FEDERAL UNIVERSITY OF TECHNOLOGY
SCHOOL OF ENVIRONMENTAL TECHNOLOGY
DEPARTMENT OF SURVEYING & GEOINFORMATICS
FIRST SMESTER EXAMINATION 2017/2018 SESSION

COURSE TITLE: Spherical & Field Astronomy **COURSE CODE:** SVG312 **CREDIT UNIT:** 2 **TIME** 2.30 Mins.

INSTRUCTION: Answer Question **ONE (1)** and any other **THREE (3)**

Q1. a. You have been commissioned to carry out a perimeter survey of a commercial farm land at Sabon Daga in Bosso LGA using a theodolite and tape. If you are faced with the challenge of nonexistence of control points close to the project site, outline the procedure you will adopt to establish a local origin for your project using altitude method. What is the optimum range of altitude observation for solar azimuth determination using altitude method? **(15 Marks)**

b. Distinguish between solar and sidereal time. Compute the local sidereal time (LST) at a place latitude 09° 20′ 25″N and longitude 06 ° 10′ 30″E by 10.30pm Nigeria time on 1st April, 2018. The extract from the star almanac is as follows:

DATE	UT	R
1st April	0hr	$8^{hr}\ 50^{min}\ 35.5^{sec}$
	6hr	$8^{hr}\ 51^{min}\ 34.8^{sec}$
	12hr	$8^{hr}\ 52^{min}\ 33.9^{sec}$
	18hr	$8^{hr}\ 53^{min}\ 33.0^{sec}$
2nd April	0hr	$8^{hr}\ 54^{min}\ 32.4^{sec}$

(25 Marks)

Q2. a. Enumerate the principles of Elongation. Give the procedural steps for programming stars to be observed at near elongation. **(15 Marks)**

b. how would you differentiate azimuth determination by altitude and hour angle methods? **(5 Marks)**

Q3. From a solar observation made on 3rd January, 2018 at 8.15am local time at a location in Minna latitude 09° 30′ 15″N and longitude 06° 20′ 15″, the horizontal angle obtained was 300° 40′ 50″ while the extract from the star almanac is:

UT	Declination (δ)	Quantity E
6hr	$15^{hr}\ 10.5^{min}$ South	$12^{hr}\ 16^{min}\ 20.2^{sec}$
12hr	$15^{hr}\ 17.0^{min}$ South	$12^{hr}\ 16^{min}\ 20.1^{sec}$

(20 Marks)

Q4. a. compute the local hour angle of the sun at UT $15^{hr}\ 17.0^{min}$ and longitude (λ) 06° 30′ 10″ on a day when the value of E is as follows:

UT	Quantity E
12hr	$11^{hr}\ 45^{min}\ 33.5^{sec}$
18hr	$11^{hr}\ 45^{min}\ 33.2^{sec}$

(15 Marks)

b. how would you define the meridian direction in preparation for stellar observation? **(5 Marks)**

Q5. a. Identify the following equation and define the parameters: $\cot A = \dfrac{\sin\phi\cos h - \tan\delta\cos\phi}{\sin h}$ what is the relevance of the equation in astronomy? **(5 Marks)**

ii. Would you advise the adoption of solar observation for second order azimuth determination by hour angle method? Give reasons for your answer. What is the essence of pairing east and west observations during astronomical observations? **(5 Marks)**

b. Briefly discuss the following terms:

(i). Star on the prime vertical (ii). Star on the horizon (iii). Star at culmination (iv). Circumpolar stars.

(10 Marks)