THE HONG KONG POLYTECHNIC UNIVERSITY

DEPARTMENT OF LAND SURVEYING AND GEO-INFORMATICS

Programme	**:**	04001 MSc/PgD in Geomatics			
Subject Title	**:**	Spatial Data Acquisition			
Subject Code	**:**	LSGI522	**Session**	**:**	Semester 1, 2019/20
Date	**:**	13 January 2020	**Time**	**:**	19:00 – 22:00
Time Allowed	**:**	3 hours	**Subject Examiner(s)**	**:**	Dr. Wei Yao (LSGI)

This question paper has a total of __7__ pages.
(Some pages may be intentionally omitted.)

Instructions to Candidates :

This is a close-book exam.

Except for a calculator, no electric devices are allowed.

This paper has **TWO** sections, A and B.

Section A: **Multiple** Choice. Answer **ALL** questions.
Section B: Answer **ALL** questions.

Total marks = 40.

Available from Invigilator : Nil

.../2

DO NOT TURN OVER THE PAGE UNTIL YOU ARE TOLD TO DO SO

Section A: **Multiple** choice. Answer **ALL** questions.
(each question might have more than one correct answer).
Each question 1 mark, total marks 20.

They are all Multiple Choice questions.

…/3

They are all Multiple Choice questions.

…/4

They are all Multiple Choice questions.

- END OF SECTION A -

…/5

Section B: Answer **ALL** questions.

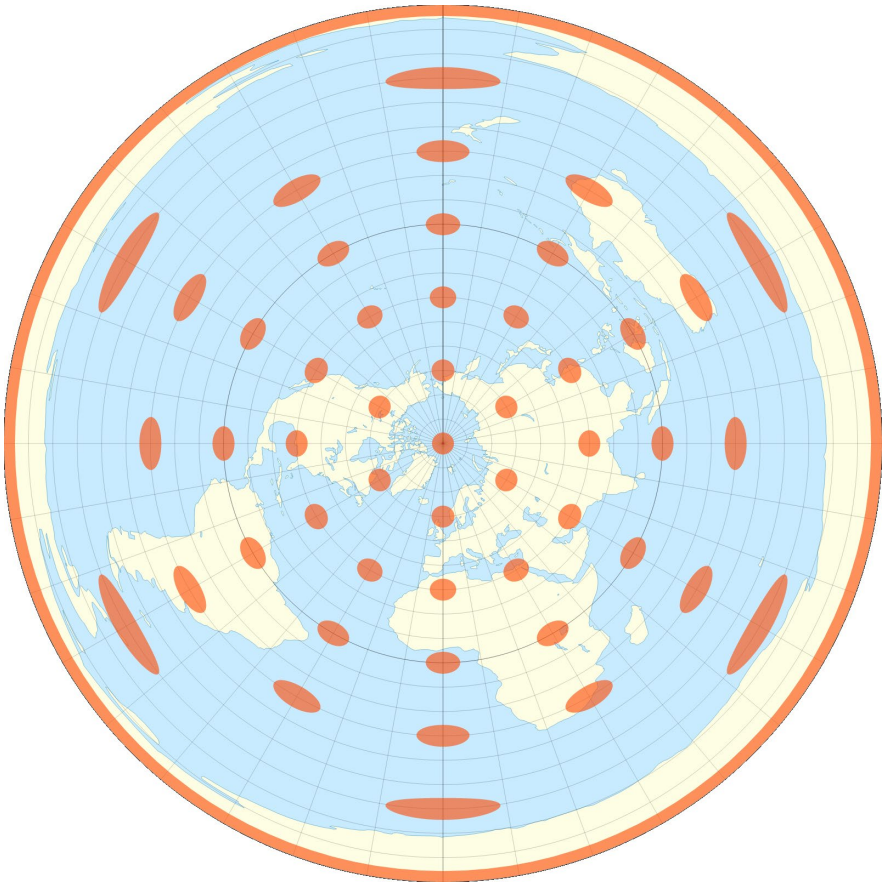
Question 21

(a) Outline the advantages and disadvantages of modern LiDAR measurements for vegetation mapping applications. (2 marks)
(b) Given the possibilities of LiDAR, briefly discuss why there is (currently) rare extant or planned space-borne LiDAR system. (1 marks)

Question 22

Checking carefully of the following figure and answer the following questions:

(a) What does the scale of map mean? (1 marks)
(b) What map projection does (a) use? (1 marks)
(c) What is the advantage of this map projection? (1 marks)
(d) How do you call the figure (a)? what do red dots mean, and how would it reflect scale variation? (2 marks)



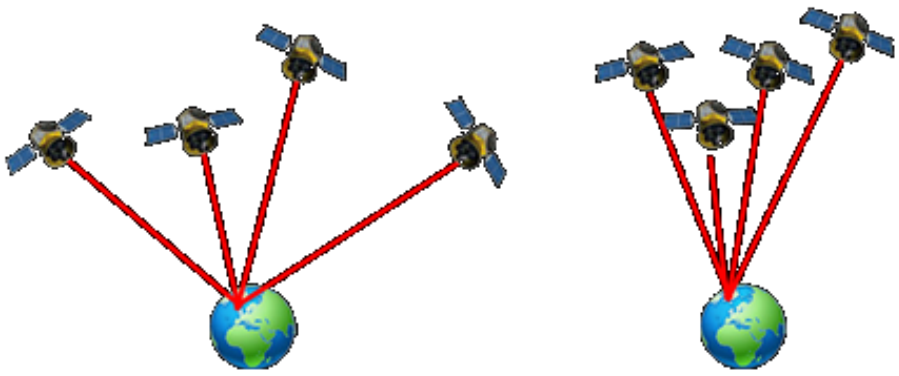
(a)

Question 23

(a) What heights do GPS, Leveling, Gravity and Satellite Altimetry measure? (1 marks)
(b) Traversing, intersection and resection are positioning techniques used in topographic surveying. Accurately describe each of them and give examples of how each may be used in a topographic survey project. (2 marks)

Question 24

(a) What are the three segments of GPS and explain their functions? (2 marks)
(b) Which kinds of observations are performed by GPS positioning technique to realize the distance resection? (1 marks)
(c) Which of following two GPS satellite constellations can deliver better positioning solution? Which factor can be used to quantify the geometric distribution of observed GPS satellites? (2 marks)



(a) (b)

Question 25

Predicted \ Truth	Asphalt	Concrete	Grass	Tree	Building
Asphalt	2385	4	0	1	4
Concrete	0	332	0	0	1
Grass	0	1	908	8	0
Tree	0	0	0	1084	9
Building	12	0	0	6	2053

Confusion matrix of land cover classification

Please pay attention that you are also required to clarify and present the intermediate steps/results of the calculation

(a) Calculate the Producer accuracy and User Accuracy for each class respectively (2 marks)

(b) Calculate the overall accuracy (1 marks)

(c) Calculate the Kappa coefficient (1 marks)

- END OF PAPER -