DEPARTMENT OF BOTANY
MARWARI COLLEGE,RANCHI

Question bank-paper-CC13
Botany sem-VI,2020- by Dr.(Mrs.) A.S. Khalkho
PLANT METABOLISM

I. CARBON ASSIMILATION

Write short notes on:

i. Photosynthetic unit
ii. Red drop in photosynthesis
iii. Z-scheme
iv. Quantum requirement of photosynthesis
v. Peroxisome
vi. Cytb6f complex
vii. Redox potential
viii. Warburg effect
ix. CAM plants
x. Water oxidizing cycle
xi. Krantz anatomy
xii. Photophosphorylation
xiii. Warburg effect
xiv. Role of water in photosynthesis
xv. Importance of photosynthesis
xvi. Thylakoid
xvii. Carbondioxide fixation in dark
xviii. Hill reaction
xix. Emerson's effect
xx. Source of liberated oxygen

Answer the following long questions:

1. Describe the mechanism of conversion of solar energy into chemical energy in plants.
2. Give an account of the process of photosynthesis.
3. Describe the mechanism of photophosphorylation in higher plants.
4. Give an account of Calvin cycle.
5. Descibe cyclic and non-cyclic electron transport and photophosphorylation.
6. What do you understand by cyclic phosphorylation?
7. What are limiting factors?Describe in details their significance in relation to photosynthesis.
8. Explain the mechanism of carbon fixation in photosynthesis.
9. Trace the path of carbon in C3 and C4 cycles.
10. Describe the mechanism of respiration in CAM plants and compare it with photorespiration.
11. What is "Dark reaction" in photosynthesis?How does it takes place in C3 plants?
12. What is photorespiration?Give the mechanism and significance of this process.

13. Outline Hatch and slack cycle and point out differences with Calvin cycle.
14. How would you differentiate C3 and C4 plants?
15. Describe the role of chlorophyll in photosynthesis.

II. CARBOHYDRATE METABOLISM

Write short notes on:

i. Synthesis of sucrose
ii. Degradation of sucrose
iii. Oligo-saccharides
iv. Polysaccharides
v. Asymmetric carbon atom
vi. Monosaccharide
vii. Breakdown of cellulose
viii. Test of starch
ix. Structure of chitin
x. Role of carbohydrate in plants

Answer the following long questions:

1. Give a brief account of structure of di-saccharides found in plants.
2. What are the main types of carbohydrates found in plants?Add a note on their importance in plant metabolism.
3. Classify carbohydrates giving suitable examples.
4. Describe the mechanism of biosynthesis and degradation of sucrose.
5. Classify carbohydrates.Describe the mechanism of biosynthesis of starch.
6. Give structure and properties of the various sugars found in plant cells.
7. Describe the different types of carbohydrates and their properties.
8. Describe polysaccharide.

III. CARBON OXIDATION

Write short notes on :

i. Role of mitochondria in the respiration
ii. ATP
iii. Prove that CO2 is evolved during respiration
iv. Respiratory quotient
v. Electron transport
vi. Oxidative phosphorylation
vii. Hexose monphosphate shunt
viii. EMP pathway
ix. Factors affecting respiration
x. Compensation point
xi. Fermentation

xii. Cyanide resistant respiration
xiii. ATP yield in respiration
xiv. Significance of Kreb's cycle
xv. Pentose phosphate pathway
xvi. Pasteur's effect
xvii. Light compensation point
xviii. Glycolysis
xix. Anaerobic respiration

Answer the following long questions:

1. Comment briefly on glycolysis and its significance in the mechanism of respiration.
2. Describe the citric acid cycle in plants and explain how ATP is generated in aerobic respiration.
3. Give an account of the energy releasing process in glucose oxidation.
4. Describe the Kreb's cycle reactions and discuss their significance.
5. Give a detailed account of EMP pathway.
6. What is R.Q? How does it differ in different plants? Give its significance.
7. Explain pentose phosphate pathway.What is its significance?
8. Explain the mechanism of complete oxidation of pyruvic acid in the presence of oxygen. How many ATP molecules are generated in this process?
9. Explain briefly terminal oxidation.
10. What are the factors affecting respiration?

IV. LIPID METABOLISM

Write short notes on :

i. Lipids
ii. Phospholipids and their occurrence
iii. Fatty acid degradation
iv. Phospholipids
v. Energetics of β- oxidation
vi. Oxidation of fatty acid
vii. β- oxidation of stearic acid and saturated fatty acid
viii. α-oxidation of fatty acid
ix. Biological importance of lipids
x. Simple lipids

Answer the following long questions:

1. Give an account of biosynthesis and oxidation of fat.
2. Give an account of fat synthesis in plants.
3. What are plant lipids?How are they synthesized ?Discuss mechanism of their biosynthesis.
4. Draw β- oxidation pathway. No description is required

5. How would you classify lipid?Give an account of energetic of oxidation of palmitic acid.
6. Explain glyoxysome cycle.
7. Explain the role of lipid in plant metabolism.
8. Give the structure and mechanism of fat synthesis in plants.
9. Explain the chain elongation reaction in fat synthesis.
10. Differentiate between α-oxidation and β-oxidation of fats.
11. Differentiate between saturated and un-saturated fatty acids.
12. Describe classification of lipids.

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Question bank-paper-DSE-3
Botany sem-VI,2020- by Dr.(Mrs.) A.S. Khalkho
PLANT BREEDING

Short answer type questions:

i. Mass selection
ii. Pure line selection
iii. Clonal or bred selection
iv. Standard error
v. Plant introduction
vi. Acclimatization
vii. Mutation breeding
viii. Emasculation
ix. Bagging
x. Pedigree method
xi. Back cross method
xii. Bulk method
xiii. Inbred variety cross of top cross
xiv. Synthetic cross
xv. Multiple or composite cross
xvi. Hybrid vigour or heterosis
xvii. Utilization of heterosis
xviii. Inbreds
xix. Clone
xx. Artificial selection
xxi. Hybridization
xxii. Goodness of fit
xxiii. Chi-square
xxiv. Variance
xxv. Standard variation
xxvi. Probability

Long answer type questions:

1. What is plant breeding? What are the aims and objectives of plant breeding?
2. Discuss in brief the relation of plant breeding with other branches of Botany.
3. Classify the cultivated plants on the basis of propagation methods in relation to breeding methods.
4. Describe in brief the important methods of plant breeding.
5. What do you mean by the term "selection"? Mention different types of selection methods employed in the improvement of crop plants.
6. Define the term "pure line".How pure line selection is applied in improving crop plants?

7. What is hybridization? What are the aims of hybridization?Mention different steps involved in hybridization procedure for the development of a new variety?
8. Give a brief account of the steps involved in hybridization procedure.
9. How hybrid seeds are obtained to raise F1 generation?
10. Describe different steps employed in hybridization technique.
11. What are the different hybridization methods for self and cross-pollinated crops?
12. What do you mean by plant introduction and acclimatization?What steps are involved in the procedure of plant introduction?
13. What do you mean by mutation breeding? How this technique is applied for production of new crop- varieties in the plant breeding?
14. What are the differences between pedigree and bulk methods of hybridization adapted for self pollinated crops?
15. Give a comparative account of the different steps involved in pedigree and bulk methods.
16. What is heterosis?Mention the effects of heterosis i.e., hybrid vigour.
17. What is heterosis? What genetical theories have been put forth to explain the cause of heterosis?
18. Write an essay on the importance of plant breeding in modern agriculture.

CROP IMPROVEMENT AND BREEDING

Short answer type questions:

i. Who worked on detection of mutation in plants?
ii. What are the practical applications of mutation in plant breeding?
iii. Types of agents(mutagens) used in plant breeding.
iv. Effect of radiation on mutation
v. Spontaneous mutation used in plant breeding
vi. Name two transgenic plants
vii. What is "flavr savr" Tomato?
viii. Transgenic plant
ix. Trisomy in plants
x. Name one example of polyploidy in plants which is used daily
xi. Autopolyploidy
xii. Allopolyploidy
xiii. Application of polyploidy in plants
xiv. Trisomic in Datura
xv. Raphanobrassica
xvi. Synthetic seed for mass cropping
xvii. Golden rice
xviii. Terminator gene
xix. Transplantomic plants
xx. Industrial application of transgenic crops
xxi. Bt gene
xxii. Cry protein

xxiii. Herbicide resistance
xxiv. Virus resistance
xxv. Anther culture
xxvi. Ovary and ovule culture
xxvii. In vitro fertilization
xxviii. Genetic modifications
xxix. Micropropagation industry
xxx. Clonal propagation
xxxi. Trypsin
xxxii. Production of Hirudin in Brassica napus

Long anwer type questions:

1. Describe with examples application of polyploidy in some important crops.
2. Define allopolyploidy and describe it in some important crop production.
3. What is mutation? Describe different types of induced methods used in plant breeding.
4. Briefly describe the mutation's role and origin of new species in plant breeding.
5. Describe the role of plant biotechnology in agriculture.
6. Describe the impact plant biotechnology in crop improvement.
7. What is tissue culture? What is the importance of tissue culture in crop improvement?
8. What are transgenic crops? Give an account of recent developments about transgenic crops for insect pest resistance and nutritional quality.
9. Discuss the importance of transgenic crops for developing countries.
10. Describe the micro-propagation methods for the multiplication in crop plants.
11. Discuss the role of plant tissue culture based micro-propagation industry in developing countries.
12. What do you understand by somaclonal variation? Discuss its importance in crop improvement.
13. Describe the application of somatic embryogenesis in crop plants.
14. Discuss the role of plant biotechnology in solving plant pathological problems.
15. What is meristem culture? Discuss its application in production of virus free plants.
16. Discuss the role of haploids in crop improvement.
17. Describe the protoplast technology for crop improvement.
18. What is a synthetic seed ? Describe various methods of synthetic seed production and its implication.

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Question bank-paper- DSE-4
Botany sem-VI, 2020- by Dr.(Mrs.) A.S. Khalkho

RESEARCH METHODOLOGY

Multiple choice questions:

1. Plant microtechniques include:
    a. Staining procedures
    b. Classification and chemistry of stain
    c. Staining equipments
    d. All of the above
2. A layer which helps in the opening of anther:
    a. Tapetum
    b. Middle layer
    c. Epidermal cell
    d. Endothelium
3. The following sclereids is found in the seed coats of *Pisum sativum*:
    a. Astrosclerids
    b. Brychysclerids
    c. Osteoscleroeids
    d. Trichosclereids
4. DPX stands for:
    a. Dilute primary xylol
    b. Distrene prime xylene
    c. Destrine ploitieiser xylene
    d. Dilute plastic xylol
5. Haematoxylin belongs to which category?
    a. Acidic stains
    b. Neutral stains
    c. Basic stains
    d. All of these
6. Which of the following is an ozodye?
    a. Safropin
    b. Hematoxylin
    c. Aniline blue
    d. Orange G
7. Cornoy's solution is a mixture of:
    a. Aqueous chromic acid,aqueous acetic acid and distilled water
    b. Ethyl alcohol, glacial acetic acid and commercial formalin
    c. Ethanol, glacial acetic acid and chloroform
    d. Aqueous alcohol, aqueous acetic acid and distilled water
8. The sectioning or woody materials for histo-enzymological study is made through:
    a. Rotary microtome
    b. Sledgo microtome

c. Cryotome
d. Rocking microtome

9. Sudan black B is often of:
    a. Protein
    b. Carbohydrate
    c. Amino acid
    d. Lipids
10. Chromatography that involves the separation of isomers:
    a. Counter current chromatography
    b. Chirol chromatography
    c. Super chromatography
    d. Thin layer chromatography
11. The total volume of material both solid and liquid in the column is known as:
    a. Void volume
    b. Bed volume
    c. Elution volume
    d. Retension volume
12. Silica gel G is used in:
    a. Thin layer chromatography
    b. Column chromatography
    c. HPLC
    d. GLC
13. Histochemical localization of proteins is performed by using:
    a. Sudan black
    b. Mercuric bromophenol blue
    c. Periodic acid schiffs (PAS) reagent
    d. Iodine potassium iodide(HCl) solution
14. Orcein is obtained from:
    a. Fractionation of coal
    b. Heartwood of Coesalpiniq
    c. Roceella tinctoria
    d. Abdominal part of insects Ductylopins coccus

    Answers:
    1-d, 2-d, 3-c,4-c, 5-c, 6-c, 7-c, 8-b, 9-d, 10-b, 11-b, 12-a, 13-b, 14-c

Write short notes on the following:

i. What is research?
ii. Define mole fractions
iii. What is class interval?
iv. What is molarity?
v. What is normality?
vi. What is molality?
vii. How micropipette is calibrated after use?
viii. What is mean?

ix. What is mode?
x. What is bar graph?
xi. What is π chart?
xii. Full form of LAF?
xiii. What is HEPA filter?
xiv. What is a staining cells?
xv. What are staining equipments?
xvi. What is research poster?
xvii. What is art of scientific writing?
xviii. What is copy right?
xix. What is a literature review?
xx. What is references?
xxi. What is hypothesis?
xxii. What is research design?
xxiii. Describe ethics
xxiv. Define plant microtechniques

Long answer questions:

1. What is proteomics and role of proteomics in the field of modern botany?
2. Why *Arabidopsis thaliana* is called queen of plant genetics?
3. Why mouse is used as model organism?
4. What are the ideal characters of a model organism?
5. What are the common precautions to be taken while writing a report?
6. Write down the basic steps of squash preparation.
7. Explain different types of research.
8. How literature review is useful for research designing?
9. What is simple staining technique in microbiology? What are the types of staining?
10. What does research mean? Discuss the types of research.
11. What is research methodology? What are the characterstics of research methodology?
12. What is a poster presentation? Discuss the rules one should follow for a good poster presentation.
13. What is the importance of genomic libraries?
14. What does the field of proteomics study? And what is protein research?
15. What is ELISA? Explain its applications?
16. Explain the role and working of different types of centrifuges.
17. What are the different types of data? Explain various methods of data collection.
18. Write an essay on various stages of biological research.
19. Explain the importance of bibliography.
20. Distinguish between research method and research methodology.
21. Describe the different steps involved in a research process.

22. Distinguish between primary and secondary data.
23. What are the sectioning method or microtomy stage?
24. Describe the different types of staining procedure.
25. Write the process of copyright.
26. Why copyright of any research is required?
27. Briefly describe the plagiarism.
28. How plagiarism is punishable?
29. How powerpoint presentation is required for research and methodology?
30. Which type of research data can be reported in powerpoint presentation?
31. Describe the method of preparation of poster.
32. What are copyright law?
33. How can anyone avoid plagiarism?
34. Why references writing is required in scientific writing?
35. Briefly describe the reference writing protocol.
36. Briefly describe any two types of research.
37. Explain briefly the functions of research design.
38. Elaborate the characterstics of hypothesis in function.
39. Differentiate between quantitative and qualitative study design.
40. Differentiate the method of data collection in quantitative and qualitative research.
41. What do you mean by ethical issues in data collection?
42. Why number and unit is important in scientific writing?
43. What are the protocol used for abbreviations and nomenclature in scientific study?
44. Why SI unit is used in the unit of scientific writing?
45. What is the role of nomenclature in scientific writing?