# Problems on True Thickness(Tt) and Vertical Thickness (Vt)

1) A Shale bed is exposed in a slope of 20^0 W and dipping 20^0 E. The width of the outcrop is 200 mt. Find Vt and Tt ? Give procedure ?

Scale **1cm = 40 mt.**

Procedure :

a) Draw Main Directions N-S , E-W and mark observation point O as Origin and draw slope direction given $i.e.$ 20^0 W.

b) we have width of outcrop = 200 mt.; Now convert this in the scale i.e. $\frac{200}{40}$ = 5 cm.

c) Take 5cm distance on slope direction $i.e.$ 20^0 W Direction, We get point A.

d) Draw Dipping Direction . 20^0 E

e) Draw perpendicular line w.r. t. origine O.

f) Now, Draw line parallel to dipping direction (20^0 E) Passing through pt. A .

g) Now, this line will intersect somewhere to perpendicular line which was drawn w.r.t. origine O. Mark It as point B.

h) Now, Measure Distance OB = Vertical Thickness Vt = 3.4 cm = 3.4*40 = 136 mt. = Answer.

i) Take any orbitary point say X on dipping Direction (20^0 E) and Draw perpendicular line from point X which will intersect at point C (See $Fig.$)

j) Distance XC = True thickness = Tt = 3.2 cm = 3.2*40 = 128 mt. = Answer.

Answers :

1) Vertical Thickness Vt = 3.4cm * 40 = 136 mt.

2) True Thickness Tt = 3.2cm *40 = 128 mt.
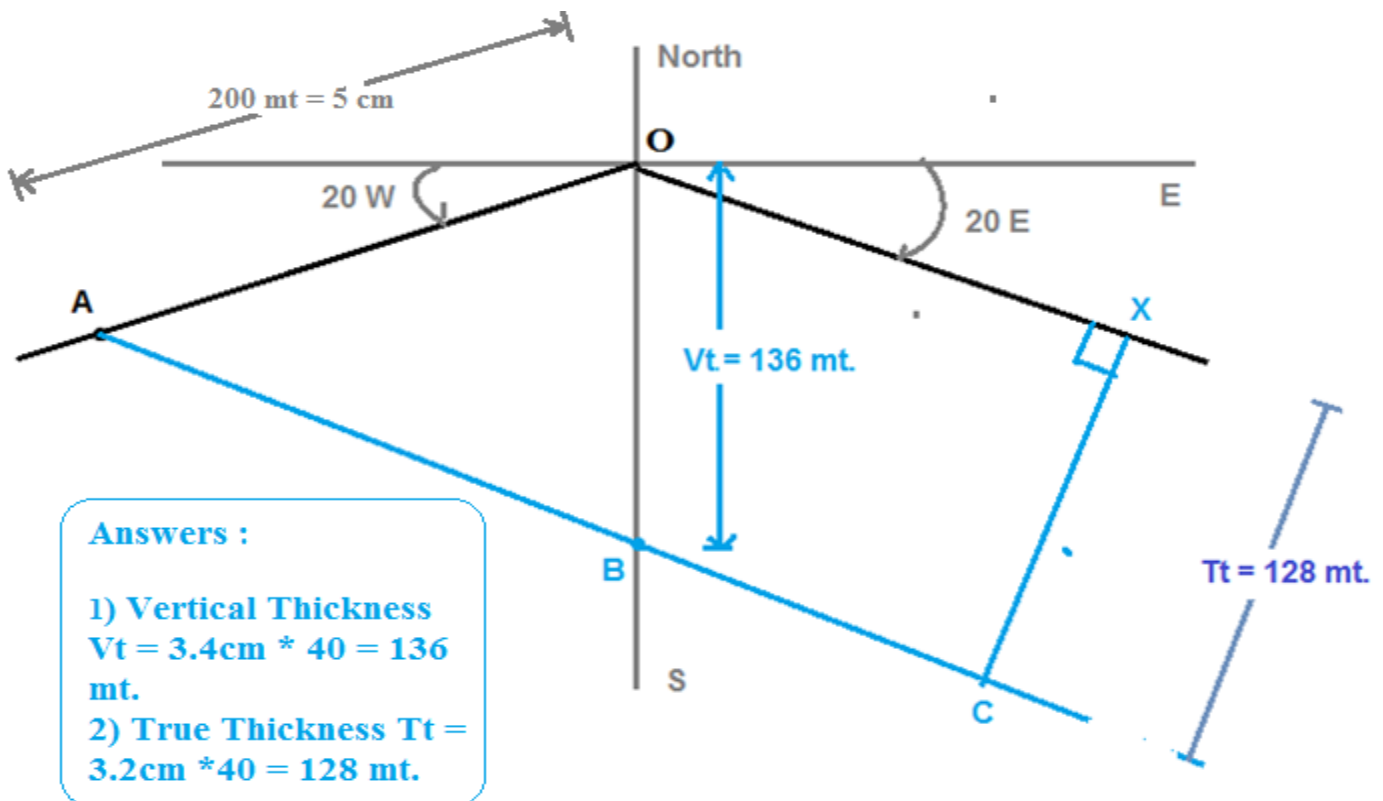
2) In a level Area a chalk bed is found to be dipping 30^0 E. The width of the outcrop is 120 mt. Find Vt and Tt ? Give procedure ?

Scale **1cm = 40 mt.**

Procedure :

a) Draw Main Directions N-S , E-W and mark observation point O as Origin ; Here, slope direction is not given *i.e. take it as 0^0* .

b) we have width of outcrop = 120 mt.; Now convert this in the scale i.e. $\frac{120}{40}$ = 3 cm.

c) Take 3cm distance on slope direction *i.e.* 0^0 E *Or* W Direction, We get point A.

d) Draw Dipping Direction . 30^0 E

e) Draw perpendicular line w.r. t. origine O.

f) Now, Draw line parallel to dipping direction (30^0 E) Passing through pt. A .

g) Now, this line will intersect somewhere to perpendicular line which was drawn w.r.t. origine O. Mark It as point B.

h) Now, Measure Distance OB = Vertical Thickness Vt = 1.8 cm = 1.8*40 = 72 mt. = Answer.

i) Take any orbitary point say X on dipping Direction (30^0 E) and Draw perpendicular line from point X which will intersect at point C (*See Fig.*)

j) Distance XC = True thickness = Tt = 1.6 cm = 1.6*40 = 64 mt. = Answer.

Answers :

1) Vertical Thickness Vt :
   1.8 cm * 40 = 72 mt.

2) True Thickness Tt :
   1.6 cm * 40 = 64 mt.
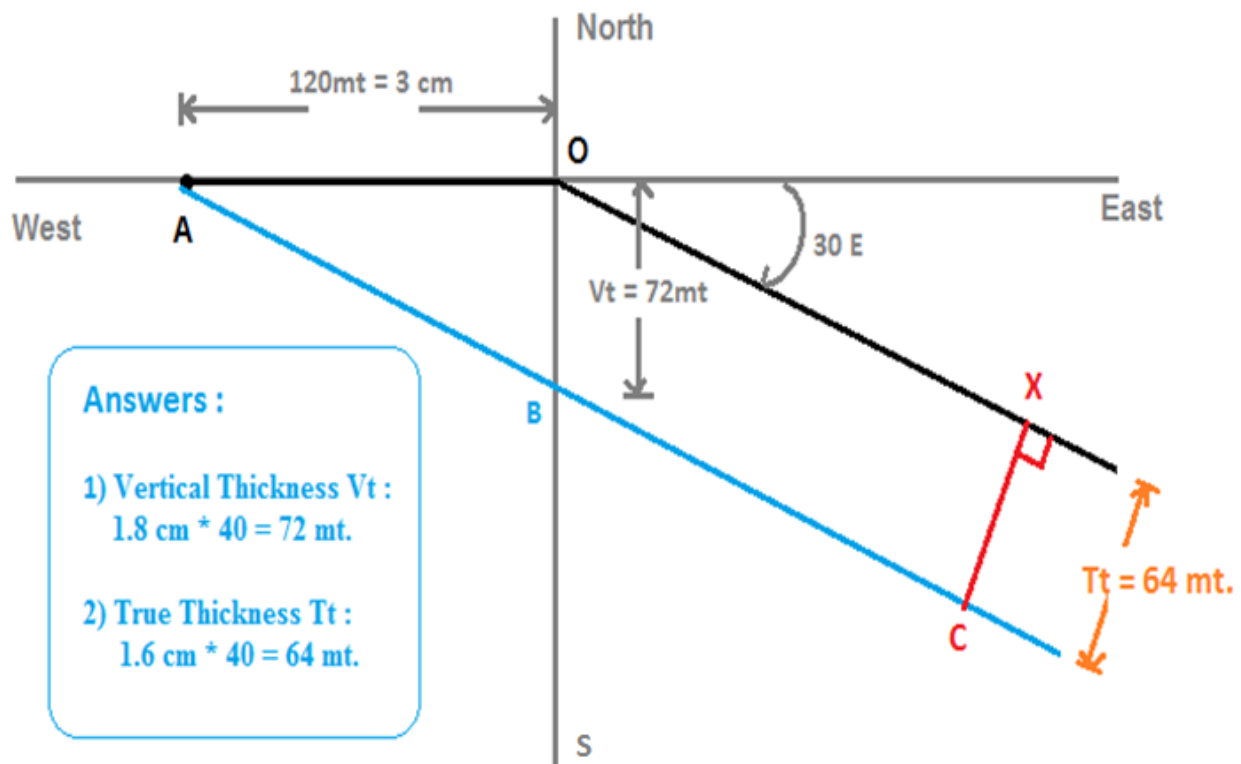
Note : Widthof outcrop is always taken on sloping Direction and Parallel line is always taken to Dip Direction.

3) A Sandystone bed is exposed with a slope of 20^0 E and dips at 30^0 w. The vertical thickness is 152 mt. Find the width of outcrop and True thickness ? Give procedure ? Scale **1cm = 40 mt.**

Procedure :

a) Draw Main Directions N-S , E-W and mark observation point O as Origin and draw slope direction given $i.e.$ 20^0 E.

b) we have Vt = 152 mt.; Now convert this in the scale i.e. $\frac{152}{40}$ = 3.8 cm.

c) Draw perpendicular line From origin O; take distance 3.8 cm such that Distance OB = 3.8 cm. (**This is what we called Vt**) , Mark point B.

d) Draw Dipping Direction 30^0 w.

e) Draw the line parallel to Dipping Direction 30^0 w passing through point B such that it will intersect the sloping direction 20^0 E , thus we get point A.

f) Now, Distance OA = Width Of Outcrop = 4cm = 4*40 = 160 mt.= Answer.

g) Take any orbitary point say X on dipping Direction (30^0 W) and Draw perpendicular line from point X which will intersect at point C ($See\ Fig.$)

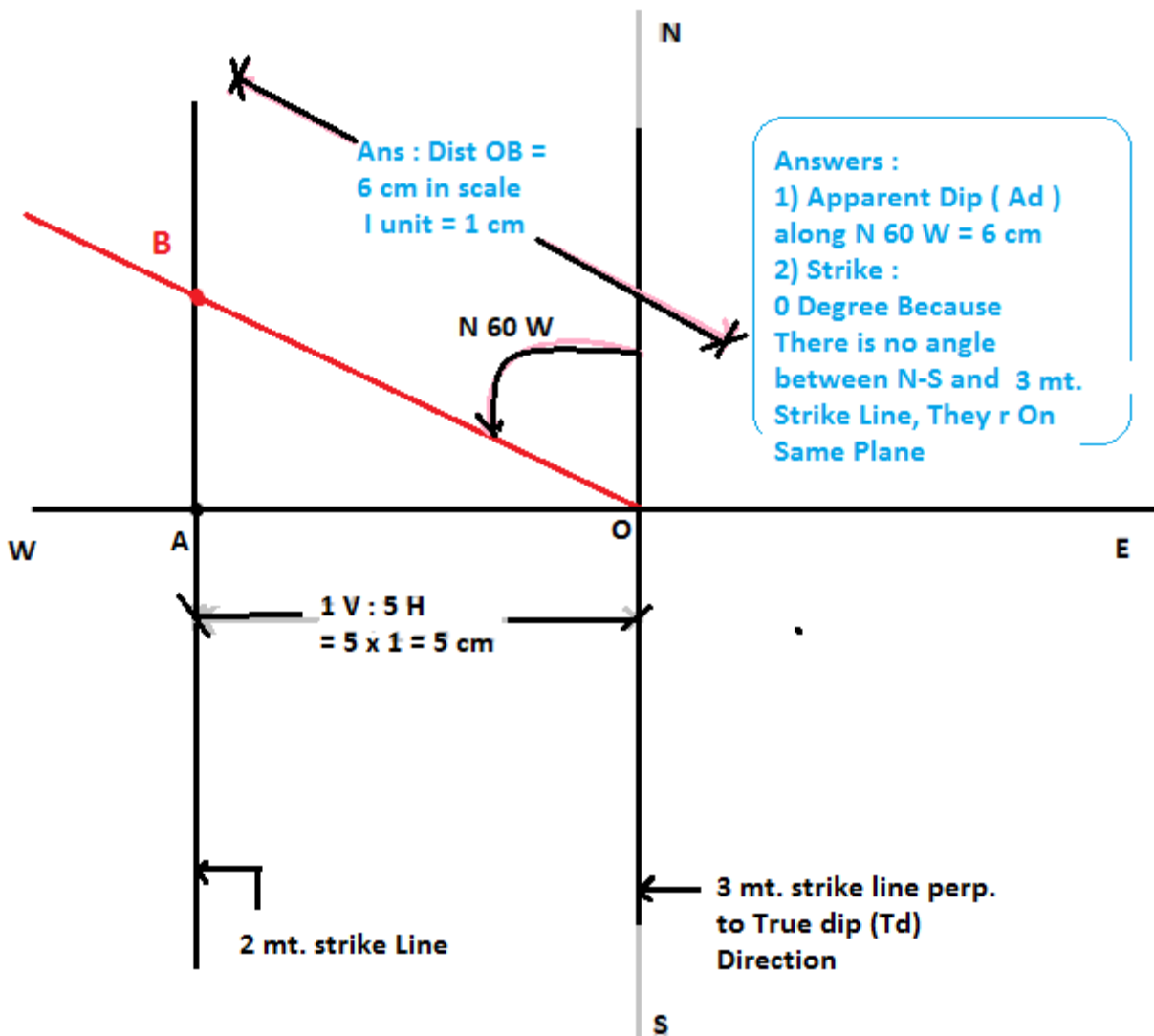h) Distance XC = True thickness = Tt = 3 cm = 3*40 = 120 mt. = Answer.
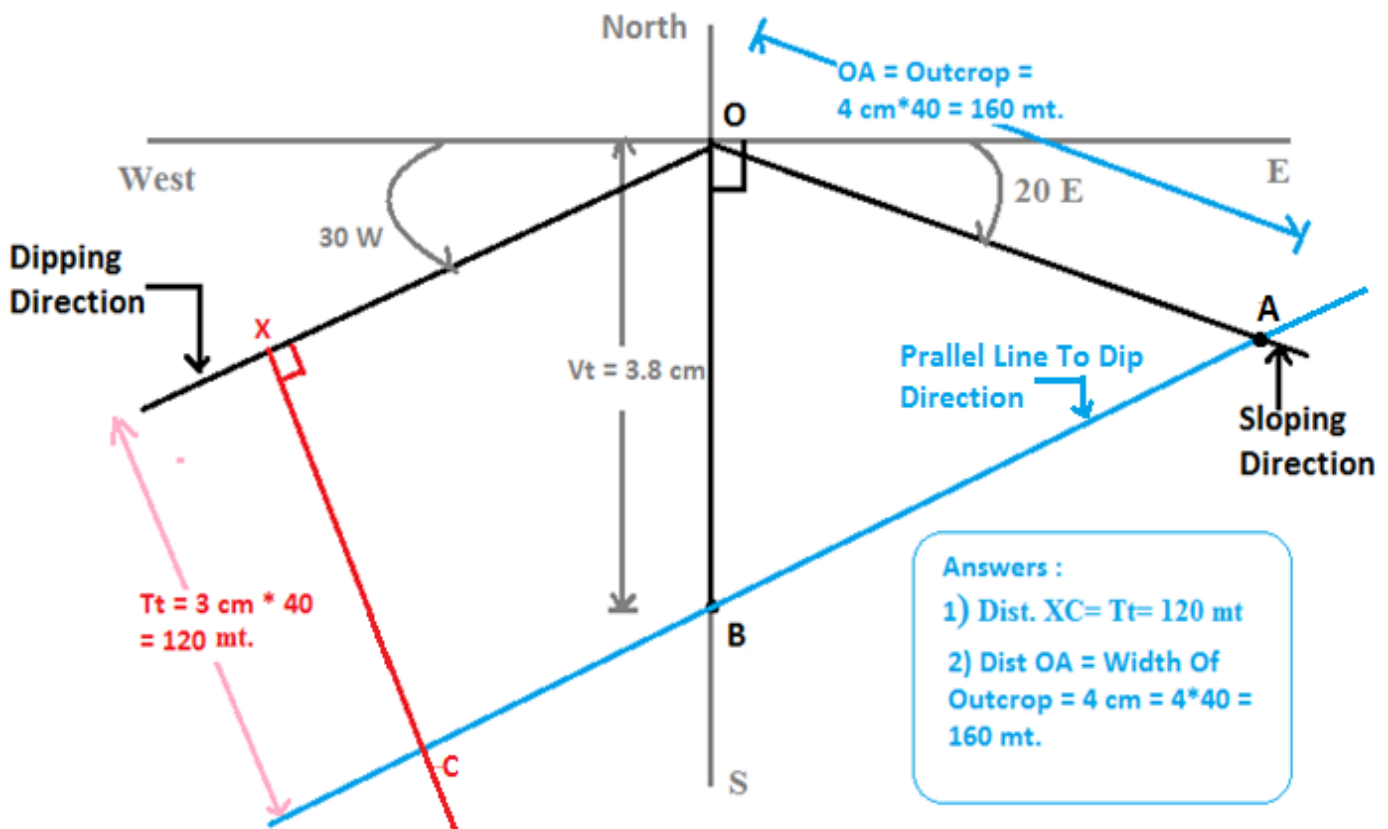
Note : Width of Outcrop Is always taken on the sloping Direction and parallel line to Dipping Direction

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Problems on Apparent Dip (Ad)

4) A fault Bracia is found to be dipping in a valley slope at 1 in 5 due West. find its Apparent Dip along S 60^0 W ? state strike ? Give procedure ? Scale : 1 unit = 1 cm
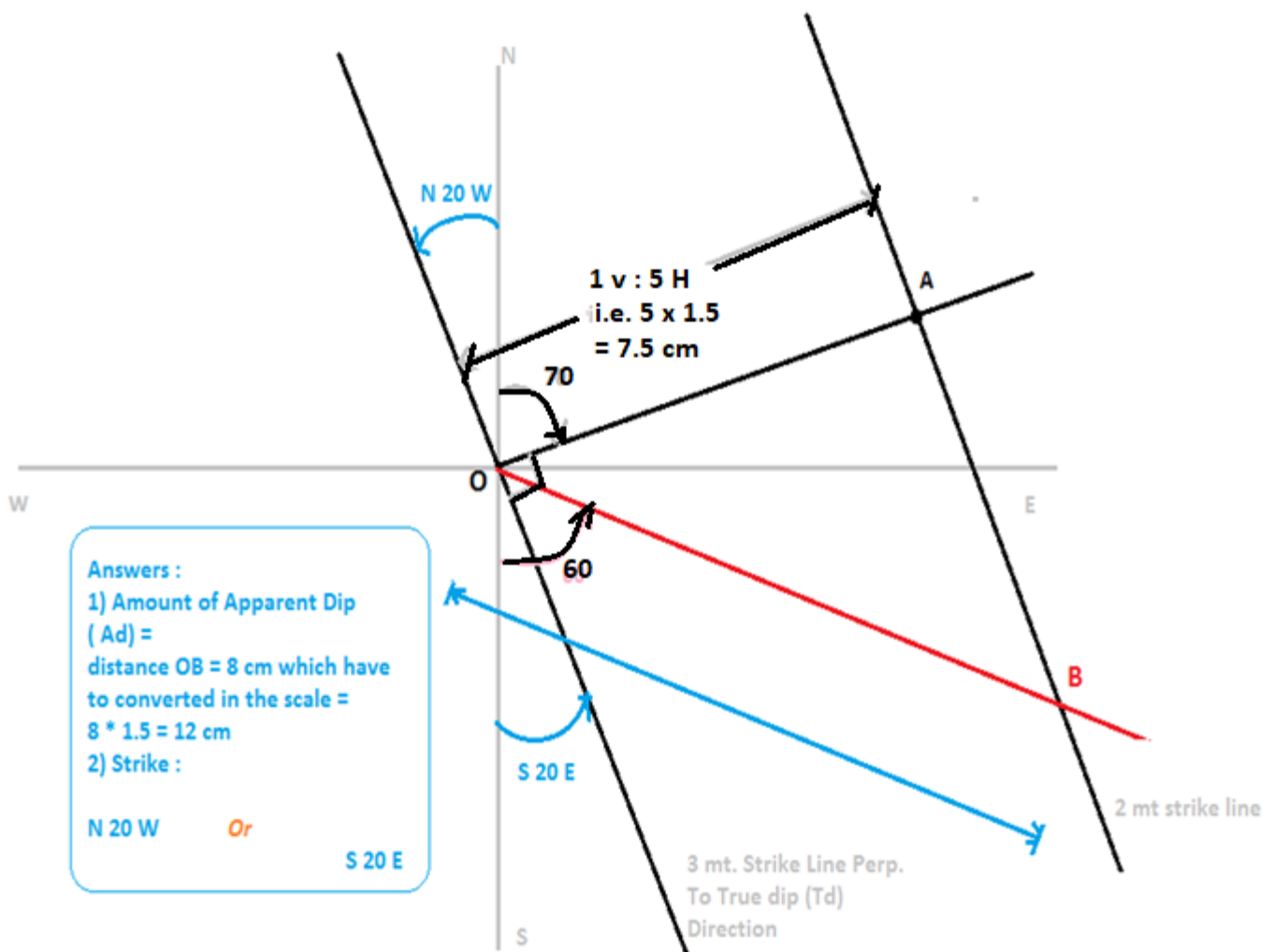
Procedure :

a) Draw Main Directions N-S , E-W and mark observation point O as Origin and draw given True dip (Td) direction i. e. Due West (On west direction).
b) draw perpendicular line to this Td direction called as 3 mt. strike line.
c) We have given the Ratio 1 V : 5 H. convert this ratio in the scale i.e.   5 * 1 = 5 cm.
d) Now take this distance on True Dip direction (Due west) , mark it as point A .
e) Draw parallel line to 3 mt. strike line passing through pt. A which is called as 2 mt. strike line.
f) Draw the direction S 60^0 W and it will intersect somewhere on 2 mt. strike line , mark it as point B.
g) Join the pts O and B..
h) Now the line OB is Our Apparent Dip Direction ; Measure the Distance OB = apparent Dip = 6 cm
i) Strike = angle formed by N-S line w. r. t. 3 mt. strike line shown in Figure.

N

Ans : Dist OB =
6 cm in scale
I unit = 1 cm

B

N 60 W

Answers :
1) Apparent Dip (Ad)
along N 60 W = 6 cm
2) Strike :
0 Degree Because
There is no angle
between N-S and 3 mt.
Strike Line, They r On
Same Plane

W

A

O

E

1 V : 5 H
= 5 x 1 = 5 cm

2 mt. strike Line

3 mt. strike line perp.
to True dip (Td)
Direction

S

5) A limestone bed in a reservoir area is dipping in 1 in 5 along N 70⁰ E. find its Apparent Dip along S 60⁰ E ? state strike ? Give procedure ? Scale : 1 unit $= 1.5$ cm
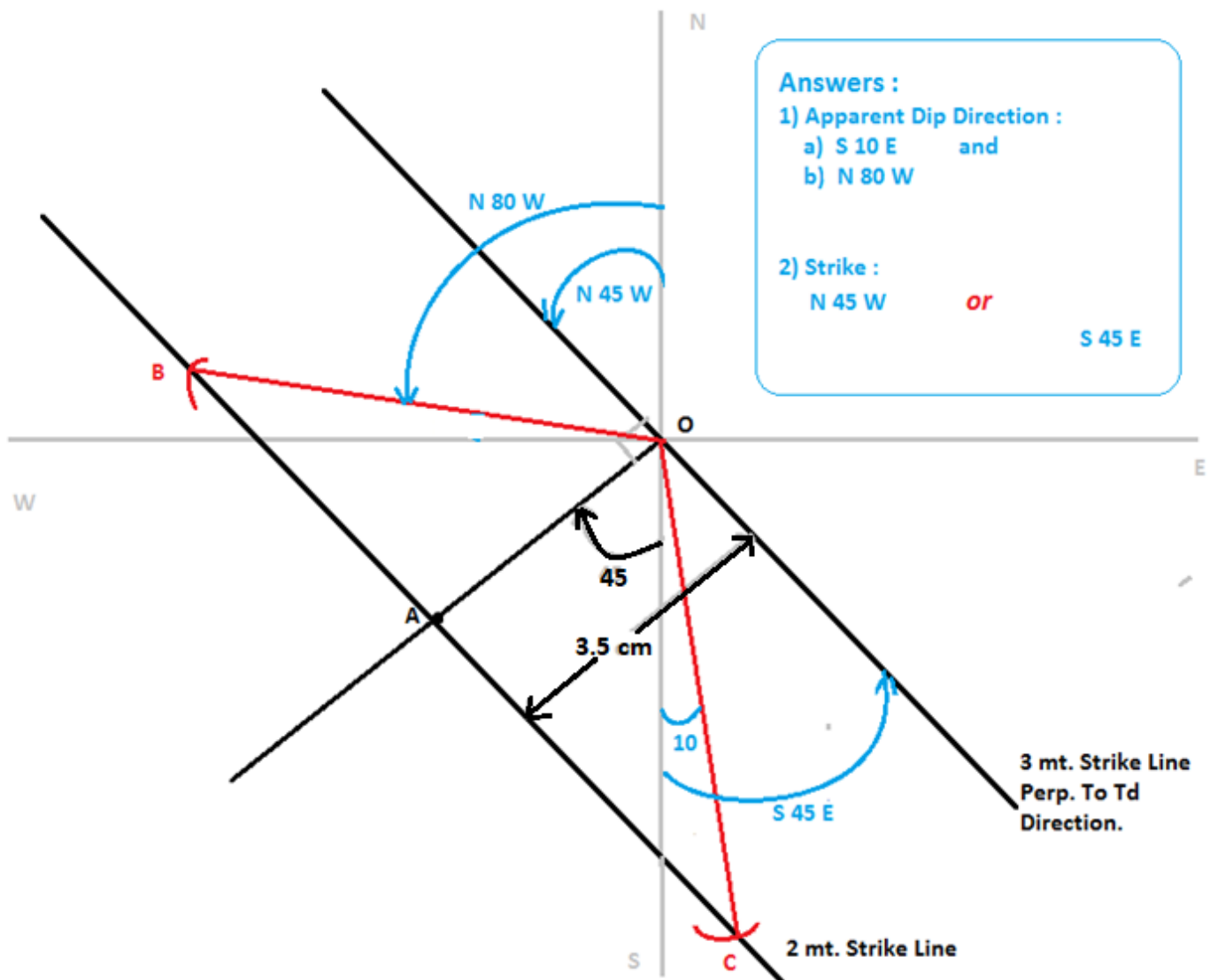
Procedure :

a) Draw Main Directions N-S , E-W and mark observation point O as Origin and draw given True dip (Td) direction i. e. N 70^0 E.

b) draw perpendicular line to this Td direction called as 3 mt. strike line.

c) We have given the Ratio 1 V : 5 H. convert this ratio in the scale i.e. $5 * 1.5 = 7.5$ cm.

d) Now take this distance on True Dip direction (N 70^0 E), mark it as point A .

e) Draw parallel line to 3 mt. strike line passing through pt. A which is called as 2 mt. strike line.

f) Draw the direction S 60^0 E and it will intersect somewhere on 2 mt. strike line , mark it as point B.

g) Join the pts O and B..

h) Now the line OB is Our Apparent Dip Direction ; Measure the Distance OB $=$ apparent Dip $= 8$ cm
   Answer $= Ad = 8*1.5 = 12$ cm

i) Strike $=$ angle formed by N-S line w. r. t. 3 mt. strike line shown in Figure.

N 20 W

1 v : 5 H
i.e. 5 x 1.5
= 7.5 cm

70

A

O

W

E

60

Answers :
1) Amount of Apparent Dip
(Ad) =
distance OB = 8 cm which have
to converted in the scale =
8 * 1.5 = 12 cm
2) Strike :

N 20 W   Or

S 20 E

S 20 E

B

2 mt strike line

3 mt. Strike Line Perp.
To True dip (Td)
Direction

S

6) A Sandstone bed in a railway cutting is dipping at 1 in 3.5 along S 45⁰ W. find its direction in which its Dip is 1 in 6 ? state strike ? Give procedure ? Scale : 1 unit = 1 cm

Procedure :

a) Draw Main Directions N-S , E-W and mark observation point O as Origin and draw given True dip (Td) direction i. e. S 45⁰ W.
b) draw perpendicular line to this Td direction called as 3 mt. strike line.
c) We have given the Ratio 1 V : 3.5 H. convert this ratio in the scale i.e. 5 * 1 = 5 cm.
d) Now take this distance on True Dip direction (S 45⁰ W), mark it as point A .
e) Draw parallel line to 3 mt. strike line passing through pt. A which is called as 2 mt. strike line.
f) We have given amount of Ad (ratio 1V : 6H) . convert this ratio in the scale i.e. 6 * 1 = 6 cm.
g) From pt. O , draw an arch by using devider with distance of 6 cm which cuts 2 mt. strike line at B and C .
h) Now join the line OB and OC. These are Our Apparent Dip Directions ;
i) Strike = angle formed by N-S line w. r. t. 3 mt. strike line shown in Figure.

Answers :
1) Apparent Dip Direction :
a) S 10 E   and
b) N 80 W

2) Strike :
    N 45 W   or
                              S 45 E

3 mt. Strike Line
Perp. To Td
Direction.

2 mt. Strike Line

Problems on True Dip (Td)

7) A shaft shale bed in a bridge abutment is dipping at 1 in 5.5 along N 50^0 W and 1 in 5 along S 35^0 W. Find its True Dip Amount and direction ? state strike ? Give procedure ?

Scale **1cm = 1 cm**

Procedure :

a) Draw Main Directions N-S , E-W and mark observation point O as Origin and draw 1st Apparent Dip Direction given i.e. N 50^0 W.

b) Now we have 1 V : 5.5 H ; Now convert this ratio in the scale i.e. 5.5 * 1 = 5.5 cm.

c) Take 5.5cm distance on N 50^0 W Direction, We get point A.

d) Repeat same procedure for S 35^0 W Direction, Here the distance is 5*1 = 5cm. We get pt. B.

e) Now, Draw line Passing through pts. A and B called as 2 mt. strike line.

f) Draw the parallel line to this 2 mt. strike line passing through origine O ; Now, this is called as 3 mt. strike line.

g) Draw perpendicular line to this 3 mt. strike line which is called as True Dip [Td] Direction.

h) This Td direction will intersect somewhere to 2 mt. strike line, mark it as pt. C.

i) Now, Measure Distance OC = 3.5 cm i.e. **1V : 3.5 H** = True Dip Amount = Ans.

j) Direction of Td = **N 80^0 E** *or* **S 80^0 W** and Strike = **N 10^0 W** *or* **S 10^0 E**.
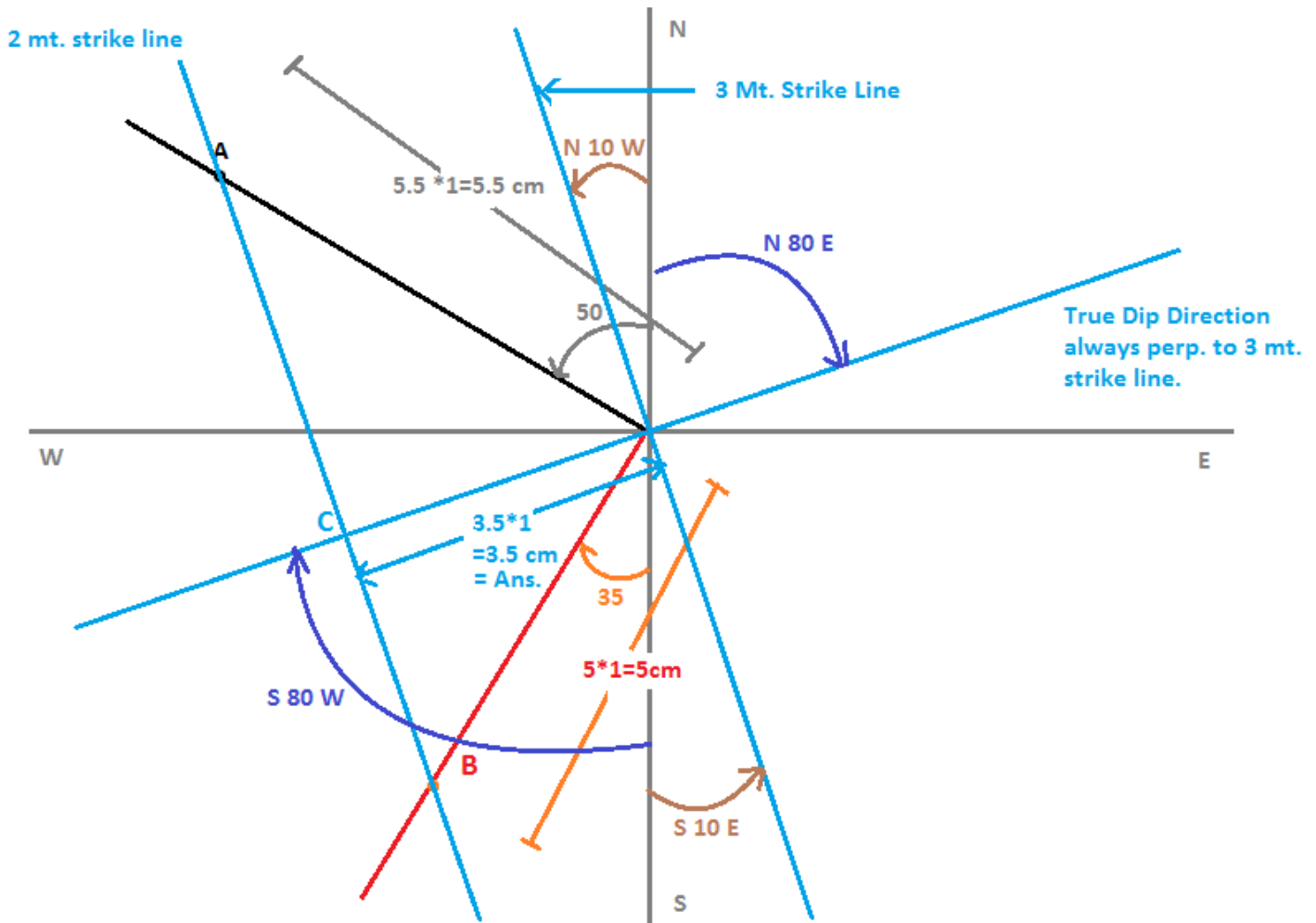
8) A Sand stone bed formation is dipping at 1 in 5 along N 10^0 W and 1 in 4.5 along N 80^0 E. Find its True Dip Amount and direction ? state strike ? Give procedure ?

Scale **1cm = 1.5 cm**

Procedure :

a) Draw Main Directions N-S , E-W and mark observation point O as Origin and draw 1st Apparent Dip Direction given i.e. N 10^0 W.

b) we have 1 V : 5 H ; Now convert this ratio in the scale i.e.   5 * 1.5 = 7.5 cm.

c) Take 7.5cm distance on N 10^0 W Direction, We get point A.

d) for N 80^0 E Direction, Here the ratio is 1V in 4.5H i.e. in scale 4.5*1.5 = 6.75cm.

e) Take 6.75cm distance on N 80^0 E Direction, We get point B.

f) Now, Draw line Passing through pts. A and B called as 2 mt. strike line.

g) Draw the parallel line to this 2 mt. strike line passing through origine O ; Now, this is called as 3 mt. strike line.

h) Draw perpendicular line to this 3 mt. strike line which is called as True Dip [Td] Direction.

i) This Td direction will intersect somewhere to 2 mt. strike line, mark it as pt. C.

j) Now, Measure   Distance OC = Let it be 3.5 cm[taken Imaginary, You take exact diastance] converting in scale i.e. 3.5*1.5=5.25 cm. = **1 V : 5.25 H** = True Dip Amount = Ans.

k) Direction of Td = **N 40^0 E *or* S 40^0 W** and Strike = **N 50^0 W   *or*   S 50^0 E.**

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