

22.5.06

B.E. (Civil) 4th Semester Examination, May 2006
Sub: Surveying II (CE-401)

Full marks: 100

Time: 3 Hours

Assume any relevant data if necessary.

First Half

Answer question no. **ONE** and any **TWO** from the rest.

1. Write short notes (any five) (4X5=20)

- i. Temporary adjustment of theodolite
- ii. Measurement of deflection angle
- iii. Telescope invert, Transiting and Changing Pivots
- iv. Consecutive coordinates and Independent coordinates
- v. Measurement of horizontal angle by reiteration
- vi. Bowditch's rule and Transit rule
- vii. Fixed Hair method and Movable Hair method

2. (7+8=15)

- (a) What is Double Meridian Distance? Derive the rules for finding out Double Meridian Distance for a traverse.
- (b) Following observations are made for a closed traverse.

Line	Latitude (m)	Departure (m)
AB	-300	+400
BC	+640	+160
CD	+100	-300
DE	-440	-260

Compute the area of the traverse by co-ordinate method.

3. (5+10=15)

- (a) Describe how the accuracy of an open traverse is checked?
- (b) A straight tunnel is to be run between two points A and B, whose independent coordinates are:

Point	Independent coordinates	
	N	E
A	0	0
B	3014	256
C	1764	1398

It is desired to sink a shaft at D, the mid-point of AB, but it is impossible to measure along AB directly. So D is fixed from C, another point whose coordinates are known.

Calculate the

- (i) Independent coordinates of D
- (ii) Length and bearing of CD
- (iii) Angle ACD, given the W.C.B. of AC is 38°24'

4. (5+10 = 15)

- (a) Derive the expression for horizontal distance using principle of stadia method.
- (b) Following observations were made by a tacheometer fitted with a anallatic lens having multiplying constant=100.00.

Instrument station	Staff Station	Vertical angle	Staff hair reading (m)			Remarks
			Lower	Middle	Upper	
P	Bench Mark	5°	2.00	1.50	1.00	Staff Inverted on B.M
P	Q	-10°	1.00	1.40	1.80	
R	Q	-10°	2.00	3.10	4.10	R.L of B.M. = 100.m

If the height of the instrument at P and R are 1.0m and 1.5 m respectively and the staff held vertical find the reduced level of P, Q and R.

Second Half

Answer question no. **FIVE**, and any **TWO** from the rest.

5. Write short notes (any five) (4X5=20)

- i. Free haul and limit of economic haul
- ii. Waste and Borrow
- iii. Multilevel section
- iv. Compound curve and Reverse curve
- v. Centrifugal ratio and Cant
- vi. Nomenclature of a curve
- vii. Shift of the curve

6. (7+8=15)

- (a) Deduce the expression for cross-sectional area for a Two-Level section.
- (b) State and prove the prismoidal formula for volume computation.

7. (a) Explain the main features of Mass Haul Diagram (7+8=15)

(b) Following data were obtained for construction of a road-way section.

Chainage (m)	0	10	20	30	40	50	60	70	80	90	100	110	120	130
Cut (m ³)	-	15	20	25	30	35	50	70	-	-	-	-	-	-
Fill (m ³)	-	-	-	-	-	-	-	-	50	40	30	50	75	90

Complete the Mass Haul Diagram from the above data and find the distance up to which the cut and fill will be balanced.

8. (7+8=15)

- (a) What is meant by a 'transition curve'? Derive the expression for ideal transition curve.
- (b) A circular curve is to be designed to negotiate the vehicles from a transition curve to a circular curve with a speed of 40 km/hr. The maximum centrifugal ratio permitted on the road way is 0.25. Calculate the length of five offsets (except two tangent points) from the long chord and the chainages of the tangent points if the chainage of the intersection is 2500 m. Take the angle of intersection equals to 140°.