



Shahjalal University of Science & Technology, Sylhet
Department of Biochemistry and Molecular Biology
B. Sc. (Hons) 3rd Year 1st Semester Final Examination, 2013
Course No. : BMB -325 Course Title: Plant Biochemistry
Credit: 2 Total marks: 70 Time: 2 hours

Instructions:

- Number in the right side indicates the marks of the question.
- Answer any two (2) questions from each Part (A and B).

Part –A

1.
 - a) What is CAM metabolism? Describe the CAM metabolism by xerophytes. 5.0
 - b) Briefly describe the biochemical mechanism of photosynthesis. 5.0
 - c) Write down the differences between C₃ and C₄ plants. 3.0
 - d) Define water photolysis. Write down the roles of PSII in water photolysis. 4.5
2.
 - a) What is nodule? Describe the process of rhizobial infection and nodule development in legume roots. 7.0
 - b) How nitrogen fixation is catalyzed by the enzyme dinitrogenase? 3.0
 - c) Describe how NOD genes and NIF genes regulates nodulation. 4.0
 - d) Discuss the role of PII protein in the assimilation of NH₄⁺. 3.5
3.
 - a) Define phytochrome. How phytochromes are characterized by a red/ far-red photochemistry? 3.5
 - b) "Phytochrome is a dimer composed of two polypeptides" justify the statement. 4.0
 - c) Demonstrate the mechanism of phytochrome action. 5.0
 - d) Define photostationary state. Discuss how F:FR ratio effects on shading of plants. 5.0

Part-B

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| 4. | a) | What is opium? Draw the structure of heroin and codeine. | 3.5 |
| | b) | Describe how plants responses to invasion by microbial pathogen through hypersensitive reaction. | 5.0 |
| | c) | What are EPSPS and PAL? What the key metabolic roles do they play? | 4.5 |
| | d) | Describe the shikimic acid pathway for the biosynthesis of aromatic amino acids. | 4.5 |
| 5. | a) | What are hormones? What are the principle sites of gibberellins biosynthesis? | 3.0 |
| | b) | Describe how cytokinins regulate the cell cycle. | 4.5 |
| | c) | Discuss how IAA (indole-3-acetic acid) deactivated by oxidation and conjugation. | 4.0 |
| | d) | Demonstrate the gibberellin biosynthesis from geranylgeranyl pyrophosphate (GGPP) | 6.0 |
| 6. | a) | Why water stresses occur? Discuss the effects of water stress on photosynthesis and protein synthesis. | 6.0 |
| | b) | Define heat shock protein? Discuss the upregulation and cardiovascular function of heat shock protein. | 5.0 |
| | c) | Write down the physiologic and biochemical symptoms of salt stress. | 3.5 |
| | d) | Discuss what types of cellular changes occur during heat stress? | 3.0 |