THE OPEN UNIVERSITY OF SRI LANKA
B. Sc / B. Ed DEGREE PROGRAMME -2011/12
BOTANY – LEVEL 4
BOU2200 / BOE4200: PLANT PHYSIOLOGY
ASSESSMENT TEST 1 (NO BOOK TEST I)
DURATION: ONE (01) HOUR

REGISTRATION NO.

DATE: 31st March 2012 **TIME: 4.15 PM – 5.15 PM**

PLEASE ANSWER ALL THE QUESTIONS **Duration: 1 Hour**

INSTRUCTIONS: This paper has 30 questions. 1st – 23rd are multiple choice questions and you need to write the number of the best suited answer for each multiple choice question in the box given in front. Questions 24th and 30th require short written answers.

1. The function of enzyme is important as
   a. it causes chemical reactions that would not otherwise takes place
   b. It drives the reactions by reducing the activation energy
   c. It change the directions of reactions
   d. It modifies the equilibrium points of reactions.

   [1]

2. Which of the following is *not* the correct statement on the enzyme?
   a. Enzymes are far larger than the substrate
   b. Shape of the enzyme molecules are modified by co-factors
   c. Very small portion of the enzyme come into contact with substrate
   d. enzymes increase molecular motion that affect the rate of reaction

   [2]

3. Which of the following is correct about the co-factors?
   a. Co-factors are organic molecules that bind with the enzymes
   b. Prosthetic groups are type of co-factors that covalently bound to the enzyme
   c. Co-factors can be either metal ions or non-metal ions
   d. Co-factors converts holoenzymes into apoenzymes

   [3]

4. In most metabolic pathways, all needed enzymes are arranged in a multi enzyme complex within a
   a. Co-enzyme complex
   b. ATP complex
   c. Membrane
   d. Globular protein

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5. What is the correct formula that describes the nitrogen fixation?
   a. $2N_2$ + glucose → amino acids
   b. $N_2 + 3H_2 \rightarrow NH_3$
   c. $2NH_3 \rightarrow N_2 + 3NH_3$
   d. $2NH_4^+ + 2O_2 + 8e \rightarrow N_2 + H_2O$

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6. Nitrogen uptake of the most of the plants can be facilitated through
   a. Formation of NO_2^- by soil microorganisms
   b. Nitrification of NH_4^+ by soil bactria
   c. Excessive presence of NH_4^+ ion in the soil
   d. Absence of Nitrosomas in the soil.

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7. Which of the following is <u>incorrect</u> on the utilization of nitrate by plants?
   a. Plant reduce NO_3^- to NO_2^- upon absorption by
   b. NO_2^- are converted to NH_4^- by nitrate reductase enzyme complex
   c. Molybdenum deficient plant are incapable of reducing the NO_3^- into NO_2^-
   d. Fe and Cu are essential in the process of reducing NO_3^- to NH_4^+

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8. What is the type of reaction by which nitrogen is incorporated into amides to form amino acids?
   a. Reductive amination
   b. Oxidative amination
   c. Transamination
   d. Nitrification

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9. Which of the following is not a non-symbiotic nitrogen fixer?
   a. *Nostoc*
   b. *Anabaena*
   c. *Klebsiella*
   d. *Rhizobium*

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10. Which of the following is *not* correct?
    a) Nitrogenase enzyme is sensitive to excess O_2
    b) Leghemoglobin regulates the availability of oxygen in the bacterioid
    c) Heterocyst are thick walled, colourless body in which *Rhizobium* bacteria fixes N
    d) Ammonia can be considered as the end product of Nitrogen fixation

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11. Photosynthesis
    a. utilizes solar energy to synthesize organic molecules
    b. produces fossil fuel
    c. produces precursor molecules for anabolic reaction
    d. determines the percentage oxygen concentration in atmosphere.

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12. How many carbon atoms are there in glyceraldehydes phosphate?
    a. 4
    b. 6
    c. 4
    d. 3

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13. The molecules in the C3 and C4 pathway that combine with carbon dioxide are
    a. Glyceraldehyde phosphate and phosphoenol pyruvic acid
    b. Ribulose biphosphate and phosphoenol pyruvic acid
    c. Ribulose biphosphate and oxaloacetic acid
    d. Glyceraldehyde phosphate and oxaloacetic acid

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14. The peculiar characteristic that can be used in identifying the CAM plants are
    a. They are shade loving plants
    b. They can survive under heat stress
    c. They have dark green, small and fleshy leaves
    d. Accumulation of acids in the cells during the long dark period

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15. Which of the following group contains maximum number of plants that fixes carbon dioxide by way of Crassulacean acid metabolism (CAM)?
    a. Cactus, maize, ulva, *Ananus sp*
    b. Maize, rice *Kalanchoe* , red algea
    c. Ulva, Cactus, Aloe, *Amaranthus sp*
    d. Cactus, *Ananus Aloe, Sedun*

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16. Which of the following is incorrect
    a. Carbon dioxide reach the photosynthetic cells of plant by way of stomata
    b. C3 plants have higher rate of photorespiration than CAM pants
    c. Light and dark reactions of the C4 and CAM plants are separated by time and place respectively
    d. CAM plants may adopt C3 photosynthesis in presence of ample water.

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17. Cellular respiration processes that do not use molecular oxygen are called
    a. Heterotrophic
    b. Aerobic
    c. Anaerobic
    d. Fermentation

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18. Anaerobic pathways that oxidize glucose to generate ATP energy by using an organic molecule as the ultimate hydrogen acceptor are called
    a. Fermentation
    b. Reduction
    c. Krebs
    d. Photorespiration

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19. In photosynthesis, energy transfer among the pigment molecules in antennae complex occur in
    a. Conduction
    b. Florescence
    c. Inductive excitation
    d. Inductive resonance

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20. Synthesis of ATP from the transport of electrons excited by light energy in living system is called
    a. Photorespiration
    b. Photophosphorylation
    c. Non-cyclic electron transport
    d. Chemiosmosis

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Select the appropriate answer with correct word order to fill the blanks in the questions

21. The positively charged hydrogen ions that are released from the glucose during cellular respiration eventually combine with _____ ion to form _____.
    a. Oxygen ion, water
    b. Carbon , CO_2
    c. Oxygen, water
    d. pyruvic acid, lactic acid

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22. Light is a particle that is called ———— with specific energy referred as ---------- and is characterized by .....
    a. Excited stage, photon, energy
    b. Photon, quantum, wavelength
    c. Photon, spectrum, wavelength
    d. Spectrum, photon, frequency

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23. Glycolysis produces 2 molecules of ---------- that are used in synthesis of 4 molecules of ------. Kreb's cycle produces 8 nos of ---------- that produces 24 ----------. Two $FADH_2$ formed in Kreb's cycle synthesize ——— numbers of ———— . Total ATP turnover per glucose molecule in aerobic respiration is ----------.
    a. NADH, ATP, NADH, ATP, 4, ATP, 38
    b. FAD, ATP, NADPH, ATP, 4, ATP, 38
    c. NADPH, , ATP, FAD, ATP, 4, ATP, 38
    d. NADH, ATP, NADPH, ATP, 5, ATP, 40

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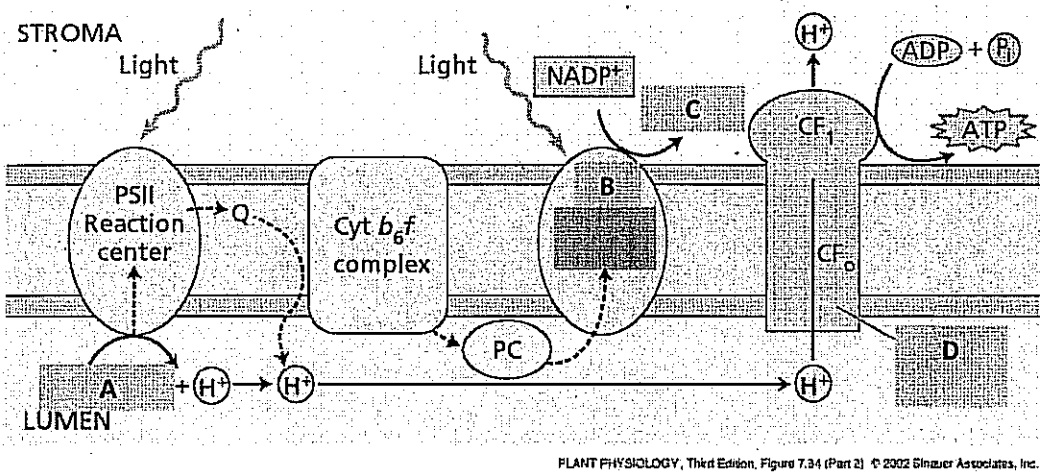
Following questions (24 - 28) are based on figure given below and require short answers only.



PLANT PHYSIOLOGY, Third Edition, Figure 7.34 (Part 2) © 2002 Sinauer Associates, Inc.

24. What is the membrane that harbours above electron transport chain? .....

25. What is the significant reaction (A) that takes place at PS11? .....

26. What is denoted by B? .....

27. What is the product 'C'? .....

28. What is 'D'? .....

29. What is the process of synthesis of ATP at D is called? .....

30. The first stable compound in the pentose phosphate pathway is
    a. Oxaloacetic acid
    b. PGAL
    c. PEP
    d. Ribulose -5 Phosphate