

**(Theory Paper)**

**Paper Code : BOT 402 (Opt-5)**

**(Advanced Plant Physiology and  
Biochemistry – II)**

**Full Marks – 80**

**Time – Three hours**

**The figures in the margin indicate full marks  
for the questions.**

**1. Choose the correct answer for the following (All  
questions are compulsory) :  $1 \times 6 = 6$**

**(i) The primary carbon dioxide acceptor in the  
Hatch and Slack pathways is**

**(a) Phosphoenolpyruvate**

**(b) Oxaloacetic acid**

**(c) Phosphoglyceric acid**

**(d) Rubisco**

**(ii) In chlorophyll, which element is at the centre  
of the porphyrin ring ?**

**(a) Magnesium      (b) Calcium**

**(c) Manganese      (d) Potassium**

- (iii) In EMP pathway, the process by which ATP is formed from ADP is
- Oxidative phosphorylation
  - Reduction
  - Substrate-level phosphorylation
  - Photo phosphorylation
- (iv) Which of the following is the general formula for Carbohydrates ?
- $(C_4H_2O)_n$
  - $(C_6H_2O)_n$
  - $CH_2O)_n$
  - $(C_2H_2O)_n COOH$
- (v) Beta-oxidation of fatty acids occur in
- Peroxisome
  - Peroxisome and Mitochondria
  - Mitochondria
  - Peroxisome, Mitochondria and ER
- (vi) Which of the following is an example of proto alkaloid ?
- Caffeine
  - Ephedrine
  - Reserpine
  - Morphine.

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2. Answer the following short questions :  $2 \times 5 = 10$

- Name the products produced during the light reaction of photosynthesis that are used to drive the dark reaction.
- What is the end product of oxidative phosphorylation ?
- What criteria are used to select the  $C_3$  and  $C_4$  photosynthesis pathways ?
- Name the sites for ATP formation in respiratory chain.
- What is the difference between true alkaloids and pseudo alkaloids ?

3. Answer any six of the following questions :

$5 \times 6 = 30$

- What is relationship between photosynthesis and respiration ?
- Distinguish between cyclic and non-cyclic photophosphorylation.
- The rate of phototsynthesis decreases at higher temperatures. – Explain.

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- (d) Write the mechanism of ATP formation.
- (e) What is the importance of glyoxylate cycle in plants ?
- (f) What is the significance of CAM cycle ? Explain.
- (g) Write the names of three alkaloids as well as their pharmacological significances.
- (h) Write the classification of Terpenes.

4. Answer any *two* of the following questions :

10×2=20

- (a) Enumerate the reactions of glycolytic pathway indicating the enzymes and cofactors.  
5+5=10
- (b) Explain Light Reaction of Photosynthesis (or) Light-dependent Reaction. List out the factors influencing Photosynthesis. 6+4=10
- (c) What is Rubisco ? What role does it play in the light-independent reactions in polysynthesis ?  
4+6=10

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5. Answer any *one* of the following questions :

14×1=14

- (a) How is pyruvic acid oxidatively decarboxylated and get oxidized in TCA cycle ? Indicate the enzymes and cofactors at appropriate places.  
10+4=14
- (b) Explain the various steps of shikimic acid pathway in phenolic compound biosynthesis.  
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