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Subject :- Engineering Survey 1

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Qnol :- A line was measured by steel tape which was 30 m long at 18 degree centigrade and found to be 450m. The temp during the measurement was 33 degree. find the true length of line if the coeffficient of expansion of tape is 0.0000035.

Solution:-

Temp correction per tape length = C_t

$= \alpha (T_m - T_o) l$

Here $l = 30m$; $T_o = 18°c$; $T_m = 33°c$;
$\alpha = 0.0000035$

$\therefore C_t = 0.0000035 (33-18) 30$

$= 0.0063 m$

Hence the length of the tape at 33°C = $30 + C$

$= 30 + 0.0063$
$= 30.0063m$

Now true length of line

$= \frac{L'}{L} \times$ its measured length

$L = 30m$; $L' = 30.0063m$;
measured length $= 450$

$\therefore$ True length $= \frac{30.0063}{30} \times 450$

$= 450.0945$

Qno 2:-

While chaning across a pound two points A & B were taken on opposite side of the pound A line CB 275 m long was laid on left of AB and an other line BD was laid down on the right of line AB is 310m Such that points C, A and D becomes inline with Each other. CA and AD were then measured and found to be 156m and 174 m respectively Find the length AB

~~Solution~~ Given Data

$CB = 275\,m$ $\quad AB = ?$
$AB = 310m$ $\quad BD = 275m$
$CA = 156m$ $\quad CD = 330\,m$
$AD = 174m$

Solution:-

$$BD^2 = CB^2 + CD^2 - 2 \times CB \times CD \times \cos\theta + CB^2 + CD^2 - BD^2$$

$$2 \times CB \times CD$$

$$\cos\theta = \frac{(275)^2 + (330)^2 - (310)^2}{2 \times 275 \times 330}$$

$$\cos\theta = \frac{184525 - 96100}{181500}$$

$$\cos\theta = 0.487$$

$$\Rightarrow \theta = \cos^{-1}(0.487)$$

$$\boxed{\theta = 60.86^{\circ}}$$

Now

$$AB^2 = CB^2 + CA - 2 \times CB \times CA \times \cos\theta$$

$$AB^2 = (275)^2 + (156)^2 - 2 \times 275 \times 156 \times \cos(60.86^{\circ})$$

$$AB^2 = 75625 + 24336 - 85800\,(0.487)$$

$$AB^2 = 99961 - 41784.6$$

$$AB^2 = 58176.4$$

Taking under root on both sides

$$\sqrt{(AB)^2} = \sqrt{58176.4}$$

$$\boxed{AB = 241.20\,m}$$

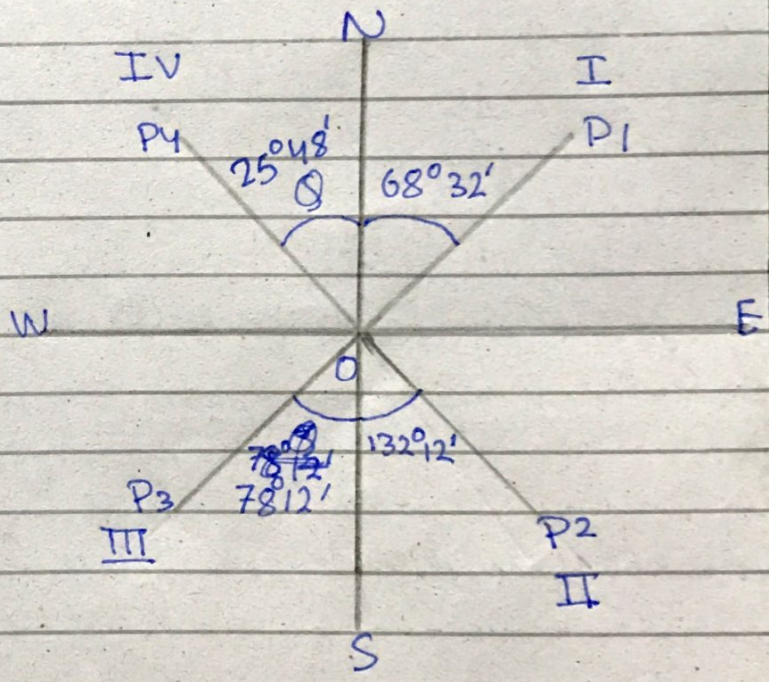
Qno3:-

Convert the following W.C.B to Quadrantal Bearing

(a) 68°32' (b) 132°12' (c) 258°12'
(d) 334°12'

(a) 68°32'

WCB = 68°32'
Quadrantal Bearing = 68°32'E



(b) 132° 12'

WCB = 132°12'
Quadrantal Bearing = 180° - 132°12'

= 47°48' S.E OR
= S 47°48' E

(c) 258° 12'

Quadrantal Bearing

258° 12' - 180°

= S 78° 12' W

(d) 334° 12'

Quadrantal Bearing

= 360° - 334° 12'

= 25° 48' WN