જાહેરાત ક્રમાંક -૮૩/૨૦૧૮-૧૯

સરકારી વિનયન, વાણિજ્ય અને વિજ્ઞાન કોલેજો ખાતે વનસ્પતિશાસ્ત્ર વિષયના મદદનીશ પ્રાધ્યાપક, વર્ગ-૨ પ્રાથમિક કસોટીનો અભ્યાસક્રમ ભાગ -૧

માધ્યમ:ગુજરાતી **કુલ ગુણ :૧૦૦**

૧	ભારતની ભૂગોળ - ભૌગોલિક, આર્થિક, સામાજિક, કુદરતી સંસાધન અને વસ્તી અંગેની બાબતો- ગુજરાતના ખાસ સંદર્ભ સાથે
૨	ભારતનો સાંસ્કૃતિક વારસો- સાહિત્ય, કલા, ધર્મ અને સ્થાપત્યો- ગુજરાતના ખાસ સંદર્ભ સાથે
૩	ભારતનો ઈતિહાસ- ગુજરાતના ખાસ સંદર્ભ સાથે
૪	ભારતની અર્થવ્યવસ્થા અને આયોજન
૫	ભારતીય રાજનીતિ અને ભારતનું બંધારણ: (૧) આમુખ (૨) મૂળભૂત અધિકારો અને ફરજો (૩) રાજ્યનીતિના માર્ગદર્શક સિદ્ધાંતો (૪) સંસદની રચના (૫) રાષ્ટ્રપતિની સત્તા (૬) રાજ્યપાલની સત્તા (૭) ન્યાયતંત્ર (૮) અનુસૂચિત જાતિ, અનુસૂચિત જનજાતિ અને સમાજના પછાત વર્ગો માટેની જોગવાઈઓ (૯) એટર્ની જનરલ (૧૦) નીતિ આયોગ (૧૧) પંચાયતી રાજ (૧૨) નાણા પંચ (૧૩) બંધારણીય તથા વૈધનિક સંસ્થાઓ- ભારતનું ચૂંટણી પંચ, સંઘ લોક સેવા આયોગ, રાજ્ય લોક સેવા આયોગ, કોમ્પ્ટ્રોલર એન્ડ ઓડિટર જનરલ; કેન્દ્રીય સતર્કતા આયોગ, લોકપાલ તથા લોકાયુક્ત અને કેન્દ્રીય માહિતી આયોગ
૬	સામાન્ય બૌદ્ધિક ક્ષમતા કસોટી
૭	સામાન્ય વિજ્ઞાન, પર્યાવરણ અને ઈન્ફર્મેશન એન્ડ કોમ્યુનિકેશન ટેકનોલોજી
૮	ખેલ જગત સહિત રોજબરોજના પ્રાદેશિક, રાષ્ટ્રીય અને આંતરરાષ્ટ્રીય મહત્વના બનાવો

Advertise No. 83/2018-19

Assistant Professor of Botany in Govt. Arts, Science, Commerce College Class-II

Syllabus of Preliminary Test

Paper-1

Medium:Gujarati Total Marks- 100

1	Geography of India-Physical, Economic, Social, Natural Resources and population related topics- with special reference to Gujarat
2	Cultural heritage of India-Literature, Art, Religion and Architecture- with special reference to Gujarat
3	History of India with special reference to Gujarat
4	Indian Economy and Planning
5	Indian Polity and the Constitution of India: (1) Preamble (2) Fundamental Rights and Fundamental Duties (3) Directive Principles of State Policy (4) Composition of Parliament (5) Powers of the President of India (6) Powers of Governor (7) Judiciary (8) Provisions for Scheduled Castes, Scheduled Tribes and backward classes of the society (9) Attorney General (10) NITIAayog (11) Panchayati Raj Institutions (12) Finance Commission (13) Constitutional and Statutory Bodies: Election Commission of India, Union Public Service Commission, State Public Service Commission, Comptroller and Auditor General; Central Vigilance Commission, Lokpal and Lokayukta, Central Information Commission
6	General Mental Ability
7	General Science, Environment and Information & Communication Technology
8	Daily events of Regional, National and International Importance including Sports

Syllabus for the Preliminary Examination for the recruitment of Assistant Professor (Botany), Class-II

Medium: English

1. Physiology:

1. Absorption and translocation of water.
2. Transpiration and stomatal behaviour.
3. Absorption and uptake of Ions, Donnan's equilibrium.
4. Role of micronutrients in plant growth.
5. Solute transport and photoassimilate translocation – uptake, transport and translocation of water, ions, solutes and macromolecules from soil, through cells, across membranes, through xylem and phloem; transpiration; mechanisms of loading and unloading of photoassimilates.
6. Respiration (Glycolysis, pentose phosphate shunt, structure and role of mitochondria, Krebs cycle, Oxidative phosphorylation, Photorespiration, Respiratory quotient, Fermentation, Pasteur effect Factors affecting).
7. Photosynthesis: - light and dark reaction, Red drop, Emerson effect, Two pigment systems, Mechanism of Hydrogen transfer, Calvin cycle, Enzymes of CO2 reduction, Hatch a slack cycle C4 cycle, CAM Pathway, Factors affecting photosynthesis, Pigments.
8. The enzymes: Nomenclature and classification, structure and composition, Mode of enzyme action, Factors affecting.
9. Nitrogen Metabolism and biosynthesis of proteins, Nitrogen fixation, Nitrogen cycle, (Physical and biological) Nitrogen assimilation Amino acid, metabolism, Biosynthesis of proteins.
10. Plant hormones - Biosynthesis, storage, breakdown and transport; physiological effects and mechanisms of action.

Auxins, Gibberellins, Cytokinins, Abscissic acid (General account).

11. Sensory photobiology - Structure, function and mechanisms of action of phytochromes, cryptochromes and phototropins; stomatal movement; photoperiodism and biological clocks.
12. Stress physiology – Responses of plants to biotic (pathogen and insects) and abiotic (water, temperature and salt) stresses. Light stress and Temperature stress- Injury and resistance
13. Plant movements: Hydrotropism, Geotropism, Phototropism, Thigmotropism

2. Anatomy and Cell Biology:

1. Ultra structure of the cell and cell organelles along with their functions.
2. Cell wall structure.
3. Tissue and Tissue systems, Complex tissue (Xylem and Phloem).
4. Root development: lateral roots; root hairs; root-microbe interaction. Leaf – fall, Root – stem transition
5. Meristems – Shoot and root apices.
6. Normal and Anamalous Secondary growth, Abnormal behavior of normal cambium, Accessory cambium formation and its activity, Abnormal secondary growth in fleshy roots
7. Types of stele – Stelar growth
8. Nodal Anatomy – Unilacunar, Trilacunar, Multilacunar

3. Algae (Phycology)

1. Introduction and general classification of Algae.
2. Criteria for the classification.
3. Thallus organization in Algae.
4. Economic importance of Algae.

5. General characters, structure, Reproduction, pigments, phylogeny, life cycles etc., of main groups in Algae with reference to Genera Given:
   (a) Cyanophyceae (Nostoc, Scytonema, Oscillatoria).
   (b) Chlorophyceae (Chlamydomonas, Volvox, Cladeopora, Oedogonium, Coleochaete, Chara).
   (c) Bacillariaphyceae – General Account.
   (d) Xanthophyceae – Vautheria]
   (e) Phaeophyceae (Ectocarpus, Laminaria)
   (f) Rhedophyceae (Polysiphonia, Gracillaria)

4. Fungi (Mycology):

1. General Characters of fungi. Occurrence and thallus structure of fungi. Nutritional aspects of Fungi (Saprophytism, parasitism, Symbiosis). Modes of reproduction (Sexual and Asexual). Life cycle in fungi. Criteria for classification of fungi. Classificatory systems.
2. General characters, morphology, reproduction, phylogeny, affinities etc., of the following : main groups with special reference to Genera given below:
   a) Mytomycetes (stemonites).
   b) Plasmodiophoromycetes (Plasmodiphora).
   c) Mastigormycotina (Saprolegnia, Phytopthera).
   d) Zygomycotina (Mucor).
   e) Ascomycotina (Taphnina Eurotium, Erysiphe, Pleospora Neuropora).
   f) Basidiomycotina (Puccinia, Agaricus).
   g) Deuteromycotina (Cercospora, Colletotrichum, Phoma).
3. Economic importance of Fungi.

5. Bryophyta:

1. General characters of Bryophyta.
2. Sporophyte evolution in Bryophytes.
3. Classification of Bryophytes.
4. General account of the following main groups.
   a) Hepaticopsida, (b) Anthoceratopsida, (c) Bryopsida.
5. Structure, reproduction and systematics of the following genera:
   a) Marchantia, (b) Anthoceros, (c) Sphagmum (d) Funaria.

6. Pteridophyta:

1. General characters of pteridophytes.
2. Classification of pteridophytes.
3. General characters of the following main groups:
   a) Psilopsida; b) Lycopsida; c) Sphenopsida (Eusporangiate and Leptosporangiates):
4. Morphology, anatomy, reproduction and affinities of the following genera:
   a) Psilotum; b) Lycopodium; c) Selaginella; d) Ophioglostum; e) Marsilea; f) Pteris.

7. Palaeobotany:

1. Fossil pteridophytes .
2. Origin and evolution of land plants.
3. Homospory, Heterospory and Origin of Seed.
4. Telome theory and origin of sporophyte.
5. General account of the following fossil Gymnosperms.
   a) Pteridosperms; b) Bennittitales; c) Cordaitales;
   d) Pentoxylales.

8. Gymnosperms:

1. Gymnosperms.
2. Comparative account of morphology, life history, Affinities etc. of the following:
   a) Cycadophyta – Cycas, Zarnia,
   b) Coniferophyta – Pinus.
   c) Ginkgophyta – Gintgo.
   d) Chlamydospermatophyta: Ephedra, Welwetschia, Gnetum.
3. Classification of Gymnosperms.

9. Taxonomy of Angiosperms:

1. Morphology: Types of Leaf and phyllotaxy,
2. Systems of classification: - Hutchinson, Takhtajan, Bessey, Engler and Prantl, Bentham and Hooker.
3. Principles of taxonomy:- Criteria of classification, categories of classification, Diversity of Phyletic concepts.
4. International code of Botanical nomenclature, principles, Typification, Citation and authority.
5. Recent trends in Taxonomy:
   a) Biosystematics; b) Chemataxonomy; c) Serodiagnostic test and classification, d) Numerical taxonomy.
6. Study of the following families with reference to their characterstics, economic importance, attributes etc.,
   a) Ranuculacease, b) Caryophyllaceae, c) Sterculiaceae,
   d) Sapotaceae, e) Malvaceae, f) Tiliacee, g) Rubiaceae,
   h) Compositae, i) Apocynaceae, j) Asclepiadaceae,
   k) Boraginaceae, l) Convolvulaceae, m) Solanaceae,
   n) Euphorbiaceae, o) Poaceae.

10. Embryology:

1. Concept of primitive flower.

2. Development of anther and ovule.
3. General account of Embryosac and types of Embryo.
4. Structure of microsporangium and male gametophyte.
5. Structure of ovule and its types.
6. Structure of megasporangium and female gametophyte. Monosporic, Bisporic, Tetrasporic (Fritillaria type).
7. Pollination in Salvia and Calotropis.
8. Fertilization.
9. Endosperm morphology and types, Types and functions of Endosperms
10. Polyembryony and apomixis.
11. Palynology : Exine ornamentation, concept of palynogram, Application of Palynology in Taxonomy, coal, oil exploration and forensic science, Germination of pollen tube and factors affecting pollen germination
12. Embryo development in Dicotyledons, Embryo development in Monocotyledons
13. Apomixis

11. Cytology, Genetics and Evolution:

1. Mitosis and Meiosis.
2. Chromosome (Morphology, Structures importance etc.).
3. Concept of gene, laws of inheritance gene action
4. Mendelian genetics (Monohybrid, Dihybrid ratio).
5. Gene interactions (Complementary and Supplementary genes).
6. Cytoplasmic inheritance: (Mirabilis, male sterility in maize)
7. Sex determination in plants.
8. Genetic code.
9. Linkage and crossing over.
10. Parasexuality.
11. General account of Mutations

12. Polyploidy and its role in crop improvement.
13. Origin of life.
14. General account and techniques of gene mapping
15. DNA and RNA Composition and Structure, DNA sequencing, Watson and Crick's model of DNA, Types of RNA, DNA Replication, Protein Synthesis
16. Regulation of gene expression in prokaryotes – Operon concept
17. Genetics Structural heterozygote, complex translocations of heterozygote
18. Transposable elements
19. Mitochondria and chloroplast genome

12. Ecology and Phytogeography:

1. Edaphic factors: Composition of soil, origin and development of soil, soil moisture, soil profile, soil erosion and soil conservation.
2. Biological clock
3. Remote sensing
4. Heterotrophic nutrition in plants.
5. Ecological adaptation in Hydrophytes and Xerophytes.
6. Ecosystem: - Concept, biotic and abiotic components, ecological pyramids, productivity.
7. Geo-chemical cycles. (Carbon, Nitrogen, Sulphur, Phosphorous cycles).
8. Plant succession – Xerosere and Hydrosere.
9. Floristic regions of the world.
10. Floristic zones of India.

13. Bacteria and Viruses:

1. General Account of viruses. Definition, Characterisation, Chemistry, Ultrasturcture, Composition, replication, Bacteriaphages, transmission of plant viruses, Importance.
2. General account of bacteria – Characteristics, shape, ultrastructure of the cell, nutrition, reproduction, classification and importance.

14. Plant Pathology:

1. Disease symptoms produced by Bacteria, Fungi, and Viruses.
2. A general account of important diseases of crop plants and their control:
   a) Late blight of potato
   b) Smuts (Wheat, Jowar)
   c) Rust of wheat
   d) Leaf spot of groundnut.
   e) Paddy blast.
   f) Leaf spot of rice.
   g) Citrus cancer
   h) Bacterial blight of paddy.
   i) Angular leaf spot of cotton.
   j) Mosaic of Tobacco.
3. Mycoplasma.
4. Control of plant diseases (A general account)

15. Economic Botany:

1. A brief introduction of medicinal plants and their chief constituents: Turmeric, *Ephedra, Adhatoda*,*Terminalia chebula*, *Tinospora*, *Isaphgul.*
2. Firewood species:
   a. *Prosopis* spp.
   b. *Holoptelia integrifolia*
   c. *Zizyphus jujuba*
   d. *Acacia nilotica.*
   e. *Salvadora persica.*
3. A concise account of Tobacco

4. Cultivation, economic importance, systematic position and morphology, climate and uses of the following plants.

   Rice, Sugarcane, Coffee, Rauwolfia, Wheat, Groundnut, Tea, Pigeon pea, Jowar, Sun flower, Jute, Pearl millet, Cotton, Castor, Cardamom, Maize, Bajra, Tuver, Sesamum, Coir

5. Botanical name, family, useful part, chemical constituents and uses:

   Condiments and Spices Cardamom, Chilies

   Medicinal and Aromatic plants: Lemon grass, Cumin

   General account of dyes: Henna, Indigofera, Butea

6. Habit, Habitat, Family, Botanical name, Useful parts and uses of the following Timber species:

   i.*Tectona grandis*

   ii.*Dalbergia sissoo*

   iii.*Gmelina arborea*

   iv.*Madhuca indica*

   v.*Azadirachta indica*.

7. Habit, Habitat, Family, Botanical name, Useful parts and uses of the following Essential oils – Sandalwood, Eucalyptus, Jasmine, Kewra.

8. A general account of organic manure.

16. Biotechnology and Genetic Engineering:

1. Application of Biotechnology in health and agriculture: Human insulin and vaccine production, gene therapy; Genetically modified organisms-BT crops; Transgenic Organisms; Artificial Seeds from plants, Edible Vaccines from plants

2. Methods of gene transfer in plants: Micro ejection, electroporation, particle gun and Agrobacterium-mediated gene transfer

3. Secondary plant products with special reference to alkaloids
4. Cryopreservation and Germplasm storage

17. Recent Aspects of Botany:

1. Modern techniques
   a) Electron microscopy,
   b) Phase contrast microscopy
   c) Spectro photometry
   d) Chromatography
   e) Electrophoresis
   f) The tracer technique
   g) Auto radiography
   h) Sero-diagnostic methods.
2. Genetic engineering.
3. Plant tissue culture.
4. Alternative sources of Energy.
5. Social forestry.
6. Microorganisms as tools in understanding biological systems.
7. Environmental pollution (Water, soil, air) health hazards and control.
8. EthnoBotnay

18. Silviculture

General Principles, Systems, Natural and Artificial regeneration of Forest, Tree Physiology and Breeding, Silviculture for Mangroves and Shoreline Vegetation, Traditional and recent advances

19. Recent Advancements and development in the field of research on above topics