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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 Ethan increases his working hours when obtaining higher hourly pay. Which of the following statement(s) is (are) correct?

- (i) Leisure could be an inferior good to Ethan.
- (ii) Leisure could be a normal good to Ethan.
- (iii) Leisure could be a Giffen good to Ethan.

- A. (i) and (iii)
- B. (ii)
- C. (i) and (ii)
- D. (i), (ii), and (iii)

2. Which of the following statement(s) is (are) correct when a government imposes tax on a good?

- (i) When supply is perfectly inelastic, imposing tax on consumers creates zero deadweight loss.
- (ii) When demand is perfectly elastic, imposing tax makes the market price of the good unchanged.
- (iii) When supply is perfectly elastic, and demand is perfect inelastic, imposing tax makes the market equilibrium quantity unchanged.

- A. (i) and (iii)
- B. (ii)
- C. (i) and (ii)
- D. (i), (ii), and (iii)

3. Which of the following statement(s) is(are) correct?

- (i) A monopoly firm can increase its revenue by raising the price when demand is perfectly inelastic.
- (ii) When marginal cost is zero and demand is linear, a monopolistic competitive firm will produce at the midpoint of the demand curve.
- (iii) A perfect competitive firm produces at the point that price elasticity of demand equals one.

- A. (i) and (iii)
- B. (ii)
- C. (i) and (ii)
- D. (i), (ii), and (iii)

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- 一、作答於試題上者，不予計分。
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4. Assume Ethan's preference on two goods, X and Y , follows typical assumptions in Economics. His budget constraint is $2X + 4Y = 20$, and his optimal consumption bundle is $(2, 4)$. Which of the following consumption bundles is possible to give the same utility level to Ethan as $(2, 4)$?

- A. $(3, 7)$
- B. $(5, 2.5)$
- C. $(0.5, 4)$
- D. $(1, 7)$

5. Town A has only three residents. They are deciding whether to spend \$ 450 to provide a public good. The public good will only be provided when all of three residents agree to do it. The value of the public good to each resident is:

Resident A	Resident B	Resident C
i	ii	iii

What is a possible bundle of (i, ii, iii) that this public good will be provided?

- A. $(0, 0, 460)$
- B. $(100, 150, 130)$
- C. $(120, 150, 160)$
- D. $(140, 140, 140)$

6. When marginal cost exceeds average total cost,

- A. average fixed cost must be falling.
- B. average fixed cost must be rising.
- C. average total cost must be rising.
- D. average total cost is falling.

7. If a firm in a competitive market increases production and its marginal revenue remains positive, raising production will

- A. be profitable.
- B. cause the firm to incur losses.
- C. leave profit unchanged.
- D. It is impossible to tell from the information provided.

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8. When a natural monopoly exists, it is
- always more cost effective for two or more private firms to produce the product.
 - never more cost effective for two or more private firms to produce the product.
 - always more cost effective for government owned firms to produce the product.
 - never more cost effective for one firm to produce the product.
9. If identical products are sold by firms participating in a market, the market is
- perfectly competitive.
 - an oligopoly.
 - monopolistically competitive.
- (i) or (ii)
 - (ii) or (iii)
 - (i) or (iii)
 - (i) only
10. A profit-maximizing firm in a monopolistically competitive market is characterized by which of the following?
- Revenue is always maximized along with profit.
 - Average revenue exceeds marginal revenue.
 - Marginal revenue exceeds average revenue.
 - Average revenue is equal to marginal revenue.
11. Every year more and more purchases are made with credit cards on the Internet. Given this trend, all else equal, we would expect:
- the money demand curve to shift outward.
 - the money demand curve to shift inward.
 - a downward movement along a fixed money demand curve.
 - an upward movement along a fixed money demand curve.
12. As a result of a decrease in the value of the dollar in relation to other currencies, American imports decrease and exports increase. Consequently, there is a(n):
- increase in short-run aggregate supply.
 - decrease in the quantity of aggregate output supplied in the short run.
 - increase in aggregate demand.
 - decrease in the quantity of aggregate output demanded.

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13. The money demand curve is:

A. downward-sloping because the opportunity cost of holding money is inversely related to the interest rate.

B. downward-sloping because the opportunity cost of holding money rises as the interest rate rises.

C. downward-sloping because the opportunity cost of holding money rises as the interest rate falls.

D. upward-sloping because the opportunity cost of holding money rises with the interest rate.

14. An example of the frictionally unemployed is a(n):

A. autoworker who is temporarily laid off because of a decline in sales.

B. geologist who is permanently laid off from an oil company due to a new technological advance.

C. worker at a fast-food restaurant who quits work and attends college.

D. real estate agent who leaves a job in Texas and searches for a similar, higher paying job in California.

15. Suppose that in year 1 an economy produces 100 baseballs that sell for \$3 each and 75 pizzas that sell for \$8 each. The next year the economy produces 110 baseballs that sell for \$3.25 each and 80 pizzas that sell for \$9 each. Using year 1 as the base year, the growth rate of real GDP from year 1 to Year 2 is:

A. 10%.

B. 7.8%.

C. 19.7%.

D. 8.8%.

16. Suppose the economy is in long-run equilibrium. Concerns about pollution cause the government to significantly restrict the production of electricity. At the same time, taxes fall. In the short-run

A. real GDP will rise, and the price level might rise, fall, or stay the same.

B. real GDP will fall, and the price level might rise, fall, or stay the same.

C. the price level will rise, and real GDP might rise, fall, or stay the same.

D. the price level will fall, and real GDP might rise, fall, or stay the same.

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17. Critics of stabilization policy argue that
- “animal spirits” must be offset by active monetary policy.
 - active monetary policy is necessary for steady economic growth.
 - the lag problem ends up being a cause of economic fluctuations.
 - active fiscal policy is required for steady economic growth.
18. Which of the following contains a list only of things that decrease when the budget deficit of the U.S. increases?
- U.S. net exports, U.S. domestic investment, U.S. net capital outflow
 - U.S. supply of loanable funds, U.S. interest rates, U.S. domestic investment
 - U.S. imports, U.S. interest rates, the real exchange rate of the dollar
 - U.S. interest rates, the real exchange rate of the dollar, U.S. domestic investment
19. If purchasing power parity holds, then if the price of a basket of goods in the U.S. rose from \$1,000 to \$1,200 and the price of the same basket in Poland rose from 6,400 Polish zloty to 8,000 zloty, then
- the nominal exchange rate would be unchanged and the real exchange rate would appreciate.
 - the U.S. dollar would appreciate and the real exchange rate would stay the same.
 - the nominal exchange rate would be unchanged and the real exchange rate would depreciate.
 - the U.S. dollar would depreciate and the real exchange rate would be unchanged.
20. Imagine the U.S. economy is in long-run equilibrium. Then suppose the value of the U.S. dollar decreases. At the same time, people in the U.S. revise their expectations so that the expected price level rises. We would expect that in the short-run
- real GDP will rise and the price level might rise, fall, or stay the same.
 - real GDP will fall and the price level might rise, fall, or stay the same.
 - the price level will rise, and real GDP might rise, fall, or stay the same.
 - the price level will fall, and real GDP might rise, fall, or stay the same.

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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. Assume a government imposes a tax on the market of good A . The total tax revenue is \$500, and the quantity demanded is 100. Further, the demand is linear and has a slope of $-\frac{1}{5}$. The supply equation is $Q^S = 2P$.

- (4 points) What is the price that consumers pay after the tax?
- (4 points) What is the demand equation?
- (4 points) What is the size of the deadweight loss of the taxation?
- (4 points) What is the tax burden of consumers?
- (4 points) Additionally, assume the government imposes this tax to deal with externality efficiently. What is the size of the externality per output unit? Is this externality positive or negative?

2. Consider an endowment economy (an economy without production). The utility function of each consumer is $U = D_x^{1/2} D_y^{1/2}$, where D_x and D_y represent demand of x and y respectively. The endowment of x is 20 units and that of y is 30 units. Answer the following questions.

- (5 points) Show that the utility function is homothetic.
- (5 points) Derive the demand of x relative to y as a function of p_x/p_y where p represents price.
- (5 points) Derive the equilibrium level of p_x/p_y .
- (5 points) Suppose there is another economy, where consumers have the same utility function but both the endowment of x and y is 30 units. Derive the equilibrium level of p_x/p_y under free trade.

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3. Given the following information: bank deposits 350, currency-to-deposits ratio 0.20, required reserve ratio 0.15,

A. (15 points) solve for the monetary base level, the level of bank reserves, and the money supply level in this economy.

B. (5 points) Suppose there is a sudden rise in the currency-to-deposits ratio, from the original level of 0.2 to a new level of 0.4. If everything else remains unchanged, find the level of monetary base needed to keep money supply fixed at the same level.

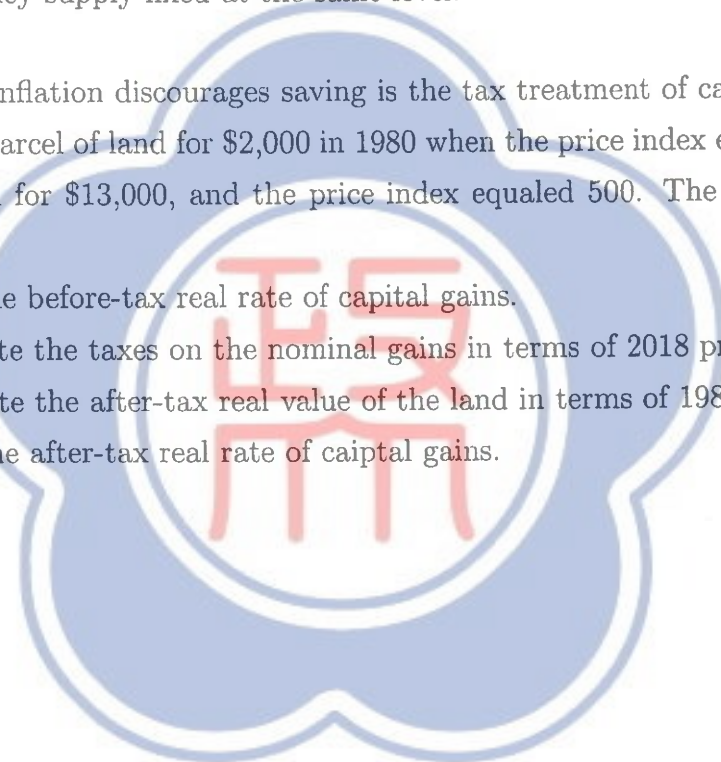
4. One example of how inflation discourages saving is the tax treatment of capital gains. Suppose that someone bought a parcel of land for \$2,000 in 1980 when the price index equaled 100. In 2018, the person sold the land for \$13,000, and the price index equaled 500. The tax rate on nominal gains was 20 percent.

A. (5 points) Find the before-tax real rate of capital gains.

B. (5 points) Compute the taxes on the nominal gains in terms of 2018 prices.

C. (5 points) Compute the after-tax real value of the land in terms of 1980 prices.

D. (5 points) Find the after-tax real rate of capital gains.



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1. (3pt) If a test of hypothesis has a Type I error probability of 0.05, this means that:
 - A. if the null hypothesis is true, we don't reject it 5% of the time
 - B. if the null hypothesis is true, we reject it 5% of the time
 - C. if the null hypothesis is false, we don't reject it 5% of the time
 - D. if the null hypothesis is false, we reject it 5% of the time

2. (3pt) Suppose we wish to test $H_0: \mu = 23$ vs. $H_1: \mu < 23$. Which of the following possible sample results gives the most evidence to support H_1 ?
 - A. sample mean is 19 and standard error is 5
 - B. sample mean is 20 and standard error is 8
 - C. sample mean is 21 and standard error is 6
 - D. sample mean is 19 and standard error is 11

3. (3pt) If a random sample of size $n=100$ fine-dining restaurants is selected and it is found that 45 restrict the use of the cell phones, give a 99% confidence interval for the true proportion of fine-dining restaurants that restrict the use of cell phone.
 - A. (0.3219, 0.5781)
 - B. (0.3525, 0.5475)
 - C. (0.2378, 0.4222)
 - D. (0.2526, 0.4073)

4. (3pt) Which of the following does the Central Limit Theorem allow us to disregard when working with the sampling distribution of the sample mean?
 - A. the standard deviation of the population distribution
 - B. the shape of the population distribution
 - C. the mean of the population distribution
 - D. all of the above can be disregarded when the Central Limit Theorem is used

5. (3pt) A man with 10 keys wants to open his door and tries the keys at random. Suppose there is exactly one key will open the door. If unsuccessful keys are eliminated from further selections. Let X be the number of trials to find the right key. What is the distribution of X ?
 - A. Uniform distribution
 - B. Geometric distribution
 - C. Binomial distribution
 - D. Negative binomial distribution

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6. (3pt) The seasonal output of a new experimental strain of pepper plants was carefully weighed. The mean weight per plant is 15.0 pounds, and the standard deviation of the normally distributed weights is 1.75 pounds. Of the 200 plants in the experiment, how many produced peppers weighing between 13 and 16 pounds?
- A. 100
B. 118
C. 197
D. 53
7. (3pt) Which of the following tests is appropriate for data if the problem objective is to compare two populations and there are exactly 2 categories?
- A. The z-test for the difference of two proportions
B. The chi-squared test of a contingency table
C. Both A and B
D. None of these choices
8. (3pt) In testing the hypothesis $H_0: \mu = 100$ vs. $H_1: \mu > 100$, the p-value is found to be 0.074, and the sample mean is 105. Which of the following statements is true?
- A. The probability of observing a sample mean at least as large as 105 from a population whose mean is 100 is 0.074
B. The probability of observing a sample mean smaller than 105 from a population whose mean is 100 is 0.074
C. The probability that the population mean is larger than 100 is 0.074
D. None of these choices
9. (3pt) The sample size needed to within 10 units of the population mean was found to be 68. If the population standard deviation was 50, then the confidence level used was
- A. 99%
B. 95%
C. 90%
D. 98%
10. (3pt) The SAT scores of entering freshmen at a certain university have mean 1215 and standard deviation 110. A random sample of 100 freshmen is taken and \bar{X} is computed. The probability that \bar{X} less than 1190 is
- A. 0.2272
B. 0.1335
C. 0.4090
D. 0.0116

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11. (15%) The weekly oil demand X (in tons) follows the pdf

$$f(x) = \frac{1}{\theta} e^{-x/\theta}, 0 < x < \infty.$$

However, the company can produce at most only 4 tons of the oil per week. Let Y be the oil sold per week.

(a) (3%) Find the probability that the oil will be sold out per week

(b) (7%) Find the cumulative distribution function of Y

(c) (5%) Find $E(Y)$

12. (20%) Suppose that a random sample of 60 observations was drawn from a normal population. Suppose that we would like to infer whether or not the observations come from a zero mean and variance one. After drawing observations randomly, the number of observations in each of the intervals below was counted. Can we infer at the 5% significance level that the data were drawn from a hypothesized population? Ps. your answer should include:

(i) the null/alternative hypothesis; (ii) the test statistic; (iii) the decision rule; (iv) the conclusion of the test

intervals	Frequency
$(-\infty, -1]$	8
$(-1, 0]$	30
$(0, 1]$	17
$(1, \infty)$	5

13. (15%) Three different models of automobiles (A, B, and C) were compared for gasoline consumption. For each model of car, 15 cars were randomly selected and subjected to standard driving procedures. The average miles/gallon obtained for each model of car and sample standard deviations are shown below. Suppose that the population variances ($\sigma_A^2 = \sigma_B^2 = \sigma_C^2 = \sigma^2$) are equal.

	Car A	Car B	Car C
Average Mile/Gallon	42	49	44
Sample Standard Deviation	4	5	3

(a) (10%) Let $\alpha = 0.05$, and see if the mean gasoline consumption for all three models of cars is the same

(b) (5%) Find a 95% confidence interval for $(\mu_C - \mu_A)$. Please use $Q_{\alpha, d.f.}$ to denote the critical value. (you must specify the distribution Q and value of d.f.)

14. (20%) An insurance company is considering opening a new branch in Lansing. The company will choose the final location from two locations within the city. One of the factors in the decision is the annual family income (in thousands of dollars) from the potential locations.

Suppose that they randomly selected n families from each location (so the sample size is $2n$). Let \bar{X}_A and

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S_A be the sample mean and the sample standard deviation of location A, respectively. Similarly, \bar{X}_B and S_B are the corresponding statistics from location B.

Use $\alpha = 0.05$ to answer the following questions. Please state your answer step-by step, including: (i) the null/alternative hypothesis; (ii) the test statistic (use \bar{X} And S to define your test statistic); (iii) the decision rule (including the distribution and critical value)

- (a) (5%) Suppose that we have no idea whether the variances are equal or not. So how to use a statistical method to determine the variances are equal or not?
- (b) (5%) Suppose that the variances are the same. Perform a hypothesis testing to determine whether the population means differ significantly.
- (c) (10%) Let Z be 1 if it comes from location B and 0 otherwise. And Y be the income. We fit a simple linear regression model to this dataset $\{(Z_i, Y_i)\}_{i=1, \dots, 2n}$ and use the least squares method to get the estimated regression equation. Show that the least squares estimates of intercept and slope parameters are \bar{X}_A and $\bar{X}_B - \bar{X}_A$, respectively.

Table I: Chi-square table

Upper tail	0.3	0.2	0.1	0.05	0.02	0.01	0.005	0.001	
df	2	2.41	3.22	4.61	5.99	7.82	9.21	10.60	13.82
	3	3.66	4.64	6.25	7.81	9.84	11.34	12.84	16.27
	4	4.88	5.99	7.78	9.49	11.67	13.28	14.86	18.47
	5	6.00	7.20	9.24	11.07	13.39	15.09	16.75	20.52
	6	7.23	8.56	10.64	12.59	15.03	16.81	18.55	22.46
	7	8.38	9.80	12.02	14.07	16.62	18.48	20.28	24.32
	8	9.52	11.03	13.36	15.51	18.17	20.09	21.95	26.12
	9	10.66	12.24	14.68	16.92	19.68	21.67	23.59	27.88
	10	11.78	13.44	15.99	18.31	21.16	23.21	25.19	29.59
	11	12.90	14.63	17.28	19.68	22.62	24.72	26.76	31.26
	12	14.01	15.81	18.55	21.03	24.05	26.22	28.30	32.91
	13	15.12	16.98	19.81	22.36	25.47	27.69	29.82	34.53
	14	16.22	18.15	21.06	23.68	26.87	29.14	31.32	36.12
	15	17.32	19.31	22.31	25.00	28.26	30.58	32.80	37.70
	16	18.42	20.47	23.54	26.30	29.63	32.00	34.27	39.25
	17	19.51	21.61	24.77	27.59	31.00	33.41	35.72	40.79
	18	20.60	22.76	25.99	28.87	32.35	34.81	37.16	42.31
	19	21.69	23.90	27.20	30.14	33.69	36.19	38.58	43.82
	20	22.77	25.04	28.41	31.41	35.02	37.57	40.00	45.31
	25	28.17	30.68	34.38	37.65	41.57	44.31	46.93	52.62
	30	33.53	36.25	40.26	43.77	47.96	50.89	53.67	59.70
	40	44.16	47.27	51.81	55.76	60.44	63.69	66.77	73.40
	50	54.72	58.16	63.17	67.50	72.61	76.15	79.49	86.66

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Table III: F table with $\alpha = 0.05$

Denominator DF	Numerator DF									
	1	2	3	4	5	6	7	8	9	10
1	161.448	199.500	215.707	224.583	230.162	233.986	236.768	238.883	240.543	241.882
2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385	19.396
3	10.128	9.552	9.277	9.117	9.013	8.941	8.887	8.845	8.812	8.786
4	7.709	6.944	6.591	6.388	6.256	6.163	6.094	6.041	5.999	5.964
5	6.608	5.786	5.409	5.192	5.050	4.950	4.876	4.818	4.772	4.735
6	5.987	5.143	4.757	4.534	4.387	4.284	4.207	4.147	4.099	4.060
7	5.591	4.737	4.347	4.120	3.972	3.866	3.787	3.726	3.677	3.637
8	5.318	4.459	4.066	3.838	3.687	3.581	3.500	3.438	3.388	3.347
9	5.117	4.256	3.863	3.633	3.482	3.374	3.293	3.230	3.179	3.137
10	4.965	4.103	3.708	3.478	3.326	3.217	3.135	3.072	3.020	2.978
11	4.844	3.982	3.587	3.357	3.204	3.095	3.012	2.948	2.896	2.854
12	4.747	3.885	3.490	3.259	3.106	2.996	2.913	2.849	2.796	2.753
13	4.667	3.806	3.411	3.179	3.025	2.915	2.832	2.767	2.714	2.671
14	4.600	3.739	3.344	3.112	2.958	2.848	2.764	2.699	2.646	2.602
15	4.543	3.682	3.287	3.056	2.901	2.790	2.707	2.641	2.588	2.544
16	4.494	3.634	3.239	3.007	2.852	2.741	2.657	2.591	2.538	2.494
17	4.451	3.592	3.197	2.965	2.810	2.699	2.614	2.548	2.494	2.450
18	4.414	3.555	3.160	2.928	2.773	2.661	2.577	2.510	2.456	2.412
19	4.381	3.522	3.127	2.895	2.740	2.628	2.544	2.477	2.423	2.378
20	4.351	3.493	3.098	2.866	2.711	2.599	2.514	2.447	2.393	2.348
21	4.325	3.467	3.072	2.840	2.685	2.573	2.488	2.420	2.366	2.321
22	4.301	3.443	3.049	2.817	2.661	2.549	2.464	2.397	2.342	2.297
23	4.279	3.422	3.028	2.796	2.640	2.528	2.442	2.375	2.320	2.275
24	4.260	3.403	3.009	2.776	2.621	2.508	2.423	2.355	2.300	2.255
25	4.242	3.385	2.991	2.759	2.603	2.490	2.405	2.337	2.282	2.236
26	4.225	3.369	2.975	2.743	2.587	2.474	2.388	2.321	2.265	2.220
27	4.210	3.354	2.960	2.728	2.572	2.459	2.373	2.305	2.250	2.204
28	4.196	3.340	2.947	2.714	2.558	2.445	2.359	2.291	2.236	2.190
29	4.183	3.328	2.934	2.701	2.545	2.432	2.346	2.278	2.223	2.177
30	4.171	3.316	2.922	2.690	2.534	2.421	2.334	2.266	2.211	2.165
31	4.160	3.305	2.911	2.679	2.523	2.409	2.323	2.255	2.199	2.153
32	4.149	3.295	2.901	2.668	2.512	2.399	2.313	2.244	2.189	2.142
33	4.139	3.285	2.892	2.659	2.503	2.389	2.303	2.235	2.179	2.133
34	4.130	3.276	2.883	2.650	2.494	2.380	2.294	2.225	2.170	2.123
35	4.121	3.267	2.874	2.641	2.485	2.372	2.285	2.217	2.161	2.114
36	4.113	3.259	2.866	2.634	2.477	2.364	2.277	2.209	2.153	2.106
37	4.105	3.252	2.859	2.626	2.470	2.356	2.270	2.201	2.145	2.098
38	4.098	3.245	2.852	2.619	2.463	2.349	2.262	2.194	2.138	2.091
39	4.091	3.238	2.845	2.612	2.456	2.342	2.255	2.187	2.131	2.084
40	4.085	3.232	2.839	2.606	2.449	2.336	2.249	2.180	2.124	2.077
41	4.079	3.226	2.833	2.600	2.443	2.330	2.243	2.174	2.118	2.071
42	4.073	3.220	2.827	2.594	2.438	2.324	2.237	2.168	2.112	2.065
43	4.067	3.214	2.822	2.589	2.432	2.318	2.232	2.163	2.106	2.059
44	4.062	3.209	2.816	2.584	2.427	2.313	2.226	2.157	2.101	2.054
45	4.057	3.204	2.812	2.579	2.422	2.308	2.221	2.152	2.096	2.049
46	4.052	3.200	2.807	2.574	2.417	2.304	2.216	2.147	2.091	2.044
47	4.047	3.195	2.802	2.570	2.413	2.299	2.212	2.143	2.086	2.039
48	4.043	3.191	2.798	2.565	2.409	2.295	2.207	2.138	2.082	2.035
49	4.038	3.187	2.794	2.561	2.404	2.290	2.203	2.134	2.077	2.030
50	4.034	3.183	2.790	2.557	2.400	2.286	2.199	2.130	2.073	2.026

備 註 一、作答於試題上者，不予計分。
二、試題請隨卷繳交。

國立政治大學 109 學年度 碩士暨碩士在職專班 招生考試試題

第 1 頁，共 4 頁

考試科目	微積分	系所別	國際經營與貿易學系國際 經濟、國際財管、國際企 管與行銷組一般生	考試時間	2 月 7 日(五) 第四節
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Multiple choice questions (5 points each). 選擇題請在答案卡上作答，否則不予計分。

1. Let $f(x) = x^4 - 2x^2 + 1$ for $x > -1$. Which of the following statements is true?

- (a) $f'(0) \leq 1$ and $f''(0) \leq 1$.
- (b) $f'(0) \leq 1$ and $f''(0) > 1$.
- (c) $f'(0) > 1$ and $f''(0) \leq 1$.
- (d) $f'(0) > 1$ and $f''(0) > 1$.
- (e) $f'(0)$ does not exist.

2. Let $f(x) = (1+x)\ln(1+x)$ for $x > -1$. Which of the following statements is true?

- (a) $f'(0) \leq 1$ and $f''(0) \leq 1$.
- (b) $f'(0) \leq 1$ and $f''(0) > 1$.
- (c) $f'(0) > 1$ and $f''(0) \leq 1$.
- (d) $f'(0) > 1$ and $f''(0) > 1$.
- (e) $f'(0)$ does not exist.

3. Suppose that f is a differentiable function on $(-\infty, \infty)$ such that $f(1) = 1$ and $f'(1) = 2$. Let

$$h(x) = \begin{cases} (f(x) - 1)/(x - 1) & \text{if } x \neq 1; \\ 2 & \text{if } x = 1. \end{cases}$$

Which of the following statements can be concluded based on the given information?

- (a) $h'(1) \leq 1$.
- (b) $1 < h'(1) \leq 2$.
- (c) $h'(1) > 2$.
- (d) $h'(1)$ does not exist.
- (e) None of the above statements can be concluded.

4. Suppose that f is a differentiable function on $(-\infty, \infty)$ such that $f(1) = 1$ and $f'(1) = 2$. Let $h(x) = f(e^{2x-2})/x$ for $x > 0$. Which of the following statements can be concluded based on the given information?

- (a) $h'(1) \leq 1$.
- (b) $1 < h'(1) \leq 2$.
- (c) $h'(1) > 2$.
- (d) $h'(1)$ does not exist.
- (e) None of the above statements can be concluded.

5. Let $f(x) = x^2 + \sin(x)$ and $g(x) = x^2 + \cos(x)$. Which of the following statements is true?

- (a) $3 < \lim_{x \rightarrow \infty} g(x)/f(x) < \infty$.
- (b) $2 < \lim_{x \rightarrow \infty} g(x)/f(x) \leq 3$.
- (c) $1 < \lim_{x \rightarrow \infty} g(x)/f(x) \leq 2$.
- (d) $-\infty < \lim_{x \rightarrow \infty} g(x)/f(x) \leq 1$.
- (e) $\lim_{x \rightarrow \infty} g(x)/f(x)$ does not exist.

備

註

一、作答於試題上者，不予計分。選擇題請在答案卡上作答，否則不予計分。
二、試題請隨卷繳交。

國立政治大學 109 學年度 碩士暨碩士在職專班 招生考試試題

第 2 頁，共 4 頁

考試科目 微積分	系所別	國際經營與貿易學系國際 經濟、國際財管、國際企 管與行銷組一般生	考試時間	2 月 7 日(五) 第四節
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6. Let $f(x) = (x - 3)^2$ and $g(x) = \ln(x - 3)$ for $x > 3$. Which of the following statements is true?
- $0 < \lim_{x \rightarrow 3^+} f(x)g(x) < \infty$.
 - $-1 < \lim_{x \rightarrow 3^+} f(x)g(x) \leq 0$.
 - $-2 < \lim_{x \rightarrow 3^+} f(x)g(x) \leq -1$.
 - $-\infty < \lim_{x \rightarrow 3^+} f(x)g(x) \leq -2$.
 - None of the above statements holds true.
7. Let $f(x) = \sqrt{x(2+x)}$ and $g(x) = x$ for $x > 0$. Which of the following statements is true?
- $-\infty < \lim_{x \rightarrow \infty} (f(x) - g(x)) \leq 0$.
 - $0 < \lim_{x \rightarrow \infty} (f(x) - g(x)) \leq 1$.
 - $1 < \lim_{x \rightarrow \infty} (f(x) - g(x)) \leq 2$.
 - $2 < \lim_{x \rightarrow \infty} (f(x) - g(x)) < \infty$.
 - None of the above statements holds true.
8. Suppose that $f'(x) = x^2(x + 2)e^x$ for $x \in (-\infty, \infty)$. Which of the following statements is true?
- f is strictly increasing on the interval $(-1, \infty)$.
 - f is strictly decreasing on the interval $(0, \infty)$.
 - f has at least one local minimum on the interval $(-1, \infty)$.
 - f has at least one local maximum on the interval $(-3, \infty)$.
 - None of the above statements holds true.
9. Let $f(x) = x - \int_0^x e^{t^2} dt$ for $x \in (-\infty, \infty)$. Which of the following statements is true?
- $f'(1) > 0$.
 - f has a local maximum at 1.
 - f has a local minimum at 1.
 - $f'(0) \leq -2$.
 - None of the above statements holds true.
10. Let $f(x) = x^2 - \int_0^x e^{t^2} dt$ for $x \in (-\infty, \infty)$. Which of the following statements is true?
- $0 < \lim_{x \rightarrow 0} f(x)/x < \infty$.
 - $-1 < \lim_{x \rightarrow 0} f(x)/x \leq 0$.
 - $-2 < \lim_{x \rightarrow 0} f(x)/x \leq -1$.
 - $-\infty < \lim_{x \rightarrow 0} f(x)/x \leq -2$.
 - None of the above statements holds true.

備

註

- 作答於試題上者，不予計分。選擇題請在答案卡上作答，否則不予計分。
- 試題請隨卷繳交。

考試科目	微積分	系所別	國際經營與貿易學系國際經濟、國際財管、國際企管與行銷組一般生	考試時間	2 月 7 日(五) 第四節
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11. Suppose that f is a twice differentiable function on $(-\infty, \infty)$ such that $f(1) = 1$, $f(2) = 2$ and $f(3) = -2$. Which of the following statements can be concluded based on the given information?

- (a) $f'(x) > -3$ for some x in the interval $(2, 3)$.
- (b) $f''(x) < -2$ for some x in the interval $(1, 3)$.
- (c) $f'(x) = -3$ for some x in the interval $(1, 3)$.
- (d) $f'(x) < -3$ for some x in the interval $(1, 2)$.
- (e) None of the above statements can be concluded.

12. Which of the following statements is true?

- (a) $\int_0^1 x^2 dx \leq 0.5$ and $\int_0^\infty e^{-x/2} dx \leq 1$.
- (b) $\int_0^1 x^2 dx \leq 0.5$ and $\int_0^\infty e^{-x/2} dx > 1$.
- (c) $0.5 < \int_0^1 x^2 dx \leq 2$ and $\int_0^\infty e^{-x/2} dx \leq 1$.
- (d) $0.5 < \int_0^1 x^2 dx \leq 2$ and $\int_0^\infty e^{-x/2} dx > 1$.
- (e) None of the above statements holds true.

13. Which of the following statements is true?

- (a) $\int_0^\pi x \sin(x) dx \leq 0.5$ and $\int_0^\infty x e^{-x/2} dx \leq 1$.
- (b) $\int_0^\pi x \sin(x) dx \leq 0.5$ and $\int_0^\infty x e^{-x/2} dx > 1$.
- (c) $0.5 < \int_0^\pi x \sin(x) dx \leq 2$ and $\int_0^\infty x e^{-x/2} dx \leq 1$.
- (d) $0.5 < \int_0^\pi x \sin(x) dx \leq 2$ and $\int_0^\infty x e^{-x/2} dx > 1$.
- (e) None of the above statements holds true.

14. Suppose that $\{a_n\}_{n=1}^\infty$ is a sequence such that $a_1 = 1$ and $a_{n+1} = \sqrt{0.5a_n + 0.06}$ for $n \geq 1$. Which of the following statements is true?

- (a) $-\infty < \lim_{n \rightarrow \infty} a_n \leq 0$.
- (b) $0 < \lim_{n \rightarrow \infty} a_n \leq 0.5$.
- (c) $0.5 < \lim_{n \rightarrow \infty} a_n \leq 1$.
- (d) $1 < \lim_{n \rightarrow \infty} a_n < \infty$.
- (e) None of the above statements holds true.

15. Which of the following statements is true?

- (a) $\sum_{n=1}^\infty (n^2 + 1)/(2n^3 + n + 1) < \infty$ and $\sum_{n=1}^\infty (-1)^n/n$ diverges.
- (b) $\sum_{n=1}^\infty (n^2 + 1)/(2n^3 + n + 1) < \infty$ and $\sum_{n=1}^\infty (-1)^n/n$ converges conditionally.
- (c) $\sum_{n=1}^\infty (n^2 + 1)/(2n^3 + n + 1) = \infty$ and $\sum_{n=1}^\infty (-1)^n/n$ diverges.
- (d) $\sum_{n=1}^\infty (n^2 + 1)/(2n^3 + n + 1) = \infty$ and $\sum_{n=1}^\infty (-1)^n/n$ converges conditionally.
- (e) $\sum_{n=1}^\infty (-1)^n/n$ converges absolutely.

備

註

一、作答於試題上者，不予計分。選擇題請在答案卡上作答，否則不予計分。
二、試題請隨卷繳交。

考試科目	微積分	系所別	國際經營與貿易學系國際經濟、國際財管、國際企管與行銷組一般生	考試時間	2 月 7 日(五) 第四節
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16. Let $f(x, y) = 4xy - 2x + 2y$ for $x, y \in (-\infty, \infty)$, and let $D_1 = \{(x, y) : 0 \leq x \leq 1 \text{ and } 0 \leq y \leq 1\}$. Which of the following statements is true?

- (a) $3 < \int_{D_1} f(x, y) d(x, y) < \infty$.
- (b) $2 < \int_{D_1} f(x, y) d(x, y) \leq 3$.
- (c) $1 < \int_{D_1} f(x, y) d(x, y) \leq 2$.
- (d) $0 < \int_{D_1} f(x, y) d(x, y) \leq 1$.
- (e) None of the above statements holds true.

17. Let $f(x, y) = 4xy - 2x + 2y$ for $x, y \in (-\infty, \infty)$, and let $D_1 = \{(x, y) : 0 \leq x \leq 1 \text{ and } 0 \leq y \leq x\}$. Which of the following statements is true?

- (a) $3 < \int_{D_1} f(x, y) d(x, y) < \infty$.
- (b) $2 < \int_{D_1} f(x, y) d(x, y) \leq 3$.
- (c) $1 < \int_{D_1} f(x, y) d(x, y) \leq 2$.
- (d) $0 < \int_{D_1} f(x, y) d(x, y) \leq 1$.
- (e) None of the above statements holds true.

18. Let $D = \{(x, y) : x > 0, y > 0, 0 < x^2 + y^2 \leq 1\}$. Which of the following statements is true?

- (a) $4 < \int_D e^{-x^2-y^2} d(x, y) < \infty$.
- (b) $3 < \int_D e^{-x^2-y^2} d(x, y) \leq 4$.
- (c) $2 < \int_D e^{-x^2-y^2} d(x, y) \leq 3$.
- (d) $1 < \int_D e^{-x^2-y^2} d(x, y) \leq 2$.
- (e) None of the above statements holds true.

19. Let $S_n = \sum_{k=1}^n \frac{k}{n^2} \sin\left(\frac{k}{n}\right)$. Which of the following statements is true?

- (a) $\lim_{n \rightarrow \infty} S_n/n$ exists and $\lim_{n \rightarrow \infty} S_n/n \geq 1$.
- (b) $\lim_{n \rightarrow \infty} S_n$ exists and $\lim_{n \rightarrow \infty} S_n \leq \sqrt{2}$.
- (c) $\lim_{n \rightarrow \infty} nS_n$ exists and $\lim_{n \rightarrow \infty} nS_n \leq 1$.
- (d) $\lim_{n \rightarrow \infty} n^2 S_n$ exists and $\lim_{n \rightarrow \infty} n^2 S_n \leq 1/2$.
- (e) None of the above statements holds true.

20. Let $f(x, y) = x^2 y + \sin(2x + y)$ for $x, y \in (-\infty, \infty)$. Which of the following statements is true?

- (a) $f_x(\pi, 0) \leq 1$ and $f_{xx}(\pi, 0) \leq 5$.
- (b) $f_x(\pi, 0) \leq 1$ and $f_{xx}(\pi, 0) > 5$.
- (c) $f_x(\pi, 0) > 1$ and $f_{xx}(\pi, 0) \leq 5$.
- (d) $f_x(\pi, 0) > 1$ and $f_{xx}(\pi, 0) > 5$.
- (e) None of the above statements holds true.

備

註

- 一、作答於試題上者，不予計分。選擇題請在答案卡上作答，否則不予計分。
- 二、試題請隨卷繳交。

考試科目	商 事 法	系所別	國際經營與貿易學系國際 經貿法組一般生	考試時間	2月7日(五)第二節
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一、A 股份有限公司，經營商業銀行業務，於民國 94 年 6 月間，以私募公開競標方式，辦理現金增資，發行 14 億特別股。當時財政部為 A 公司之最大股東，為達成吸引潛在策略投資人參與投標，達成政府 2 次金改之公股整併政策，於同年 7 月財政部以新聞稿同意支持所引進之金融機構取得 A 公司之經營權，另發函同意完成增資後，經營管理權移由得標投資人主導，並同意於董監事改選時，支持得標投資人取得董監事過半數席次。B 股份有限公司，亦經營銀行業務，以新台幣 365 億（較底價溢價 114 億元）標得特別股，成為 A 公司最大股東，其後三屆 A 公司股東會改選董監事，B 公司在財政部支持下皆順利取得 A 公司過半數董監事席次；唯於 103 年改選董監事時，財政部以立法院決議（公股股權不得支持非公股代表）為由，未支持 B 公司之人選，致其未能取得過半數董監事席次，遂引起雙方爭端。請問：何謂表決權拘束契約？財政部與 B 公司間是否存有此等契約關係？雙方此等契約是否因違反公序良俗（如未定期限）而無效？（25%）

二、依 A 股份有限公司章程之記載，該公司設董事 5-9 人，任期 3 年，採董事候選人提名制度，A 公司於 106 年 5 月 11 日召開股東會前公告持有該公司股份總數百分之一以上股份之股東，依公司法第 172 條之一及第 192 條之一規定，得以書面向公司提出議案及董事候選人提名。B 公司為持有 A 公司已發行股份總數 1.7% 之股東，檢附資料文件，提名甲、乙為 B 公司法人代表董事，丙為獨立董事。A 公司遂於同年 3 月 29 日召開董事會，對董事被提名人進行審查，經審查後以下列文件不齊備為理由，未將前開三人列入董事候選人名單：(1) B 公司未出具當選後願任董事之承諾書與無第 30 條規定情事之聲明書、(2) B 公司及甲、乙、丙均未提供持股證明書。因此，股東會決議通過改選之董事，均無前開三位人選。B 公司遂起訴請求確認股東會有關董事改選之決議無效。依 107 年新修正之公司法有關董事候選人提名制度相關規定，請問：A 公司以文件不齊備為理由剔除 B 公司提名之候選人是否有理由？前開董事會決議與股東會決議之效力為何？（25%）

三、甲為 A 公司與 B 公司之負責人，今 B 公司有資金需求，授權乙代表 B 公司與丙簽訂借款合同新台幣 2000 萬元，雙方約定 B 公司應提供由甲簽發之本票及 A 公司開具之支票為擔保，於未按期清償債務時，丙得持上開票據提示付款。查該支票由 A 公司簽發（旁有甲之印章），背面則有甲之簽名。今到期提示不獲付款，丙依票據法第 144 條準用第 85 條第 1 項規定請求 A 公司給付票款，A 公司辯稱：(1) 該支票欠缺交付要件（由乙交付，並非由其交付）、(2) 甲無權代表 A 公司簽發票據（甲另於刑事案件承認盜開，且不符合公司內部簽發支票規則）、(3) 該支票簽發違反公司法第 16 條不得為保證人之規定，因此，得依票據法第 13 條與第 14 條之規定為抗辯。請問：A 公司之三項抗辯有無理由？（25%）

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	商法	系所別	國際經營與貿易學系國際 經貿法組一般生	考試時間	7月7日(五) 第二節
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四、A 公司與 B 公司簽訂運送契約，委託 B 公司運送變壓器貨物，由臺灣基隆運至日本橫濱港。經運送抵達目的地，於受貨人 C 公司領貨時，發現系爭貨物受有遭海水浸濕而生鏽受損情形，造成損失。查系爭貨物乃 B 公司自行包裝送交指定之貨櫃廠（委託 D 包裝公司為之），並自行固定放置在平板櫃，D 公司為能將貨物固定於平板櫃，將包覆貨物吊耳部分之內層塑膠套挖空，以便從吊耳處將鋼索繫縛固定在平板櫃支柱上，使得原包裝防水性遭破壞。而航程中貨物因放置甲板（貨物體積龐大，依商業慣例置於甲板）遇雨滲入導致鏽蝕。D 公司於破壞防水包裝後並未為任何修補，逕交付 B 公司託運，B 公司於接收該貨物後，即簽發清潔載貨證券，記載：上述貨物於運送人收到時外觀良好（未就貨物瑕疵為保留），但同時載有：據告稱內裝有及託運人自裝自計。請問：B 公司是否違反海商法第 63 條之貨物照管義務？B 公司得否依海商法第 69 條主張免責？A 公司主張因 B 公司所簽發者為清潔載貨證券，不得以包裝不固主張免責，是否有理由？（25%）



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	國際經濟法	系所別	國際經濟法學系 國際經濟法組	考試時間	2月7日(五) 第二節
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- 一、為了解決空氣污染以及氣候變遷等環境問題，我國持續針對電動機車的購買提供優惠獎勵措施，今（2020年）年的購車補助金額雖然有減少，但針對使用國產電池的車輛，補助金額反而由兩千元提高至三千元，請由 WTO 相關協定之適法性分析此一獎勵政策？（20%）
- 二、請問反傾銷協定下的「歸零」爭議所指為何？近年來，WTO 下涉及此議題的案例法對此一作法的主要裁決為何？（25%）
- 三、我國持續努力推動加入 CPTPP 等區域貿易協定的政策，需要特別留意哪些 WTO 下的相關規定？（10%）此外，現今許多區域貿易協定納入所謂 WTO-plus 或是 WTO-extra 的規定，請問此兩類型的規定所指為何？我國於推動加入區域貿易協定時是否需要將此股風潮納入考量？（15%）
- 四、在美國持續杯葛 WTO 上訴機構成員選任的狀況下，目前上訴機構僅剩下一名成員，請問此一現況對於 WTO 現正進行中的各個爭端案件、以及對 WTO 整體的爭端解決機制將產生何種影響？（20%）
- 五、請試譯以下條文（10%）

1. In the event of conflict between a provision of the General Agreement on Tariffs and Trade 1994 and a provision of another agreement in Annex 1A to the Agreement Establishing the World Trade Organization (referred to in the agreements in Annex 1A as the "WTO Agreement"), the provision of the other agreement shall prevail to the extent of the conflict. (3%)
2. Members shall ensure that enforcement procedures as specified in this Part are available under their law so as to permit effective action against any act of infringement of intellectual property rights covered by this Agreement, including expeditious remedies to prevent infringements and remedies which constitute a deterrent to further infringements. These procedures shall be applied in such a manner as to avoid the creation of barriers to legitimate trade and to provide for safeguards against their abuse. (3%)
3. Where authorization is required for the supply of a service on which a specific commitment has been made, the competent authorities of a Member shall, within a reasonable period of time after the submission of an application considered complete under domestic laws and regulations, inform the applicant of the decision concerning the application. At the request of the applicant, the competent authorities of the Member shall provide, without undue delay, information concerning the status of the application. (4%)

備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。