



*必要之計算過程均須寫在答案卷上，僅寫答案者不予計分。

1. (25%) 某運輸供需問題之成本即共映需求量表如下：

單位運 輸成本	需求站				供應量
	1	2	3	4	
供 1	41	27	28	24	75
應 2	40	29	--	23	75
站 3	37	30	27	21	45
需求量	20	30	30	40	

回答下列問題：

- (a) (10%) 將此問題以線性規畫問題模式表達。
 (b) (15%) 以運輸問題模式解此問題。

供應站 2 至需求站 3 因為無法直接運送，所以成本不予標示。

2. (25%) 斗六市早上下雨的機率為 p 、下午下雨的機率為 q 。黃老師每天早上從宿舍到辦公室上班，下午從辦公室回家。他有一把雨傘，每當上下班時如果遇到下雨而且雨傘就在身邊他就會撐傘，如果沒遇見下雨那麼雨傘就會留在原處。

- a. (15%) 將此問題模式成 Markov Chain 問題並定義清楚每一個狀態 (state)。
 b. (10%) 若 $p = q = 0.5$ ，計算黃老師每天淋雨的機率。



- 1, (1) (4%) Draw a picture to describe a basic queueing process.
- (2) (6%) What are the important considerations or assumptions you may have in constructing various queueing models?
- (3) (15%) A maintenance person has the job of keeping two machines in working order. The amount of time that a machine works before breaking down has an exponential distribution with a mean of 10 hours. The time then spent by the maintenance person to repair the machine has an exponential distribution with a mean of 8 hours.
- (3a) Construct the rate diagram for this queueing system.
- (3b) Develop the balance equations.
- (3c) Find the expected waiting time (including service) for the machines.
- (3d) Determine the proportion of time that the maintenance person is busy.
- (3e) Determine the proportion of time that any given machine is working.
- 4, A company is considering developing and marketing a new product. It is estimated to be twice as likely that the product would prove to be successful as unsuccessful. If it were successful, the expected profit would be \$1,500,000. If unsuccessful, the expected loss would be \$1,800,000. A marketing survey can be conducted at a cost of \$300,000 to predict whether the product would be successful. Past experience with such surveys indicates that successful products have been predicted to be successful 80% of the time, whereas unsuccessful products have been predicted to be unsuccessful 70% of the time. You wish to use Bayes' decision rule to maximize expected profit.
- (1) (7%) What is the optimal action, given that you decline the option of conducting the marketing survey? Also identify the actions, states of nature, and payoff table.
- (2) (3%) What is the expected value of perfect information regarding the state of nature?
- (3) (12%) Draw the decision tree to show the decision procedure considering whether to conduct the marketing survey, and whether to develop and market this new product. Identify the optimal policy.
- (4) (3%) What is the expected value of the marketing survey?

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八十八學年度研究所碩士班入學考試試題

所別：工管所
科目：生產管理

(各計算題目請敘述計算過程，否則不予計分。並請明確標示各大題及小題之題號。)

1. 某公司過去各季的銷售量呈現季節性循環，目前收集各季的銷售量數據如下表。

年 \ 季	第一季	第二季	第三季	第四季
1997	28	36	60	71
1998	45	54	84	88
1999	58	68		

- 以 Centered Moving Average 方法，求第三季的平均季節指數(Seasonal Index)。(5%)
- 若假設年銷售量趨勢以 40% 成長，預測 1999 年第三季的銷售量為何？。(5%)
- 若以 Simple Moving Average ($F_t = \sum_{i=t-n}^{t-1} A_i / n$) 方法做預測，說明 n 值的大小對預測值的影響。(5%)
- 若以 Exponential Smoothing ($F_t = F_{t-1} + \alpha(A_{t-1} - F_{t-1})$) 方法做預測，說明 α 值的大小對預測值的影響。(5%)

2. 某公司生產所需之零件預計對外採購，該零件之年需求量 2000 個、年儲存成本為 \$/unit、每次採購成本 \$20。目前有兩家供應廠商(A 與 B)之報價如下表所示：

數量 \ 廠商	A 供應商	數量 \ 廠商	B 供應商
1 ~ 49	4.00 \$/unit	1 ~ 74	3.90 \$/unit
50 ~ 99	3.80 \$/unit	75 ~ 149	3.75 \$/unit
100 ~ 以上	3.65 \$/unit	150 ~ 以上	3.60 \$/unit

請選擇最佳之供應廠商、計算最佳之採購批量、及計算最佳之年採購總成本。(15%)

3. 單期(Single Period)存貨系統在決定最佳訂購量時，主要以服務水準(Service Level, SL) 概念決定最佳訂購量，公式如下：

$$SL = \frac{C_s}{C_s + C_e} \quad \text{where: } C_s = \text{Shortage cost per unit}$$

$$C_e = \text{Excess cost per unit}$$

- 說明或證明上述公式之由來。(10%)
- 以 Discrete Stocking Levels 說明該公式如何使用。(5%)

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4. 某工廠有四個生產基地(F1, F2, F3, 及 F4)，目前該廠正規劃配銷中心倉庫(WH)的位置。下表提供各生產基地座標位置、及各生產基地與配銷中心倉庫間每月的貨運量資料。試以 Center of Gravity Method 回答下述各小題。

生產基地 (基地代號)	座標位置 (x, y)	貨運量 (每月運貨車趟次)
F1	(2, 3)	75
F2	(3, 5)	70
F3	(5, 4)	30
F4	(8, 6)	25

- (a) 決定配銷中心倉庫最佳的座標位置。(5%)
- (b) 若各生產基地與配銷中心倉庫間的運貨車輛不同，且每公里的運貨成本如後：
 F1↔WH：每公里 50 元。 F2↔WH：每公里 40 元。
 F3↔WH：每公里 45 元。 F4↔WH：每公里 60 元。
 依上述資料，決定配銷中心倉庫最佳的座標位置。(5%)
- (c) 試推導 Center of Gravity Method 公式的由來。(10%)
 【提示：假設兩點 (x_1, y_1) 及 (x_2, y_2) 間之距離(D)為： $D = (x_1 - x_2)^2 + (y_1 - y_2)^2$ 】

5. 某加工中心依序已有五個加工件(A, B, C, D, and E)進入該中心等待加工，下表顯示各加工件之相關資料。目前考慮三種排程方式：(1)CR (Critical Ratio)、(2)SPT (Shortest Process Time First)、及(3)DD (Due Date)。

加工件	進入該中心 之順序	於該中心之 加工時間(天)	距交貨期 之天數	後續必經之加 工中心數目	後續之 總加工天數
A	1	4	11	3	6
B	2	6	5	2	6
C	3	3	1	2	3
D	4	2	8	1	3
E	5	5	7	3	7

- (a) 以 CR 排程方式，決定該加工中心之加工順序。(5%)
- (b) 以 SPT 及 DD 兩種排程方式，比較 Makespan，何者較佳？(5%)
- (c) 以 SPT 及 DD 兩種排程方式，比較加工件的平均延誤時間，何者較佳？(5%)
- (d) 以 SPT 及 DD 兩種排程方式，比較加工件的平均在製品數量，何者較佳？(5%)
- (e) 若考慮加工件之 Change Over Time，則應如何處理該加工中心之排程問題？(10%)

1. (10%) A certain component in a computer system fails 5% of the time. To achieve a greater reliability in the system, this component is duplicated n times. The system fails only when all the n components fail. Assume the component failures are independent of each other. What is the smallest value of n that can be used to guarantee that the system works 99% of the time?
2. (10%) A city has a professional basketball team playing at home and a professional hockey team playing away on the same night. According to probabilities for professional sports published in *Chance* (Fall, 1992), a professional basketball team has a 0.641 probability of winning a home game and a professional hockey team has a 0.462 probability of winning an away game. Historically, when both teams play on the same night, the chance that the next morning's leading sports story will be about the basketball game is 60% and the chance that it will be about the hockey game is 40%. Suppose that on the morning after these games the newspaper's leading sports story begins with the headline "We Win!!" What is the probability that the story is about the basketball team?
3. (10%) Round-off error has a uniform distribution on $[-0.5, +0.5]$ and round-off errors are independent. A sum of 50 numbers is calculated where each is of the form XXX.D, rounded to XXX before adding. What is the probability that the total round-off error exceeds 5?
4. (10%) Let (X_1, X_2) denote a random sample of size 2 from the uniform distribution on the interval $(0, 1)$. Find the probability density function for $Y = X_1 + X_2$.
5. (10%) A continuous random vector $[X_1, X_2]$ has density function f as given below:

$$f(x_1, x_2) = 1, \quad \text{for } -x_2 < x_1 < +x_2 \text{ and } 0 < x_2 < 1.$$
 - (a) Obtain the marginal density functions of X_1 and X_2 . (3%)
 - (b) Obtain the covariance of X_1 and X_2 . (4%)
 - (c) Are X_1 and X_2 independent? (3%)
6. (10%) A pseudo random number generator is designed so that the integers 0 through 9 have equal probability of occurrence. The number of times of occurrence for the first 10,000 numbers is listed below. Does this generator seem to be working properly? Using $\alpha = 0.05$.

#	0	1	2	3	4	5	6	7	8	9
times	967	1008	975	1022	1003	989	1001	981	1043	1011



7. (10%) Let X be uniformly distributed on the interval 0 and a .
- Obtain the estimator of a using the method of maximum likelihood.
 - Obtain the estimator of a using the method of moments.
8. (10%) Two new drugs were given to patients with heart disease. The first drug lowered the blood pressure of 16 patients an average of 11 points, with a standard deviation of 6 points. The second drug lowered the blood pressure of another 20 patients an average of 12 points, with a standard deviation of 8 points.
- Determine a 95% confidence interval for the difference in the mean reductions in blood pressure. (6%)
 - What assumptions are required in part (a)? (4%)
9. (10%) The diameters of bolts are known to have a standard deviation of 0.0001 inch. A random sample of 10 bolts yields an average diameter of 0.2546 inch.
- Test the hypothesis that the true mean diameter of bolts equal 0.255 inch, using $\alpha = 0.05$.
 - What sample size would be necessary to detect a true mean bolt diameter of 0.2552 inch with probability at least 0.90?
10. (10%) A manufacturer of paper used for making grocery bags is interested in improving the tensile strength of the product. Product engineering thinks that tensile strength is a function of the hardwood concentration in the pulp. One of the engineers responsible for the study decides to investigate four levels of hardwood concentration: 5%, 10%, 15%, and 20%. She also decides to make up six test specimens at each concentration level, using a pilot plant. All specimens are tested on a laboratory tensile tester, in a random order. The analysis of variance (ANOVA) is conducted after the experiment.
- Complete the following ANOVA table for the experiment.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F_0
Hardwood concentration				
Error		130.17		
Total		512.96		

- Let $\mu_{k\%}$ be the mean of the tensile strength (in psi) as the hardwood concentration is set at $k\%$. Find the 95% confidence interval for $\mu_{15\%} - \mu_{10\%}$ if the sample statistics indicate that $\hat{\mu}_{10\%} = 15.67$ psi and $\hat{\mu}_{15\%} = 17.00$ psi.

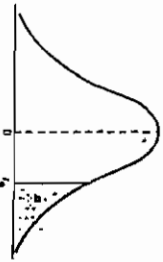
所別：工管所
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(continued) Areas Under the Normal Curve

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9278	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9992	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9997	.9997	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

Critical Values of the t-Distribution



v	α									
	0.40	0.30	0.20	0.15	0.10	0.05	0.025	0.01	0.005	0.001
1	0.325	0.727	1.376	1.963	3.078	6.314	12.706			
2	0.289	0.617	1.061	1.386	1.886	2.920	4.303			
3	0.277	0.584	0.978	1.250	1.638	2.353	3.182			
4	0.271	0.569	0.941	1.190	1.533	2.132	2.776			
5	0.267	0.559	0.920	1.156	1.476	2.015	2.571			
6	0.265	0.553	0.906	1.134	1.440	1.943	2.447			
7	0.263	0.549	0.896	1.119	1.415	1.895	2.365			
8	0.262	0.546	0.889	1.108	1.397	1.860	2.306			
9	0.261	0.543	0.883	1.100	1.383	1.833	2.262			
10	0.260	0.542	0.879	1.093	1.372	1.812	2.228			
11	0.260	0.540	0.876	1.088	1.363	1.796	2.201			
12	0.259	0.539	0.873	1.083	1.356	1.782	2.179			
13	0.259	0.537	0.870	1.079	1.350	1.771	2.160			
14	0.258	0.537	0.868	1.076	1.345	1.761	2.145			
15	0.258	0.536	0.866	1.074	1.341	1.753	2.131			
16	0.258	0.535	0.865	1.071	1.337	1.746	2.120			
17	0.257	0.534	0.863	1.069	1.333	1.740	2.110			
18	0.257	0.534	0.862	1.067	1.330	1.734	2.101			
19	0.257	0.533	0.861	1.066	1.328	1.729	2.093			
20	0.257	0.533	0.860	1.064	1.325	1.725	2.086			
21	0.257	0.532	0.859	1.063	1.323	1.721	2.080			
22	0.256	0.532	0.858	1.061	1.321	1.717	2.074			
23	0.256	0.532	0.858	1.060	1.319	1.714	2.069			
24	0.256	0.531	0.857	1.059	1.318	1.711	2.064			
25	0.256	0.531	0.856	1.058	1.316	1.708	2.060			
26	0.256	0.531	0.856	1.058	1.315	1.706	2.056			
27	0.256	0.531	0.855	1.057	1.314	1.703	2.052			
28	0.256	0.530	0.855	1.056	1.313	1.701	2.048			
29	0.256	0.530	0.854	1.055	1.311	1.699	2.045			
30	0.256	0.530	0.854	1.055	1.310	1.697	2.042			
40	0.255	0.529	0.851	1.050	1.303	1.684	2.021			
60	0.254	0.527	0.848	1.045	1.296	1.671	2.000			
120	0.253	0.526	0.845	1.041	1.289	1.658	1.980			
∞	0.253	0.524	0.842	1.036	1.282	1.645	1.960			



Percentage Points of the χ^2 Distribution^a

	.995	.990	.975	.950	.900	.500	.100	.050	.025	.010	.005
1	.00+	.00+	.00+	.00+	.02	.45	2.71	3.84	5.02	6.63	7.88
2	.01	.02	.05	.10	.21	1.39	4.61	5.99	7.38	9.21	10.60
3	.07	.11	.22	.35	.58	2.37	6.25	7.81	9.35	11.34	12.84
4	.21	.30	.48	.71	1.06	3.36	7.78	9.49	11.14	13.28	14.86
5	.41	.55	.83	1.15	1.61	4.35	9.24	11.07	12.83	15.09	16.75
6	.68	.87	1.24	1.64	2.20	5.35	10.65	12.59	14.45	16.81	18.55
7	.99	1.24	1.69	2.17	2.83	6.35	12.02	14.07	16.01	18.48	20.28
8	1.34	1.65	2.18	2.73	3.49	7.34	13.36	15.51	17.53	20.09	21.96
9	1.73	2.09	2.70	3.33	4.17	8.34	14.68	16.92	19.02	21.67	23.59
10	2.16	2.56	3.25	3.94	4.87	9.34	15.99	18.31	20.48	23.21	25.19
11	2.60	3.05	3.82	4.57	5.58	10.34	17.28	19.68	21.92	24.72	26.76
12	3.07	3.57	4.40	5.23	6.30	11.34	18.55	21.03	23.34	26.22	28.30
13	3.57	4.11	5.01	5.89	7.04	12.34	19.81	22.36	24.74	27.69	29.82
14	4.07	4.66	5.63	6.57	7.79	13.34	21.06	23.68	26.12	29.14	31.32
15	4.60	5.23	6.27	7.26	8.55	14.34	22.31	25.00	27.49	30.58	32.80
16	5.14	5.81	6.91	7.96	9.31	15.34	23.54	26.30	28.85	32.00	34.27
17	5.70	6.41	7.56	8.67	10.09	16.34	24.77	27.59	30.19	33.41	35.72

國立雲林科技大學
八十八學年度研究所碩士班入學考試試題

所別：工管所

科目：經濟學

Part I. 單選題(每題四分) (答錯不倒扣)

1. Factors that explain the negative relationship in the law of demand are
 - a. income and consumer effects.
 - b. the substitution effect and the income effect.
 - c. the principle of substitution and the principle of demand.
 - d. the income effect and the effect of more buyers in the market.
 - e. None of the above.

2. As more industrial robots are installed in television assembly lines, firms are able to produce more televisions at lower cost. This causes the equilibrium price to ___ and quantity of televisions to ____.
 - a. fall; fall
 - b. fall; rise
 - c. rise; fall
 - d. rise; rise
 - e. change, but we cannot predict whether they will rise or fall

3. Information costs are
 - a. only the time cost of obtaining knowledge about a good.
 - b. only the costs paid to consultants hired to provide information about a good.
 - c. completely eliminated by speculators.
 - d. nonexistent in our computer based, information oriented society.
 - e. the time cost and money cost of acquiring information about a good.

4. Which of the following always plays a negative role in society?
 - a. advertising
 - b. profitable speculation
 - c. unprofitable speculation
 - d. intermediaries
 - e. all of the above

5. Which of the following is an implicit rather than explicit cost to a firm?
 - a. The cost of hiring an outside consultant.
 - b. The electricity used by the firm.
 - c. The time on the weekend the owner devotes to the firm's business.
 - d. The paycheck paid to the owner.
 - e. The interest paid on a bank loan.

6. The fact that the marginal cost curve eventually slopes up as output expands reflects
 - a. the point that fixed costs eventually increase as output expands.
 - b. the negative slope of the average total cost curve.
 - c. the law of diminishing returns.
 - d. the increasing marginal product of labor.
 - e. None of the above.



7. If the total average cost curve falls, then is constant, and finally rises, the firm encounters ____.
- first increasing, next constant, then diminishing returns to scale
 - first constant, next increasing, then diminishing returns to scale
 - first diminishing and then increasing returns but never a section of constant returns to scale
 - always diminishing returns to scale
 - It is impossible to say with the information given in the question.
8. When can monopolistic competitive firms earn an economic profit?
- In only the short run.
 - In only the long run.
 - In both the short run and long run.
 - Never.
 - Depending on market conditions, in either the long run or the short run but not both.
9. Economic inefficiency is created when
- $P=MR$.
 - $P>MC$
 - $P=MC$
 - $MR=MC$
 - None of the above.
10. After a price-searching firm determines its profit maximizing level of production, it will determine the price of its output by referring to
- the demand curve for its product.
 - its marginal revenue curve.
 - its marginal cost curve.
 - its long run average cost curve
 - its marginal demand cost curve
11. Rent is usually paid to which factor of production?
- Labor.
 - Capital.
 - Land.
 - Apartment.
 - Entrepreneurs.
12. In a period with inflation, nominal GDP rises
- more rapid than real GDP.
 - at a rate equal to real GDP.
 - less rapidly than real GDP.
 - at a rate that bears no relationship to real GDP.
 - more rapidly than real GDP only if the inflation rate is at least 5 percent.



13. After the self-correcting mechanism has worked, the long-run effect of a demand shock that shifted the AD curve to the right is to ___ the price level and ___ output.
- raise; raise
 - raise; not change
 - not change; raise
 - not change; not change
 - lower; lower
14. M1 increases when the Fed
- raises the discount rate.
 - sells a government security.
 - raises the required reserve ratio.
 - buys a government security.
 - all the actions lower the money supply.
15. An adverse supply shock
- does not cause a lasting inflation.
 - causes persistent inflation.
 - causes wages to rise more rapidly than prices.
 - can cause persisting inflation only if it raises velocity.
 - causes wages and prices to rise by the same amount.
16. The short-run Phillips curve suggests unemployment rises when there is
- an anticipated increase in inflation.
 - an anticipated decrease in inflation.
 - an unanticipated increase in inflation.
 - an unanticipated decrease in inflation.
 - none of the above, because unemployment is not changed by inflation.
17. Which school of thought believed the self-correcting mechanism works slowly?
- Keynesian.
 - Monetarist.
 - Rational expectations.
 - Keynesian and monetarist only.
 - All schools believe the self-correcting mechanism is slow.
18. Purchasing power parity suggests exchange rates depend on
- interest rates.
 - inflation rates.
 - capital movements.
 - the business cycle.
 - changes in comparative advantage.

國立雲林科技大學
八十八學年度研究所碩士班入學考試試題

所別：工管所

科目：經濟學

19. With a flexible exchange rate, the exchange rate appreciates whenever
- domestic citizens increase their demand for foreign goods.
 - domestic inflation greatly exceeds foreign inflation.
 - foreign citizens increase their demand for goods exported from the domestic country.
 - domestic citizens decide to increase their investment in foreign countries.
 - domestic firms reduce their exports.
20. The marginal tax rates of a progressive tax
- rise with income.
 - do not change with income.
 - fall with income.
 - first rise and then fall with income.
 - first fall and then rise with income.

Part II. 計算問答題(每題 10 分)

- What are the differences between sunk cost and fixed cost? Why the differences are important to the business firms?
- Assume that the following equations summarize the structure of an economy:

$$C = a + 0.75(Y - T) \quad G = 1000$$

$$a = 800 - 10r \quad (M/P)^d = 0.4Y - 100r$$

$$T = 400 + 0.2Y \quad M^s/P = 1000$$

$$I_p = 900 - 30r$$
 - What is the equation of the IS curve?
 - What is the equation of the LM curve?
 - What is the equilibrium real interest rate and real output?
 - If G increases to 1280, what is the equilibrium interest rate and real output?
 - If G remains at 1000 but M^s/P increases to 1350, what is the equilibrium interest rate and real output?

解答時，必要之計算或推導過程均需顯示在答案卷上，祝各位成功。

1.(10%) 求星形線

$$x^{(2/3)} + y^{(2/3)} = a^{(2/3)}$$

$a > 0$ 之全弧長 (arc length)

2.(10%) 解 $dy/dx = y(T-y)$, 其中 $y(0)=1, T > 1$.

3.(10%) 試判定

$$\sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)}$$

為收斂，並求其和。

4.(10%) 在球上， $S = \{(x, y, z) \mid x^2 + y^2 + z^2 = 3\}$ ，
試找出座標和為極大之點。

5.(10%) 試以重積分算出 $E = \{(x, y) \mid (x^2/9) + (y^2/16) \leq 1\}$ 之面積。

6.(10%) Given a matrix A, where

$$A = \begin{bmatrix} 0 & 0 & -2 \\ 1 & 2 & 1 \\ 1 & 0 & 3 \end{bmatrix}$$

(a) Find the eigenvalues and the corresponding eigenvectors. (4%)

(b) Find a matrix P that diagonalizes A, that is, $P^{-1}AP$ is a diagonal matrix. (3%)

(c) $P^{-1}AP = ?$ (3%)

7.(10%) Find the eigenvalues and bases of A^{25} for

$$A = \begin{bmatrix} -1 & -2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$$



8.(10%) Given a matrix A , then find $\det(A)=?$

$$A = \begin{bmatrix} 3 & 3 & 0 & 5 \\ 2 & 2 & 0 & -2 \\ 4 & 1 & -3 & 0 \\ 2 & 10 & 3 & 2 \end{bmatrix}$$

9.(10%) Given a matrix A , then find $A^{-1}=?$

$$A = \begin{bmatrix} k & 0 & 0 & 0 \\ 1 & k & 0 & 0 \\ 0 & 1 & k & 0 \\ 0 & 0 & 1 & k \end{bmatrix}$$

10.(10%) Given

$$\begin{bmatrix} 2 & 2 & -1 & 0 & 1 \\ -1 & -1 & 2 & -3 & -1 \\ 1 & 1 & -2 & 0 & -1 \\ 0 & 0 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

then $x_1, x_2, x_3, x_4, x_5 = ?$ (hint: you may use Gaussian elimination or other methods)



1. 某家企業面臨嚴重競爭，流失不少顧客，原總經理採取縮減支出方式來勉強減少虧損，但也導致流失更多的顧客。假如你臨危授命為總經理，試問你將如何挽救此企業？[25%]
2. 企業競爭標的中的「時間」愈來愈重要，能愈快提供產品或服務予顧客之企業，愈容易取得顧客之訂單。試問你將如何來縮短提供產品或服務之時間？[25%]
3. 一般的搬家，可能僅須委託一搬家公司，約好時間，屆時將所有東西由舊址搬遷至新址就大功告成。但搬家若牽涉到一個大單位，譬如說一家綜合醫院或是一家工廠，則問題會變得複雜處許多。

以醫院為例，下列是一家大型醫院在搬遷時所必須考慮的狀況或限制。

醫院不可因搬家而全面停業。即使是一個部門亦不允許長時間(例如一週以上)的搬遷，甚至在搬遷時，尚須維持基本的醫療運作。

一家綜合醫院的部門可多到三十個以上，因此不可能要求在短時間內(例如一天以內)全部搬遷完畢，否則會堵塞在新舊院址之間的通路上，反倒動彈不得。

醫院的儀器設備須周邊設施例如水、電、蒸汽的配合，方能運作。因此搬遷前須確定新院址之周邊設施業已安裝完畢。而且其搬遷不能賴以一般搬家公司，必須是原來儀器設備廠商才有足夠的專業知識來執行搬遷。

由於儀器設備共用，若干醫院的部門必須同時搬遷，或是有些部門必須等到其它部門搬遷後方可搬遷。因此可說有些醫院的部門的搬遷，彼此存在有先後次序的關係。

因此假設新院址之周邊設施業已安裝完畢，一家醫院的搬遷會牽涉到的人或單位有搬家公司、儀器設備公司、各部門主任。而搬遷的對象就是醫院所有的物品設備及病患。並且在一預定的時段內，搬遷到新院址。

現假設你是醫院的總務主任，你要如何形成搬遷計畫，搬遷計畫的內容為何，如何執行搬遷計畫，因而可成功地控管整個醫院的搬遷任務。[50%]



1. a) 何謂 Windows 98、Windows NT、Unix 及 Linux? (2%)
b) 試說明 a)之 4 種作業系統主要之異同處? (6%)
2. a) 何謂 K6-2 300 及 Pentium II 300? (2%)
b) 試說明個人在購買電腦時，在軟硬體上應如何考量以選購符合個人需求之電腦呢? (6%)
3. a) 何謂 CGI、ASP、ActiveX Control 及 Java Applet? (4%)
b) 試比較用 a)之 4 種方式來開發 Web-based 應用程式時之優缺點? (8%)
4. a) 何謂 Client/Server 架構及 N-tier 架構? (4%)
b) 試說明 a)之 2 種方式如何來開發應用程式呢? (8%)
5. 隨著網路的功能增強，網路上的商機無限，但其安全性卻是令人裹足不前。試說明目前在加強安全性方面有哪些作法？並簡述各種作法。 (10%)
6. 解釋 Data Abstraction, Abstract Data Type, Inheritance, Polymorphism, Dynamic Binding。 (10%)
7. 系統與系統之間要能夠互動必須要有相互溝通的標準(Standard)，請列舉五種不同特性的標準並簡介之(軟硬體及商業應用皆可)。 (10%)
8. 就 MTS, MIDAS, CORBA 三種中介軟體所提供之相關服務，任選一種詳述其功能特性。 (10%)
9. 就你所參與過且最滿意之系統發展專案回答以下問題：
 - a) 專案簡述，並說明你在專案中所扮演之角色。 (5%)
 - b) 盡你所能解釋所採用之系統分析方法 (如 Yourdon SA, ARIS, LOVEM, OOA, 自創, ...) 之進行步驟及各步驟之產出文件。 (15%)