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**JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
UNIVERSITY EXAMINATIONS 2017/2018**

**YEAR III SEMESTER I EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN LAND RESOURCES PLANNING AND MANAGEMENT**

ALP 2308: SOIL GENESIS AND CLASSIFICATION

DATE: JANUARY 2018

TIME: 2 HOURS

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO
QUESTIONS**

QUESTION ONE

(a) Define the following terms;

- (i) Soil and its limits
- (ii) Diagnostic horizon
- (iii) Soil forming factor
- (iv) Diagnostic property
- (v) Diagnostic Epipedon
- (vi) Regolith

[9 marks]

(b) (i) Why is soil viewed as a space?

[1 mark]

(ii) Explain the following soil forming sub-processes.

- (a) Illuviation
- (b) Pedoturbation
- (c) Humification
- (d) Calcification

[6 marks]

(c) Describe the characteristics needed in a horizon for it to qualify as;

- (i) Mollic A
- (ii) Argic B
- (iii) Cambic B
- (iv) Ferralic B

[10 marks]

(d) Outline the differences (if any) between the following pair of terms;

- (i) Greyzems and Gleysols
- (ii) Solonchaks and salic Fluvisols
- (iii) Cambic B and Ferralic B
- (iv) Humic Nitisols and Luvic Phacozems

[4 marks]

QUESTION TWO

- (a) Name and describe the essential characteristics of three diagnostic epipedons which constitute a soil profile and explain how each is formed. [6 marks]
- (b) Explain how soil formation is influenced by climate and biosphere. [10 marks]
- (c) Describe the essential properties required in a soil profile for it to classify as *humic* Nitisols. [4 marks]

QUESTION THREE

- (a) Name and give the relevant chemical equations of six reactions which contribution to transformations in a soil profile. [9 marks]
- (b) Describe the essential properties required in a soil profile to classify as *UVic* phaeozems. [5 marks]
- (c) Name and outline the differentiating criteria of the categories employed by the USDA Soil Taxonomy. [6 marks]

QUESTION FOUR

- (a) Name and describe the essential characteristics of four major soil units formed during the process of illuviation. [10 marks]
- (b) State the essential soil characteristics for the following soil units;
- (i) Kastanozems
 - (ii) ●cyzems
 - (iii) Solonchaks
 - (iv) Fluvisols
- [10 marks]