I. Define each of the terms below in no more than 30 English words (50%):

1. agency problem
2. barriers to entry
3. competitive advantage
4. differentiation strategy
5. management by objectives
6. open system
7. outsourcing
8. product life cycle
9. self-actualization
10. span of control

II. Read the Gillette case and then answer the following questions in English:

1. Do you think Gillette's program – training foreign college graduates in the United States and then offering them jobs in their home countries – would work for McDonald's? Why or why not? (25%)

2. Would this program be equally successful if Taiwanese companies tried it with graduates from Southeast Asia countries? Explain. (25%)

RECRUITING FOREIGN TALENT THE GILLETTE WAY

Gillette, the venerable Boston establishment founded by King C. Gillette in 1901, now operates in 56 countries around the world. It is this diversity of worldwide markets that has become one of the biggest challenges facing the company. As traditional markets in the United States and Europe became saturated with Gillette products – including razors and razor blades, electric shavers, toothbrushes, and writing implements – the large markets of mainland Asia and Latin America became a logical next target for growth.

The problem was that even though Gillette executives possessed long-term experience marketing products in the industrial West, they had little knowledge of the market habits of Asians or Latin Americans. As Gillette pursued its expansion, it quickly became clear that the company would need to work with local talent.

Consequently, Gillette developed a program to take top university graduates from the Far East and Latin America and place them in an intensive executive training course. For this program, Gillette's recruiters pick young, aggressive graduates from such countries as Mexico, Columbia, Japan, and Singapore. Those chosen must have both a willingness to travel and a mastery of the English language. They receive a stipend of $1000 per month, along with housing expenses, medical insurance, vacations, and bonuses for meeting performance goals. The 18-month program teaches these new management recruits company policy and helps them develop their business skills in a practical setting.

Each program begins with a 6-month training period in the students' home country.　During this initial phase, the trainees develop a base of experience in the local business setting, under the leadership of Gillette executives.　This phase of the program will help them become more productive in the latter stages of their training. At that time, the students are instructed in the company's overall strategies and are able to envision how the macro policies reflect on their home division's work.

After their local training, students are transferred to the company headquarters in Boston.　While in the United States, trainees are paired with a mentor in their specialty field.　These mentors are Gillette executives from one of five business areas: sales, personnel, marketing, manufacturing, or finance.　The students receive technical guidance from these seasoned veterans and are exposed to a heavy dose of Gillette's corporate culture.　Monthly seminars teach them such topics as communication skills and how to dress appropriately for business, all with the goal of helping the trainees fit smoothly into the company's organization.

Gillette has seen great success in this recruitment of young foreign talent: 90 percent of the trainees go on to work for the company.　This is an impressive statistic, considering that the skills these graduates possess are also highly valued by other companies in their home countries.　Thus for, 113 people have graduated from the program, 60, or 53 percent, of whom still work for Gillette.　Another 25 students from such countries as Russia, Poland, and China are currently in the training program.

Gillette has also found the program to be very cost effective.　The company spends between $20,000 and $25,000 a year on each trainee.　If Gillette concentrated on recruiting experienced expatriate businesspersons instead, it would have to spend five to ten times as much.　Furthermore, the new Gillette-trained managers fit well into the corporate structure and show great promise for becoming future leaders. Most important of all, they have been able to increase Gillette's presence in unfamiliar markets.

(每題二十五分，共計一百分)

I. 假設生產者使用一個生產要素來生產兩項產品，且其生產函數之型式為 $x = A(q_1^\alpha + q_2^\beta), \alpha, \beta > 1$; 並假設他買生產要素及賣產品均是以固定價格，請您

  1. 求解利潤極大化生產者之產出為價格之函數。

  2. 証明生產函數就 $q_1, q_2 > 0$ 而言是 Strictly Convex.

II. 就一個追求收入極大化的獨佔廠商 (Revenue-Maximizing Monopolist) 來說，請証明何以利潤稅 (Profit Tax) 不再具有產出中立性 (Output Neutrality)。

III. 請採用總體經濟模型

  1. 說明 Lucas Critique。

  2. 解析 Ricardian Equivalence Controversy。

IV. 請使用包括貨幣市場、資金市場、外匯市場及 AD-AS 模型之總體經濟均衡架構並輔以幾何圖形分析，以探討下列情況之傳遞機制 (Transmission Mechanism)

  1. 提高外資進入本國市場之限額。

  2. 調降存款準備率。

Please show your calculations and **circle your answers.**

1. Given the regression results from a statistics package:

THE REGRESSION EQUATION IS
C4 = 16.4 + 0.879 C6

COLUMN	COEFFICIENT	ST. DEV. OF COEF.
Constant	16.4087	0.2842
C6	0.87885	0.04004

S = 0.6109
R-SQUARED = 92.7 PERCENT

ANALYSIS OF VARIANCE

DUE TO	DF	SS	MS=SS/DF
REGRESSION	1	179.79	179.79
RESIDUAL	38	14.18	0.37
TOTAL	39	193.98	

(a) Do an F-test to see if the model is significant at 0.05 level. State the hypothesis, the decision rule, the value of the test statistic and the conclusion. (10%)
(b) What does R-SQUARED = 92.7 PERCENT mean? (5%)

2. Given the following results from a statistics package: (as a continuation of 1.)

THE REGRESSION EQUATION IS
C4 = 13.1 + 0.574 C6 + 0.0523 C7

COLUMN	COEFFICIENT	ST. DEV. OF COEF.
Constant	13.1438	0.8907
C6	0.57385	0.08710
C7	0.05227	0.01372

S = 0.5247
R-SQUARED = 94.7 PERCENT
R-SQUARED = 94.5 PERCENT, ADJUSTED FOR D.F.

ANALYSIS OF VARIANCE

DUE TO	DF	SS	MS=SS/DF
REGRESSION	2	183.790	91.895
RESIDUAL	37	10.185	0.275
TOTAL	39	193.975	

(a) Do a hypothesis test at 0.05 significance level to see if the coefficients of C6 and C7 are both zero. State the hypothesis, the decision rule, the value of the test statistic and the conclusion. (10%)

(b) Use the information in 1. to find the coefficient of partial determination between C4 and C7 given that C6 is already in the model. What does this information mean?(10%)

(c) Do a hypothesis test at 0.05 significance level to see if we should use model in 1 or 2. (10%)

3. A firm developing a new soft drink conducted an experiment to study consumer preferences for the color of the drink. Four colors were under consideration: colorless, pink, orange, and lime green. Twenty test localities were selected that were similar in marketing condition. Each color was randomly assigned to five of these localities for test marketing. The following table shows the number of cases sold per 1000 population during the study period.

	Colorless	Pink	Orange	Green	Total
1	26.5	31.2	27.9	30.8	
2	28.7	28.3	25.1	29.6	
3	25.1	30.8	28.5	32.4	
4	29.1	27.9	24.2	31.7	
5	27.2	29.6	26.5	32.8	
Total	136.6	147.8	132.2	157.3	573.9

(a) Let Y indicate the number of cases sold per 1000 population. To test if the mean number of cases sold for each color is equal, analysis of variance (ANOVA) is usually applied. What assumptions are required in ANOVA? (5%)

(b) Please do necessary calculations to set up an ANOVA table: (10%)

Source	SS	d.f.	MS
Treatment			
Error			
Total			

(c) Test whether the mean numbers of cases sold for each color are all equal at 0.05 significance level. State the hypothesis, the decision rule, the value of the test statistic and the conclusion. (10%)

4.　Forty-two persons who were seriously overweight were randomly assigned to one of two weight reduction regimens, with 21 assigned to each regimen. During the study period, one person in regimen 2 moved out of town. All other persons remained in the study. At the end of the study period, the weight losses were ascertained. The data on weight losses (in kilograms) follow:
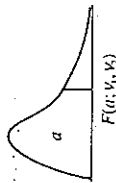
Regimen 1
15.2　14.4　16.3　13.6　11.7　10.2　12.6　14.3　16.7　13.0
17.1　11.7　12.9　14.4　14.2　14.5　14.8　12.7　15.1　11.1　10.0

Regimen 2
16.2　18.6　12.6　17.9　18.2　20.0　17.3　18.3　19.7　15.1
16.3　16.8　15.5　20.5　16.7　16.4　14.8　18.3　16.6　17.9

(a) Assume that the two populations (of weight reduction regimens) are normal. Test whether the two population variances are equal at 0.05 significance level. State the hypothesis, the decision rule, the value of the test statistic and the conclusion. (10%)

(b) Assume that the two populations are normal and have equal variances. Test whether the mean weight loss for regimen 2 exceeds that for regimen 1 at 0.05 significance level. State the hypothesis, the decision rule, the value of the test statistic and the conclusion. (10%)

(c) Assume that the two populations are normal and have equal variances. Find a 90% confidence interval for the difference in the mean weight losses. (10%)

Percentiles of the F distribution. Entry is $F(\alpha; \nu_1, \nu_2)$ where $P[F(\nu_1, \nu_2) \le F(\alpha; \nu_1, \nu_2)] = \alpha$.

$a = 0.95$

(continued)

numerator df — $a = 0.95$

denominator df	1	2	3	4	5	6	7	8	9
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96
∞	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88

numerator df — $a = 0.95$

denominator df	10	12	15	20	24	30	40	60	120	∞
1	241.9	243.9	245.9	248.0	249.1	250.1	251.1	252.2	253.3	254.3
2	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
3	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53
4	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63
5	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.36
6	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
7	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
8	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
9	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71
10	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
11	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
12	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
13	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
14	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13
15	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
16	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
17	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
18	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
19	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
20	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84
21	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
22	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78
23	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76
24	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
25	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
26	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
27	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
28	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
29	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64
30	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
40	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51
60	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39
120	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25
∞	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00