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MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER EXAMINATIONS

MAIN EXAMINATION

FOR THE DEGREE OF
BACHELOR OF SCIENCE IN GEOSPATIAL INFORMATION SCIENCE

COURSE CODE: **DPG 309**

COURSE TITLE: **DIGITAL IMAGE ANALYSIS II**

DATE: 25/4/2023   **TIME: 3-5 PM**

INSTRUCTIONS TO CANDIDATES

This paper contains **four (4)** questions
Question **one (1) is compulsory {total = 30 Marks}**
Attempt **any other two (2) {total = 40 Marks}** from the remaining questions
Be brief and to the point

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over⟹

SECTION I: COMPULSORY {30 MARKS}

Question ONE

a] Define image classification (2mks)

b] Write brief concise notes on the following digital image analysis concepts.

   i)   Expert/rule based image classification (6mks)

   ii)   Change detection mapping (6mks)

   iii)   Image feature extraction (5mks)

   iv)   Supervised image classification (6mks)

   v)   Normalized difference vegetation Index (5mks)

SECTION II: ATTEMPT ANY OTHER TWO (2) QUESTIONS {40 MARKS}

Question TWO

Assume that a crop type classification has been performed using Landsat-TM Sensor on board landsat-5 satellite. Subsequently the classification result was evaluated by means of a field GPS survey point. The results are as follows.

- *Of the 25 potato pixels, 15 were classified correctly as potatoes, 5 as Wheat and 5 as Maize*
- *Of the 50 Wheat pixels 40 were classified correctly as Wheat, 5 ass potatoes and 5 as Maize.*
- *Of 25 Maize pixels, 15 were classified correctly as Maize, 6 were classified as Potatoes and 4 as Wheat*

a) Prepare a confusion matrix for this classification (10mks)

b) Calculate individual class classification accuracy (5mks)

c) Determine and comment on overall accuracy of the classification (5mks)

Question THREE

Explain how the method of minimum distance classification algorithm works (20mks)

Question FOUR

a) State any five (5) criteria used in selecting images for change detection analysis (5mks)

b) Explain any three (3) methods used in digital image change detection (15mks)