

110 學年度四技二專第三次聯合模擬考試

土木與建築群 專業科目(二) 詳解

110-3-06-5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B	D	A	B	B	D	B	C	C	A	D	A	A	D	D	C	B	C	C	A
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
B	A	C	D	D	C	B	D	A	B	D	B	C	C	B	A	C	D	A	A

1. 大地測量將地球視為一橢球體，其指北線交會於北極，而平面測量其指北線均視為平行指向北方

2. $L_{AD} = L_{AB} + L_{BC} + L_{CD}$
 $= 233.21 + 227.8315 + 332.012 = 793.0535$
 但因 L_{AB} 的有效位數取至小數點後 2 位，故 L_{AD} 距離取 793.05 m

$$\sigma_{AD} = \pm \sqrt{\sigma_{AB}^2 + \sigma_{BC}^2 + \sigma_{CD}^2}$$

$$= \pm \sqrt{(0.03)^2 + (0.0402)^2 + (0.120)^2} = \pm 0.1301 \text{ m}$$

取至小數點後 2 位，故 $\sigma_{AD} = \pm 0.13 \text{ m}$

4. (1) 尺長改正：

$$C_c = \frac{200}{20} \times 20.02 - 200 = 200.2 - 200 = +0.2 \text{ m}$$

(2) 傾斜改正：

$$\Delta h = 200 \times 2\% = +4 \text{ m}$$

$$C_h = -\frac{\Delta h^2}{2L} = -\frac{4^2}{2 \times 200} = -0.04 \text{ m}$$

故改正後的水平距離為

$$L + C_c + C_h = 200 + 0.2 - 0.04 = 200.16 \text{ m}$$

5. 甲、水準測量施測過程中，其水準尺讀數僅有前視者，其目的主要為求此點位的高程，此點高程精度不影響推求他點高程的精度，不得設置尺墊

乙、水準測量使用尺墊之目的為保持標尺穩固，不致下陷，以維持水準測量精度

丙丁戊為正確，故選(B)

$$6. H_{\text{視準軸}} = H_{\text{基準點}} + L_{\text{基準點}} = H_A + L_A$$

$$= H_B + L_B = H_C + L_C$$

$$H_{\text{視準軸}} = 15.000 + 1.337 = 16.337 \text{ m}$$

$$\therefore H_A = H_{\text{視準軸}} - L_A = 16.337 - 1.442 = 14.895 \text{ m}$$

$$H_B = H_{\text{視準軸}} - L_B = 16.337 - 1.455 = 14.882 \text{ m}$$

$$H_C = H_{\text{視準軸}} - L_C = 16.337 - 1.249 = 15.088 \text{ m}$$

$$7. (1) \Delta h_{AC} = \Delta h_{AB} + \Delta h_{BC} \Rightarrow \Delta h_{AB} + \Delta h_{BC} - \Delta h_{AC} = 0$$

$$0.054 + 0.072 - 0.125 = +0.001 \text{ m}，\text{合理}$$

$$(2) \Delta h_{EB} = \Delta h_{EA} + \Delta h_{AB} \Rightarrow \Delta h_{EA} + \Delta h_{AB} - \Delta h_{EB} = 0$$

$$(-0.103) + 0.054 - (-0.091) = +0.042 \text{ m}，\text{不合理}$$

$$(3) \Delta h_{ED} = \Delta h_{EB} + \Delta h_{BD} \Rightarrow \Delta h_{EB} + \Delta h_{BD} - \Delta h_{ED} = 0$$

$$(-0.091) + 0.019 - (-0.032) = -0.040 \text{ m}，\text{不合理}$$

$$(4) \Delta h_{ED} = \Delta h_{EA} + \Delta h_{AB} + \Delta h_{BD}$$

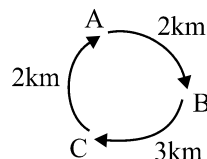
$$\Rightarrow \Delta h_{EA} + \Delta h_{AB} + \Delta h_{BD} - \Delta h_{ED} = 0$$

$$(-0.103) + 0.054 + 0.019 - (-0.032) = 0.002 \text{ m}，\text{合理}$$

由(1)(4)可知 $\overline{AB}$ 段、 $\overline{BD}$ 段、 $\overline{EA}$ 段、 $\overline{ED}$ 段、 $\overline{BC}$ 段、 $\overline{AC}$ 段皆合理

檢核(2)(3)可知 $\overline{EB}$ 段應為登錄錯誤的路線

8.



$$\text{閉合差} = 19.986 - 20.000 = -0.014 \text{ m}$$

$$\Delta h_{AB} \text{ 改正值} = +0.014 \times \frac{2}{7} = +0.004 \text{ m}$$

$$\Delta h_{BC} \text{ 改正值} = +0.014 \times \frac{3}{7} = +0.006 \text{ m}$$

$$\Delta h_{CA} \text{ 改正值} = +0.014 \times \frac{2}{7} = +0.004 \text{ m}$$

$$\text{改正後 } H_B = H_B + \Delta h_{AB} \text{ 改正值}$$

$$= 18.936 + 0.004 = 18.940 \text{ m}$$

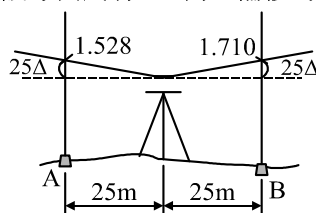
$$\text{改正後 } H_C = H_C + \Delta h_{AB} \text{ 改正值} + \Delta h_{BC} \text{ 改正值}$$

$$= 19.010 + 0.004 + 0.006 = 19.020 \text{ m}$$

$$9. \text{現地距離} = 5 \times 2000 = 10000 \text{ cm} = 100 \text{ m}$$

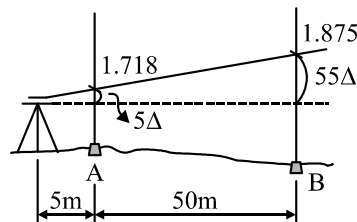
$$\text{坡度} = \frac{2.5 \text{ m}}{100 \text{ m}} \times 100\% = 2.5\%$$

10. 設每公尺有 1Δ 向上偏移的視準軸誤差



$$\Delta h_{AB} = L_a - L_b = (1.528 - 25\Delta) - (1.710 - 25\Delta)$$

$$= -0.182 \text{ m} \cdots \cdots \textcircled{1}$$



$$\Delta h_{AB} = (1.718 - 5\Delta) - (1.875 - 55\Delta)$$

$$= -0.157 + 50\Delta \cdots \cdots \textcircled{2}$$

聯立①②式

$$-0.182 = -0.157 + 50\Delta$$

$$\therefore 50\Delta = -0.025, \Delta = -0.0005 \text{ m} = -0.5 \text{ mm}$$

11. 經緯儀有 $+1'30''$ 的誤差，架站於 B 點後視 A 點時有 1 倍的誤差，直接縱轉照準 C 點時，則有 2 倍的角度誤差

$$\frac{+1'30'' \times 2}{206265''} = \frac{\delta}{206} \therefore \text{橫向偏移量 } \delta = 0.180 \text{ m}$$

12. 經緯儀測角度採正倒鏡觀測取平均值，可消除橫軸誤差、視準軸誤差、視準軸偏心誤差、縱角指標差及十字絲偏斜誤差等項。甲乙丁戊庚為正確，故選(A)

13. 指標差 $i = \frac{z_{\text{正}} + z_{\text{倒}} - 360^\circ}{2} = +6''$

$$\text{天頂距平均值} = z_{\text{正}} - i = 88^\circ 21' 42''$$

$$\text{垂直角 } \alpha = 90^\circ - z_{\text{正}} = 90^\circ - 88^\circ 21' 42'' = +1^\circ 38' 18''$$

14. 真方位角 = 磁方位角 + 磁偏角

磁偏角偏東為正，磁偏角偏西為負

$$AB \text{ 真方位角} = 230^\circ + (+2^\circ) = 92^\circ \text{ 年磁方位角} + (-3^\circ)$$

$$\therefore 92^\circ \text{ 年 AB 磁方位角為 } 235^\circ$$

15. $\phi_{AB} = 60^\circ, \phi_{CD} = 171^\circ$

$$\phi_{B1} = \phi_{AB} + (180^\circ - 80^\circ)$$

$$\phi_{12} = \phi_{B1} - (180^\circ - 91^\circ)$$

$$\phi_{23} = \phi_{12} + (180^\circ - 85^\circ)$$

$$\text{故 } \phi_{23} = [\phi_{B1} - (180^\circ - 91^\circ)] + (180^\circ - 85^\circ) \\ = [\phi_{AB} + (180^\circ - 80^\circ)] - (180^\circ - 91^\circ) + (180^\circ - 85^\circ)$$

$$\phi_{23} = 60^\circ + 180^\circ - 80^\circ - 180^\circ + 91^\circ + 180^\circ - 85^\circ = 166^\circ$$

$$[\text{另解}] \phi_{23} = 171^\circ + 88^\circ - 180^\circ - 93^\circ + 180^\circ = 166^\circ$$

16.

測站	測點	鏡位	水平度盤讀數	平均值	水平角
A	C	正	185°27'45"	185°27'55"	60°00'00"
		倒	5°28'05"		
	B	正	245°28'02"	245°27'55"	
		倒	65°27'48"		

$$\angle CAB = 60^\circ$$

$$\overline{AC} = \frac{119.998 + 120.002}{2} = 120.000 \text{ m}$$

$$\phi_{AB} = 90^\circ (\Delta N = 0, \Delta E = +50) \text{ W} \begin{array}{c} \text{N} \\ \times \\ \text{E} \\ \text{S} \end{array}$$

$$\phi_{AC} = \phi_{AB} - \angle CAB = 90^\circ - 60^\circ = 30^\circ$$

$$N_C = N_A + \overline{AC} \times \cos \phi_{AC} = 203.923 \text{ m}$$

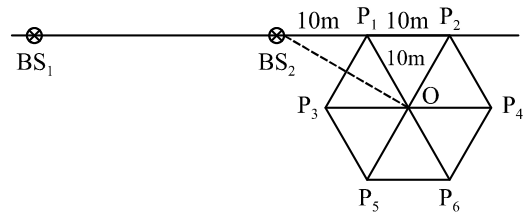
$$E_C = E_A + \overline{AC} \times \sin \phi_{AC} = 260.000 \text{ m}$$

17. 視距間隔 a = 上絲讀數 - 下絲讀數
 $= 2.653 - 1.855 = 0.798 \text{ m}$

$$\text{水平距離 } D = aK + C = 0.798 \times 100 + 0.3 = 80.100 \text{ m}$$

18. $\Delta h_{AB} = V + i_A - z_B = \overline{AB} \times \tan \alpha + i_A - z_B$
 $= 100 \times \tan(90^\circ - 79^\circ 35' 20'') + 1.500 - 2.000$
 $= 100 \times \tan 10^\circ 24' 40'' + 1.500 - 2.000 = 17.900 \text{ m}$

19. 由圖示及點位座標資料可獲知 BS_1 、 BS_2 、 P_1 及 P_2 位於同一直線上



$$\phi_{BS2-BS1} = 0^\circ$$

$$(\Delta N = +20 \text{ m}, \Delta E = 0; \text{W} \begin{array}{c} \text{N} \\ \times \\ \text{E} \\ \text{S} \end{array})$$

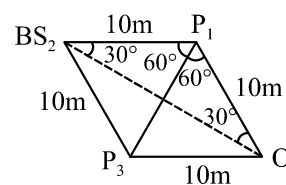
$$\phi_{BS2-P1} = 180^\circ$$

$$(\Delta N = -10 \text{ m}, \Delta E = 0; \text{W} \begin{array}{c} \text{N} \\ \times \\ \text{E} \\ \text{S} \end{array})$$

$$L_{BS2-P1} = \sqrt{(-10)^2 + 0^2} = 10 \text{ m}$$

$$L_{BS2-P3} = \sqrt{5^2 + 8.66^2} = 10 \text{ m}$$

繪製 BS_2 - P_1 - O - P_3 ，可構成一平行四邊形

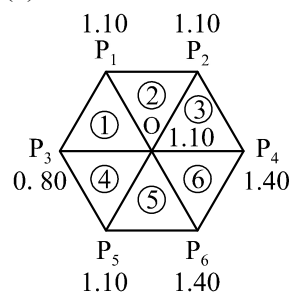


故知 BS_2 - O 距離為 $10\sqrt{3} \text{ m}$

$$\angle P_1-BS_2-O \text{ 為 } 30^\circ$$

統整上述資料，將儀器架站於 BS_2 後視 BS_1 ，設定角度為零方向，順轉 210° 並測設 $10\sqrt{3} \text{ m}$ 釘定 O 點即可

20. (1) 將各點位高程扣除計劃高程，並將其標示於基地位址
 (2) 分別計算各塊三角形區域的平均高程



$$H_{\text{①}} = \frac{1.10 + 0.80 + 1.10}{3} = 1.00 \text{ m}$$

$$H_{\text{②}} = \frac{1.10 + 1.10 + 1.10}{3} = 1.10 \text{ m}$$

$$H_{\text{③}} = \frac{1.10 + 1.10 + 1.40}{3} = 1.20 \text{ m}$$

$$H_{\text{④}} = \frac{0.80 + 1.10 + 1.10}{3} = 1.00 \text{ m}$$

$$H_{\text{⑤}} = \frac{1.10 + 1.10 + 1.40}{3} = 1.20 \text{ m}$$

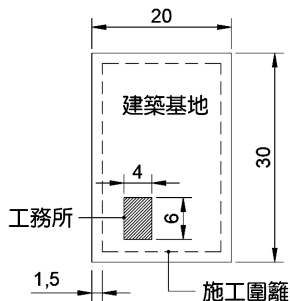
$$H_{\text{⑥}} = \frac{1.10 + 1.40 + 1.40}{3} = 1.30 \text{ m}$$

$$\Sigma V = A_{①} \times H_{①} + A_{②} \times H_{②} + \dots + A_{⑥} \times H_{⑥}$$

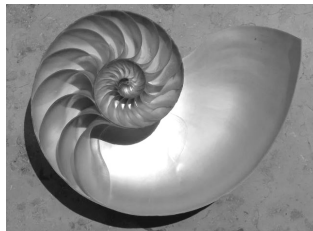
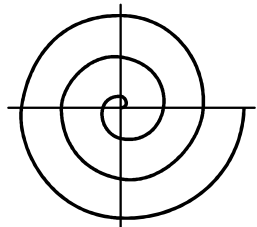
$$= \frac{10 \times 5\sqrt{3}}{2} (H_{\textcircled{1}} + H_{\textcircled{2}} + \cdots + H_{\textcircled{6}})$$

$$= 25\sqrt{3} \times 6.80 \approx 294.44 \text{ m}^3 \text{ (挖土)}$$

21. ①將實體尺度以比例尺放大後繪製於圖紙上，例如 2：1(倍尺)
②將實體尺度直接繪製於圖紙上，例如 1：1(實尺)
③將實體尺度以比例尺縮小後繪製於圖紙上，例如 1：20(縮尺)
22. (B) 鉛筆依筆蕊分為三類：硬質、中質、軟質三級類
(C) 由硬質到軟質為 3H、H、F、HB、B、2B、3B
(D) 一般筆蕊軟硬不同，6H 比 6B 筆質堅硬
23. (C) 圖中③尺度應為 6 m

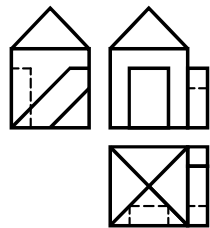


24. (A) 建築線應以單點線繪製，與 CNS3, B1001 中心線相同其空白間隔約為 1 mm
(B) 依 CNS3 剖面線為細實線，剖面線為粗細鏈線
(C) 尺度界線為細實線，中心線為細鏈線
25. (D) 阿基米德螺旋線

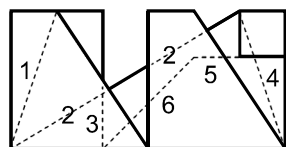


26. (C) 平行投影依投射線與投影面之關係，又可分為正投影、斜投影
28. (D) 右側視圖正確如下

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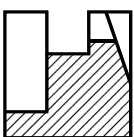


30. (B) 六條



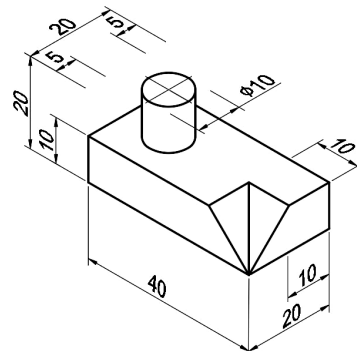
(虛線 2 爲同一斜面形成)

31. (D)

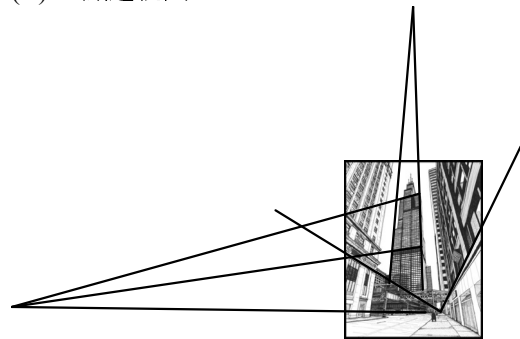


33. (A)  剖面線不能與斜面垂直
- (B)  剖面線太密
- (D)  剖面線太粗

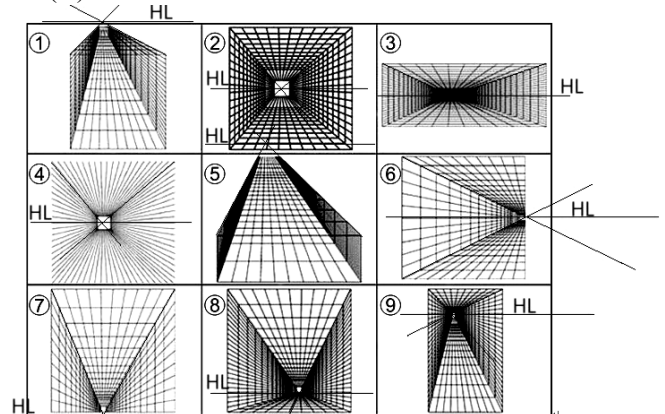
34. (C) 尺度界線沿著所欲標註的尺度兩端與輪廓線約留 1 mm 之空隙
35. (B) 圓柱尺度需標註直徑符號



36. (A) 具有複斜面的物體，在主投影面的視圖投影均呈現縮小形狀
37. (C) 三點透視圖



38. (D) HL 視平線在畫面上方的共有 3 個圖面①⑤⑨



39. (A) 當燈具往上移動時，陰影長度將隨之變短
40. (A)

