Reg. No._____

UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE, BACHELOR OF SCIENCE (BIOLOGY), BACHELOR OF SCIENCE (ENVIRONMENTAL CONSERVATION AND NATURAL RESOURCES MANAGEMENT) AND BACHELOR OF EDUCATION (SCIENCE)

SBT 401: PLANT BIOCHEMISTRY

DATE: APRIL 6, 2018 **TIME: 11:00 – 1:00PM**

INSTRUCTIONS: Answer **ALL** Questions from **SECTIONS A** and **B**, and **ONE** Question selected from **Section C**.

SECTION A: Multiple Choice Questions (1 Mark each)
Please tick in the box opposite the correct answer.

1. Pectic substances are synthesized from_____.
   - ☐ Glucose phosphate units
   - ☐ Fructose and glucose units
   - ☐ Glucose and galactose units
   - ☐ Starch
2. During cellulose synthesis_____is used as an acceptor molecule?
   - ☐ Starch
   - ☐ Cellodextrins
   - ☐ Cellobiose
   - ☐ Glucose

3. Gluconeogenesis occurs in organelles called_____.

- ☐ Spherosomes
- ☐ Lysosomes
- ☐ Mitochondria
- ☐ Glyoxysomes

4. Transamination is a process in which _____ is transferred to the carbonyl group of a Keto acid.

- ☐ Carboxyl group
- ☐ Amide group
- ☐ Amino group
- ☐ Hydroxyl group

5. Sucrose is degraded in the plant tissues to yield glucose and fructose using_____enzyme.

- ☐ Amylase
- ☐ Invertase
- ☐ Glucose isomerase
- ☐ Sucrose synthetase

6. Which of the following codons can code for an amino acid during protein synthesis?

- ☐ UAA
- ☐ UAG
- ☐ UGA
- ☐ UGG

7. Which statement best describes denitrification?

- ☐ Process through which nitrates in the soil are converted into ammonia, nitrous oxide and nitrogen gas
- ☐ Nitrates are absorbed from the soil into the plant and converted into ammonia
- ☐ This is a process in which ammonia in the soil is oxidised to nitrates
- ☐ Process through which nitrogen move from the soil reservoir into the plant reservoir

8. Which of these organisms is not involved in asymbiotic nitrogen fixation?

- ☐ *Clostridium pasteurianium*
- ☐ *Azotobacter chroococcum*
- ☐ Brandyrhizobia
- ☐ Nostoc

9. β oxidation of fatty acid is catalyzed by the following enzymes except?

- ☐ Thiokinase
- ☐ acyl-CoA dehydrogenase
- ☐ β-Ketothiolase
- ☐ *Kinase*

10. _____is the protein portion of a conjugated protein?

- ☐ Apoenzyme
- ☐ Holoenzyme
- ☐ Prosthetic group
- ☐ Amino acid

11. Coenzymes have the following characteristics except?

- ☐ Acts as a donor or acceptor of atoms or electrons added to or removed from the substrate
- ☐ When a coenzyme is removed from the enzyme, the catalytic properties of the enzyme are greatly enhanced.
- ☐ Most coenzymes are composed of vitamins, organic compounds that are synthesized in plants and used in small amounts.

12. The precursors of vitamin A are _____?

- ☐ Amino acids
- ☐ Carotenoids
- ☐ Vitamin B_1
- ☐ Flavin mononucleotide

13. Explain why NAD and NADP are coenzymes of the dehydrogenase type?

- ☐ They are mainly bound to biotin.
- ☐ Mainly bound to dehydrogenase enzymes.
- ☐ Are capable of degradative dehydrogenation of molecules.
- ☐ They can easily be reduced.

14. _____is not an organic acid of the TCA cycle.

- ☐ Citric acid
- ☐ Succinic acid
- ☐ Malic acid
- ☐ Malonic acid

15. _____ is a non-protein amino acid.

- ☐ Alanine
- ☐ Glutamic acid
- ☐ Valine
- ☐ Homoarginine

SECTION B: SHORT ANSWER QUESTIONS (5 Marks Each)

Your answers should be brief and to the point (Use the examination answer book provided)

16. Differentiate between transamination and reductive amination.
17. Explain why most plants store carbohydrates as starch and not sucrose while others store sucrose and glucose.
18. Discuss the role of proteinaceous factors in protein synthesis.
19. Discuss the assimilation of inorganic nitrogen in plants.
20. Describe the characteristics of vitamins.
21. Explain why vitamin B6 is considered to be a complex.

SECTION C: ESSAY QUESTIONS (25 Marks Each)

Write an essay on any ONE of the following topics (Use the examination answer book provided)

22. Discuss the degradation sequence of fatty acids.
23. Write an essay on the synthesis and degradation of starch molecules.
24. Discuss the classification and functions of lipids.

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