
U.	Food security.	

Standard Reference Books:

Sl	Book Name and Authors	Code No
1		
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