Subject： 統計學 (二)		開課班別： 統計學整合開課			Teacher: Han-Ming Wu
Date：21 Mar.（Thur）15:00-16:00		※Allowed:「O」,Prohibited:「×」			1. 需加發計算紙或答案紙請在試題內封袋備註。
Pages: 3,Copies: 65	Calculator	Textbook	Class notes	3C product	2. 為環保節能減碳,試題一律採雙面印刷,如有特殊印製需求,請註記：
Scope: §ch9	O	×	×	×	

Notes:

(1) Fill in the student ID number and name on the answer sheet。

(2) Answer all questions in English (部份寫中文可)。

(3) Answer each question in the order it appears。

(4) It is recommended to use a dark ballpoint pen。(鉛筆可)

(5) The calculation process (for parts **IV** and **V**) is required (calculate to 4 decimal places)。

(6) Return both the answer sheet and the question sheet.

(7) The total score is 120.

(8) Please transcribe the following oath onto the answer sheet. (請複寫下列宣誓詞至答案卷上)。

0. Please write in either Chinese or English. (10 points will be deducted if not written.)(不寫扣 10 分)

” 本人姓名 恪遵各項考試規則,若如違反,願受校方最嚴厲處罰,謹誓。”

”I (your name here) will strictly adhere to all examination rules. If I break this oath, I am willing to accept the most severe punishment imposed by the school. Solemnly sworn.”

(I) Multiple choice (20%, 10% each); select one correct answer.

1. For a given sample size in hypothesis testing, (a). the smaller the Type I error, the smaller the Type II error will be. (b). the smaller the Type I error, the larger the Type II error will be. (c). Type II error will not be affected by Type I error. (d). the sum of Type I and Type II errors must equal to 1.

2. The power curve provides the probability of (a). correctly accepting the null hypothesis. (b). incorrectly accepting the null hypothesis. (c). incorrectly rejecting the null hypothesis. (d). correctly rejecting the null hypothesis.

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本試題共3頁，印刷份數： 65 份		2. 為環保節能減碳，試題一律採雙面印刷，如有特殊印製需求，請註記：

備註：注意事項要看!! (Scope: §ch9)	計算機	課本	筆記	字典	手機平板筆電	
	O	×	×	×	×	

(II) Fill-in-the-blank (Correct spelling should be used.) (20%, 10% each)

3. The level of significance is the probability of making a _____ when the null hypothesis is _____.

4. The _____ is the value of the test statistic that corresponds to an area of α in the lower tail of the sampling distribution of the test statistic.

(III) Short answer (20%, 10% each)

5. What is the p-value in hypothesis testing?

6. What does a small p-value indicate?

(IV) Calculation (40%, 20% each)

7. **CEO Tenure.** A shareholders' group, in lodging a protest, claimed that the mean tenure for a chief executive office (CEO) was at least nine years. A survey of companies reported in The Wall Street Journal found a sample mean tenure of $\bar{x} = 7.27$ years for CEOs with a standard deviation of $s = 6.38$ years.

   (a) Formulate hypotheses that can be used to challenge the validity of the claim made by the shareholders' group.

   (b) Assume 85 companies were included in the sample. What is the p-value for your hypothesis test?

   (c) At $\alpha = 0.01$, what is your conclusion?

8. **Production Line Accuracy.** A production line operation is tested for filling weight accuracy using the following hypotheses.

Hypothesis	Conclusion and Action
$H_0 : \mu = 16$	Filling okay; keep running
$H_a : \mu \neq 16$	Filling off standard; stop and adjust machine

The sample size is 30 and the population standard deviation is $\sigma = 0.8$. Use $\alpha = 0.05$.

   (a) What would a Type II error mean in this situation?

   (b) What is the power of the statistical test when the machine is overfilling by 0.5 ounces?

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(V) Bonus (20%)

8. (20%) What is the relationship between interval estimation and hypothesis testing?

機率表

Area in Upper Tail	0.20	0.10	0.05	0.025	0.01	0.005
t value ($df = 84$)	0.846	1.292	1.663	1.989	2.372	2.636

<The blank pages at the back can be used as scratch paper. (後面空白頁可當計算紙)>

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注意： 1、考試求公平及公正，請同學務必自律，維護學校與學生之榮譽。

2、考試時不得有交談、窺視、夾帶、抄襲、傳遞、代考或其它作弊等舞弊行為，考畢務必交卷，不得攜卷出場，違者依考場規則議處。