



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

SECOND SEMESTER EXAMINATIONS, MAY/JUNE 2018

COURSE NO: GM 382

COURSE NAME: SPATIAL STATISTICS

CLASS: GM III

TIME: 3 HOURS

Name: _____ Index Number: _____

Attempt All Questions (A total mark of 60 is to be awarded)

1. A study was conducted involving 10 infants to investigate the association between gestational age at birth, measured in weeks, and birth weight, measured in grams (refer to Table 1). Given that, the birth weight is the dependent variable and gestational age is the independent variable, compute the Pearson correlation between gestational age and infant birth weight **[20 marks]**

Table 1 Correlation of Gestational Age and Birth Weight

Infant ID #	Gestational Age (weeks)	Birth Weight (grams)
1	34.7	1895
2	36.0	2030
3	38.7	2005
4	40.1	2835
5	35.7	3090
6	42.4	3827
7	40.3	3260
8	37.3	2690
9	40.9	3285
10	38.3	2920

2. Table 2 shows six (6) weather stations. Estimate the unknown value at point 0 from the five (5) surrounding weather stations, using:

a. an IDW Interpolation, with a power of 1.0 **[10 marks]**

b. the linear or first-order trend surface **[10 marks]**

Point	X (m)	Y (m)	Value (m)
0	69	67	Unknown
1	69	76	19.820
2	59	64	16.910
3	75	52	16.380
4	93	73	16.600
5	89	53	17.560

3. State any five (5) assumptions that underpins multiple regression. **[5 marks]**
4. DTM provides the means for representing the continuous surface in a digital form using a finite amount of storage. Briefly discuss three (3) benefits of DTM over traditional analog representation. **[3 marks]**
5. State three (3) basic requirements for TIN formation. **[6 marks]**
6. State two (2) advantages and two (2) disadvantages of TIN. **[4 marks]**
7. What are the two (2) main challenges associated with Point-Based Moving Averaging Interpolation. **[2 marks]**