KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2018

Marks Scored:

Level : B. E.
Year : IV
Course : GEOM 416
Semester: I

Exam Roll No.:
Time: 30 mins.
F. M. : 10

Registration No.:
Date MAR 15 2018

SECTION "A"
[20 Q ×0.5=10 marks]

Choose the most appropriate answer among the given choices

1. The geodetic astronomy is the branch of geodesy which includes:
   a. Celestial observation
   b. Physical problem of the Earth
   c. Geometrical problem of the Earth
   d. Geographical problem of the Earth

2. Which one is not the part of celestial sphere?
   a. Ecliptic
   b. Right Ascension
   c. Hour Angle
   d. Greenwich Meridian

3. In Hour Angle System, the declination and hour angle values are 30^0 and 12 H respectively. The same value in Cartesian coordinate system will be given by:
   a. Z=0.86
   b. Z=0.50
   c. Z=0.5774
   d. 1.7321

4. Which type of stars never cross the prime vertical?
   a. North Circumpolar stars (a) type
   b. North Circumpolar stars (b) type
   c. Equatorial Stars
   d. South Circumpolar stars

5. At what azimuth angle (z), star rise or set?
   a. $z=30^0$
   b. $z=45^0$
   c. $z=90^0$
   d. $z=180^0$

6. At what parallactic angle (p) define Elongation?
   a. $z=30^0$
   b. $z=45^0$
   c. $z=90^0$
   d. $z=180^0$

7. Which of the rule is followed by the satellite signals shift register?
   a. 2^n
   b. 2^n+1
   c. 2^n-1
   d. 2n

8. Which of the following is correct for Local Sidereal Time (LST) ?
   a. $LST= h - \alpha$
   b. $LST = h + \alpha$
   c. $LST = \alpha - h$
   d. $LST= h \times \alpha$

9. Which of the following does not depend upon the motion of the Earth?
   a. Sidereal Time
   b. Universal Time
   c. Atomic Time
   d. Ephemeris Time

10. Which of the following is not a part of Terrestrial Reference Frame (TRF)
    a. Angular Momentum axis
    b. Earth Rotation Axis
    c. Greenwich Meridian
    d. Perpendicular axis

11. The relation between Heliocentric direction, Geocentric direction and annual (stellar) parallax (π) is given by:
    a. $\Pi+\theta-\theta'=90$ b. $\Pi+\theta-\theta'<90$
    c. $\Pi+\theta-\theta'>90$ d. $\Pi-\theta-\theta'=90$

12. The right ascension measurement unit is given by:
    a. Degree b. Hour
    c. Both units d. Depends on situation

13. IERS stands for
    a. International Earth Rotation and Reference Systems Service
    b. International Earth Rotation Service Systems
    c. International Earth Rotation Station Systems
    d. International Earth Reference Service Systems

14. Ephemerides contains:
    a. Clock Information b. Orbital Information
    c. Location Information d. Equatorial Information

15. Which of the following is correct?
    a. $\cos A\cos c=\sin c\cot b-\sin A\cot B$
    b. $\cos A\cos c=\sin a\cot b-\sin A\cot B$
    c. $\cos A\cos c=\sin c\cot b-\sin A\cot C$
    d. $\cos A\cos c=\sin c\cot b-\sin C\cot B$

16. Which of the following is not a part of Celestial Reference Frame
    a. Angular Momentum axis b. Vernal Equinox
    c. Greenwich Meridian d. Perpendicular axis

17. In geodetic astronomy, the distances are measured as:
    a. Vector quantity b. Scalar quantity c. Vector and Scalar d. Tensor quantity

18. In geodetic astronomy, the orbital path of planets is considered as:
    a. Ellipse b. Circle c. Parabola d. Hyperbola

19. Which unit is not a part of Horizon System?
    a. Altitude b. Azimuth c. Zenith distance d. Declination

20. Which unit is not a part of Hour Angle System?
    a. Hour Angle b. Declination c. Azimuth d. Polar Distance

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SECTION "B"

(Short answer question)
[6 Q. × 4=24 marks]

Attempt *ANY SIX* questions.

1. Make a chart of digital signals for the three shift registers. [4]

2. Write the transformation between Right Ascension and Ecliptic systems. [2+2]

3. Explain the Polaris stars and write the derivation of it. [2+2]

4. Write a short note on the Nutation motion of the Earth [4]

5. Write the definitions of the Horizon and Hour Angle Systems. [2+2]

6. Explain the CRF and TRF and write the relation between them. [1+1+2]

7. How you will determine astronomic latitude and longitude in geodetic astronomy. [2+2]

SECTION "C"

(Long answer question)
[2 Q. × 8=16 marks]

Attempt *ANY TWO* questions.

8. Derive the relation of trigonometric function for the inverse problem of geodesy. [8]

9. Explain Elongation, Prime Vertical Crossing, Upper and Lower Culmination. [2+2+4]

10. Explain of Projectivity and Affine Transformations. Calculate the Projectivity and Affine transformation parameters between ITRF 05 and ITRF 08, given that [2+2+4]

ITRF 05			ITRF08		
x	y	z	x	y	z
2230	5000	600	2231	4999	602
2200	6000	800	2198	6001	798
1885	7008	408	1886	7006	410