

II B. Sc - SEMESTER- IV THEORY: BOTANY SYLLABUS
PAPER – DSC IIB: Plant Physiology and Metabolism
W.E.F. 2016 - 17

Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: Plant – Water relations (12 hrs)

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing mechanism of stomata.

UNIT –II: Mineral nutrition & Enzymes (12hrs)

1. Mineral Nutrition: Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium*, outlines of protein synthesis (transcription and translation).
4. Enzymes: General characteristics, mechanism of enzyme action and factors regulating enzyme action.

UNIT –III: PHOTOSYNTHESIS (12 hrs)

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, carbon assimilation pathways: C₃, C₄, and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

UNIT – IV: PLANT METABOLISM (12 hrs)

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system.
Mechanism of oxidative phosphorylation.
2. Lipid Metabolism: Types of lipids, Beta-oxidation.

UNIT –V: GROWTH AND DEVELOPMENT (12hrs)

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering -photoperiodism, role of phytochrome in flowering; Vernalization.
4. Physiology of Senescence and Ageing.

Suggested activity: Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube.

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Bos Chau person

K. Sujatha
13/12/16
B. Lakshmi
13/12/16

Books for Reference:

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) Addison-Wesley Publishing Co., Inc. Reading, Massachusetts, Palo alto, London.
2. Devlin, R.M. (1969) : Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi .
3. Noggle, R.& Fritz (1989):Introductory Plant Physiology Prentice Hall of India.
4. Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.
5. Mayer, Anderson & Bonning(1965): Introduction to Plant Physiology D.Van Nostrand . Publishing Co., N.Y.
6. Mukherjee, S. A.K. Ghosh(1998) Plant Physiology ,Tata McGraw Hill Publishers(P) Ltd., New Delhi.
7. Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
2. Plummer, D.(1989) Biochemistry–the Chemistry of life ,McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.
9. Day, P.M.& Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

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13/12/16
BOS chairman

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13/12/16

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13/12/16

II B. Sc SEMESTRE- IV. – BOTANY PRACTICAL SYLLABUS
PAPER- DSC IIB - Plant Physiology and Metabolism)
W.E.F. 2016-17
Total hours of laboratory Exercises 30 hrs @ 2 per week

Suggested Laboratory Exercises:

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of *Rhoeo* / *Tradescantia*.
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer
6. Demonstration of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of photosynthesis under varying CO_2 concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmott' bubbler.


II B. Sc – SEMESTRE- IV. BOTANY PRACTICAL MODEL PAPER
(PAPER- IV - Plant Physiology and Metabolism)

1. Perform the Experiments A & B. Give the aim, principle, procedure and observation. Tabulate the results if any. Draw labeled diagram. 2 x 15 = 30 marks
2. Give the protocol of the experiments C & D 2 x 5 = 10 marks
3. Record & Viva 10 marks

50 marks

Signature of the ~~Chairman~~ / Chairperson:

Signature of the Members :


 1. K. Sujatha 13/12/16
 2. [Signature] 13/12/2016
 3. B. [Signature] 13/12/16

II B.Sc. BOTANY
Theory Model Question Paper
Paper IV (Plant Physiology and Metabolism) W.E.F. 2016-17
SEMESTER - IV

Time: 3 Hrs.

Max. Marks:75

Section - I

Answer any Five of the Following questions

5 x 5 = 25

ఏదేని ఐదు ప్రశ్నలకు సమాధానములు వ్రాయండి.

1. Osmosis : ద్రవోద్ధమం
2. Importance of N.P.K. Fertilizers in Agriculture వ్యవసాయంలో N,P,K, ఎరువుల ప్రాముఖ్యత.
3. CAM : క్రాసు లేషియన్ ఆమ్లజీవక్రియ.
4. Photo synthetic Pigment Systems
కిరణజన్య సంయోగక్రియలోని వర్ణవ్యవస్థలు.
5. R.Q. శ్వాసక్రియకోషంట్
6. Biological Nitrogen Fixation
జీవ నత్రజని స్థాపన
7. Role of Phyto Chrome in Flowering
పుష్పించుటలో ఫైటోక్రోమ్ పాత్ర

8. ~~Gluconeogenesis : గ్లూకోసియోజెనెసిస్~~

8. ABA - ఆబ్సిసిక్ ఆమ్లము

Section - II

Answer the following Questions

5 x 10 = 50

క్రింది ప్రశ్నలకు సమాధానములు వ్రాయండి.

9. Describe the methods of water absorption in plants
మొక్కలలో నీటిశోషణ యాంత్రికాలను విశదీకరించండి.

[OR]

Write about different types of Transpiration, and Opening and closing of stomata.


భాష్పోత్పేక రకాలను వివరించి, పత్రరంధ్రాలు మూసుకుని తెరచుకునే విధానమును గూర్చి వ్రాయుము.

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11. (a). Describe the internal structure of pinus needle and its xerophytic characters.
 పైనసీడిల్ అంతర్నిర్మాణమును వివరించి దాని యొక్క ఎడారి మొక్కల లక్షణాలు వ్రాయండి.
 (or)
 (b). Discuss the Economic importance of various taxa of gymnosperms.
 వివృత బీజాల ఆర్థిక ప్రాముఖ్యత గురించి వ్యాసము వ్రాయుము.
12. (a). Write an essay on complex Tissues.
 సంక్లిష్ట కణజాలాలు గురించి వ్యాసము వ్రాయుము.
 (or)
 (b). Describe the various theories regarding the organisation of the stem apex.
 కాండగ్ర నిర్మాణమును వివరించే వివిధ సిద్ధాంతాలను గురించి వ్రాయుము.
13. (a). Describe anomalous secondary growth in Boerhaavia stem
 బోయర్హావియా కాండములో జరిగే అసంగత ద్వితీయ వృద్ధిని వివరించుము.
 (or)
 (b). Describe the wood structure and uses of Teakwood and Red sanders.
 టేకు, ఎర్రచందనం మొక్కల కలప లక్షణాలను మరియు ఉపయోగాలను వ్రాయుము.


 13/12/16
 Bos chairperson
 1. K. Sujatha 13/12/16
 2. Anu 13/12/16
 3. B. Lakshmi 13/12/16