

CIVIL ENGINEERING 3<sup>RD</sup> YEAR EXAMINATION, 2017  
1<sup>st</sup> Semester Supplementary

SUBJECT –Higher Surveying  
(Name in full)

Full Marks 100  
(50 marks for each part)

Time: Three hours

Use a separate Answer-Script for each part

PART I

**ANSWER ANY TWO QUESTIONS**

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|---|---|--|----|
| 1 | a | Assuming radius of earth = 6400 km calculate the geodetic area enclosed within the spherical triangle between places A ( $72^{\circ} 55' E, 30^{\circ} 45' N$ ), B ( $40^{\circ} 12' E, 36^{\circ} 14' N$ ) and C( $64^{\circ} 18' E, 27^{\circ} 31' N$ )?   | 13 |
|   | b | The coordinates of places P and Q are given below.<br>P: latitude N $45^{\circ} 27'$ longitude W $15^{\circ} 41'$<br>Q: latitude N $36^{\circ} 40'$ longitude E $22^{\circ} 61'$<br>What is the "convergence" of meridian between the above two places?  | 12 |
| 2 | a | Differentiate between sidereal day and mean solar day. Which one is longer in duration ?   | 5  |
|   | b | Derive the relation between LST at LMM and GST at GMM.   | 8  |
|   | c | Write notes on three types of astronomical co-ordinates we use .   | 12 |
| 3 | a | Draw a neat diagram of the celestial sphere showing:<br>Zenith, nadir, celestial horizon, Celestial poles and equator, Ecliptic ,First point of Aries and First point of Libra ,Position of the sun, Position of a star, with RA $38^h 42^m$ and declination $41^{\circ} N$ .<br>Given data:<br>Place of observation, $42^{\circ} N, 32^{\circ} E$<br>Time and date of observation, $14^h$ LMT on the $16^{\text{th}}$ May, 1978.<br>Equation of time = $+ 2^m 48^s$ | 20 |
|   | b | Write a note on geocentric parallax correction.  | 5  |

**B. CIVIL ENGG 3<sup>RD</sup> YEAR 1<sup>ST</sup> SEMESTER SUPPLEMENTARY EXAMINATION 2017  
HIGHER SURVEYING (OLD)**

Time: 3 Hours

Full Marks: 100  
(50 marks for each part)

**Part II**

Use Separate Answer scripts for each Part

Answer ALL Questions

1. Write short notes on the following – 3×4
    - a. Normal Tension
    - b. Phase Error of Non-Luminous Signal
    - c. Extension of Base
  
  2. The following results were obtained in a course of levelling work starting from the point A whose R.L. is 35.425 m. Using least square principle under conditional extremum with unit weight factor for all, Find the most probable R.L. values of stations B, C and D. 10

Level Line	A to B	B to C	B to D	C to D	D to A	C to A
Rise (m)	-52.295	+29.005	+30.250	+1.390	+22.210	+23.930
  
  3. In a triangle PQR, the station R could not be occupied and a satellite station S was selected at 10.95m from R inside the triangle PQR. The following observations were noted:  $\angle RPQ = 52^\circ 11' 40''$  and  $\angle RQP = 65^\circ 48' 20''$ ,  $\angle RSP = 156^\circ 30' 30''$ ,  $\angle PSQ = 62^\circ 03' 20''$  and  $PQ = 12650\text{m}$ . Determine the angle  $\angle PRQ$ . 10
  
  4. In a triangulation survey, the altitudes of two stations A and B, 110 km apart, are respectively 440 m and 725 m. The elevation of a peak P situated at 65 km from A has an elevation of 410 m. Ascertain if A and B are intervisible, and if necessary, find by how much signal at B should be raised so that the line of sight nowhere be less than 3 m above the surface of ground. Take earth's mean radius as 6400 km and the mean coefficient of refraction as 0.07. 10
  
  5. A reciprocal levelling operation is carried out in between two stations A & B which are 4.5 Km apart. The observations noted are – H.I. at A = 1.5m, H.I. at B = 1.55m, H.S. at A = 3m, H.S. at B = 2.6m, Observed Angle of Elevation from A to B =  $02^\circ 39' 49''$  and Observed Angle of Depression from B to A =  $02^\circ 39' 56''$ . Considering radius of earth as 6370Km find the Level difference between A and B. 8
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