考試科目	經濟學	系所別	財政學系	考試時間	2 月 2 日(四) 第 2 節

I. 選擇題 (30 分，一題 3 分)

1. A monopolist charges a _____ price markup than a monopolistic competitor because the demand curve faced by a monopolist is _____.
A. smaller; flatter.
B. smaller; steeper.
C. larger; steeper.
D. larger; flatter.

2. Firms_____will produce at MR=MC to maximize their profits.
A. in perfect competition.
B. that are monopolists.
C. in monopolistic competition.
D. All of the above.

3. Suppose the central bank aims to increase the money supply to meet people's money demand during Chinese New Year. Which of following actions would not increase the money supply?
A. Conduct open market sales.
B. Lower the required reserve ratio.
C. Lower the federal funds rate.
D. None of the above.

4. Under perfect competition in the long run, average revenue is equal to
A. Price.
B. Marginal revenue.
C. Average total cost.
D. All of the above.

5. If the banks have $1000 in deposit and there is a 100 percent reserve requirement for banks,
A. The required reserves held by the banks are $1000.
B. The banks cannot loan out any money.
C. The money multiplier is 1 assuming people hold no cash and banks hold no excess reserves.
D. All of the above are correct.

考試科目	經濟學	系所別	財政學系	考試時間	2 月 2 日(四) 第 2 節

6. Suppose you deposit $2000 in the bank. The real interest rate is 5% and the inflation rate is 1%. Which of the following statements is correct?
A. You can earn $100 for interest, and it is worth $80 in terms of goods.
B. You can earn $80 for interest, and it is worth $100 in terms of goods.
C. You can earn $120 for interest, and it is worth $100 in terms of goods.
D. You can earn $100 for interest, and it is worth $120 in terms of goods.

7. Suppose the money wage rate increased by 4 percent while the price level increased by 3 percent. As a result, the
A. short-run aggregate supply curve shifted leftward.
B. long-run aggregate supply curve shifted rightward.
C. short-run aggregate supply curve shifted rightward.
D. short-run and long-run aggregate supply curves shifted rightward.

8. You plan to sell 1000 books a month, which have an average variable cost of $50. If your total fixed costs are $50,000 per month, what is the break-even price?
A. $10.
B. $100.
C. $50.
D. $60.

9. Stagflation describes a situation in the economy when output is _____.
A. falling and prices are falling.
B. growing and prices are falling.
C. falling and prices are rising.
D. falling and prices are stable.

10. Which of the following statements concerning the Laffer curve is FALSE?
A. If the current tax rate is on the upward sloping side of the Laffer curve, a decrease in the tax rate will raise the tax revenue.
B. The Laffer curve describes a relationship between tax revenue and tax rate.
C. If the tax rate is 100%, the tax revenue will be 0.
D. If the tax rate is 0%, the tax revenue will be 0.

考試科目	經濟學	系所別	財政學系	考試時間	2月2日(四) 第2節

II. 非選擇題 (70 分)

1. (18 分，一題 6 分) The following table shows the hypothetical demand of bottled water in a small town. Suppose there are no costs for production (marginal cost=0).

Quantity (Market Demand)	Price
0	$80
100	$70
300	$60
500	$50
750	$40
1100	$30
1200	$20
1400	$10
1500	$0

(1) Suppose this market is perfectly competitive. What are the equilibrium price and equilibrium quantity, respectively?
(2) If there is only one firm in this market, then what is the profit-maximization output level? What is the price this firm would charge to customers?
(3) Suppose there are two firms in the town and they decide to collude. Under collusion, how many units does each firm produce? What are the profits each firm earns?

2. (13 分) Please explain Ricardian equivalence and the permanent income hypothesis, respectively. What do they have in common?

考試科目	經濟學	系所別	財政學系	考試時間	2月2日(四)第2節

3. (27 分，一個答案 3 分)

The market demand and supply functions for candy bars are as follows.

$$Q^D = 12 - 0.04P$$
$$Q^S = 0.01P + 2$$

(1) (9 分) Calculate the equilibrium quantity, equilibrium price and point elasticity of demand in equilibrium.
(2) Calculate consumer surplus.

Suppose a tax of $25 per candy bar is imposed.

(3) (6 分) Calculate the after-tax equilibrium quantity and equilibrium price.
(4) Calculate the tax revenues.
(5) Calculate the loss in consumer surplus.
(6) What percentage of the tax burden is paid by consumers?

4. (12 分，一題 3 分) Use the following table to answer the following questions.

Country	Currency	Currency per U.S. Dollar	U.S. Price Index	Country Price Index
A	*A*	8	200	1600
B	*B*	125	200	50,000
C	*C*	10	200	2000
D	*D*	20	200	3000

(1) What is the real exchange rate between country B and the U.S.?
(2) For which country in the table does purchasing-power parity hold?
(3) In real terms, which country has more expansive goods than the U.S.?
(4) Based on the purchasing-power parity, is currency *D* undervalued or overvalued? By how much?

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	會計學	系所別	財政學系	考試時間	2 月 2 日(四) 第 四 節

一、(24%)果夫公司為一醫療器材製造公司，在其租用的廠房內生產相關產品。果夫公司為了想在科學園區興建廠房，向政府相關單位申請低利貸款，並於 X1 年 1 月 1 日收到政府低利貸款$200,000,000。貸款利率為 3%，期限 3 年，3 年屆滿還本，每年計息一次並於年底支付利息。當時市場利率為 6%。該廠房於 X4 年 1 月 1 日正式啟用，估計耐用年限 40 年，殘值$20,000,000，按直線法計提折舊。

		1.5%	3%	6%
複利現值	3 期	0.956317	0.915142	0.839619
	6 期	0.914542	0.837484	0.704961
年金現值	3 期	2.912200	2.828611	2.673012
	6 期	5.697187	5.417191	4.917324

試作（所有計算均四捨五入至元）：

(一)X1 年取得政府低利貸款應做之相關分錄。

(二)X2 年之相關分錄。

(三)X3 年之相關分錄。

(四)X4 年之相關分錄。

(五)若政府低利貸款係每半年計息並於每年 6/30 及 12/31 支付，試計算：

(1)取得貸款時應入帳之貸款金額及

(2)X1 年至 X3 年所有應認列之利息費用。

二、(18%) 志希公司 X1 年至 X3 年有關透過其他綜合損益按公允價值衡量金融工具投資之交易相關資料如下：

投資標的	X1 年 12 月 31 日 購入時成本	X2 年 12 月 31 日 公允價值	X3 年 1 月 1 日 處分價格	X3 年 12 月 31 日 公允價值
債券 A	$500,000	$525,000	繼續持有	$550,000
債券 B	$400,000	$425,000	$425,000	--
普通股 C	$300,000	$325,000	繼續持有	$350,000
普通股 D	$100,000	$125,000	$125,000	--

說明：

A. 上述投資標的中之債券皆為平價購入，票面利率皆為 5%，每年年底支付一次利息。兩張債券在購入時皆非已信用減損之債券，其相關時點之信用風險情況及預期信用損失資料如下：

	X1 年 12 月 31 日		X2 年 12 月 31 日		X3 年 12 月 31 日	
債券別	債券 A	債券 B	債券 A	債券 B	債券 A	--
12 個月預期信用損失	$12,500	$10,000	$12,500	$10,000	$12,500	--
存續期間預期信用損失	$37,500	$30,000	$75,000	$30,000	$37,500	--
信用風險是否已顯著增	否	否	是	否	否	--

考試科目	會計學	系所別	財政學系	考試時間	2月2日(四) 第四節

加

B. 前述投資標的中之普通股 C，其發行公司從未宣告發放現金股利；志希公司持有之普通股 D 於 X2 年 8 月 1 日收取現金$2,000。

請分別計算：前述股票及債券投資對 X1 年、X2 年及 X3 年損益之影響數（須註明損失或利益）及其他綜合損益之影響數（須註明損失或利益）。

三、(25%)道藩公司 X3 年 1 月 1 日有關權益之資料如下：

特別股股本（15%，面額$100，累積，核准發行 25,000 股）	$ 1,000,000
普通股股本（面額$10，核准發行 750,000 股）	5,000,000
已認購普通股股本	750,000
資本公積－普通股溢價	975,000
保留盈餘	2,720,000
庫藏股票（30,000 股，每股$11）	330,000

道藩公司採用成本法處理庫藏股票交易，其 X9 年有關的股本交易如下：

2 月 22 日	收到認購普通股之剩餘股款$500,000，並發行股票。
3 月 15 日	發行特別股 4,000 股，每股$105。
3 月 21 日	發行普通股 10,000 股以換取設備一套，設備之公允價值為$130,000。
5 月 6 日	以每股$11 的價格買回普通股 15,000 股，作為庫藏股票。
6 月 29 日	出售庫藏股票 20,000 股，每股$12.5。
7 月 5 日	接受投資人認購普通股 60,000 股，每股$12。
9 月 10 日	以 20,000 股庫藏股票換取土地一塊，土地之公允價值為$145,000。
10 月 5 日	收到 7 月 5 日認股之半數股款。
12 月 10 日	收到 7 月 5 日認股之剩餘股款，並發行股票。
12 月 18 日	宣告普通股每股$1.5 現金股利以及特別股股利。
12 月 31 日	發放所宣告之股利。

試作：

(一)上述交易之分錄。

(二)若道藩公司 X3 年度之稅後淨利為$1,250,000，試編製 12 月 31 日資產負債表中權益之部分。

考試科目	會計學	系所別	財政學系	考試時間	2月2日(四) 第四節

四、(15%)百年公司於 X3 年初將一項成本為$750,000，已提列累計折舊$400,000 之辦公設備，以公允價值$300,000 出售給季陶公司並立即租回（此交易滿足 IFRS15「客戶合約之收入」銷售資產之規定）。租期 4 年，每年年初支付租金$78,000，與市場上性質類似之辦公設備合理之年租金相同。租期屆滿時百年公司須將該辦公設備還給季陶公司。該辦公設備採直線法折舊，在租期屆滿日有百年公司保證之殘值$40,000，百年公司預估租期屆滿時須就保證殘值支付季陶公司$4,000，季陶公司之租賃隱含利率為 8%，且為百年公司所知。

（利率 8%，每期$1，3 期之普通年金現值為 2.577097；
利率 8%，每期$1，3 期之複利現值為 0.793832。
利率 8%，每期$1，4 期之普通年金現值為 3.312127；
利率 8%，每期$1，4 期之複利現值為 0.735030）

試作：X3 年百年公司與此項租賃相關之所有分錄（金額四捨五入計算至整數元）。

五、(18%)井塘公司 X1 年會計所得$1,200,000，其中已扣除機器設備折舊費用$300,000。該機器於 X1 年 1 月 1 日購入，成本$510,000，無殘值，估計使用三年，採直線法折舊。井塘公司以前年度無任何遞延所得稅資產或負債。井塘公司報稅時，採用年數合計法為該設備計提折舊。

試作：
(一)假設 X1 年至 X3 年各年所得稅率已知為 20%，請問 X1 年應付所得稅、所得稅費用及遞延所得稅資產（負債）分別為多少？
(二)假設 X1 年至 X3 年各年所得稅率已知分別為 18%、20%、22%。請問 X1 年應付所得稅、所得稅費用及遞延所得稅資產（負債）分別為多少？
(三)承(二)小題，請編製 X1 年有關跨期間所得稅分攤之

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	統計學	系所別	財政學系	考試時間	2 月 2 日(四) 第 四 節

說明：

- 作答時請完整列出過程，評分同時考量答案完整性及正確性
- 查表過程中，若本試題所提供之統計附表無對應數值，請使用最接近之查表數值代替。

Question 1 (20%)

The table below shows the winning percentages for 5 professional baseball teams during the 2021 and 2022 season. Let X denote the winning percentage in 2022 and Y denote the percentage in 2021.

Teams	2022 (X)	2021 (Y)
Monkey	0.603	0.479
Elephant	0.595	0.574
Snake	0.496	0.427
Lions	0.410	0.557
Fighter	0.397	0.466

a) Find $E\left(\frac{X+Y}{2}\right)$ and $V\left(\frac{X+Y}{2}\right)$

b) What is the correlation coefficient between the 2021 and 2022 season winning percentages?

Question 2 (15%)

A poll was taken this year asking college students if they support the bill to raise minimum wage by NT$2,000. A similar poll was taken five years ago. Results are summarized below.

	Sample Size	Number of Responses in Support of the Bill
Present Sample	300	150
Previous sample	275	121

a) Find the 99% confidence interval for the *current* support of the bill.

b) Suppose the researcher wants to reduce the margin of error of the 95% confidence interval to be within ±2 percentage points. How large a sample should be taken the next time when she conducts the survey?

c) At 5% significance level, test whether the the support for the bill has increased in the past 5 years.

Question 3 (15%)

A salesperson contacts at most 10 potential customers every day. Each day, he randomly selects 10 individuals to be contacted and 15% of the contacted persons would make the purchase based on his past experience.

a) How many sales can he expect to make each day?

b) Suppose the manager promises him a bonus if he can make at least 3 sales in a day. What is the likelihood that the salesperson can earn the bonus?

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	統計學	系所別	財政學系	考試時間	2 月 2 日(四) 第 四 節

Question 4 (15%)

A manager wants to compare the error rates of three auditors in the firm. Random samples of five performance reports were reviewed for each auditor. The results appear in the table below:

Error Rates for the Auditors

Auditor 1	Auditor 2	Auditor 3
12	4	9
15	8	3
13	6	5
14	5	7
17	4	4

a) Set up the complete ANOVA Table.
b) Test at the 5% significance level to determine whether the mean error rates for the three auditors differ.

Question 5 (35%)

To predict the stopping distance of their automobiles, a car company collects a sample of 50 observations and develops a simple linear regression model to test the relationship between a vehicle's speed and its stopping distance. The variable "stopping distance" (denoted by *distance*) is measured in feet and the variable "speed" (denoted by *speed*) is measured in miles per hour (mph). After the estimation, the software package produced the following output:

	Estimate	Standard Error
Intercept	−17.5791	6.7584
Speed	3.9324	0.4155

- Residual standard error: 15.38
- Average speed in the sample: 15.4
- F-statistics: 89.567

Answer the following questions based on the given information.

a) What is the estimated regression equation?
b) What is the sample average of stopping distance?
c) At 0.05 level of significance, test whether the stopping distance is related to the vehicle's speed.
d) Provide the 95% confidence interval for the expected stopping distance when the driver is driving at 15.4 mph.
e) Compute the correlation coefficient between speed and distance.
f) Comment on the good of fit for the regression model.

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	統計學	系所別	財政學系	考試時間	2 月 2 日(四) 第 四 節

Cumulative Probabilities for Standard Normal Distribution

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990

考試科目	統計學	系所別	財政學系	考試時間	2 月 2 日(四) 第 四 節

Student's t-Distribution

Degrees of Freedom	Area in Upper Tail 0.2	0.1	0.05	0.025	0.01	0.005	Degrees of Freedom	Area in Upper Tail 0.2	0.1	0.05	0.025	0.01	0.005
1	1.376	3.078	6.314	12.706	31.821	63.657	51	0.849	1.298	1.675	2.008	2.402	2.676
2	1.061	1.886	2.920	4.303	6.965	9.925	52	0.849	1.298	1.675	2.007	2.400	2.674
3	0.978	1.638	2.353	3.182	4.541	5.841	53	0.848	1.298	1.674	2.006	2.399	2.672
4	0.941	1.533	2.132	2.776	3.747	4.604	54	0.848	1.297	1.674	2.005	2.397	2.670
5	0.920	1.476	2.015	2.571	3.365	4.032	55	0.848	1.297	1.673	2.004	2.396	2.668
6	0.906	1.440	1.943	2.447	3.143	3.707	56	0.848	1.297	1.673	2.003	2.395	2.667
7	0.896	1.415	1.895	2.365	2.998	3.499	57	0.848	1.297	1.672	2.002	2.394	2.665
8	0.889	1.397	1.860	2.306	2.896	3.355	58	0.848	1.296	1.672	2.002	2.392	2.663
9	0.883	1.383	1.833	2.262	2.821	3.250	59	0.848	1.296	1.671	2.001	2.391	2.662
10	0.879	1.372	1.812	2.228	2.764	3.169	60	0.848	1.296	1.671	2.000	2.390	2.660
11	0.876	1.363	1.796	2.201	2.718	3.106	61	0.848	1.296	1.670	2.000	2.389	2.659
12	0.873	1.356	1.782	2.179	2.681	3.055	62	0.847	1.295	1.670	1.999	2.388	2.657
13	0.870	1.350	1.771	2.160	2.650	3.012	63	0.847	1.295	1.669	1.998	2.387	2.656
14	0.868	1.345	1.761	2.145	2.624	2.977	64	0.847	1.295	1.669	1.998	2.386	2.655
15	0.866	1.341	1.753	2.131	2.602	2.947	65	0.847	1.295	1.669	1.997	2.385	2.654
16	0.865	1.337	1.746	2.120	2.583	2.921	66	0.847	1.295	1.668	1.997	2.384	2.652
17	0.863	1.333	1.740	2.110	2.567	2.898	67	0.847	1.294	1.668	1.996	2.383	2.651
18	0.862	1.330	1.734	2.101	2.552	2.878	68	0.847	1.294	1.668	1.995	2.382	2.650
19	0.861	1.328	1.729	2.093	2.539	2.861	69	0.847	1.294	1.667	1.995	2.382	2.649
20	0.860	1.325	1.725	2.086	2.528	2.845	70	0.847	1.294	1.667	1.994	2.381	2.648
21	0.859	1.323	1.721	2.080	2.518	2.831	71	0.847	1.294	1.667	1.994	2.380	2.647
22	0.858	1.321	1.717	2.074	2.508	2.819	72	0.847	1.293	1.666	1.993	2.379	2.646
23	0.858	1.319	1.714	2.069	2.500	2.807	73	0.847	1.293	1.666	1.993	2.379	2.645
24	0.857	1.318	1.711	2.064	2.492	2.797	74	0.847	1.293	1.666	1.993	2.378	2.644
25	0.856	1.316	1.708	2.060	2.485	2.787	75	0.846	1.293	1.665	1.992	2.377	2.643
26	0.856	1.315	1.706	2.056	2.479	2.779	76	0.846	1.293	1.665	1.992	2.376	2.642
27	0.855	1.314	1.703	2.052	2.473	2.771	77	0.846	1.293	1.665	1.991	2.376	2.641
28	0.855	1.313	1.701	2.048	2.467	2.763	78	0.846	1.292	1.665	1.991	2.375	2.640
29	0.854	1.311	1.699	2.045	2.462	2.756	79	0.846	1.292	1.664	1.990	2.374	2.640
30	0.854	1.310	1.697	2.042	2.457	2.750	80	0.846	1.292	1.664	1.990	2.374	2.639
31	0.853	1.309	1.696	2.040	2.453	2.744	81	0.846	1.292	1.664	1.990	2.373	2.638
32	0.853	1.309	1.694	2.037	2.449	2.738	82	0.846	1.292	1.664	1.989	2.373	2.637
33	0.853	1.308	1.692	2.035	2.445	2.733	83	0.846	1.292	1.663	1.989	2.372	2.636
34	0.852	1.307	1.691	2.032	2.441	2.728	84	0.846	1.292	1.663	1.989	2.372	2.636
35	0.852	1.306	1.690	2.030	2.438	2.724	85	0.846	1.292	1.663	1.988	2.371	2.635
36	0.852	1.306	1.688	2.028	2.434	2.719	86	0.846	1.291	1.663	1.988	2.370	2.634
37	0.851	1.305	1.687	2.026	2.431	2.715	87	0.846	1.291	1.663	1.988	2.370	2.634
38	0.851	1.304	1.686	2.024	2.429	2.712	88	0.846	1.291	1.662	1.987	2.369	2.633
39	0.851	1.304	1.685	2.023	2.426	2.708	89	0.846	1.291	1.662	1.987	2.369	2.632
40	0.851	1.303	1.684	2.021	2.423	2.704	90	0.846	1.291	1.662	1.987	2.368	2.632
41	0.850	1.303	1.683	2.020	2.421	2.701	91	0.846	1.291	1.662	1.986	2.368	2.631
42	0.850	1.302	1.682	2.018	2.418	2.698	92	0.846	1.291	1.662	1.986	2.368	2.630
43	0.850	1.302	1.681	2.017	2.416	2.695	93	0.846	1.291	1.661	1.986	2.367	2.630
44	0.850	1.301	1.680	2.015	2.414	2.692	94	0.845	1.291	1.661	1.986	2.367	2.629
45	0.850	1.301	1.679	2.014	2.412	2.690	95	0.845	1.291	1.661	1.985	2.366	2.629
46	0.850	1.300	1.679	2.013	2.410	2.687	96	0.845	1.290	1.661	1.985	2.366	2.628
47	0.849	1.300	1.678	2.012	2.408	2.685	97	0.845	1.290	1.661	1.985	2.365	2.627
48	0.849	1.299	1.677	2.011	2.407	2.682	98	0.845	1.290	1.661	1.984	2.365	2.627
49	0.849	1.299	1.677	2.010	2.405	2.680	99	0.845	1.290	1.660	1.984	2.365	2.626
50	0.849	1.299	1.676	2.009	2.403	2.678	100	0.845	1.290	1.660	1.984	2.364	2.626

考試科目	統計學	系所別	財政學系	考試時間	2月2日(四) 第四節

F-Distribution

Denominator df	Area in Upper Tail	Numerator Degrees of Freedom 1	2	3	4	5	6	7	8	9	10	15	20	25	30
1	0.100	39.86	49.50	53.59	55.83	57.24	58.20	58.91	59.44	59.86	60.19	61.22	61.74	62.05	62.26
	0.050	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	245.95	248.01	249.26	250.10
	0.025	647.79	799.50	864.16	899.58	921.85	937.11	948.22	956.66	963.28	968.63	984.87	993.10	998.08	1001.41
	0.010	4052.18	4999.50	5403.35	5624.58	5763.65	5858.99	5928.36	5981.07	6022.47	6055.85	6157.28	6208.73	6239.83	6260.65
2	0.100	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38	9.39	9.42	9.44	9.45	9.46
	0.050	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.43	19.45	19.46	19.46
	0.025	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39	39.40	39.43	39.45	39.46	39.46
	0.010	98.50	99.00	99.17	99.25	99.30	99.33	99.36	99.37	99.39	99.40	99.43	99.45	99.46	99.47
3	0.100	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24	5.23	5.20	5.18	5.17	5.17
	0.050	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.70	8.66	8.63	8.62
	0.025	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47	14.42	14.25	14.17	14.12	14.08
	0.010	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35	27.23	26.87	26.69	26.58	26.50
4	0.100	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94	3.92	3.87	3.84	3.83	3.82
	0.050	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.86	5.80	5.77	5.75
	0.025	12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90	8.84	8.66	8.56	8.50	8.46
	0.010	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66	14.55	14.20	14.02	13.91	13.84
5	0.100	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32	3.30	3.24	3.21	3.19	3.17
	0.050	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.62	4.56	4.52	4.50
	0.025	10.01	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68	6.62	6.43	6.33	6.27	6.23
	0.010	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16	10.05	9.72	9.55	9.45	9.38
6	0.100	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96	2.94	2.87	2.84	2.81	2.80
	0.050	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	3.94	3.87	3.83	3.81
	0.025	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52	5.46	5.27	5.17	5.11	5.07
	0.010	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.56	7.40	7.30	7.23
7	0.100	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72	2.70	2.63	2.59	2.57	2.56
	0.050	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.51	3.44	3.40	3.38
	0.025	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82	4.76	4.57	4.47	4.40	4.36
	0.010	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.31	6.16	6.06	5.99
8	0.100	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56	2.54	2.46	2.42	2.40	2.38
	0.050	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.22	3.15	3.11	3.08
	0.025	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36	4.30	4.10	4.00	3.94	3.89
	0.010	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	5.52	5.36	5.26	5.20
9	0.100	3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44	2.42	2.34	2.30	2.27	2.25
	0.050	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.01	2.94	2.89	2.86
	0.025	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96	3.77	3.67	3.60	3.56
	0.010	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26	4.96	4.81	4.71	4.65
10	0.100	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35	2.32	2.24	2.20	2.17	2.16
	0.050	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.85	2.77	2.73	2.70
	0.025	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.52	3.42	3.35	3.31
	0.010	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85	4.56	4.41	4.31	4.25
11	0.100	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27	2.25	2.17	2.12	2.10	2.08
	0.050	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.72	2.65	2.60	2.57
	0.025	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59	3.53	3.33	3.23	3.16	3.12
	0.010	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63	4.54	4.25	4.10	4.01	3.94
12	0.100	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21	2.19	2.10	2.06	2.03	2.01
	0.050	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.62	2.54	2.50	2.47
	0.025	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44	3.37	3.18	3.07	3.01	2.96
	0.010	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.01	3.86	3.76	3.70
13	0.100	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20	2.16	2.14	2.05	2.01	1.98	1.96
	0.050	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.53	2.46	2.41	2.38
	0.025	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31	3.25	3.05	2.95	2.88	2.84
	0.010	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19	4.10	3.82	3.66	3.57	3.51
14	0.100	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15	2.12	2.10	2.01	1.96	1.93	1.91
	0.050	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.46	2.39	2.34	2.31
	0.025	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21	3.15	2.95	2.84	2.78	2.73
	0.010	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.66	3.51	3.41	3.35
15	0.100	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09	2.06	1.97	1.92	1.89	1.87
	0.050	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.40	2.33	2.28	2.25
	0.025	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12	3.06	2.86	2.76	2.69	2.64
	0.010	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.52	3.37	3.28	3.21
16	0.100	3.05	2.67	2.46	2.33	2.24	2.18	2.13	2.09	2.06	2.03	1.94	1.89	1.86	1.84
	0.050	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.35	2.28	2.23	2.19
	0.025	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05	2.99	2.79	2.68	2.61	2.57
	0.010	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78	3.69	3.41	3.26	3.16	3.10
17	0.100	3.03	2.64	2.44	2.31	2.22	2.15	2.10	2.06	2.03	2.00	1.91	1.86	1.83	1.81
	0.050	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.31	2.23	2.18	2.15
	0.025	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98	2.92	2.72	2.62	2.55	2.50
	0.010	8.40	6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68	3.59	3.31	3.16	3.07	3.00
18	0.100	3.01	2.62	2.42	2.29	2.20	2.13	2.08	2.04	2.00	1.98	1.89	1.84	1.80	1.78
	0.050	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.27	2.19	2.14	2.11
	0.025	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93	2.87	2.67	2.56	2.49	2.44
	0.010	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60	3.51	3.23	3.08	2.98	2.92
19	0.100	2.99	2.61	2.40	2.27	2.18	2.11	2.06	2.02	1.98	1.96	1.86	1.81	1.78	1.76
	0.050	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.23	2.16	2.11	2.07
	0.025	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88	2.82	2.62	2.51	2.44	2.39
	0.010	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52	3.43	3.15	3.00	2.91	2.84
20	0.100	2.97	2.59	2.38	2.25	2.16	2.09	2.04	2.00	1.96	1.94	1.84	1.79	1.76	1.74
	0.050	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.20	2.12	2.07	2.04
	0.025	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84	2.77	2.57	2.46	2.40	2.35
	0.010	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.09	2.94	2.84	2.78

考試科目	財政學	系所別	財政學系	考試時間	2 月 2 日(四)第四節

考生應答注意：

一、「答題如使用題目未給定之數學符號與參數、變數及其上、下標等，以及製圖之座標軸與點、線等，務必有清楚標示並佐以文字說明。」

二、作答於試題上者，不予計分。

三、試題請隨卷繳交。

1. (20%)

The evaluation of the allocation of resources is an important subject in public finance; answer the following two questions on the allocation of goods and services.

(1). Consider an economy of two goods, x and y. Use the horizontal axis to denote good x, and the vertical axis to denote y, draw—in one figure—a graph that shows the allocation of goods x and y is in overall (exchange as well as production) efficient.

(2). What is the relationship between the Pareto efficiency allocation of goods and services and the competitive equilibrium outcome?

2. (30%)

Consider an economy with 15 individuals and one pure public good—street lights. Denote Q as the quantity of installed street lights. Among the individuals, 5 of them are high demand consumers for street lights with marginal benefit: $MB^H = 100 - 5Q$, and 10 of them are low demand consumers for street lights with marginal benefit: $MB^L = 50 - .25Q$. Suppose the marginal cost of street lights: $MC = 25$. Answer the following questions, and show your calculation in the answer sheet.

(1). (5%) Compute the marginal social benefit, MSB, of street lights, and the number of street lights Q^* to be installed as suggested by the Samuelson condition.

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(2). (5%) Compute the tax prices and quantity at the Lindahl equilibrium. How does the equilibrium number of street lights Q^{LE} compare to the Q^* calculated in (1)?

(3). (5%) Explain that there can be a deficit at the Lindahl equilibrium calculated. On the other hand, they can also be a surplus at the equilibrium.

(4). (5%) Compute the consumer surplus for any of the low demand consumers at the Lindahl equilibrium.

(5). (10%) Use your result in (4) to argue that for any one of the low-demand individuals, there is an incentive to free-ride at the Lindahl equilibrium, and therefore, the Lindahl scheme is prone to free-rider problems.

3. (10%) In 1996 James Mirrlees (together with William Vickrey) was awarded the Nobel Prize in economics for his contribution on the theory of optimal taxation. Mirrlees proved that the marginal tax rate on the highest-income individual in the economy should be zero—the so called "zero-rate-at-the-top" result. Suppose the top tax rate in some economy is 40 percent and that the top-earning individual makes $500 million in a year before tax. Explain why Mirrlees suggested that the optimal marginal income tax rate should be zero for the top earning individual?

4. (15%) Denote P^*, Q^* as the pretax equilibrium price and quantity in the market, η^D as the compensated demand elasticity at the equilibrium, and t as the tax rate. The well-known excess burden formula of an *ad valorem* tax:

$$\frac{1}{2}\eta^D P^* Q^* t^2,$$

for simplicity, assumes perfectly elastic supply. Denote η^S as the compensated supply elasticity, derive the generalized excess burden formula when $\eta^S > 0$. Show your derivation.

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5. 請回答以下時事問題：

(1). (15%) 何謂「超徵」？你對行政院日前決議「還稅於民」的政策有何看法？

(2). (10%) 2022 年 3 月 25 日，立法院以出席立委 109 人全數贊成的票數三讀通過「18 歲公民權修憲案」，明定年滿 18 歲中華民國國民，依法有選舉、罷免、創制、複決、參加公投及被選舉權。2022 年 11 月 26 日（與地方公職人員選舉同日）舉行上述修憲案之公民複決投票，結果卻為不通過。請試以公共選擇理論解釋之。

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。