

B.Sc. (Honours) Agriculture Semester-II Examination, 2019

Course No: CPH-121 (New)
(Fundamentals of Crop Physiology)

Signature of Centre Superintendent

Roll No. : (in figure) _____ (in words) _____

Student Index No. _____ Regn. No. _____ of _____

Time : Two Hours

Full marks : 50

Questions are of value as indicated in the margin

Part - I
(Objective and Short Answer Type)
(Use only ball point pen)

Time : 30 minutes

Full marks : 20

- Note:** 1. Answer in question paper itself.
2. Striking, rewriting or overwriting are not allowed in the objective type questions.

1. **State True (T) or False (F) in respect of the following statements (*any ten*):** 0.5×10=5

- | | |
|---|--------------------------|
| a) Kranz anatomy is found in C ₄ and CAM plants. | ☐ |
| b) Ethylene application promotes flowering in pineapples plants. | ☐ |
| c) Sieve tubes and companion cells are part of phloem. | ☐ |
| d) Mass flow hypothesis was given by Mitchel. | ☐ |
| e) Chloroplast, peroxisome and mitochondrion are the organelles where photorespiration takes place. | ☐ |
| f) The precursor for ethylene biosynthesis is methionine. | ☐ |
| g) Wheat is a C ₄ plant. | ☐ |
| h) The end product of glycolysis is α-keto glutaric acid. | ☐ |
| i) Potassium ion plays an important role in closing and opening of stomata. | ☐ |
| j) CO ₂ is the source of oxygen evolved during photosynthesis. | ☐ |

2. **Fill up the blanks with most appropriate words (*any ten*):** 0.5×10=5

- a) The maximum value of water potential is _____.
- b) _____ is known as stress hormone.
- c) Delayed senescence of detached leaves (Richmond-Lang effect) is induced by the phytohormone _____.
- d) Respiratory Quotient for Anaerobic respiration is _____.
- e) The LAI can be mathematically expressed as _____.
- f) _____ is an example of beneficial nutrient for plants.
- g) Growing plants in nutrient enriched water without soil is called _____.
- h) Middle lamella is composed of _____.

P.T.O.

- i) Whiptail disease of cabbage is caused due to the deficiency of _____.
- j) The process of glycolysis takes place in the _____ of a cell.
- k) In C_4 plants, C_3 cycle operates in _____ cells.
- l) The first stable product of dark reaction in case of C_4 plants is _____.

3. Match column 'A' with column 'B' and jot down your answer in column 'C' based on column 'A'

0.5×10=5

Column-A	Column-B	Column-C
a) Auxin	i) Nickel	()
b) Guttation	ii) Chlorophyll	()
c) C_3 plant	iii) Blackman	()
d) Cytokinin	iv) Hydathode	()
e) Ethylene	v) Apical dominance	()
f) Peroxisome	vi) Stress hormone	()
g) Climacteric fruit	vii) Photorespiration	()
h) Porphyrin	viii) Zeatin	()
i) Trace element	ix) Paddy	()
j) Limiting Factors	x) Banana	()

4. Answer the following questions as per directions (any ten):

0.5×10=5

a) Match List-I (physiological events) with List-II (name of plants) and select the correct answer.

List-I	List-II
i) C_3 pathway of CO_2 fixation	A. <i>Bryophyllum</i> sp.
ii) C_4 pathway of CO_2 fixation	B. <i>Zea mays</i>
iii) CAM pathway of CO_2 fixation	C. <i>Triticum aestivum</i>
iv) Guttation	D. <i>Lycopersicon esculentum</i>
(I) A B C D	(II) A B C D
3 4 1 2	3 2 1 4
(III) A B C D	(IV) A B C D
3 4 1 2	2 3 4 1

b) When a cell is placed in a hypotonic solution

- i) water flows into the cell by the process of endosmosis
- ii) water flows out of the cell due to the process of endosmosis
- iii) water flows into the cell by the process of exosmosis
- iv) there will be no net movement of water.

c) Which of the following is the correct formula of RGR?

- i) $(W_2 - W_1)/(t_2 - t_1)$
- ii) $(W_2 - W_1)/(t_2 - t_1) \times (\log_e L_2 - \log_e L_1)/(L_2 - L_1)$
- iii) $(\log_e W_2 - \log_e W_1)/(t_2 - t_1)$
- iv) none of these

d) 2,4-Dinitrophenol (DNP) inhibits cell function by disrupting

- i) Citric acid cycle
- ii) Oxidative phosphorylation
- iii) Glycolysis
- iv) Pentose phosphate pathway

e) Most abundant enzyme protein on earth is

- | | |
|------------------------|----------------------------|
| i) PEP carboxylase | ii) Rubisco |
| iii) Nitrate reductase | iv) Pyruvate dehydrogenase |

f) During respiration the ATP molecules are generated by

- | | |
|--------------------------------------|-------------------------------|
| i) Photophosphorylation | ii) Oxidative phosphorylation |
| iii) Substrate level phosphorylation | iv) both (ii) and (iii) |

g) Which of the following is the essential nutrient element required in the photosynthetic oxidation of water?

- | | |
|----------------|----------------|
| i) Magnesium | ii) Iron |
| iii) Manganese | iv) Molybdenum |

h) Match List-I with List-II and select the correct answer:

- | List-I | | | | List-II | | | |
|--------------------|--------------|---------------|--------------|---|--|--|--|
| i) Hill Reaction | | | | A. Reversal of Red drop | | | |
| ii) Emerson effect | | | | B. Limiting factors | | | |
| iii) Blackmans Law | | | | C. Inhibition of photosynthesis by oxygen | | | |
| iv) Warburg effect | | | | D. Photolysis of water | | | |
| (I) A B C D | (II) A B C D | (III) A B C D | (IV) A B C D | | | | |
| 1 4 2 3 | 4 1 3 2 | 1 4 3 2 | 4 1 2 3 | | | | |

i) Application of which of the following acts as a substitute for low temperature treatment (during vernalization process)?

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|----------------|-------------------|
| i) Auxin | ii) Gibberellin |
| iii) Cytokinin | iv) none of these |

j) Match List-I (Plant Hormone) with List-II (Typical Physiological effect) and select the correct answer:

- | List-I | | | | List-II | | | |
|------------------|--------------|---------------|--------------|---------------------------|--|--|--|
| i) Auxin | | | | A. Apical dominance | | | |
| ii) Gibberellins | | | | B. Cell division | | | |
| iii) Cytokinin | | | | C. Fruit ripening | | | |
| iv) Ethylene | | | | D. Inter-nodal elongation | | | |
| (I) A B C D | (II) A B C D | (III) A B C D | (IV) A B C D | | | | |
| 1 4 2 3 | 1 4 3 2 | 4 1 2 3 | 4 1 3 2 | | | | |

B.Sc. (Honours) Agriculture Semester-II Examination, 2019

Course No: CPH-121 (New)

(Fundamentals of Crop Physiology)

Part - II
(Descriptive Type)

Time : 90 Minutes

Full marks : 30

Questions are of value as indicated in the margin

Answer *any four* questions from the following.

5. Write short notes on the following (*any three*): 3×2.5=7.5
- a) Kranz Anatomy
 - b) Rubisco
 - c) Antitranspirants
 - d) Ribosome
 - e) Cell membrane
6. Differentiate between the following (*any three*): 3×2.5=7.5
- a) Osmosis and Diffusion
 - b) Transpiration and Guttation
 - c) Auxin and Gibberellins
 - d) Functions and deficiency symptoms of N and K
 - e) Smooth Endoplasmic Reticulum and Rough Endoplasmic reticulum
6. a) Describe the importance of water for plant life? 4.5
- b) What is water potential? Discuss in brief about different components of water potential. 1+2=3.0
7. a) Why is Glycolysis? Describe the Krebs's cycle reaction and discuss its significance? 2+3.5=5.5
- b) Write a note on β -Oxidation of fatty acids. 2
8. What is crop growth analysis? Discuss in brief about different physiological indices of growth with formulae. 1.5+6=7.5
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