FACULTY OF ENGINEERING

END OF SEMESTER EXAMINATIONS - APRIL -MAY 2025

PROGRAMME : Bachelor of PETROLEUM ENGINEERING

YEAR/SEM : Three (3), Semester II

COURSE CODE : PTE3252

NAME : GEOGRAPHICAL INFORMATION SYSTEMS

DATE: 17/04/2025

TIME: 02:00Pm – 05:00Pm

INSTRUCTIONS TO CANDIDATES:

1. Do not open this examination until you are told to do so

2. **ATTEMPT ALL QUESTIONS IN SECTION A AND ANY THREE (3) IN SECTION B.**

3. All rough work should be in your answer booklet

4. The time allowed for this examination is strictly 3 hours

5. **ON THE FIRST PAGE OF YOUR ANSWER BOOKLET**

   • Write your registration number properly

   • Write the course name and course code

   • Write examination venue

   • Do not write, draw or scratch anything else on the first page

   • Writing unnecessary information like phone numbers in the first page shall annul your exam

   • Answer booklets that do not carry the required information, or that have unnecessary writing in the first page shall not be marked.

   • Do not carry any section of this question paper out of the examination room, submit it together with your answer booklet.

GEOGRAPHIC INFORMATION SYSTEM

Section A (40 Marks)

1.1. What can you define the terms; Data and Information.
(4 marks)

1.2. Give 4 digitizing errors you know.
(4 marks)

1.3. Define the terms Rasterization and Vectorization.
(4 marks)

1.4. We can say that the horizontal datum is defined by?
(4 marks)

1.5. List at least three interpolation techniques you know.
(4 marks)

1.6. A simple representation of area features would be to list for each polygon simply the list of lines that describe its boundary. Why doesn't this work?
(4 marks)

1.7. List the criteria one should use to select a map projection.
(4 marks)

1.8. What are data processing systems?
(4 marks)

1.9. Give four reasons for using a DBMS.
(4 marks)

1.10. List four pieces of information that one could get by looking at the lineage of data. (4 marks)

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Section B (60 Marks)

2.0 The tables below show forged information about 10 selected GIS second year students.

Table = STUDENT_INFO

Surname	Reg No	Age	Height (In)	Weight (kg)
Katamba	2699	37	50	51
Masolo	1267	19	53	58
Male	4708	22	51	60
Ninsiima	2291	18	44	48
Nayebale	1789	27	48	59
Nasasira	2314	20	49	62
Abitegeka	2222	25	50	58
Kusiima	6875	18	50	60
Katongole	8974	35	52	63
Kiyingi	9018	21	51	69

Table = STUDENT_HALL

Student_ID	No	Hall	Meal card No	Room No
2699	2	Lumumba	129	B2
1267	19	Mitchel	100	D13
4708	33	UH	139	F6
2291	20	CCE	34	A8
1789	19	Africa	229	B9
2314	17	Nsibirwa	103	C2
2222	22	Mary Stuart	294	H8
6875	19	Lumumba	267	C4
8974	23	UH	777	E3
9018	40	Livingstone	123	A9

(a) Write a SQL which was used to query the information given in the table below. (6 marks)

Surname	Reg No	Age	Height (inches)	Weight (kg)
Katamba	2699	37	50	51
Abitegeka	2222	25	50	58
Kusiima	6875	18	50	60

(c) Write a SQL that could be used to join the tables, STUDENT_INFO and STUDENT_HALL.   (6 marks)

(d) Using the answer of the question above, display the output.
          (7 marks)

3.0 Using the table given below

Point	Topo Map		GPS		Errors	
	X	Y	X	Y	δX	δY
1	12345	54321	12354	54316		
2	12456	54221	12470	54229		
3	12566	54664	12558	54657		
4	12211	54478	12202	54484		
5	12501	54347	12495	54345		

(a) Compute the systematic RMSE errors
          (8 marks).

(b) Compute the systematic error
          (5 marks).

(c) Suppose you were given the error matrix below

Classified Image	Reference data			Total
	Forest	Agriculture	Urban	
Forest	62	5	0	67
Agriculture	2	18	0	20
Urban	0	1	12	13
Total	64	24	12	100

In your own words, discuss how one would come up with such a matrix
          (7 marks)

4.0 Discuss the following terms as applied in

- Positional accuracy
          (8 marks)
- Attribute accuracy
          (6 marks)
- Lineage
          (6 marks)

5.0 (a) In the GIS lecture, we provided the (logical) definition of the 'meets' relationship. Provide your version of the definitions of 'covered by' and 'overlaps'

(6 marks).

(b) List the rules of topology

(5 marks).

(c) Give the advantages and disadvantages of vector and raster presentations

(14 marks).