

考試科目	管理學 A211B, A212B	所別	企業管理	考試時間	2月28日(六)第3節
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總共五題申論題，請按題號依序作答，每題二十分。

不必抄題，作答時請將試題題號及答案依照順序寫在試卷上，試題與答題本於試畢一起繳回。

作答時，內容除了要有重點標題外，還須闡釋清楚，可以提出觀念圖形，但必須輔以文字說明。

- 一、請說明管理的四大機能內涵在二十一世紀的現代經營環境中與過去有何差異。
- 二、企業是否應善盡其社會責任的正反兩派論點為何？
- 三、自工業革命以來，經營管理思想經歷過哪些階段的演進？實務上該如何看待這些經營論點？
- 四、請解釋何謂環境不確定性(Environmental Uncertainty)，針對各類環境不確定性，企業有哪些應對方式？
- 五、請以策略地圖解釋平衡計分卡(Balanced Scorecard)的績效控制原理。

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。
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考試科目	經濟學	所別	商學院共同科目	考試時間	2月28日(六)第一節
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Multiple Choice (1 point each)

Identify the letter of the choice that best completes the statement or answers the question.

1. Suppose that for a particular firm the only variable input into the production process is labor and that output equals zero when no workers are hired. In addition, suppose that when the firm hires 4 workers, the firm produces 50 units of output. If the fixed cost of production is \$8, the variable cost per unit of labor is \$20, and the marginal product of labor for the fifth unit of labor is 4, what is the average total cost of production when the firm hires 5 workers?

- A. \$2.
- B. \$4.
- C. \$5.
- D. \$20.

2. If soybean farmers know that the demand for soybeans is inelastic, in order to increase their total revenues they should

- A. use more fertilizers and weed killers to increase their yields.
- B. plant additional acres to increase their output.
- C. reduce the number of acres they plant to decrease their output.
- D. hire more workers to plow the land.

3. The price received by sellers in a market will increase if the government

- A. decreases a binding price floor in that market.
- B. increases a binding price ceiling in that market.
- C. increases a tax on the good sold in that market.
- D. stops subsidizing the seller.

4. Neither public goods nor common resources are

- A. excludable, but only public goods are not rival in consumption.
- B. excludable, but only common resources are not rival in consumption.
- C. rival in consumption, but only public goods are not excludable.
- D. rival in consumption, but only common resources are not excludable.

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註

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考試科目	經濟學	所別	商學院共同科目	考試時間	二月八日(六)第一節
------	-----	----	---------	------	------------

5. When producers operate in a market characterized by negative externalities, a tax that forces them to internalize the externality will
- give sellers the incentive to account for the external effects of their actions.
 - increase demand.
 - increase the amount of the commodity exchanged in market equilibrium.
 - restrict the producers' ability to take the costs of the externality into account when deciding how much to supply.
6. As a general rule, profit maximizing producers in a competitive market produce output at a point where
- marginal cost is decreasing.
 - marginal revenue is increasing.
 - marginal cost is increasing.
 - price is less than marginal revenue.
7. When a country allows trade and becomes an exporter of a good, which of the following would NOT be true?
- The price paid by domestic consumers of the good increases.
 - The price received by domestic producers of the good increases.
 - The losses of domestic consumers exceed the gains of domestic producers.
 - The gains of domestic producers exceed the losses of domestic consumers.
8. Price discrimination requires the firm to
- differentiate between different units of its product.
 - engage in arbitrage.
 - separate customers according to their willingness to pay.
 - All of the above.
9. Assuming the oligopolists do not have the opportunity to collude, once they have reached the Nash equilibrium,
- it is always in their best interest to supply more to the market.
 - it is always in their best interest to leave supply unchanged.
 - it is always in their best interest to supply less to the market.
 - it may be their best interest to do any of the above, depending on market conditions.

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考試科目	經濟學	所別	商學院共同科目	考試時間	二月28日(六)第一節
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10. If a firm in a monopolistically competitive market uses advertising to decrease elasticity of demand for its product,
- the firm will eventually have to lower price to remain competitive.
 - it will be able to increase its mark-up over marginal cost.
 - it will increase the well-being of society.
 - it will reduce average total cost.
11. Policy makers should use a variety of fiscal and monetary policy measures to stabilize the economy since
- this will shorten any policy lags.
 - this will always maintain full employment.
 - this will eliminate multiplier uncertainty.
 - there is a chance that errors in estimating one multiplier will be offset by errors in estimating another.
 - None of the above.
12. According to liquidity preference theory, an increase in money demand for some reason other than a change in the price level causes
- the interest rate to fall, so aggregate demand shifts right.
 - the interest rate to fall, so aggregate demand shifts left.
 - the interest rate to rise, so aggregate demand shifts right.
 - the interest rate to rise, so aggregate demand shifts left.
13. One of the assertions that Keynesians make when explaining the severity of the Great Depression in the U.S. is that
- the economic collapse originated from the negative effect that the stock market crash had on individuals' wealth.
 - investment spending responded negatively to huge increases in the real interest rate.
 - vigorous use of expansionary fiscal policy early on could have reduced the severity of the economic downturn.
 - in response to the stock market crash, the U.S. Fed imposed credit controls that were much too restrictive.
 - None of the above.

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考試科目	經濟學	所別	商學院共同科目	考試時間	2月8日(六)第一節
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14. Suppose that during the Great Depression long-run aggregate supply shifted left. To be consistent with what happened to the price level and output, what would have had to happen to aggregate demand?

- A. It would have to have shifted left by less than aggregate supply.
- B. It would have to have shifted left by more than aggregate supply.
- C. It would have to have shifted right by less than aggregate supply.
- D. It would have to have shifted right by more than aggregate supply.

15. During the period referred to as "the Great Moderation"

- A. there were only mild economic fluctuations despite severe supply shocks.
- B. few policy changes were implemented so output stayed close to the full employment level.
- C. economic fluctuations were largely contained through effective policy changes.
- D. inflation consistently exceeded 4 percent.
- E. All of the above.

16. Given a certain rate of nominal money growth, an increase in inflation will cause output growth to

- A. increase.
- B. decrease.
- C. remain constant.
- D. More information is needed to answer the question.

17. Research by John Taylor on the staggering of wage decisions indicates which of the following actions by the central bank should be taken to reduce inflation?

- A. a rapid, unannounced reduction in money growth
- B. a slow, unannounced reduction in money growth
- C. a rapid, announced reduction in money growth
- D. a slow, but gradually faster, announced reduction in money growth

18. Which of the following actions by the Federal Reserve will result in an increase in the money supply?

- A. an increase in federal spending
- B. an increase in buying stocks in the open market
- C. a decrease in the discount rate
- D. an increase in the required reserve ratio

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考試科目	經濟學	所別	商學院共同科目	考試時間	2月28日(六)第一節
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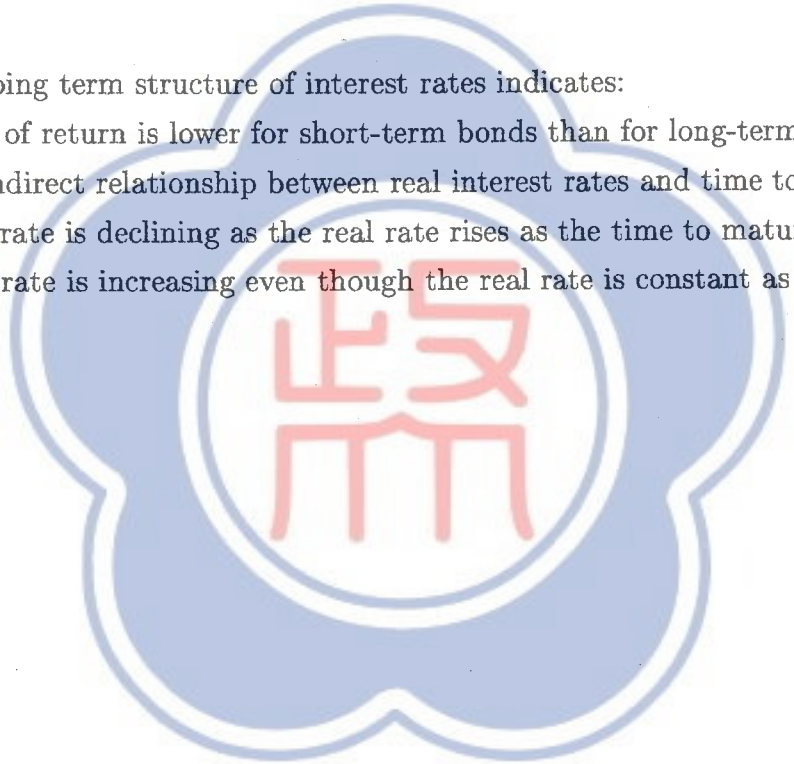
19. A 10% devaluation in the short run will cause

- I. an increase in net exports.
- II. price level to increase by more than 10%.
- III. a real depreciation.
- IV. an increase in unemployment rate.

- A. I, II
- B. III, IV
- C. I, III
- D. I, II, IV

20. An upward-sloping term structure of interest rates indicates:

- A. the real rate of return is lower for short-term bonds than for long-term bonds.
- B. there is an indirect relationship between real interest rates and time to maturity.
- C. the nominal rate is declining as the real rate rises as the time to maturity increases.
- D. the nominal rate is increasing even though the real rate is constant as the time to maturity increases.



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考試科目	經濟學	所別	商學院共同科目	考試時間	二月八日(六)第一節
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Problems and Short-essay Questions

Please answer the following questions IN SEQUENCE. All questions may be answered in either Chinese or English.

1. John receives NT\$600 per week as an allowance to spend on anything he likes. Because he likes only soda and chips, he spends the entire amount on soda (at NT\$20 per bottle) and chips (at NT\$15 per bag). John always consumes soda and chips in the fixed proportion of one to two. That is, his preference can be represented by the utility function

$$U(s, c) = \min \left\{ s, \frac{c}{2} \right\}.$$

- (4 points) How many bottles of soda and how many bags of chips will John buy with his NT\$600 allowance in a week?
- (4 points) Suppose the price of soda were to increase to NT\$30 a bottle. How much of each commodity would be bought?
- (6 points) By how much should John's allowance be increased to compensate for the increase in the price of soda in part (b)?
- (6 points) Compare your answers in part (a) and part (b). How much of the decrease in the consumption of soda is attributable to the substitution effect and income effect, respectively?

2. (20 points) There is a small open economy producing two goods, food and cloth. The production function in food industry is represented by the following Cobb-Douglas production technology

$$Q_f = L_f^{\frac{1}{2}} T^{\frac{1}{2}},$$

where L_f is the labor hired in food industry and T is land. The production function in cloth industry is

$$Q_c = L_c^{\frac{1}{2}} K^{\frac{1}{2}},$$

where the subscript c represents cloth and K is capital. Labor is mobile between sectors. Supply of all factors is fixed.

- Derive the real return of labor, capital and land in terms of each good.
- How does the standard of living of each factor owner change when the supply of cloth in the international market decreases?

備

註

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考試科目	經濟學	所別	商學院共同科目	考試時間	二月28日(六)第一節
------	-----	----	---------	------	-------------

3. a. (8 points) Explain in detail how the Keynesian aggregate supply curve differs from the classical one?

b. (12 points) The aggregate demand model looks very similar to the standard demand model of microeconomics. State three reasons that cause the aggregate demand curve to be negatively sloped. Be sure to elaborate on those reasons carefully! DO NOT just list your reasons.

4. The Swiss National Bank (SNB) made an unexpected announcement on January 15th this year that it would remove its cap on Swiss franc's value vs. the euro, effective immediately. The SNB set a goal of keeping its currency from rising beyond 1.20 francs to the euro since September 2011 and that had been the de facto fixed exchange rate ever since. The Swiss economy has expanded more rapidly than the Eurozone's in recent years and was expected to do so in the near future.

a. (5 points) Please explain the rationale of the SNB to keep the cap in the past three-and-half years and how the SNB can achieve it.

b. (5 points) One reason that the SNB scraped the peg because the quantitative easing program (QE) the European Central Bank (ECB) was about to launch in the following week. Please explain the effect of the QE program on the SNB and the Swiss franc if the cap was still in place.

c. (5 points) An Italian firm knows that it will have to pay 10 million Swiss francs to a Swiss chemical company 3 months later. The current spot exchange rate is 0.9623 euro per 1 CHF. The three-month forward rate is 0.9660 euro per 1 CHF. If you are the treasurer of the company and you are worried that the euro will depreciate in the next few weeks. What will you do with this only tool and is it a wise decision if the spot exchange rate turns out to be 0.9700 three months later?

d. (5 points) If the exchange rate also has a chance to go to 0.9620 euro per 1 CHF instead of the 0.9660 predicted by the forward rate (i.e. it can go either way), is there still a reason to hedge the exchange risk with a forward contract?

備

註

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考試科目	統計學 4-11A	所別	企業管理	考試時間	2月28日(六)第3節
------	--------------	----	------	------	-------------

1. (18%) A recent study looked into the amount of debt accumulated by recent college graduates. The study found that among those who had graduated with debts from student loans, 33% had sold possessions since graduating. Among those who had graduated free of debt, only 17% had sold possessions since graduating.
- (1) Express these two percentages as conditional probabilities. (4%)
 - (2) Give a short description of the associated sample space. (2%)
 - (3) If the proportion of having debt after graduating is 15%, then determine the proportion of recent college graduates who sold possessions after college. (6%)
 - (4) Determine the proportion of recent college graduates having loan among those who sold possessions after college. (6%)

2. (16%) The following data present 209 secondary school students about height (short or not) and whether or not the student had ever been bullied in school.

Height	Ever Bullied?	
	Yes	No
Short	42	50
Not short	30	87

- (1) Use the z-test to verify whether the proportion of being bullied for short students is higher than that of students being not shorts. Use $\alpha=0.05$. (8%)
 - (2) Use the chi-squared test to verify whether there is a relationship between height and the likelihood of having been bullied. Use $\alpha=0.05$. (8%)
3. (16%) Suppose that we wish to test the hypothesis
- $$H_0: \mu = 65 \text{ kilograms,}$$
- $$H_1: \mu > 65 \text{ kilograms,}$$
- for the weights of male students at a certain college using an $\alpha=0.05$ when it is assumed that the weights follow a normal distribution with known $\sigma=5$.
- (1) A random sample of 20 male students taken from this college yields a sample mean of 67.5 kilograms. Do the data support this hypothesis? (8%)
 - (2) Find the sample size required if the power of our test is to be 0.99 when the true mean is 66.5 kilograms. (8%)
4. (20%) Three different machines, M_1 , M_2 , and M_3 are to be considered in the assembling of a toy car. Four operators are to be used in a randomized block experiment to compare the machines. The machines are assigned in a random order to each operator. The operation of the machines requires a certain amount of

考試科目	統計學 4211A	所別	企業管理	考試時間	二月二十八日(六) 第三節
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physical dexterity, and it is anticipated that there will be a difference among the operators in the speed with which they operate the machines. The following times, in minutes, were recorded for assembling the toy car.

Operator 1	M ₂	35	M ₃	29	M ₁	26
Operator 2	M ₁	28	M ₃	31	M ₂	34
Operator 3	M ₃	27	M ₁	25	M ₂	31
Operator 4	M ₁	24	M ₂	35	M ₃	30

- (1) Test the hypothesis H_0 , at the 0.05 level of significance, that the machines perform at the same mean rate of speed. (10%)
 - (2) Test the hypothesis H_0 , at the 0.05 level of significance, that the operators perform at the same mean rate of speed. (10%)
5. (30%) The grades of a class of 9 students on a midterm report (independent variable) and on the final examination (dependent variable) are shown below:

Midterm	77	55	70	73	83	92	94	99	68
Final	82	67	78	56	69	87	98	97	65

Below shows the ANOVA results.

ANOVA

	Degree of freedom	SS	MS	F	p
Regression 1		(a)	(c)	10.45	
Error	7	(b)	(d)		
Total	8	1712			

	Coefficient	Standard error	T
Intercept	(e)	19.67	0.76
Midterm	(f)	0.25	

- (1) Please fill out cells (a) to (f) (calculate to two decimal points) (12%)
- (2) What is the critical value of F to be significant at $\alpha=0.05$? (3%)
- (3) Estimate the linear regression line (calculate to two decimal points). (3%)
- (4) Test the hypothesis that β (slope of the regression line) = 0 against the alternative that $\beta \neq 0$ at the 0.05 level of significance. (3%)
- (5) Use the data from ANOVA to calculate the coefficient of correlation between the midterm report and the final

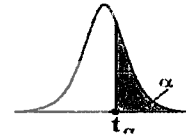
考試科目	統計學 4-11A	所別	企業管理	考試時間	2月28日(六)第3節
------	--------------	----	------	------	-------------

examination. (3%)

- (6) Estimate the final examination grade of a student who received 80 on the midterm report. (3%)
- (7) Construct a 95% confidence interval for the average final examination grade of students who make a 80 on the midterm report. (3%)

Percentage Points of the t Distribution; $t_{v, \alpha}$

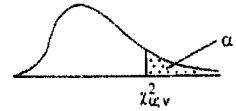
$$P(T > t_{v, \alpha}) = \alpha$$



v	α													
	0.40	0.30	0.20	0.15	0.10	0.05	0.025	0.02	0.015	0.01	0.0075	0.005	0.0025	0.0005
1	0.325	0.727	1.376	1.963	3.078	6.314	12.706	15.895	21.205	31.821	42.434	63.657	127.322	636.590
2	0.289	0.617	1.061	1.386	1.886	2.920	4.303	4.849	5.643	6.965	8.073	9.925	14.089	31.598
3	0.277	0.584	0.978	1.250	1.638	2.353	3.182	3.482	3.896	4.541	5.047	5.841	7.453	12.924
4	0.271	0.569	0.941	1.190	1.533	2.132	2.776	2.999	3.298	3.747	4.088	4.604	5.598	8.610
5	0.267	0.559	0.920	1.156	1.476	2.015	2.571	2.757	3.003	3.365	3.634	4.032	4.773	6.869
6	0.265	0.553	0.906	1.134	1.440	1.943	2.447	2.612	2.829	3.143	3.372	3.707	4.317	5.959
7	0.263	0.549	0.896	1.119	1.415	1.895	2.365	2.517	2.715	2.998	3.203	3.499	4.029	5.408
8	0.262	0.546	0.889	1.108	1.397	1.860	2.306	2.449	2.634	2.896	3.085	3.355	3.833	5.041
9	0.261	0.543	0.883	1.100	1.383	1.833	2.262	2.398	2.574	2.821	2.998	3.250	3.690	4.781
10	0.260	0.542	0.879	1.093	1.372	1.812	2.228	2.359	2.527	2.764	2.932	3.169	3.581	4.587
11	0.260	0.540	0.876	1.088	1.363	1.796	2.201	2.328	2.491	2.718	2.879	3.106	3.497	4.437
12	0.259	0.539	0.873	1.083	1.356	1.782	2.179	2.303	2.461	2.681	2.836	3.055	3.428	4.318
13	0.259	0.538	0.870	1.079	1.350	1.771	2.160	2.282	2.436	2.650	2.801	3.012	3.372	4.221
14	0.258	0.537	0.868	1.076	1.345	1.761	2.145	2.264	2.415	2.624	2.771	2.977	3.326	4.140
15	0.258	0.536	0.866	1.074	1.341	1.753	2.131	2.249	2.397	2.602	2.746	2.947	3.286	4.073
16	0.258	0.535	0.865	1.071	1.337	1.746	2.120	2.235	2.382	2.583	2.724	2.921	3.252	4.015
17	0.257	0.534	0.863	1.069	1.333	1.740	2.110	2.224	2.368	2.567	2.706	2.898	3.222	3.965
18	0.257	0.534	0.862	1.067	1.330	1.734	2.101	2.214	2.356	2.552	2.689	2.878	3.197	3.922
19	0.257	0.533	0.861	1.066	1.328	1.729	2.093	2.205	2.346	2.539	2.674	2.861	3.174	3.883
20	0.257	0.533	0.860	1.064	1.325	1.725	2.086	2.197	2.336	2.528	2.661	2.845	3.153	3.850
21	0.257	0.532	0.859	1.063	1.323	1.721	2.080	2.189	2.328	2.518	2.649	2.831	3.135	3.819
22	0.256	0.532	0.858	1.061	1.321	1.717	2.074	2.183	2.320	2.508	2.639	2.819	3.119	3.792
23	0.256	0.532	0.858	1.060	1.319	1.714	2.069	2.177	2.313	2.500	2.629	2.807	3.104	3.768
24	0.256	0.531	0.857	1.059	1.318	1.711	2.064	2.172	2.307	2.492	2.620	2.797	3.091	3.745
25	0.256	0.531	0.856	1.058	1.316	1.708	2.060	2.167	2.301	2.485	2.612	2.787	3.078	3.725
26	0.256	0.531	0.856	1.058	1.315	1.706	2.056	2.162	2.296	2.479	2.605	2.779	3.067	3.707
27	0.256	0.531	0.855	1.057	1.314	1.703	2.052	2.158	2.291	2.473	2.598	2.771	3.057	3.690
28	0.256	0.530	0.855	1.056	1.313	1.701	2.048	2.154	2.286	2.467	2.592	2.763	3.047	3.674
29	0.256	0.530	0.854	1.055	1.311	1.699	2.045	2.150	2.282	2.462	2.586	2.756	3.038	3.659
30	0.256	0.530	0.854	1.055	1.310	1.697	2.042	2.147	2.278	2.457	2.581	2.750	3.030	3.646
40	0.255	0.529	0.851	1.050	1.303	1.684	2.021	2.123	2.250	2.423	2.542	2.704	2.971	3.551
60	0.254	0.527	0.848	1.045	1.296	1.671	2.000	2.099	2.223	2.390	2.504	2.660	2.915	3.460
120	0.254	0.526	0.845	1.041	1.289	1.658	1.980	2.076	2.196	2.358	2.468	2.617	2.860	3.373
∞	0.253	0.524	0.842	1.036	1.282	1.645	1.960	2.054	2.170	2.326	2.432	2.576	2.807	3.291

考試科目	統計學 4211A	所別	企業管理	考試時間	2月28日(六)第3節
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Table of the Chi-square Distribution



$\alpha =$	0.995	0.99	0.98	0.975	0.95	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.05	0.025	0.02	0.01	0.005	0.001	$=\alpha$
v = 1	0.0000393	0.000157	0.000628	0.000982	0.00393	0.0158	0.0642	1.642	2.706	3.841	5.024	5.412	6.635	7.879	10.827	13.815	16.266	19.591	24.468	31.576	v = 1
2	0.0100	0.0201	0.0404	0.0506	0.103	0.211	0.446	3.219	4.605	5.991	7.378	7.824	9.210	10.597	13.815	16.266	19.591	24.468	31.576	41.401	2
3	0.0717	0.115	0.185	0.216	0.352	0.584	1.005	4.642	6.251	7.815	9.348	9.837	11.345	12.838	16.266	19.591	24.468	31.576	41.401	50.154	3
4	0.207	0.297	0.429	0.484	0.711	1.064	1.649	5.989	7.779	9.488	11.143	11.668	13.277	14.860	18.465	21.064	24.468	31.576	41.401	50.154	4
5	0.412	0.554	0.752	0.831	1.145	1.610	2.343	7.289	9.236	11.070	12.832	13.388	15.086	16.750	20.517	23.154	26.753	33.924	41.401	50.154	5
6	0.676	0.872	1.134	1.237	1.635	2.204	3.070	8.558	10.645	12.592	14.449	15.033	16.812	18.548	22.457	25.188	28.753	36.191	44.984	53.982	6
7	0.989	1.239	1.564	1.690	2.167	2.833	3.822	9.803	12.017	14.067	16.013	16.622	18.475	20.278	24.322	27.154	30.778	38.162	47.205	56.153	7
8	1.344	1.646	2.032	2.180	2.733	3.490	4.594	11.030	13.362	15.507	17.535	18.168	20.090	21.955	26.125	29.154	32.909	40.521	49.646	58.578	8
9	1.735	2.088	2.532	2.700	3.325	4.168	5.380	12.242	14.684	16.919	19.023	19.679	21.666	23.589	27.877	31.154	34.909	42.796	51.982	60.921	9
10	2.156	2.558	3.059	3.247	3.940	4.865	6.179	13.442	15.987	18.307	20.483	21.161	23.209	25.188	29.588	32.909	36.924	45.154	54.578	63.691	10
11	2.603	3.053	3.609	3.816	4.575	5.578	6.989	14.631	17.275	19.675	21.920	22.618	24.725	26.757	31.264	34.909	38.924	47.154	56.211	65.154	11
12	3.074	3.571	4.178	4.404	5.226	6.304	7.807	15.812	18.549	21.026	23.337	24.054	26.217	28.309	32.909	36.924	40.984	49.154	58.321	67.154	12
13	3.565	4.107	4.765	5.009	5.892	7.042	8.634	16.985	19.812	22.362	24.736	25.472	27.688	29.819	34.528	38.924	42.909	50.154	59.321	68.154	13
14	4.075	4.660	5.368	5.629	6.571	7.790	9.467	18.151	21.064	23.685	26.119	26.873	29.141	31.319	36.123	40.984	44.909	51.154	60.321	69.154	14
15	4.601	5.229	5.985	6.262	7.261	8.547	10.307	19.311	22.307	24.996	27.488	28.259	30.578	32.801	37.697	41.909	45.924	52.154	61.321	70.154	15
16	5.142	5.812	6.614	6.908	7.962	9.312	11.152	20.465	23.542	26.296	28.845	29.633	32.000	34.267	39.252	43.909	47.924	53.154	62.321	71.154	16
17	5.697	6.408	7.255	7.564	8.672	10.085	12.002	21.615	24.769	27.587	30.191	30.995	33.409	35.718	40.790	45.924	49.909	54.154	63.321	72.154	17
18	6.265	7.015	7.906	8.231	9.390	10.865	12.857	22.760	25.989	28.869	31.526	32.346	34.805	37.156	42.312	47.924	51.909	55.154	64.321	73.154	18
19	6.844	7.633	8.567	8.907	10.117	11.651	13.716	23.900	27.204	30.144	32.852	33.687	36.191	38.582	43.820	49.909	53.924	56.154	65.321	74.154	19
20	7.434	8.260	9.237	9.591	10.851	12.443	14.578	25.038	28.412	31.410	34.170	35.020	37.566	39.997	45.315	51.909	55.924	57.154	66.321	75.154	20
21	8.034	8.897	9.915	10.283	11.591	13.240	15.445	26.171	29.615	32.671	35.479	36.343	38.932	41.401	46.797	53.909	57.924	58.154	67.321	76.154	21
22	8.643	9.542	10.600	10.982	12.338	14.041	16.314	27.301	30.813	33.924	36.781	37.659	40.289	42.796	48.268	55.924	59.909	59.154	68.321	77.154	22
23	9.260	10.196	11.293	11.688	13.091	14.848	17.187	28.429	32.007	35.172	38.076	38.968	41.638	44.181	49.728	57.924	61.909	60.154	69.321	78.154	23
24	9.886	10.856	11.992	12.401	13.848	15.659	18.062	29.553	33.196	36.415	39.364	40.270	42.980	45.538	51.179	59.924	63.909	61.154	70.321	79.154	24
25	10.520	11.524	12.697	13.120	14.611	16.473	18.940	30.675	34.382	37.652	40.646	41.566	44.314	46.928	52.620	61.924	65.909	62.154	71.321	80.154	25

F - Distribution ($\alpha = 0.05$ in the Right Tail)

df ₂	df ₁	Numerator Degrees of Freedom								
		1	2	3	4	5	6	7	8	9
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385	
3	10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8867	8.8452	8.8123	
4	7.7086	9.9443	6.5914	6.3882	6.2561	6.1631	6.0942	6.0410	6.9988	
5	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725	
6	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2067	4.1468	4.0990	
7	5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767	
8	5.3177	4.4590	4.0662	3.8379	3.6875	3.5806	3.5005	3.4381	3.3881	
9	5.1174	4.2565	3.8625	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789	
10	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0204	
11	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962	
12	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964	
13	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144	
14	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458	
15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876	
16	4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377	
17	4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943	
18	4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563	
19	4.3807	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227	
20	4.3512	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928	
21	4.3248	3.4668	3.0725	2.8401	2.6848	2.5727	2.4876	2.4205	2.3660	
22	4.3009	3.4434	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419	
23	4.2793	3.4221	3.0280	2.7955	2.6400	2.5277	2.4422	2.3748	2.3201	
24	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002	

考試科目	微積分 ^{4/12A}	所別	企管所(2組)	考試時間	2月28日(六)第三節
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(All the calculations and justification process should be clear; otherwise, no point will be given.)

(1) Evaluate the limit.

(1a) (8%) $\lim_{x \rightarrow 0} \frac{\tan x}{x}$

(1b) (8%) $\lim_{x \rightarrow \infty} \left(1 + \frac{2}{x}\right)^x$

(2) Find $\frac{dy}{dx}$ evaluated at the given point

(2a) (8%) $y(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right) & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$ at $x = 0$.

(2b) (8%) $y = \sin(\cos x)$ at $x = 0$.

(3) Evaluate the definite integral.

(3a) (8%) $\int_0^{\frac{1}{2}} \frac{x}{\sqrt{1-x^2}} dx$

(3b) (8%) $\int_0^{\pi} t \cdot \sin t dt$

(3c) (8%) $\int_0^{\pi} \sin^4 t dt$

備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。

考試科目	微積分 ^{4212A}	所別	企管所(乙組)	考試時間	2月28日(六)第三節
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(4) Determine whether the series is convergent or divergent

(4a) (8%) $\sum_{n=1}^{\infty} \frac{\ln(n)}{n}$

(4b) (8%) $\sum_{n=1}^{\infty} \frac{1}{n^2}$

(5) Ella deposits \$10000 into an account in which interest accumulates at the rate of 4% per year, compounded continuously. She plans to withdraw \$2000 per year. This is modelled as the following differential equation

$$\frac{dQ(t)}{dt} = 0.04Q(t) - 2000.$$

(5a) (8%) Solve the differential equation.

(5b) (5%) How long does it take for her account to be exhausted? (You may use the facts: $\ln 5 = 1.6094$ and $\ln 2 = 0.6931$.)

(6) (15%) A manufacturer supplies refrigerators to two stores, A and B. The manager estimates that if x units are delivered to store A and y units to store B each month, the monthly profit will be $P(x, y)$ hundred dollars, where

$$P(x, y) = -0.02x^2 - 0.03xy - 0.05y^2 + 15x + 40y - 3000.$$

Each month, the company can produce exactly 700 refrigerators. How many refrigerators should be supplied to store A and how many to store B to maximize monthly profit?

備註 一、作答於試題上者，不予計分。
二、試題請隨卷繳交。

考試科目	管理學 4211B, 4212B	所別	企業管理	考試時間	2月18日(六)第3節
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總共五題申論題，請按題號依序作答，每題二十分。

不必抄題，作答時請將試題題號及答案依照順序寫在試卷上，試題與答題本於試畢一起繳回。

作答時，內容除了要有重點標題外，還須闡釋清楚，可以提出觀念圖形，但必須輔以文字說明。

一、請說明管理的四大機能內涵在二十一世紀的現代經營環境中與過去有何差異。

二、企業是否應善盡其社會責任的正反兩派論點為何？

三、自工業革命以來，經營管理思想經歷過哪些階段的演進？實務上該如何看待這些經營論點？

四、請解釋何謂環境不確定性(Environmental Uncertainty)，針對各類環境不確定性，企業有哪些應對方式？

五、請以策略地圖解釋平衡計分卡(Balanced Scorecard)的績效控制原理。

備註	<p>一、作答於試題上者，不予計分。</p> <p>二、試題請隨卷繳交。</p>
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