Ref. No. – EX/CE/T/311/2018(S)(OLD)

B.E. Civil Engineering Third Year ,First Semester Supplementary Examination, 2018 (Old)

SUBJECT – Higher Surveying

Full Marks 100

Time: Three hours (50 marks for each part)

Use a separate Answer-Script for each part

PART I

Answer any two questions

1 a	Assuming radius of earth = 6400 km calculate the geodetic area enclosed within the spherical triangle between places A (60^0 50′N, 20^0 38′ E), B (25^0 12′N, 36^0 14′ E) and C (62^0 18′ N, 27^0 31′ E) .	15
1b	The coordinates of places P and Q are given below. P: latitude N 40^0 20′ longitude W 5^0 41′ Q: latitude N 30^0 18′ longitude E 5^0 25′ What is the "convergence' of meridian between the above two places?	10
2 a	Draw a neat diagram of the celestial sphere showing: i) Zenith, nadir, celestial horizon ii) Celestial poles and equator iii) Ecliptic iv) First point of Aries and first point of Libra v) Position of the sun vi) Position of a star, RA 36^h 16^m and declination 20^0N . Given data: i) Place of observation, 42^0 N, 20^0 E ii) Time and date of observation, 11^h LMT on the 7^{th} September, 2010. iii) Equation of time = + 2^m 36^s iv)	17
b	Explain the concepts of solar time , mean solar time and sidereal time .Which one among solar day and sidereal day is longer and why ?	8
3a	Explain the following terms with sketches – hour angle , right ascension , GST at GMN , Napier's rules ,first point of Aries .	8
b	A circumpolar star of RA 11 ^{h} , declination75^0 50′N is observed at eastern elongation from a place of latitude = 55 ^{0} N and longitude = 92 ^{0}W .Whole circle bearing of the star with respect to a reference = 120 ^{0} .Calculate the LMT of elongation , expected altitude and azimuth of reference . Given that GST at GMM = 10^h .	17

Ref. No.: EX/CE/T/311/2018 (S) (OLD)

B. E. CIVIL ENGINEERING 3RD YEAR 1ST SEMESTER SUPPLEMENTARY EXAMINATION 2018 (OLD)

HIGHER SURVEYING

Time: 3 Hours **Full Marks: 100**

Part II **(50 marks for each part)**

Use Separate Answer scripts for each Part

Answer ALL Questions

1. Write short notes on the following – 4×5
   a. Normal Tension
   b. Reduction to Centre
   c. Extension of Base
   d. Least Square Theory under Conditional Extremum

2. 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

3. 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°39'49" and Observed Angle of Depression from B to A = 02°39'56". Considering radius of earth as 6400Km find the Coefficient of refraction and Level difference between A and B. 10

4. The angles measured from a central station 'O' to the four stations A, B, C and D by the method of repetition are – AOB = 67°14'32", BOC = 75°36'21", COD = 59°56'02", DOA = 157°13'02". Using the principle of least square with conditional extremum, determine the most probable value of the angles. 4

5. The directions observed from a satellite station S, 70 m from a triangulation station C, to the triangulation station A, B, and C are 0°00'00", 71°32'54" and 301°16'15", respectively. The lengths of AB, and AC are 16.5 km and 25.0 km, respectively. Deduce the angle ACB. 6