

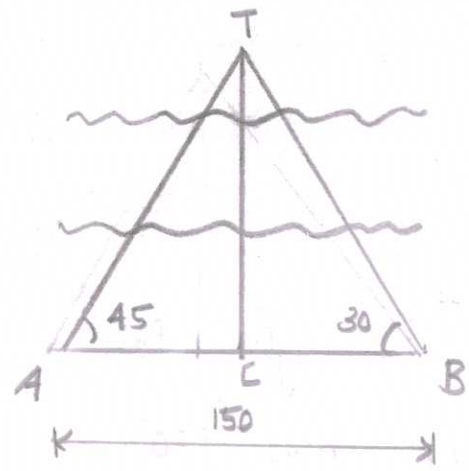
SCHEME OF VALUATION

Scoring Indicators

Revision: 2015		Course code: 2011		
Course Title: SURVEYING-1				
Qst No.	Scoring indicator	Split up score	Subtotal	Total
1	<p style="text-align: center;">PART-4</p> Triangle in which no angle is less than 30° or more than 120° .		2	
2	levelling centering orientation		2	
3	The angle which magnetic field lines of force make with the surface of earth is called dip		2	
4	i) Internal radius of the tube ii) Diameter of the tube iii) length of the bubble iv) Roughness of the walls		2	
5	Two contour lines of different elevation intersects and forms overhanging cliff		2	

Q
1

PART-B



From $\triangle ACT$,

$$\tan 45^\circ = \frac{TC}{AC}$$

$$AC = \frac{TC}{\tan 45}$$

From $\triangle BCT$,

$$\tan 30 = \frac{TC}{BC}$$

$$BC = \frac{TC}{\tan 30}$$

$$AC + BC = \frac{TC}{\tan 45} + \frac{TC}{\tan 30}$$

$$= TC \left(\frac{1}{\tan 45} + \frac{1}{\tan 30} \right)$$

Given

$$AC + BC = AB = 150 \text{ m}$$

$$150 = TC \left(\frac{1}{\tan 45} + \frac{1}{\tan 30} \right)$$

Width of River, $TC = 54.904 \text{ m}$

2 Plane table traverse in which at each successive station the plane table is set, a foresight is taken to the following station and its location is plotted by measuring distance between two stations

Procedure of Traversing

4

Diagram of Traversing

2

6

3 Diurnal Variation - is the systematic departure of declination from its mean value during a period of 24 hours.

Annual Variation - Variation which has a yearly period is known as annual variation

Secular Variation - Magnetic meridians swing like a pendulum it swings in one direction for long terms of 100-150 years, gradually

4 x 1/2

6

comes to rest and then swings in opposite direction.

Irregular Variation - They are due to ~~isobaric~~ known as 'magnetic storms'. They may occur due to earthquake & other solar influences

4

STATION	BS	IS	FS	HI	R-L	Remarks
	2.228			303.088	300.86	BM
	0.988		1.606	302.47	301.482	CP ₁
		2.090			300.38	
		2.864			299.606	
	0.602		1.262	301.81	301.208	CP ₂
	1.044		1.982	300.832	299.628	CP ₃
			2.684		298.188	

check

$$\sum BS - \sum FS = \text{Last R-L} - \text{First R-L}$$

$$-2.682 = -2.682$$

5

- i) Drawing of sections
- ii) Determination of intervisibility between two points
- iii) Tracing of contour gradients and location of route.

	iv) Measurement of drainage areas v) Calculation of reservoir capacity vi) Intersection of surfaces & Measurement of earthwork	6x1	6
6	i) Plane table ii) Alidade iii) Plumbing Fork & Plumb bob iv) Spirit level v) Compass vi) Drawing paper with a rainproof cover	6x1	6
7	a) $N 5^{\circ}42' W - QB$ In WCB $\Rightarrow 360^{\circ} - 5^{\circ}42'$ $= \underline{\underline{354^{\circ}18'}}$		
	b) $94^{\circ}24' - WCB$ In QB $\Rightarrow 180^{\circ} - 94^{\circ}24'$ $= \underline{\underline{S 85^{\circ}36' E}}$		
	c) $S 30^{\circ}50' W - QB$ In WCB $\Rightarrow 180 + 30^{\circ}50' = \underline{\underline{210^{\circ}50'}}$	3x2	6

PART - C

III a) Radiation Method

⇒ In this method a ray is drawn from the instrument station towards the point, the distance is measured between the instrument station and that point, and the point is located by plotting to some scale the distance so measured.

⇒ This method is more suitable when the distances are small

4 1/2

Intersection Method

⇒ is resorted to when the distance between the point and the instrument station is either too large or cannot be measured accurately

⇒ The location of an object

is determined by sighting at the object from two plane table stations (previously plotted) and drawing the rays. The intersection of these rays will give the position of the object.

4/2

9

III b) Errors in chaining

- 1) Incorrect lengths of tape
- cumulative '+' or '-'
- 2) Bad ranging - cumulative '+'
- 3) Tape not stretched horizontally - cumulative '+'
- 4) Tape not stretched tight and straight, but both ends in line - cumulative '+'
- 5) Error due to temperature
- cumulative '+' or '-'
- 6) Variation in pull
- compensating \pm
- 7) Error due to sag
- cumulative '+'

6x1

6

- 8) Error in marking tape lengths
- compensating \pm
- 9) Disturbing arrows after they
are set - Blunder
- 10) Error in reading the tape
- Mistake
- 11) Incorrect counting of tape
lengths - Blunder

IV a)

sketch

3

\Rightarrow it is resorted to when both the ends of the survey lines are not intervisible due to high intervening grounds or due to long distance between them

\Rightarrow Procedure of Reciprocal Ranging

OBSTACLES IN CHAIN SURVEYING

IV b)

- 1. obstacles to ranging
- 2. obstacles to chaining
- 3. obstacles to both ranging & chaining

6

3x2

6

V a)

Corrected Bearings

$$F.B \text{ of } DE = 231^{\circ} 0' 0''$$

$$B.B \text{ of } DE = 51^{\circ} 0' 0''$$

$$F.B \text{ of } EA = 312^{\circ} 0' 0''$$

$$B.B \text{ of } EA = 132^{\circ} 0' 0''$$

$$F.B \text{ of } AB = 62^{\circ} 10' 0''$$

$$B.B \text{ of } AB = 262^{\circ} 10' 0''$$

$$F.B \text{ of } BC = 122^{\circ} 25' 0''$$

$$B.B \text{ of } BC = 302^{\circ} 25' 0''$$

$$F.B \text{ of } CD = 171^{\circ} 40' 0''$$

$$B.B \text{ of } CD = 351^{\circ} 40' 0''$$

9x1 9

V b)

Prismatic compass

⇒ Most convenient and portable

Form of magnetic compass

⇒ The Magnetic needle is of 'Broad needle' type

⇒ Graduations are in W.C.B system, having 0° at south, 90° at west, 180° at north

⇒ The graduations are engraved inverted

⇒ Object vane consists of metal vane with a vertical hair

⇒ The eye vane consists of a small metal vane with a slit

⇒ Readings are taken with the help of prism provided at the eye slit

6

VI a)

Line	Observed Bearing	Correction	Corrected Bearing	True Bearing	Remarks
AB	75° 5'	+30' at A	75° 35'	81° 5'	
BA	254° 20'	+1° 15' at B	255° 35'	261° 5'	
BC	115° 20'	+1° 15' at B	116° 35'	122° 5'	
CB	296° 35'	0' at C	296° 35'	302° 5'	stations
CD	165° 35'	0' at C	165° 35'	171° 5'	3
DC	345° 35'	0' at D	345° 35'	351° 5'	are
DE	224° 50'	0' at D	224° 50'	230° 20'	3
ED	44° 5'	+45' at E	44° 50'	50° 20'	by
EA	304° 50'	+45' at E	305° 35'	311° 5'	local
AE	125° 5'	+30' at A	125° 35'	131° 5'	3
		marks	3	3	3

3

9

vi b)

True Bearing - is the horizontal angle which it makes with the true meridians through one of the extremities of a line

2

Magnetic Bearing - is the horizontal angle which it makes with the magnetic meridians passing through one of the extremities of a line

2

$$\text{True Bearing} = \text{Magnetic Bearing} \pm \text{Declination}$$

Givens

$$\begin{aligned} \text{Magnetic Bearing of Sun at noon} \\ = 345^{\circ}20' \end{aligned}$$

$$\begin{aligned} \text{Declination} &= 360^{\circ} - 345^{\circ}20' \\ &= 14^{\circ}40' = \underline{\underline{14^{\circ}40' E}} \end{aligned}$$

2

6

vi a) station	BS	IS	FS	Rise	Fall	R.L	Re marks
1	2.280					232.46	BM1
2	1.650		2.260	0.020		232.48	
3		2.105			0.455	232.045	
4	1.825		1.960	0.145		232.17	
5	2.050		1.925		0.300	231.87	
6		1.665		0.385		232.255	BM2
7	1.690		1.325	0.340		232.915	
8	2.865		2.100		0.410	232.185	
9			1.620	1.245		233.430	BM3

9x1

9

vii b)

$$\Rightarrow \text{Curvature error, } C_c = \frac{d^2}{2R}$$

$$\Rightarrow \text{Refraction error, } C_r = \frac{1}{7} \left[\frac{d^2}{2R} \right]$$

\Rightarrow Correction for

$$\text{Curvature} = 0.07849 d^2 \text{ metres}$$

$$= 0.07849 \times 1.215^2$$

$$= \underline{\underline{0.1159 \text{ m}}}$$

3

Correction for

$$\text{Refraction} = \frac{1}{7} \times 0.1159$$

$$= \underline{\underline{0.1655 \text{ m}}}$$

3

6

viii a) Temporary adjustments in levelling

1. Setting up of the level

2. Levelling up

a) Three screw head

b) Four screw head

3. Elimination of parallax

a) Focussing eyepiece

b) Focussing objective

3x3

~~1x2~~

9

~~6~~

Viii b)	station	BS	IS	FS	HI	RL	Remarks
	P	1.622			86.68	85.058	
		1.874		0.354	88.20	86.326	
		2.032		1.780	88.452	86.42	
	Q		2.362			86.09	
		0.984		1.122	88.314	87.33	
		1.906		2.824	87.396	85.49	
				2.036		85.360	BM
	check	$\sum BS$ $= 0.302$				Last R.L - First R.L $= 0.302$	
		hence checked					
							1
							6
ix a)	Cross sectioning						
	<p>The diagram shows a horizontal line labeled 'center line'. Six vertical dashed lines, labeled CS1 through CS6 from left to right, intersect the center line at right angles. CS1, CS2, and CS3 are on the left side of the center line, while CS4, CS5, and CS6 are on the right side. The lines are drawn as dashed lines to indicate they are not part of the main profile but are used for cross-sectioning.</p>						
	<p>They run at right angles to the longitudinal profile and on either side of it for the purpose of lateral outline of the ground surface</p>						
							3

⇒ They provide data for estimating quantities of earthwork and for other purposes

⇒ The cross sections are numbered consecutively from the commencement of the center line and are set out at right angles to the main line of section

⇒ Length of cross section depends upon the nature of work

6

9

1x6) Methods of interpolation of contours

- Direct Method -

i) Vertical contour - Location of points on contour

ii) Horizontal contour - Survey of those points

- Indirect Methods -

a) By Squares b) By Cross sections

c) By Tacheometric Method

2x3

6

x a) - Characteristic features of contouring-

1. Two contour lines of different elevations cannot cross each other. If they did, the point of intersection would have two different elevations which is absurd. However, contour lines of different elevations can intersect only in the case of an overhanging cliff or a cave.

2. Contour lines of different elevations can unite to form one line only in the case of a vertical cliff.

3. Contour lines close together indicate steep slope. They indicate a gentle slope if they are far apart. If they are equally spaced, uniform slope is indicated. A series of straight, parallel & equally spaced contours represent a plane surface.

4. A contour passing through any point is perpendicular to the line of steepest slope at that point.

5. A closed contour line with one or more higher ones inside it represents a hill. Similarly a closed contour line with one or more lower ones inside it indicates a depression with out an outlet.

6. Two contour lines having the same elevation cannot unite and continue as one line. Similarly a single contour cannot split into two lines.

7. A contour lines must close upon itself, though not necessarily within the limits of the map.

8. Contour lines cross a watershed or ridge line at right angles. They form curves of U shape round it with the concave side of the curve towards the higher ground.

9. Contour lines cross a valley line at right angles. They form

9x1

9

sharp curves of V-shape across it with convex side of the curve towards the higher ground

10. The same contour appears on either sides of a ridge or valley for the highest horizontal plane that intersects the ridge cut it on both sides.

8 b)

Reciprocal levelling

⇒ when it is necessary to carry levelling across a river, ravine or any obstacle requiring a long sight between two points so situated that no place for the level can be found from which the foresight & backsight will be even approximately equal, special method reciprocal levelling must be used to obtain accuracy and to eliminate the following

1. error in instrument adjustment

4

2. Combined effect of curvature and refraction

3. Variations in the average refraction

2

6