

一、(20分)簡答題

1. χ^2 (Chi-Square)及 R^2 (R-Square)?(5%)
2. 何謂 t-test? 何謂 F-test?(5%)
3. 何謂中央極限定理? 並請舉出營建工程管理上實際發生的例子進一步說明之。(5%)
4. 如何建立品質管制圖的上下界?(5%)

二、(20分) 若要分析 A,B,C,D 廠生產之瀝青材料對某路面工程之瀝青含量是否有影響,今隨機抽取樣本如下:

	瀝青含量, %				
A 廠	5.60	5.60	5.18	5.65	5.55
B 廠	5.33	5.85	5.58	5.43	5.62
C 廠	5.48	6.05	5.82	5.58	5.92
D 廠	5.49	5.69	5.53	5.47	5.61

- (一) 試以 0.05 檢定不同廠之混凝土對其抗壓強度是否有顯著之差異?(10%)
- (二) 運用此檢定, 探討用 D 廠與原用(A,B,C)廠之混凝土對其抗壓強度是否有顯著差異?(10%)

三、(20分)某鋼筋場分別在連續十週中, 定出每噸鋼筋價格如下:

週數	1	2	3	4	5	6	7	8	9	10
價格	15000	17600	16400	17200	17300	15200	17500	18900	17000	16400
出售數量	2000	2210	2800	2500	1950	1900	2350	2500	2400	2350

- (一) 以最小平方法求估計迴歸式(5分)
- (二) 在 16800 之價格下, 預測可能之出售數量? (5分)
- (三) 以 $\alpha=0.05$ 檢定價格與出售數量是否有關係存在?(10分)

四、(20分) 某工程主要項目如下:

項目		前置作業	平均工期	標準差
1	基礎開挖	---	20	8
2	基腳施工	1	10	6
3	基礎牆	2	30	10
4	切割單元	---	50	12
5	運至工地	4	20	4
6	結構組合	3,5	30	12
7	裝修工程	6	40	15

假設各項工程之工期呈標準常態分佈, 且彼此相互獨立。

- (一) 請問其要徑為何? 可能完工時程為何?(10%)
- (二) 若工項 2 落後 3 天且工項 5 落後 3 天, 請問本工程能如期完工之機率為何?(10%)

見背面

五、(20分)英文題: The compressive strengths of five different concrete mixes were compared in an experiment. The first mix was a standard concrete mix designed for a compressive strength of 38 Mpa (1 Mpa = 145.04 psi). The second and third mixes have the same mix ratio but 25% and 35%, respectively, of the fine aggregate (sand) was replaced with discarded (dirty) foundry sand. The fourth and fifth mixes are similar to the second and third mixes except they use new (clean) foundry sand. The 28-day compressive strength data for hardened concrete (15cm*30cm cylinder) are as follows.

Normal	25%Dirty	35%Dirty	25%Clean	35%Clean
42.5	32.5	30.9	41.5	43.0
44.0	33.5	30.7	42.0	44.5
43.0	33.0	31.0	43.5	44.0
43.5	35.4	31.7	44.0	43.5

- (1) At the 0.05 level of significant, is there evidence of a difference in the average compressive strength for the different mixes? (10%)
- (2) Which concrete mix would you recommend? (10%)

接次頁

表 A.1 標準常態分佈或然率表 $\phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x \exp(-\frac{t^2}{2}) dt$

Table with 6 columns: z, phi(z), z, phi(z), z, phi(z). It lists standard normal distribution values for z from 0.0 to 1.40.

Critical values of the t-distribution

The following table contains critical values of t for given probability levels.

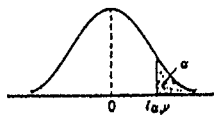


Table with 6 columns: Degrees of Freedom, v; .1; .05; .025; .01; .005. It lists critical values of t for various degrees of freedom and probability levels.

表 A.3 z' 分佈, alpha-百分率值 (取自 Brownlee, 1960)

Table with 10 columns: alpha (0.005 to 0.990) and 10 rows of z' values. It lists values for the z' distribution.