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Multiple Choice (1.7 points each) 本科目之選擇題請在答案卡上作答

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

Mark each answer clearly with a No. 2 pencil on the Scantron form.

1. Which of the following would shift the demand curve for new textbooks to the right?
 - (a) A fall in the price of paper used in publishing texts
 - (b) A fall in the price of equivalent used textbooks
 - (c) An increase in the number of students attending college
 - (d) A fall in the price of new textbooks
2. Which of the following will NOT cause a shift in the supply of gasoline?
 - (a) An increase in the wage rate of refinery workers
 - (b) A decrease in the price of gasoline
 - (c) An improvement in oil refining technology
 - (d) A decrease in the price of crude oil
3. We observe that both the price of and quantity sold of golf balls are rising over time. This is due to
 - (a) continual improvements in the technology used to produce golf balls.
 - (b) increases in the price of golf clubs over time.
 - (c) decreases in membership fees for country clubs with golf facilities.
 - (d) more stringent professional requirements on the quality of golf balls requiring producers to use more expensive raw materials.
4. Mikey is very picky and insists that his mom make his breakfast with equal parts of cereal and apple juice – any other combination will end up on the floor. Cereal costs 4 cents per tablespoon and apple juice costs 6 cents per tablespoon. If Mikey's mom budgets \$8 per month for Mikey's breakfast, how much cereal and juice does she buy?
 - (a) 40 tablespoons each of cereal and juice
 - (b) 80 tablespoons each of cereal and juice
 - (c) 40 tablespoons of cereal and 75 tablespoons of juice
 - (d) 100 tablespoons of cereal and 67 tablespoons of juice
5. Any risk-averse individual would always
 - (a) take a 10% chance at \$100 rather than a sure \$10.

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(b) take a 50% chance at \$4 and a 50% chance at \$1 rather than a sure \$1.
 (c) take a sure \$10 rather than a 10% chance at \$100.
 (d) take a sure \$1 rather than a 50% chance at \$4 and a 50% chance at losing \$1.

6. A farmer uses K units of machinery and L hours of labor to produce Q tons of corn, with the following production function $Q = L^{0.5} + K^{0.75}$. This production function exhibits
 (a) decreasing returns to scale for all output levels.
 (b) constant returns to scale for all output levels.
 (c) increasing returns to scale for all output levels.
 (d) no clear pattern of returns to scale.

7. If a competitive firm's marginal costs always increases with output, then at the profit maximizing output level, producer surplus is
 (a) zero because marginal costs equal marginal revenue.
 (b) zero because price equals marginal costs.
 (c) positive because price exceeds average variable costs.
 (d) positive because price exceeds average total costs.

8. At the current level of output, long-run marginal cost is \$50 and long-run average cost is \$75. This implies that
 (a) there are neither economies nor diseconomies of scale.
 (b) there are economies of scale.
 (c) there are diseconomies of scale.
 (d) the cost-output elasticity is greater than one.

9. How are a firm's short-run and long-run average cost curves related?
 (a) SRAC is greater than LRAC, which forces the LRAC curve to be upward sloping.
 (b) SRAC and LRAC slope up or down together, but SRAC is always the steeper of the two curves.
 (c) The SRAC curve is tangent to and lies above the LRAC curve.
 (d) The LRAC curve just touches the SRAC curve at its minimum point.

10. A firm is currently producing 200 units of output using 60 hours of labor and 80 hours of capital. The marginal product of labor is 12 units of output per hour, and the marginal product of capital is 15 units of output per hour. If the wage rate is \$6 per hour and the rental rate is \$3 per hour, then
 (a) the firm's use of labor and capital is cost-efficient.

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(b) the firm should use more labor and less capital.
 (c) the firm should use more capital and less labor.
 (d) we cannot determine if the firm's use of inputs is efficient without more information.

11. There are three firms in Green Valley. Initially, each firm emits 4 units of pollution. The following table shows the total costs for each of three firms (A, B, and C) to eliminate units of pollution from their production processes. For example, for Firm A to eliminate one unit of pollution, it would cost \$1, and for Firm A to eliminate two units of pollution, it would cost a total of \$3.

Unit to be eliminated	Firms		
	A	B	C
One unit	1	4	4
Two units	3	8	9
Three units	6	12	15
Four units	10	16	22

Suppose the government wants to reduce pollution to 9 units, so it gives each firm 3 tradable pollution permits. Which of the following statement is true?

(a) Firm A will buy permit(s) from firms B and C.
 (b) Firms A and B will buy permit(s) from firm C.
 (c) Firm B will buy permit(s) from firms A and C.
 (d) Firms B and C will buy permit(s) from firm A.

12. Consider a monopolist facing two consumers whose preferences for its product are given by the following demand curves: $P_1 = 20 - Q_1$ and $P_2 = 12 - 2Q_2$. The monopolist's fixed cost is equal to 0 and marginal cost is equal to 4. Suppose the monopolist can not tell the consumers apart. What is the maximum profit if the monopolist uses a two-part tariff pricing scheme?

(a) 32
 (b) 64
 (c) 128
 (d) 144

13. A monopolistically competitive firm is currently producing 10 units of output. At this level of output the firm is charging a price equal to \$10, has marginal revenue equal to \$6,

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has marginal cost equal to \$6, and has average total cost equal to \$12. From this information we can infer that

- (a) the firm can increase its profit by producing less.
- (b) the profits of the firm are negative.
- (c) firms are likely to enter this market in the long run.
- (d) the firm's fixed cost must be greater than 20.

14. It is commonly argued that national defense is a public good. Nevertheless, many weapons used by the R.O.C. military are produced by U.S. private firms. We can conclude that

- (a) resources would be used more efficiently if the U.S. firms produced the weapons.
- (b) resources would be used more efficiently if private firms provided national defense.
- (c) weapons are rival in consumption and excludable.
- (d) national defense is rival in **consumption** and excludable.

15. Some economists argue that a resale price maintenance agreement is not anti-competitive because

- (a) suppliers are never able to exercise noncompetitive market power.
- (b) if a supplier has market power, it can exert that power through the wholesale price rather than the retail price.
- (c) retail markets are inherently noncompetitive.
- (d) resale price maintenance prevents the retailers from competing on price.

16. A monetary expansion combined with an increase in government spending will cause

- (a) an increase in output with ambiguous effects on the interest rate.
- (b) a reduction in output with ambiguous effects on the interest rate.
- (c) an increase in the interest rate with ambiguous effects on output.
- (d) a reduction in the interest rate with ambiguous effects on output.

17. Which of the following event is most likely to occur when the interest rate increases?

- (a) the money demand curve shifts to the right
- (b) the money demand curve shifts to the left
- (c) the price of bonds will fall
- (d) the price of bonds will rise

18. The recent recession may increase the marginal propensity to save, which tends to cause

- (a) an increase in the multiplier and a given change in government expenditures to have a smaller effect on equilibrium output.

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(b) a reduction in the multiplier and a given change in government expenditures to have a smaller effect on equilibrium output.

(c) an increase in the multiplier and a given change in government expenditures to have a greater effect on equilibrium output.

(d) a reduction in the multiplier and a given change in government expenditures to have a greater effect on equilibrium output.

19. According to the theory of liquidity preference, which variable adjusts to balance the supply and demand for money?

- (a) interest rate
- (b) monetary base
- (c) quantity of output
- (d) price level

20. Which of the following events will trigger a rightward shift of the aggregate demand curve?

- (a) an increase in the price level
- (b) an increase in tax
- (c) an increase in money supply
- (d) an increase in the nominal wage

21. Without an accommodating monetary policy, a push by workers to get higher wages will cause

- (a) hyperinflation.
- (b) higher unemployment.
- (c) cost-push inflation.
- (d) demand-pull inflation.

22. If the government issues debt to the public to finance its spending, the monetary base will _____ and the money supply will _____.

- (a) decrease; increase
- (b) increase; increase
- (c) increase; decrease
- (d) not change; not change

23. If the expected path of one-year interest rates over the next five years is 5 percent, 6 percent, 8 percent, 9 percent, and 7 percent, then according to the expectations theory

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today's interest rate on the five-year bond should be

- (a) 4 percent.
- (b) 5 percent.
- (c) 6 percent.
- (d) 7 percent.

24. If a bank has \$80,000 of checkable deposits, a required reserve ratio of 20 percent on these deposits, and it holds \$40,000 in reserves, then the maximum deposit outflow it can sustain without altering its balance sheet is

- (a) \$20,000.
- (b) \$30,000.
- (c) \$40,000.
- (d) \$25,000.

25. The most important advantage of discount policy is that the central bank can use it to

- (a) control the money supply.
- (b) punish banks that have deficient reserves.
- (c) perform its role as lender of last resort.
- (d) precisely control the monetary base.

26. The nominal exchange rate is the

- (a) nominal interest rate in one country divided by the nominal interest rate in the other country.
- (b) price of a good in one country divided by the price of the same good in another.
- (c) rate at which a person can trade the currency of one country for the currency of another.
- (d) the number of goods a person can trade for a similar good in another country.

27. If the direct nominal exchange rate, S , is domestic dollar per foreign currency, the domestic price is P , and the foreign price is p^* , the direct real exchange rate is defined as

- (a) $(SP^*)/P$.
- (b) $(SP)/P^*$.
- (c) $P^*/(SP)$.
- (d) $P/(SP^*)$.

28. If purchasing-power parity holds, then the value of the

- (a) real exchange rate is equal to one.

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(b) nominal exchange rate is equal to one.
 (c) real exchange rate is equal to the nominal exchange rate.
 (d) real exchange rate is equal to the difference in inflation rates between the two countries.

29. Which of the following statements is incorrect for an open economy?

(a) A country can have a trade deficit, trade surplus, or balanced trade.
 (b) A country that has a trade deficit has positive net capital outflow.
 (c) Net exports must equal net capital outflow.
 (d) National saving must equal domestic investment plus net capital outflow.

30. The People's Republic of China has had a large trade surplus in recent years. Which of the following is the most likely explanation of this surplus?

(a) China has a high rate of inflation, which reduces the value of its currency.
 (b) China has a large supply of labor, so low wages give it a competitive edge.
 (c) China has many trade barriers, which restrict the ability of other countries to sell their products in China.
 (d) China has a large amount of saving relative to domestic investment.

Numerical/algebraic problems and short-essay questions

Please answer the following questions IN SEQUENCE. All questions may be answered in EITHER Chinese OR English.

1. Suppose the market for wine can be described by the following equations:

$$\text{Demand : } P = 60 - Q, \quad \text{Supply : } P = 2Q - 30,$$

where P is the price in dollars per bottle and Q is the quantity in millions of bottles.

(a) (4 points) What is the equilibrium price and quantity? Now suppose the government imposes a tax of \$3 per bottle to reduce wine consumption and raise government revenues. What will the new equilibrium quantity of wine be?

(b) (4 points) Calculate the effects of the tax on consumer surplus, producer surplus and social welfare.

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2. (8 points) Customers attending baseball games at the local arena must pay for parking on the grounds and then pay for a ticket needed to enter the arena. If the arena manager knows that the customers' identical demands can be expressed collectively as $P = 25 - 0.000625Q$. How much of a parking fee could the management collect if the marginal cost of providing entertainment were a constant $MC = \$10$ per seat?

3. Consider a market where two firms produce a homogeneous good. The inverse market demand is given by $p = 24 - q_1 - q_2$ where q_1 and q_2 denote the quantities produced by firm 1 and 2, respectively. While there are no production costs incurred by firm 1, the cost function of firm 2 is given by

$$C_2(q_2) = \begin{cases} 0 & \text{if } q_2 = 0 \\ 49 & \text{if } q_2 > 0. \end{cases}$$

Suppose that the firms set quantities simultaneously.

- (a) (4 points) Draw the best response curves.
- (b) (4 points) Find all pure strategy Nash equilibria.

4. During the recent financial turmoil, the U.S. M1 money multiplier kept slipping and it even dropped below 1 in the early 2009.

(a) (2 points) What are the likely causes of this historically low level of the money multiplier?

(b) (3 points) How would such a low money multiplier affect the effectiveness of the monetary policy applied by the Federal Reserve Bank?

(c) (3 points) Suppose you work for Paul Volcker, the Chair of the U.S. President's Economic Recovery Advisory Board, in the capacity of an economic advisor. Please use the AD-AS model and other models, if necessary, to explain how you would suggest the government to fight the recession.

5. Recently as a result of the Federal Reserve's actions to save the financial institutions and markets, the monetary base of United States has been exploding. However, the increase in the broader monetary aggregate such as M2 is much more moderate.

(a) (2 points) Please suggest reasons explaining the M2's moderate growth despite the dramatic increase in monetary base.

(b) (2 points) Suppose you are a bank with \$100,000 in vault cash. When the central bank conducts open market operation to sell government bonds, you decide to use the \$100,000 to purchase these bonds to earn interest. How would your action affect the monetary base?

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(c) (2 points) Or, you simply decide to put the \$100,000 in the reserve account of your bank at the central bank. How would this action affect the monetary base?

(d) (2 points) Please comment on the following statement: "When reserves pay interest (as the Fed now does), the monetary base becomes an uninteresting economic statistic."

6. (a) (4 points) "Faster population growth might increase a country's GDP, but it makes everyone poorer." Is the above statement true, false, or uncertain, and why?

(b) (5 points) Can capital accumulation itself sustain growth in GDP per capita in the long term? Why or why not?



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1. (25 points) Of the travelers arriving at a small airport, 60% fly on major airlines, 30% fly on privately owned planes, and the remainder fly on commercially owned planes not belonging to a major airline. Of those traveling on major airlines, 50% are traveling for business reasons, whereas 60% of those arriving on private planes and 90% of those arriving on other commercially owned planes are traveling for business reasons. Suppose that we randomly select one person arriving at this airport.

- (1) (7 points) What is the probability that the person is traveling on business?
- (2) (6 points) What is the probability that the person is traveling for business on a privately owned plane?
- (3) (6 points) If the person is traveling for business reasons, what is the probability that he arrives on a privately owned plane?
- (4) (6 points) If this person is flying on a commercially owned plane, what is the probability that he travels for the non-business purpose?

2. (20 points) To reach maximum efficiency in performing an assembly operation in a manufacturing plant, new employees require approximately a 1-month training period. Nine employees each were trained for a period of 3 weeks following the standard training procedure. The length of time (in minutes) required for each employee to assemble the device was recorded at the end of the 3-week period. The resulting measurements are as follows.

Measurements from Nine Employees	
Time (minutes)	32, 37, 35, 28, 41, 44, 35, 31, 34

- (1) (6 points) Calculate the sample mean and sample variance.
- (2) (7 points) Construct a 95% confidence interval for the true mean. Assume that the assembly times are approximately normally distributed and the samples are independent.
- (3) (7 points) Estimate σ^2 with confidence coefficient 0.9.

3. (10 points) The reaction of an individual to a stimulus in a psychological experiment may take one of two forms, A or B. If an experimenter wishes to estimate p which represents the chance that a person will react in manner A. How many people must be included in the experiment? Assume that the experimenter will be satisfied if the error of estimation is less than 0.04 with probability equal to 0.9. Also, assume p equals 0.6.

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4. (15 points) A marketing researcher believes that the fraction p_1 of girls strongly in favor of 3C products is greater than the fractions p_2 of boys strongly in favor of 3C products. He acquired independent random samples of 200 girls and 200 boys and found 46 girls and 34 boys strongly favoring 3C products. Does this evident provide statistical support for his belief? Use $\alpha = 0.05$. (the probability of type I error) [Hint: pool the sample to estimate p_1 and p_2]

5. (10 points) The service times for customers coming through a checkout counter in a retail store are independent random variables with mean 1.5 minutes and variance 1.0. Approximate the probability that 100 customers can be served in less than 2 hours of total service time. Also, interpret the meaning of your answer.

6. (20 points) A study was conducted to determine the effects of sleep deprivation on people's ability to solve simple questions. The amount of sleep deprivation varied over 8, 12, 16, 18, 20, and 24 hours without sleep. A total of 10 persons participated in the study, two at each sleep-deprivation level. After his or her specified sleep-deprivation period, each person was administered a set of simple addition problems and the number of errors recorded. The results shown in the following table were obtained.

Number of Errors (y)	8, 6	6, 10	8, 14	14, 12	16, 12
Number of Hours without Sleep (x)	8	12	16	20	24

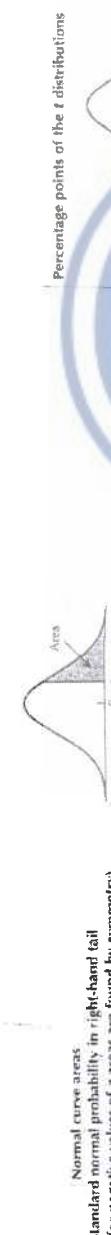
- (1) (10 points) Find the Least Squares Estimators $\hat{\beta}_0$ and $\hat{\beta}_1$, from which the Least Square Line can be written as $\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x$. (\hat{y} is the estimated number of errors)
- (2) (7 points) Is the estimator $\hat{\beta}_1$ unbiased? Justify it. (only answering Yes or No will not give any point)
- (3) (3 points) Plot the points and graph the least squares line as a check on your calculation.

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Percentage points of the χ^2 distributions

d.f.	$\chi^2_{0.995}$	$\chi^2_{0.990}$	$\chi^2_{0.975}$	$\chi^2_{0.950}$	$\chi^2_{0.900}$	$\chi^2_{0.100}$	$\chi^2_{0.050}$	$\chi^2_{0.025}$	$\chi^2_{0.010}$	$\chi^2_{0.005}$	d.f.
1	0.0000393	0.0001571	0.0009921	0.0039321	0.0157908	2.70554	3.84146	5.02289	6.63490	7.87944	1
2	0.0100251	0.0201007	0.0506356	0.102587	0.210720	4.60517	5.99147	7.37776	9.21034	10.5966	2
3	0.0717212	0.114832	0.245795	0.351846	0.584375	6.25139	7.81473	9.34840	11.3449	12.8381	3
4	0.206990	0.297110	0.484419	0.710721	1.063623	7.77944	9.48773	11.1433	13.2767	14.8602	4
5	0.411740	0.554300	0.831211	1.145476	1.61031	9.23635	11.0705	12.8325	15.0863	16.7496	5
6	0.675727	0.872085	1.237347	1.63539	2.20413	10.6446	12.5916	14.494	16.8119	18.5476	6
7	0.989265	1.239043	1.68987	2.16735	2.83311	12.0170	14.0671	16.0128	18.4753	20.2777	7
8	1.344419	1.646482	2.17973	2.73264	3.48954	13.3616	15.5073	17.5346	20.0902	21.9550	8
9	1.734926	2.087912	2.70039	3.32511	4.16816	14.6837	16.9190	19.0228	21.6660	23.5893	9
10	2.15585	2.55821	3.24697	3.94010	4.86518	15.9871	18.3070	20.4831	23.2093	25.1882	10
11	2.60321	3.05347	3.81575	4.57481	5.57779	17.2750	19.6751	21.0261	24.7250	26.7569	11
12	3.07382	3.57056	4.40379	5.22603	6.30380	18.5494	20.3367	23.3367	26.2170	28.2995	12
13	3.56503	4.10691	5.00874	5.89186	7.04150	19.8119	22.3621	24.7356	27.6883	29.8194	13
14	4.07468	4.66043	5.62872	6.57063	7.78953	21.0642	23.6848	26.1190	29.1413	31.3193	14
15	4.60094	5.22935	6.26214	7.26094	8.54675	22.3072	24.9958	27.4884	30.5779	32.8013	15
16	5.14224	5.81221	6.90766	7.96164	9.31223	23.5418	26.2962	28.8454	31.9999	34.2672	16
17	5.69724	6.40776	7.56418	8.67176	10.0852	24.7690	27.5871	30.1910	33.4087	35.7185	17
18	6.26481	7.01491	8.23075	9.39046	10.8649	25.9894	28.8693	31.5264	34.8053	37.1564	18
19	6.84398	7.63273	8.90655	10.1170	11.6509	27.2036	30.1435	32.8523	36.1908	38.5822	19
20	7.43386	8.26040	9.59083	10.8508	12.4426	28.4120	31.4104	34.1696	37.5662	39.9968	20
21	8.03366	8.89720	10.28293	11.5913	13.2396	29.6151	32.6705	35.4789	38.9321	41.4010	21
22	8.54249	8.64272	10.9823	12.3380	14.0415	30.8133	33.5244	36.7807	40.2894	42.7956	22
23	9.26042	10.19567	11.6885	13.0905	14.8479	32.0069	35.1725	38.0757	41.6384	44.1813	23
24	9.88623	10.8364	12.4011	13.8484	15.6587	33.1963	36.4151	39.3641	42.9798	45.5955	24
25	10.5197	11.5240	13.1197	14.6114	16.4734	34.3816	37.6525	40.6465	44.3141	46.9278	25
26	11.1603	12.1981	13.8439	15.3791	17.2919	35.5561	38.8852	41.9232	45.6417	48.2899	26
27	11.8076	12.8786	14.5733	16.1513	18.1136	36.7412	40.1133	43.1944	46.9630	49.6449	27
28	12.4613	13.5648	15.3079	16.9279	18.3397	37.9159	41.3372	44.6607	48.2782	50.9933	28
29	13.1211	14.2565	16.0471	17.7083	19.7677	39.0875	42.5569	45.7222	49.5879	52.3356	29

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z	Second decimal place of z										$t_{0.05}$	$t_{0.025}$	$t_{0.01}$	$t_{0.005}$	$t_{0.001}$	$t_{0.0005}$	
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09							
0.0	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	.4601	1.3078	1.314	1.314	1.314	1.314	1.314	1.314
0.1	.4602	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	.4208	1.886	1.920	1.920	1.920	1.920	1.920	1.920
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859	1.638	1.638	1.638	1.638	1.638	1.638	1.638
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483	1.533	1.533	1.533	1.533	1.533	1.533	1.533
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121	1.440	1.440	1.440	1.440	1.440	1.440	1.440
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776	1.416	1.416	1.416	1.416	1.416	1.416	1.416
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451	1.405	1.405	1.405	1.405	1.405	1.405	1.405
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148	1.395	1.395	1.395	1.395	1.395	1.395	1.395
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1862	1.387	1.387	1.387	1.387	1.387	1.387	1.387
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611	1.383	1.383	1.383	1.383	1.383	1.383	1.383
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379	1.372	1.372	1.372	1.372	1.372	1.372	1.372
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170	1.336	1.336	1.336	1.336	1.336	1.336	1.336
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.985	1.356	1.356	1.356	1.356	1.356	1.356	1.356
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823	1.350	1.350	1.350	1.350	1.350	1.350	1.350
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0722	.0708	.0694	.0681	1.345	1.345	1.345	1.345	1.345	1.345	1.345
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559	1.341	1.341	1.341	1.341	1.341	1.341	1.341
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455	1.337	1.337	1.337	1.337	1.337	1.337	1.337
1.7	.0446	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367	.0359	1.333	1.333	1.333	1.333	1.333	1.333	1.333
1.8	.0359	.0352	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294	1.330	1.330	1.330	1.330	1.330	1.330	1.330
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233	1.328	1.328	1.328	1.328	1.328	1.328	1.328
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183	1.325	1.325	1.325	1.325	1.325	1.325	1.325
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143	1.323	1.323	1.323	1.323	1.323	1.323	1.323
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110	1.321	1.321	1.321	1.321	1.321	1.321	1.321
2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084	1.319	1.319	1.319	1.319	1.319	1.319	1.319
2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064	1.318	1.318	1.318	1.318	1.318	1.318	1.318
2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048	1.316	1.316	1.316	1.316	1.316	1.316	1.316
2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036	1.315	1.315	1.315	1.315	1.315	1.315	1.315
2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026	1.314	1.314	1.314	1.314	1.314	1.314	1.314
2.8	.0026	.0025	.0024	.0023	.0022	.0021	.0021	.0021	.0020	.0019	1.313	1.313	1.313	1.313	1.313	1.313	1.313
2.9	.0019	.0018	.0017	.0017	.0016	.0016	.0015	.0015	.0014	.0014	1.311	1.311	1.311	1.311	1.311	1.311	1.311
3.0	.00135										1.282	1.282	1.282	1.282	1.282	1.282	1.282
3.5	.00033																
4.0	.000317																
4.5	.000340																
5.0	.000387																

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管理學問答題，共四大題，每大題 25 分，共 100 分。

- A 公司為某工程材料製造商，近五年來因各國對於各項建設工程之需求快速遞增，使得 A 公司成長快速，員工數從三年前的 80 人到現在的 220 人，三年前所服務的國外客戶僅在亞洲地區共五個國家，現在已經遍及歐洲、美洲及澳洲等三十個國家。由於不斷開發新產品及新客戶，使得公司各部門的工作更為多元及複雜。早期公司的組織結構設計沿用到今日已造成許多分工協調等問題，例如除了公司的新產品開發部門之外，國外業務部為了快速回應國外客戶需求，於是在部門內另組成研發技術小組，製造部門也有所屬的研發小組，組織結構調整已經是刻不容緩，如果你是 A 公司的總經理，請問公司進行組織結構調整應考慮到哪些因素？(25 分)
- A 公司規模龐大，由於總經理主張公司應有一套正式的策略規劃制度，才能使公司永續經營，因此公司設有一個正式的「策略規劃」部門，聘用一群策略規劃人員負責提出各項計劃，且必須依循一套策略管理程序按步就班地制定公司的策略，請問總經理對於「正式策略規劃」的主張及作法有哪些優缺點？(25 分)
- 張先生是某大藥廠業務代表。其工作是拜訪各種醫生，向他們推銷該藥廠的產品。張先生今年二十八歲，已婚，有一子，已在該公司工作四年。張先生畢業於某校企管系。
 - 請應用 Herzberg 的雙因子理論 (Herzberg's Motivation-Hygiene Theory) 分析張先生的可能需求，並提供可能的激勵方案以提昇組織生產力，請說明其理由。(15 分)
 - 請比較雙因子理論與傳統馬斯洛 (Maslow) 需求理論觀點之差異。(10 分)
- 試論述何謂競爭優勢？企業競爭優勢的來源有哪些？(25 分)

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Multiple Choice (1.7 points each) 本科目之選擇題請在答案卡上作答

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

Mark each answer clearly with a No. 2 pencil on the Scantron form.

1. Which of the following would shift the demand curve for new textbooks to the right?
 - (a) A fall in the price of paper used in publishing texts
 - (b) A fall in the price of equivalent used textbooks
 - (c) An increase in the number of students attending college
 - (d) A fall in the price of new textbooks
2. Which of the following will NOT cause a shift in the supply of gasoline?
 - (a) An increase in the wage rate of refinery workers
 - (b) A decrease in the price of gasoline
 - (c) An improvement in oil refining technology
 - (d) A decrease in the price of crude oil
3. We observe that both the price of and quantity sold of golf balls are rising over time. This is due to
 - (a) continual improvements in the technology used to produce golf balls.
 - (b) increases in the price of golf clubs over time.
 - (c) decreases in membership fees for country clubs with golf facilities.
 - (d) more stringent professional requirements on the quality of golf balls requiring producers to use more expensive raw materials.
4. Mikey is very picky and insists that his mom make his breakfast with equal parts of cereal and apple juice – any other combination will end up on the floor. Cereal costs 4 cents per tablespoon and apple juice costs 6 cents per tablespoon. If Mikey's mom budgets \$8 per month for Mikey's breakfast, how much cereal and juice does she buy?
 - (a) 40 tablespoons each of cereal and juice
 - (b) 80 tablespoons each of cereal and juice
 - (c) 40 tablespoons of cereal and 75 tablespoons of juice
 - (d) 100 tablespoons of cereal and 67 tablespoons of juice
5. Any risk-averse individual would always
 - (a) take a 10% chance at \$100 rather than a sure \$10.

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(b) take a 50% chance at \$4 and a 50% chance at \$1 rather than a sure \$1.
 (c) take a sure \$10 rather than a 10% chance at \$100.
 (d) take a sure \$1 rather than a 50% chance at \$4 and a 50% chance at losing \$1.

6. A farmer uses K units of machinery and L hours of labor to produce Q tons of corn, with the following production function $Q = L^{0.5} + K^{0.75}$. This production function exhibits
 (a) decreasing returns to scale for all output levels.
 (b) constant returns to scale for all output levels.
 (c) increasing returns to scale for all output levels.
 (d) no clear pattern of returns to scale.

7. If a competitive firm's marginal costs always increases with output, then at the profit maximizing output level, producer surplus is
 (a) zero because marginal costs equal marginal revenue.
 (b) zero because price equals marginal costs.
 (c) positive because price exceeds average variable costs.
 (d) positive because price exceeds average total costs.

8. At the current level of output, long-run marginal cost is \$50 and long-run average cost is \$75. This implies that
 (a) there are neither economies nor diseconomies of scale.
 (b) there are economies of scale.
 (c) there are diseconomies of scale.
 (d) the cost-output elasticity is greater than one.

9. How are a firm's short-run and long-run average cost curves related?
 (a) SRAC is greater than LRAC, which forces the LRAC curve to be upward sloping.
 (b) SRAC and LRAC slope up or down together, but SRAC is always the steeper of the two curves.
 (c) The SRAC curve is tangent to and lies above the LRAC curve.
 (d) The LRAC curve just touches the SRAC curve at its minimum point.

10. A firm is currently producing 200 units of output using 60 hours of labor and 80 hours of capital. The marginal product of labor is 12 units of output per hour, and the marginal product of capital is 15 units of output per hour. If the wage rate is \$6 per hour and the rental rate is \$3 per hour, then
 (a) the firm's use of labor and capital is cost-efficient.

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(b) the firm should use more labor and less capital.
 (c) the firm should use more capital and less labor.
 (d) we cannot determine if the firm's use of inputs is efficient without more information.

11. There are three firms in Green Valley. Initially, each firm emits 4 units of pollution. The following table shows the total costs for each of three firms (A, B, and C) to eliminate units of pollution from their production processes. For example, for Firm A to eliminate one unit of pollution, it would cost \$1, and for Firm A to eliminate two units of pollution, it would cost a total of \$3.

Unit to be eliminated	Firms		
	A	B	C
One unit	1	4	4
Two units	3	8	9
Three units	6	12	15
Four units	10	16	22

Suppose the government wants to reduce pollution to 9 units, so it gives each firm 3 tradable pollution permits. Which of the following statement is true?

(a) Firm A will buy permit(s) from firms B and C.
 (b) Firms A and B will buy permit(s) from firm C.
 (c) Firm B will buy permit(s) from firms A and C.
 (d) Firms B and C will buy permit(s) from firm A.

12. Consider a monopolist facing two consumers whose preferences for its product are given by the following demand curves: $P_1 = 20 - Q_1$ and $P_2 = 12 - 2Q_2$. The monopolist's fixed cost is equal to 0 and marginal cost is equal to 4. Suppose the monopolist can not tell the consumers apart. What is the maximum profit if the monopolist uses a two-part tariff pricing scheme?

(a) 32
 (b) 64
 (c) 128
 (d) 144

13. A monopolistically competitive firm is currently producing 10 units of output. At this level of output the firm is charging a price equal to \$10, has marginal revenue equal to \$6,

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has marginal cost equal to \$6, and has average total cost equal to \$12. From this information we can infer that

- (a) the firm can increase its profit by producing less.
- (b) the profits of the firm are negative.
- (c) firms are likely to enter this market in the long run.
- (d) the firm's fixed cost must be greater than 20.

14. It is commonly argued that national defense is a public good. Nevertheless, many weapons used by the R.O.C. military are produced by U.S. private firms. We can conclude that

- (a) resources would be used more efficiently if the U.S. firms produced the weapons.
- (b) resources would be used more efficiently if private firms provided national defense.
- (c) weapons are rival in consumption and excludable.
- (d) national defense is rival in **consumption** and excludable.

15. Some economists argue that a resale price maintenance agreement is not anti-competitive because

- (a) suppliers are never able to exercise noncompetitive market power.
- (b) if a supplier has market power, it can exert that power through the wholesale price rather than the retail price.
- (c) retail markets are inherently noncompetitive.
- (d) resale price maintenance prevents the retailers from competing on price.

16. A monetary expansion combined with an increase in government spending will cause

- (a) an increase in output with ambiguous effects on the interest rate.
- (b) a reduction in output with ambiguous effects on the interest rate.
- (c) an increase in the interest rate with ambiguous effects on output.
- (d) a reduction in the interest rate with ambiguous effects on output.

17. Which of the following event is most likely to occur when the interest rate increases?

- (a) the money demand curve shifts to the right
- (b) the money demand curve shifts to the left
- (c) the price of bonds will fall
- (d) the price of bonds will rise

18. The recent recession may increase the marginal propensity to save, which tends to cause

- (a) an increase in the multiplier and a given change in government expenditures to have a smaller effect on equilibrium output.

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(b) a reduction in the multiplier and a given change in government expenditures to have a smaller effect on equilibrium output.

(c) an increase in the multiplier and a given change in government expenditures to have a greater effect on equilibrium output.

(d) a reduction in the multiplier and a given change in government expenditures to have a greater effect on equilibrium output.

19. According to the theory of liquidity preference, which variable adjusts to balance the supply and demand for money?

- (a) interest rate
- (b) monetary base
- (c) quantity of output
- (d) price level

20. Which of the following events will trigger a rightward shift of the aggregate demand curve?

- (a) an increase in the price level
- (b) an increase in tax
- (c) an increase in money supply
- (d) an increase in the nominal wage

21. Without an accommodating monetary policy, a push by workers to get higher wages will cause

- (a) hyperinflation.
- (b) higher unemployment.
- (c) cost-push inflation.
- (d) demand-pull inflation.

22. If the government issues debt to the public to finance its spending, the monetary base will _____ and the money supply will _____.

- (a) decrease; increase
- (b) increase; increase
- (c) increase; decrease
- (d) not change; not change

23. If the expected path of one-year interest rates over the next five years is 5 percent, 6 percent, 8 percent, 9 percent, and 7 percent, then according to the expectations theory

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today's interest rate on the five-year bond should be

- (a) 4 percent.
- (b) 5 percent.
- (c) 6 percent.
- (d) 7 percent.

24. If a bank has \$80,000 of checkable deposits, a required reserve ratio of 20 percent on these deposits, and it holds \$40,000 in reserves, then the maximum deposit outflow it can sustain without altering its balance sheet is

- (a) \$20,000.
- (b) \$30,000.
- (c) \$40,000.
- (d) \$25,000.

25. The most important advantage of discount policy is that the central bank can use it to

- (a) control the money supply.
- (b) punish banks that have deficient reserves.
- (c) perform its role as lender of last resort.
- (d) precisely control the monetary base.

26. The nominal exchange rate is the

- (a) nominal interest rate in one country divided by the nominal interest rate in the other country.
- (b) price of a good in one country divided by the price of the same good in another.
- (c) rate at which a person can trade the currency of one country for the currency of another.
- (d) the number of goods a person can trade for a similar good in another country.

27. If the direct nominal exchange rate, S , is domestic dollar per foreign currency, the domestic price is P , and the foreign price is p^* , the direct real exchange rate is defined as

- (a) $(SP^*)/P$.
- (b) $(SP)/P^*$.
- (c) $P^*/(SP)$.
- (d) $P/(SP^*)$.

28. If purchasing-power parity holds, then the value of the

- (a) real exchange rate is equal to one.

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(b) nominal exchange rate is equal to one.
 (c) real exchange rate is equal to the nominal exchange rate.
 (d) real exchange rate is equal to the difference in inflation rates between the two countries.

29. Which of the following statements is incorrect for an open economy?

(a) A country can have a trade deficit, trade surplus, or balanced trade.
 (b) A country that has a trade deficit has positive net capital outflow.
 (c) Net exports must equal net capital outflow.
 (d) National saving must equal domestic investment plus net capital outflow.

30. The People's Republic of China has had a large trade surplus in recent years. Which of the following is the most likely explanation of this surplus?

(a) China has a high rate of inflation, which reduces the value of its currency.
 (b) China has a large supply of labor, so low wages give it a competitive edge.
 (c) China has many trade barriers, which restrict the ability of other countries to sell their products in China.
 (d) China has a large amount of saving relative to domestic investment.

Numerical/algebraic problems and short-essay questions

Please answer the following questions IN SEQUENCE. All questions may be answered in EITHER Chinese OR English.

1. Suppose the market for wine can be described by the following equations:

$$\text{Demand : } P = 60 - Q, \quad \text{Supply : } P = 2Q - 30,$$

where P is the price in dollars per bottle and Q is the quantity in millions of bottles.

(a) (4 points) What is the equilibrium price and quantity? Now suppose the government imposes a tax of \$3 per bottle to reduce wine consumption and raise government revenues. What will the new equilibrium quantity of wine be?

(b) (4 points) Calculate the effects of the tax on consumer surplus, producer surplus and social welfare.

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2. (8 points) Customers attending baseball games at the local arena must pay for parking on the grounds and then pay for a ticket needed to enter the arena. If the arena manager knows that the customers' identical demands can be expressed collectively as $P = 25 - 0.000625Q$. How much of a parking fee could the management collect if the marginal cost of providing entertainment were a constant $MC = \$10$ per seat?

3. Consider a market where two firms produce a homogeneous good. The inverse market demand is given by $p = 24 - q_1 - q_2$ where q_1 and q_2 denote the quantities produced by firm 1 and 2, respectively. While there are no production costs incurred by firm 1, the cost function of firm 2 is given by

$$C_2(q_2) = \begin{cases} 0 & \text{if } q_2 = 0 \\ 49 & \text{if } q_2 > 0. \end{cases}$$

Suppose that the firms set quantities simultaneously.

- (a) (4 points) Draw the best response curves.
- (b) (4 points) Find all pure strategy Nash equilibria.

4. During the recent financial turmoil, the U.S. M1 money multiplier kept slipping and it even dropped below 1 in the early 2009.

(a) (2 points) What are the likely causes of this historically low level of the money multiplier?

(b) (3 points) How would such a low money multiplier affect the effectiveness of the monetary policy applied by the Federal Reserve Bank?

(c) (3 points) Suppose you work for Paul Volcker, the Chair of the U.S. President's Economic Recovery Advisory Board, in the capacity of an economic advisor. Please use the AD-AS model and other models, if necessary, to explain how you would suggest the government to fight the recession.

5. Recently as a result of the Federal Reserve's actions to save the financial institutions and markets, the monetary base of United States has been exploding. However, the increase in the broader monetary aggregate such as M2 is much more moderate.

(a) (2 points) Please suggest reasons explaining the M2's moderate growth despite the dramatic increase in monetary base.

(b) (2 points) Suppose you are a bank with \$100,000 in vault cash. When the central bank conducts open market operation to sell government bonds, you decide to use the \$100,000 to purchase these bonds to earn interest. How would your action affect the monetary base?

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(c) (2 points) Or, you simply decide to put the \$100,000 in the reserve account of your bank at the central bank. How would this action affect the monetary base?

(d) (2 points) Please comment on the following statement: "When reserves pay interest (as the Fed now does), the monetary base becomes an uninteresting economic statistic."

6. (a) (4 points) "Faster population growth might increase a country's GDP, but it makes everyone poorer." Is the above statement true, false, or uncertain, and why?

(b) (5 points) Can capital accumulation itself sustain growth in GDP per capita in the long term? Why or why not?



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1. (10%) Calculate (a) $\lim_{x \rightarrow 0} \frac{x}{e^x - 1}$ (b) $\lim_{x \rightarrow \infty} \frac{\ln x^2}{x}$
2. (10%) Prove the product rule $(f(x)g(x))' = f'(x)g(x) + f(x)g'(x)$ by the definition of differentiation.
3. (10%) Sketch the graph of the function $f(x) = \frac{x^2}{x^2 - 4}$. Make a sign diagram for the first derivative, second derivative and sketch the graph showing all relative extreme points and inflection points.
4. (10%) Find the value of 1000 deposited in a bank at 6% interest for 8 years compounded:
 - annually
 - quarterly
 - monthly
 - continuously
5. (10%) A traffic patrol helicopter is stationary 0.3 mile directly above a highway. Its radar detects a car whose line-of-sight distance from the helicopter is half a mile and increasing at the rate of 54 mph. Is the car exceeding the highway's speed limit of 60 mph.
6. (10%) A moving company wishes to design an open-top box with a square base whose volume is exactly 32 cubic feet. Find the dimensions of the box requiring the least amount of materials.
7. (10%) Use the Riemann Sum to calculate $\int_{-1}^1 x^2 dx$. $(1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6})$
8. (10%) Evaluate the given integral (a) $\int \ln x dx$ (b) $\int_{-1}^4 \frac{x}{\sqrt{x+5}} dx$
9. (20%) To determine how much of a drug is absorbed into the body, researchers measure the difference between the dosage D and the amount excreted from the body. The total amount excreted is found by integrating the excretion rate $r(t)$ from 0 to ∞ . If the initial dose is $D=200$ milligrams (mg), and the excretion rate is $r(t)=40e^{-0.5t}$ mg per hour. Find the amount of the drug absorbed by the body.

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考試科目	管理學	所別	企管系 4151 甲組 4152 乙組	考試時間	3月7日(日)第三節
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管理學問答題，共四大題，每大題 25 分，共 100 分。

- A 公司為某工程材料製造商，近五年來因各國對於各項建設工程之需求快速遞增，使得 A 公司成長快速，員工數從三年前的 80 人到現在的 220 人，三年前所服務的國外客戶僅在亞洲地區共五個國家，現在已經遍及歐洲、美洲及澳洲等三十個國家。由於不斷開發新產品及新客戶，使得公司各部門的工作更為多元及複雜。早期公司的組織結構設計沿用到今日已造成許多分工協調等問題，例如除了公司的新產品開發部門之外，國外業務部為了快速回應國外客戶需求，於是在部門內另組成研發技術小組，製造部門也有所屬的研發小組，組織結構調整已經是刻不容緩，如果你是 A 公司的總經理，請問公司進行組織結構調整應考慮到哪些因素？(25 分)
- A 公司規模龐大，由於總經理主張公司應有一套正式的策略規劃制度，才能使公司永續經營，因此公司設有一個正式的「策略規劃」部門，聘用一群策略規劃人員負責提出各項計劃，且必須依循一套策略管理程序按步就班地制定公司的策略，請問總經理對於「正式策略規劃」的主張及作法有哪些優缺點？(25 分)
- 張先生是某大藥廠業務代表。其工作是拜訪各種醫生，向他們推銷該藥廠的產品。張先生今年二十八歲，已婚，有一子，已在該公司工作四年。張先生畢業於某校企管系。
 - 請應用 Herzberg 的雙因子理論 (Herzberg's Motivation-Hygiene Theory) 分析張先生的可能需求，並提供可能的激勵方案以提昇組織生產力，請說明其理由。(15 分)
 - 請比較雙因子理論與傳統馬斯洛 (Maslow) 需求理論觀點之差異。(10 分)
- 試論述何謂競爭優勢？企業競爭優勢的來源有哪些？(25 分)

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The Road to Brand

If you really want to capture the value of innovation, you must have a brand identity.

—Peter Chou²³

In 2006, HTC found itself at a critical juncture. Other Taiwanese competitors were rapidly catching up in the ODM market. "We had greater bargaining power than the typical ODM," recalled HM Cheng, the CFO. "HTC would name the price and they [customers] would take it."²⁴ Then Palm and HP, two of HTC's biggest non-operator customers, actively started to search for different partners who could manufacture their products for less.

Market forces were not the only winds driving changes at the company. HT Cho had retired as chairperson, passing the torch to Peter Chou. Cher Wang remained as chairperson but shifted her focus to the board. Chou was an ambitious, energetic general manager who had been groomed to become the next CEO by Cho and Wang. They even sent him to Harvard Business School for the Advanced Management Program in 2006. Chou was obsessed with electronic gadgets, claiming that, "[I] could go on an entire week without sleep toying with these gadgets."²⁵ Nicknamed "Mr. Perfect," Chou was zealous when it came to details—engineers would enter his office with trepidation, knowing that their boss could pick out the most minute design defect in a second.

Chou's relentless passion for innovation drove him to incubate a Silicon Valley-like culture within HTC. During his years as an engineer for DEC, Chou spent a significant time at Silicon Valley, which he came to embrace for its vibrant energy and culture of constantly experimenting with new ideas and technology. Chou encouraged his engineers to question and to collaborate with each other in an open work environment, breaking away from a more bureaucratic, hierarchical research structure. As one close observer noted, "For Asian manufacturers, that is just completely foreign."²⁶

The CEO also took pride in running a quick, nimble organization. Andy Rubin, the executive who ran Android at Google, recalled praising a new HTC phone design but complaining that it needed a better physical keyboard because he couldn't distinguish a break between the different keys, making it difficult to type. Five days later, Chou handed Rubin a modified model that had altered the keyboard with a new backlight and grooves between the keys. "I just couldn't believe it," said Rubin. "The speed at which he can move, I've never experienced it at anywhere else."

Chou ushered in several changes to the company. First, he laid out a bold plan that could take HTC to a different level—branding and selling handsets under the company's own name. Chou believed that "Without some sort of brand, our business, international growth... will be limited." Cher Wang agreed. HTC had gained a critical mass by being a "white label" for other companies. Now, she believed that HTC should differentiate itself from competitors and gain greater control over the company's future.

Yet creating a brand bore significant risks. Own brand sales meant that HTC would now directly take on inventory, marketing and support, as well as warranty risks. In fact, there was a vigorous internal debate over the brand strategy. CMO John Wang claimed that the company was not ready: "In essence, \$1 billion in market cap was going to be wiped out." Other executives worried that operators could view HTC as a competitor, creating a conflict of interest between HTC's own brand sales and customized phones for the operators. Marketing was a major concern as HTC lacked the scale and budget to launch an aggressive worldwide publicity blitz like the ones Samsung and LG had pursued to gain greater brand recognition. Indeed, HTC's share price halved as investors expressed their anxiety with HTC's new business model. Chou received harsh comments from shareholders who complained that, "You are out of your mind."²⁷

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Several Taiwanese ODMs had tried to build their own brands with little success. Competitor BenQ, for example, was a successful ODM for companies like Motorola. Then in 2005, BenQ acquired Siemens' poorly performing cell phone business. Siemens even paid BenQ more than \$300 million to take over the money-losing unit. The purchase was motivated by BenQ's belief that it could fast track its global brand building effort by buying the more well-known German player in the industry. However, BenQ failed to revive the Siemens unit, racked up more than \$700 million in losses, and the unit filed for bankruptcy a year later. BenQ subsequently spun off its own branded business to refocus on contract manufacturing.

Acer, another Taiwanese company that built a diversified electronics business, tried a multi-business approach by doing both ODM and own brand sales at the same time. However, as Acer's own brand sales grew, it also started to lose ODM orders. Acer finally spun off its contract manufacturing business into a new company, Winstron, in 2001.

Yet Chou and Wang were determined to push forward. At one point, they considered a multi-billion dollar merger with a competitor, which would have given HTC its own software platform and a more powerful brand name. However, HTC ended up deciding against it, citing concerns over the price tag and readiness to handle a merger with a bigger, more international company. But by going alone, HTC faced stiff competition from the world's biggest handset manufacturers.

HTC's Own Brand Operations

Chou officially started the brand strategy in 2007 with HTC branded phones available for sale in Europe and Asia. Through the \$15 million acquisition of Dopod, a well established brand name in Taiwan with a strong presence in Asia, HTC also started selling branded products in China. The closed nature of the U.S. market posed more challenges for HTC. Its success in the U.S. would depend on the operators' willingness to subsidize its products and offer co-marketing support.

While Apple largely targeted sophisticated consumers, RIM historically targeted larger enterprises, and Nokia targeted all segments (including the mass market), HTC focused on the high end of the 'prosumer' market (the overlap of professionals and consumers) where individuals – not businesses – bought the products. The target was to "Build a reputation of making the BMW of phones, slightly more expensive but still affordable... the 'better' product," according CMO Wang. He also noted that there was greater pressure with the new brand strategy to develop high-quality innovative products with attractive designs and functions that would catch the operators' attention.

Own brand sales altered the structure of HTC's financial model as well. Warranty coverage expenses rose to 4% of revenue. Average product life cycles were kept to around three quarters compared to other competitors who tended to run on a six quarter cycle for their phones. Shorter product cycles reflected HTC's initial desire to experiment with more handset models to gauge consumers' preferences and market reactions. Sales and marketing spending tripled to represent 6% of total sales in two years. CMO Wang said this reflected a conscious choice by HTC to invest more into R&D to drive product innovation. The same expense for competitors Samsung and RIM reportedly exceeded 12% of their sales.

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Strategic Challenges

The rules of the game is, given the cards that you get, figure out the most optimum way to play this hand that will enhance your chance to win.

—John Wang

The global recession in 2009 presented a variety of adversities for the entire mobile phone industry. Network operators tightened their inventory levels and became more selective in their product offerings, especially in terms of identifying which phones they believed were worthy of providing a substantial subsidy. Handset manufacturers strived to deliver "killer" products that would appeal to consumers' tighter spending strings.

Since HTC had a diverse customer base (no one client held more than 10% of HTC's business) and focused on a high-growth market, Chou remained optimistic that HTC could achieve its sales growth target of 10% for the year. Growth would come from sales of Android-based smartphones and ramped up sales efforts in China and the United States. China had only recently opened up its doors to 3G networks and Chou believed that China offered great potential for smartphones, which only represented 5% of the total Chinese mobile phone market.

Brand Promotion

The outreach for China was part of HTC's overall vision to expand its brand name into the global market. This led HTC's executive team to ponder on how quickly it had to move to achieve this dream. "We already have the products," Cher Wang claimed. "But our competitors are coming ... we have to penetrate fast." At the same time, Chief Operating Officer Fred Liu cautioned that, "We have to go carefully on the brand," indicating his preference to take a slower approach.³⁴ CMO John Wang wanted HTC to first concentrate on building brand value, i.e., more cutting-edge, innovative products such as the Diamond to earn the respect of the end-users. "Think about brand value—Apple equals simplicity, FedEx equals speed, RIM equals mobile e-mail," he claimed. "What does HTC stand for?"

Brand awareness market surveys, indeed, conveyed that the HTC brand still had a long way to go in the U.S. market compared to Europe or Asia (see Exhibits 10a and 10b). A survey revealed that 60% of U.S. consumers had plans to purchase a new mobile phone within the next 12 months, preferably a phone that offered greater functionality beyond basic calling.³⁵ Seven in ten consumers preferred a brand with a proven track record. Although few U.S. mobile phone owners were aware of the HTC brand, the majority of those who did own a HTC handset ranked their satisfaction level with a score of eight out of ten or higher.

Achieving Greater Economies of Scale

The decision whether to take a faster, more aggressive brand promotion approach to heighten brand awareness was closely tied to another issue—finding ways to achieve greater economies of scale. In an HTC-sponsored survey, 80% of U.S. consumers indicated that they wanted to buy a phone that cost less than \$200. HTC's Jason Mackenzie claimed that, "They [Apple] created a price ceiling" for premium products. This put "more pressure on network operators' subsidy budgets, which in turn puts more pressure downstream into every OEM..."³⁶

The \$200 price point was a tall challenge for HTC. Several HTC executives acknowledged that up to now, HTC did not have the necessary scale to drive costs down, an area where Nokia excelled. For instance, HTC had a higher cost structure regarding components and overhead expenses. CFO Cheng

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argued that in order to lower HTC's average sale price (ASP), it had to increase the portion of common components across HTC's entire product portfolio (see Exhibit 11). Increasing the share of common components would deliver significant improvements in terms of their economies of scale. A lower ASP could also help HTC reduce its dependency on operators' subsidy budgets when it came to the final price tag for end-users in markets such as the United States.

Other areas of costs were harder to attack. Since HTC lacked significant intellectual property rights in mobile phones, intellectual property and licensing fees were essentially fixed. Regarding labor costs, the company had opened a second production facility in Shanghai, which allowed HTC to save up to 50% in labor costs. However, production at the Shanghai facility was kept to a fifth of the total 12 million phones the company manufactured in 2008. COO Liu noted that HTC opted to keep the bulk of its manufacturing in Taiwan. Cutting edge mobile phones required multiple iterations between R&D and manufacturing, and significant investments in quality control. As a result, the company saved 15% on its full production cost by moving manufacturing to mainland China. HTC's primary manufacturing facility was located right next door to the company's headquarters. The factory operated around the clock and was closed just three days of the year.

The efforts to control costs simultaneously raised questions on how they would affect HTC's traditional approach of making customized phones for mobile network operators. With the HTC Touch, the company had produced some 400 SKUs for about 70 countries. Even if the changes were minor (e.g., creating a British English version versus American English), each little change added up with the cost of customization ranging from \$5 to \$10 per phone for HTC.

One suggestion was to make phones that would fall towards the mid-range rather than the current high-end offerings. For instance, LG had enjoyed great success with its Vu and Rant phones. They performed many of the basic functions of a smartphone, but were made with components that required less memory or processing speed than a top-of-the-line smartphone. Yet many HTC executives were reluctant to copy LG, concerned that a move towards mid-priced phones could further confuse HTC's brand at a time when HTC's image had yet to be defined. As one CEO from a competitor noted, "The only thing that ultimately wins with the carriers is a highly innovated, differentiated product that is backed by a brand that customers demand, period."³⁷

The Future

As Chou reflected on HTC's position and competitiveness, he was extremely proud. While Chou noted that "we are still a very young company," HTC had delivered extraordinary success in a very short time. He nonetheless wondered if the current model was sustainable in the long term: "We are seeing lots of new entrants into our space, product cycles are getting shorter, and the innovations are breathtaking. New mobile phones are becoming smaller, more functional, more varied with individual tastes and of course, prices will come down in the next three to five years." HTC had also built its business through its close relationship with Microsoft. HTC could proudly claim that it had shipped 30 million Windows Mobile smartphones, equivalent to three out of every four Windows Mobile phone in the market. But in the aftermath of the iPhone revolution, the success of RIM, the emergence of app stores and open-source solutions such as Google's Android, should HTC make further changes? Peter Chou coolly reflected that "Japan was synonymous with Sony, Korea was synonymous with Samsung, and we want Taiwan to be synonymous with HTC. Are we on the path to make that a reality?"

Are they on the path to make that a reality? Based on the understanding, please give your comments on this topic. (100%)

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