國立中央大學106學年度碩士班考試入學試題

所別： 營建管理研究所 碩士班 不分組(一般生)　　共2頁 第1頁

科目： 工程經濟與統計

本科考試可使用計算器，廠牌、功能不拘　　＊請在答案卷內作答

I. 工程統計（50分）

參考用

一、下表所列為量測20組混凝土抗壓試體所得之抗壓強度(kgf/cm^2)(共20分)。

1. 請計算表中數據之平均數與標準偏差(5分)
2. 請為表中數據繪製一個莖葉圖(stem-and-leaf plot)。(5分)
3. 請為表中數據找出其五數綜合(five-number summary)。(10分)

260	251	246	255	305	294	266	225	213	257
236	244	257	260	276	194	224	209	262	249

二、一項對營建工程品質管理的研究所進行的民意調查發現，樣本中有60%的人認為「管理階層的支持」比「導入ISO品質管理系統」來得重要。請計算在下列樣本大小(n)的情況下，所有營建工程從業人員之中有相同想法者的95%信賴區間為何？(各5分，共15分)

1. n=750。
2. n=3,000。
3. 從上述結果可以看出增加樣本大小有何影響？

三、一項針對全國公共工程專案目標的調查，有73%的工程專案經理表示「零職災事故」為其最重要的專案目標。在南部幾個縣市的200位受訪的工程專案經理之中，有132位認為這個目標最為重要。若我們想知道是否該南部縣市認為「零職災事故」最重要的比例，與全國73%有差別。(各5分，共15分)

1. 敘述說明此題中的參數p是什麼？
2. 虛無假設(H_0)與對立假設(H_a)分別是什麼？
3. 樣本比例$\hat{p}$的值是多少？

注意：背面有試題

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II. 工程經濟 (50 分)

A college graduated person is planning to open a coffee shop. He's considering two different locations (urban and suburban) for the shop. His minimum attractive rate of return (MARR) is 5% for operating a coffee shop but uncertainty usually varies from location to location. The risk premium (adjustment) for MARR can be either 3% or 5% due to different level of uncertainty associated with how difficult to run a shop. Assuming that it is easier to run a coffee shop in urban area; the initial costs for equipment is higher in the urban area; the lease is repeatable in the same terms, **please answer the following questions based on the given information in the table.**

Table: Cashflows for the alternatives

($Thousand NTD)	Location A	Location B
Capital investment on equipment	2000	500
Annual operation & maintenance cost	50	150
Annual incomes	600	300
Market value	300	150
lease period (years)	5	8

a) What are the adjusted MARRs for shops located in urban area and suburban area, respectively (5 pt)? According to information shown in the Table, which area (urban or suburban) should Location A belong to (5 pt)? Please describe your reason briefly (5 pt).

b) What is the assumption you should make before conducting your comparison for these two locations? Please briefly state your reasons (5 pt).

c) Please compare Locations A and B and determine which one is preferred (15 pt).

d) Please calculate the rate of return for the better location from (c) using Internal Rate of Return (IRR) method (15 pt)?

注意：背面有試題

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**To find Present value given Future value (P/F) at the first 15 period discount rate:

	i=5%	i=6%	i=7%	i=8%	i=10%	i=12%	i=15%
Period 1	.9524	.9434	.9346	.9259	.9091	.8929	.8696
Period 2	.9070	.8900	.8734	.8573	.8264	.7972	.7561
Period 3	.8638	.8396	.8163	.7938	.7513	.7118	.6575
Period 4	.8227	.7921	.7629	.7350	.6830	.6355	.5718
Period 5	.7835	.7473	.7130	.6806	.6209	.5674	.4972
Period 6	.7462	.7050	.6663	.6302	.5645	.5066	.4323
Period 7	.7107	.6651	.6227	.5835	.5132	.4523	.3759
Period 8	.6768	.6274	.5820	.5403	.4665	.4039	.3269
Period 9	.6446	.5919	.5439	.5002	.4241	.3606	.2843
Period 10	.6139	.5584	.5083	.4632	.3855	.3220	.2472
Period 11	.5847	.5268	.4751	.4289	.3505	.2875	.2149
Period 12	.5568	.4970	.4440	.3971	.3186	.2567	.1869
Period 13	.5303	.4688	.4150	.3677	.2897	.2292	.1625
Period 14	.5051	.4423	.3878	.3405	.2633	.2046	.1413
Period 15	.4810	.4173	.3624	.3152	.2394	.1827	.1229

**To find Present value given Annuity (P/A) at the first 15 period discount rate:

	i=5%	i=6%	i=7%	i=8%	i=10%	i=12%	i=15%
Period 1	0.9524	0.9434	0.9346	0.9259	0.9091	0.8929	0.8696
Period 2	1.8594	1.8334	1.8080	1.7833	1.7355	1.6901	1.6257
Period 3	2.7232	2.6730	2.6243	2.5771	2.4869	2.4018	2.2832
Period 4	3.5460	3.4651	3.3872	3.3121	3.1699	3.0373	2.8550
Period 5	4.3295	4.2124	4.1002	3.9927	3.7908	3.6048	3.3522
Period 6	5.0757	4.9173	4.7665	4.6229	4.3553	4.1114	3.7845
Period 7	5.7864	5.5824	5.3893	5.2064	4.8684	4.5638	4.1604
Period 8	6.4632	6.2098	5.9713	5.7466	5.3349	4.9676	4.4837
Period 9	7.1078	6.8017	6.5152	6.2469	5.7590	5.3282	4.7716
Period 10	7.7217	7.3601	7.0236	6.7101	6.1446	5.6502	5.1088
Period 11	8.3064	7.8869	7.4987	7.1390	6.4951	5.9377	5.2337
Period 12	8.8633	8.3836	7.9427	7.5361	6.8137	6.1944	5.4206
Period 13	9.3936	8.8527	8.3577	7.9038	7.1034	6.4235	5.5831
Period 14	9.8986	9.2950	8.7455	8.2442	7.3667	6.6282	5.7245
Period 15	10.3797	9.7122	9.1079	8.5595	7.6061	6.8109	5.8474