Ex./CON/T/221/2017(OLD)

BACHELOR OF CONSTRUCTION ENGINEERING EXAMINATION, 2017

(2nd Year, 2nd Semester, Old Syllabus)

Surveying - II

Time : Three hours Full Marks : 100

PART - I

Instructions:

1. Answer any **TWO** questions.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.

1. (a) The survey records of a closed traverse are given in the following table. Fill up the missing entries

Line	AB	BC	CD	DE	EA
Lengths (m)	278.6	376.4	318.4	?	?
WCB	117°19′	57°36′	312°52′	271°13′	201°56′
Reduced Bearing	S62.683°E	N 57.6000°E	N 47.1333°W	N 88.7833°W	S 21.9305°W

Also find out the area of the traverse (ABCDE) Assume any arbitrary Bearing of Line BC **(20)**

(b) Briefly explain 'vertical curves' and 'shift of a transition curve'? **(5)**

2. (a). State the relationship between the radius of a curve and the degree of the curve. **(5)**
(b). what are transition curves? **(5)**

© From the given data calculate only the deflection angles of the Transition curve for setting out purpose with **NECESSARY CHECKS**? Minimum peg interval = 2m
Velocity = 60km/hr Radius = 250m α = rate of change of radial acceleration = 1.1m/sec^3
Meterage at intersection point = 320m I=Intersection angle = 33°34'20" **(15)**

3. (a) Derive an expression for the horizontal distance of a vertical staff from a tacheometer if the line of sight of the telescope is horizontal.

(b) Stadia readings were taken with a theodolite on a vertical staff with the telescope inclined at an angle of depression of 3°30′. The staff readings were 2.990, 2.055 and 1.120. The reduced level of the staff station is 100.000m, and the height of the instrument is 1.40 m. What is the reduced level of the ground at the instrument? Take constants as 100 and zero. **(15+10)**

B. Construction Engg. 2nd Yr 2nd Semester Exam. 2017 (old)

Surveying - II

PART - II

Answer Q.no.1 and any two from the rest.

1. Write **TRUE** or **FALSE** for the following questions: 1 x 10

(a) Normally the area of a plane triangle is less than that of the spherical triangle.

(b) The principle of least square can be applied to conditional extremum problems.

(c) The directions of aeroplanes are determined along great circle routes.

(d) Napier's rule is applicable for right angled spherical triangles.

(e) Method of equal shifts involves more mathematical calculations than the method of least square.

(f) In a braced quadrilateral the sum of base angles of opposite triangles are not equal.

(g) In a triangulation survey only linear measurements are made.

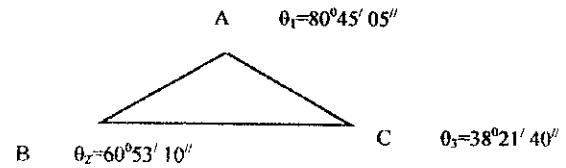
(h) To convert a conditional extremum function into an unconditional one, Lagrange's multipliers are introduced.

(i) The first derivatives of the auxiliary function w.r.t. the error functions are not equal to zero for unconditional extremum problems.

(j) Sum of the three angles of a spherical triangle is equal to 180^0.

2. a. State the principle of least square. Discuss the extremisation of a function subject to constraint equations giving a suitable example.

b. In a simple triangulation system the observed angles are:



Angle	Weight of observation
$A=\theta_1=80^0 45' 05''$	$w_1=1$
$B=\theta_2=60^0 53' 10''$	$w_2=1$
$C=\theta_3=38^0 21' 40''$	$w_3=1$

What are the probable values of the angles?

8 + 12

3. (a) What are the necessary and sufficient conditions for a closed figure for regular geometric shapes of various triangulation schemes? In connection with this state and prove the log sin condition.

(b) In a triangulation survey the signal was eccentrically placed at E away from the main triangulation station A. The observed angles at B and C (which are also triangulation stations) taken to the eccentric signal E are, $\angle EBC = 80^0 50'$ and $\angle ECB = 75^0 15'$. The eccentric length EA was measured to be 2.3 m. The directions of E, C and B as observed from A shows, $AE = 360^0 00'$, $AB = 307^0 45'$ and $274^0 30'$. From the adjoining triangle the length BC was found to be 480.2 m. What would have been the angles at B and C if the signal was correctly erected at A?

8 + 12

4.(a) State and explain Napier's rule.

(b) What do you mean by zero convergence? Explain.

(c) The latitudes and longitudes of two places A and B are given below:

$A = 22^0 35' N$ and $80^0 25' E$
$B = 23^0 42' N$ and $90^0 25' E$

i) What will be the direction of flight from A to B?
ii) What is the shortest distance between them? Assume R = 6400 km.
What is the "convergence"?

5 + 3 + 12