國立中山大學 111 學年度
碩士班暨碩士在職專班招生考試試題

科目名稱：經濟學【企管系企管甲班碩士班甲組、乙組、丙組】

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－作答注意事項－

考試時間：100 分鐘

- **考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。**請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。

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- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶具有通訊、記憶或收發等功能或其他有礙試場安寧、考試公平之各類器材、物品（如鬧鈴、行動電話、電子字典等）入場。

- **試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。**

- **試題採雙面列印，考生應注意試題頁數確實作答。**

- **違規者依本校招生考試試場規則及違規處理辦法處理。**

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壹、單選題〈1 至 25 題，每題 4 分；總計 100 分〉

1. 有關就讀國立中山大學碩士班的機會成本，下列何者是最適當的表示？
   (A)就讀國立中山大學碩士班時期所付之學雜費
   (B)就讀國立中山大學碩士班時期所付之學雜費加上生活支出之和
   (C)就讀國立中山大學碩士班所放棄的最高收入機會之報酬
   (D)就讀國立中山大學碩士班所放棄就讀最貴私立大學碩士班的學雜費

2. 若 X 的需求函數為 $P_x = 3 - Q_x + P_Y + 0.02 \cdot I$，其中 P_x 為商品 X 的價格，Q_x 為 X 的需求數量，P_Y 為消費者可能消費的相關商品 Y 的價格，I 為所得，則下列何者正確？
   (A)X 為正常品且與 Y 為互補品
   (B)X 為正常品且與 Y 為替代品
   (C)X 為劣等品且與 Y 為互補品
   (D)X 為劣等品且與 Y 為替代品

3. 以下對超額需求(excess demand)與超額供給(excess supply)的敘述何者不正確？
   (A)超額需求為給定價格下的需求量減去供給量
   (B)超額需求可能為正值也可能為負值
   (C)超額需求與超額供給相加可以是正值、負值、或是等於 0
   (D)市場均衡時超額供給等於 0

4. 下列何者變動會造成需求數量沿著需求曲線移動？
   (A)消費者偏好改變
   (B)生產者增加此商品的供給
   (C)消費者可能消費的相關商品價格上漲
   (D)消費者的所得改變

5. 假設某甲追求效用最大，且其對麥當勞大麥克的需求曲線為負斜率，則：
   (A)麥當勞大麥克對某甲而言必是正常財(normal goods)
   (B)麥當勞大麥克對某甲而言必是劣等財(inferior goods)
   (C)麥當勞大麥克對某甲而言可能是正常財或劣等財
   (D)麥當勞大麥克對某甲而言必是季芬財(Giffen goods)

6. 假設橘子市場的需求函數為 $Q^d = 120 - 6P$，而市場的供給函數為 $Q^s = 4P - 10$，其中 Q^d 為市場需求量，Q^s 為市場供給量，且 P 為市場價格。在均衡價量下的消費者剩餘為：
   (A) 130
   (B) 145
   (C) 147
   (D) 294

7. 下列何者不是造成市場失靈（market failure）的原因？
   (A)獨占市場
   (B)廠商生產過程中所產生的空氣污染
   (C)消費者在消費過程中所造成的高分貝噪音
   (D)經濟個體間的完全訊息

8. 下列關於外部性的敘述何者錯誤？
   (A)外部性為造成市場失靈的原因之一
   (B)消費者因害怕得癌症而減少香菸消費，會產生使香菸公司收入降低的外部性
   (C)外部性可以是正的，也可以是負的
   (D)政府可以藉由課稅或補貼的方式消除外部性

9. 若依經濟體系之總生產函數為 $Y = 0.5K^{0.5}L^{0.5}$，其中 Y 為總產出，K 為總資本存量，L 為總勞動力，則下列何者錯誤？
   (A)總勞動力的邊際產出遞減
   (B)總資本存量的邊際產出遞減
   (C)此生產函數為規模報酬遞減
   (D)當 $K = 100$ 且 $L = 100$ 時，總產出 $Y = 50$

10. 假設「XX 工廠」是完全競爭的市場結構中的一家廠商，則下列敘述何者正確？
    (A)市場需求曲線為負斜率
    (B)「XX 工廠」的 MR 線為負斜率
    (C)市場需求曲線為水平線
    (D)「XX 工廠」的 MR 線在 AR 線的下方

11. 完全競爭市場的產業長期供給曲線(long-run market supply)為：
    (A)正斜率的曲線
    (B) 負斜率的曲線
    (C) 水平線
    (D) 資訊不足，無法判別

12. 下列何者會造成手機生產廠商勞動需求曲線向"左"移動？
    (A) 手機價格上升
    (B) 一般物價水準上升
    (C) 手機生產廠商的實體資本設備數量增加
    (D) 手機廠商的生產技術進步

13. 視地區而定，植牙市場為不完全競爭市場(可能是獨占性競爭、寡占、或獨占市場)。假設 A 牙科診所位於租金成本較高，牙科診所家數較多的大城市地區(例如新北市的板橋新北特區)；B 牙科診所位於租金成本相對較低，牙科診所家數較少的新開發地區(例如新北市的三峽北大特區)。如果 A 與 B 診所都是追求最大利潤的廠商，則
    (A)A 牙科診所的植牙價格一定會和 B 牙科診所的植牙價格相同
    (B)B 牙科診所的植牙價格有可能高於 A 牙科診所的植牙價格
    (C)A 牙科診所一定會訂出較高的植牙價格
    (D)B 牙科診所一定會訂出較高的植牙價格

14. 下列何者對臺灣今年度的 GDP 貢獻最大？
    (A) 我國捐贈發生地震的 A 國新臺幣 5,000 萬元
    (B) 某甲賣了一棟中古屋，賺了新臺幣 2,000 萬元
    (C) 台積電向美國購買新的機器設備，價值新臺幣 1 億元
    (D) 某公司購買在臺灣製造的新電腦，價值新臺幣 20 萬元

試題請隨卷繳回，請留意背面是否有題

15. 假設某國銀行一年期的定期存款牌告利率為 3.5%，且實質利率為 2%，則該國的通貨膨脹率為：
    (A) 1.5%
    (B) 2%
    (C) 3.5%
    (D) 5.5%

16. 自然失業率為下列何者占勞動力的百分比?
    (A) 循環性失業＋結構性失業
    (B) 循環性失業＋摩擦性失業
    (C) 結構性失業＋摩擦性失業
    (D) 循環性失業＋結構性失業＋摩擦性失業

17. 長期封閉經濟下，透過可貸資金市場，政府購買增加使
    (A) 長期實質利率下降，投資支出與消費支出均上升
    (B) 長期實質利率下降，投資支出與消費支出均下降
    (C) 長期實質利率上升，投資支出與消費支出均上升
    (D) 長期實質利率上升，投資支出與消費支出均下降

18. 安倍經濟學指的是日本首相希望透過調升通貨膨脹目標刺激日本經濟，此舉增加了貨幣供給。如果沒有搭配其他提升經濟體系生產效率的做法，安倍經濟學的作法將使長期下的實質利率____，物價水準____，實質產出____。
    (A) 下降，增加，增加
    (B) 下降，增加，不變
    (C) 增加，下降，不變
    (D) 不變，增加，不變

19. 下列何者因素會使 IS 曲線右移?
    (A) 國民所得上升
    (B) 國民所得下降
    (C) 預期景氣復甦
    (D) 預期景氣衰退

20. 金融危機會使
    (A) 貨幣需求增加，AD 曲線左移
    (B) 貨幣需求增加，短期總合供給曲線(SRAS)右移
    (C) 資產價格下跌，AD 曲線右移
    (D) 資產價格下跌，短期總合供給曲線(SRAS)左移

21. 下列關於總合需求和總合供給曲線的敘述何者錯誤?
    (A) 總合需求曲線的斜率為負
    (B) 當物價上升時，消費者的實質資產減少，使得消費需求減少，並進一步減少總合需求
    (C) 總合供給曲線與菲利浦曲線(Phillips curve)的關係就像是銅板的兩面，是同一件事
    (D) 擴張性財政政策會增加就業，使總合供給曲線右移

22. 長期恆久性總要素生產力(total factor productivity)的提昇會透過影響短期總合供給曲線(SRAS)的哪一部份而使短期總合供給曲線右移？
    (A) 物價預期
    (B) 自然產出
    (C) 供給面衝擊
    (D) 長期利率

23. 增加政府購買一方面透過直接增加總合需求的乘數效果使增加產出；另一方面也會有排擠效果使產出減少，原因在於增加政府購買促使利率上升，排擠了私人投資支出。對一封閉經濟體系而言，如果它增加政府購買 1,000 億，使用下列何者模型評估此政策效果時會得到對產出的影響效果最小？
    (A) 凱因斯交叉線模型 (Keynesian-Cross model)
    (B) IS-LM 模型
    (C) 具有水平短期總合供給曲線的 AD-AS 模型
    (D) 具有正斜率短期總合供給曲線的 AD-AS 模型

24. 在資金自由流動下，美國聯準會實施緊縮性貨幣政策將使
    (A) 美元相對他國貨幣貶值
    (B) 美元相對他國貨幣升值
    (C) 聯準會貨幣政策的寬鬆與否與美元升貶無關
    (D) 美元相對他國貨幣升值或貶值要看此緊縮性貨幣政策使美國利率下降的幅度而定

25. 一小型開放經濟體系若經由增加政府預算赤字而使全國儲蓄下降，此將使國際利率____，此經濟體經常帳餘額____
    (A) 上升；下降
    (B) 不變；下降
    (C) 下降；上升
    (D) 不變；上升

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一作答注意事項一

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一、複選題(共 17 題，每題五分，合計 85 分。每題有五選項，答錯 k 個選項者，得該題全部分數的(5-2k)/5，得分低於零分或所有選項均未作答者，該題以零分計)

Use the tables of probability distributions in Appendix as needed (page 6-9).

1. Which of the following descriptions is/are correct? (A) "Postal code" is a numerical variable; (B) "Temperature in Fahrenheit" is a NOT ratio variable; (C) "Cancer stage" is an interval variable; (D) "Satisfaction level" is an ordinal variable when applying a 5-point Likert scale; (E) None of above.

2. Which of the following graphical displays is/are used to summarize one numerical variable? (A) Histogram; (B) Stem-and-Leaf plot; (C) Box-plot; (D) Scatter diagram; (E) Pie chart.

3. If two events X and Y are mutually exclusive, which of the following conditions is/are satisfied? (A) $P(Y|X)=P(Y)$; (B) $P(Y|X)=P(X)$; (C) $P(A \cap B)=P(A)+P(B)$; (D) $P(A \cup B) = P(A) \cdot P(B)$; (E) None of above.

4. A Semiconductor Corp. considers purchasing the SARS-CoV-2 fast test kits for periodical screening to employees. The test kit has 95% sensitivity (test positive given the disease is present) and 80% specificity (test negative given the disease is absent). Suppose there is a 5% probability that an individual has the disease. (A) If an individual is confirmed to have the disease, the probability of being tested negative with the test kit is 5%; (B) If an individual is confirmed to have NO disease, the probability of being tested positive with the test kit is 5%; (C) If an individual is tested positive, the probability of having the disease is 20%; (D) If an individual is tested negative, the probability of having the disease is 3%; (E) If there are 10,000 employee being tested, the expected number of individuals that is tested positive is 2,375.

5. Which of the following belongs to discrete probability distributions? (A) Normal probability distribution; (B) Poisson probability distribution; (C) Binomial probability distribution; (D) Exponential probability distribution; (E) Chi-square probability distribution.

6. Customers arrive at a bubble tea shop randomly and independently. The probability of an arrival is the same for any interval of equal length. The mean arrival rate is 3 customers per 10 minutes. Which of the following is/are correct? (A) The probability that less than 2 customers will arrive during any given 10 minutes of operation is 0.9810; (B) The probability that 5 or more customers will arrive during any given 10 minutes of operation is 0.9161; (C) The probability that more than 6 customers will arrive during any given 10 minutes of operation is 0.0335; (D) The probability that exact 3 customers will arrive during any given 10 minutes of operation is 0.2240; (E) The standard deviation of the arrival rate per 10 minutes is 3.

7. An experiment is conducted by rolling two fair dice simultaneously. The pips on dice are colored red on the 1 and 4 sides and colored black on the rest. Which of the following descriptions is/are correct? (A) The probability of getting a sum of 12 is 1/36; (B) The probability of getting a sum of 11 is 1/18; (C) The probability of getting at least a red side is 24/36; (D) The probability of getting a sum ≤ 4 is 1/12; (E) The probability of getting at least a red side given a sum >8 is 2/5.

8. Suppose that the mean hours of time per customer staying in a coffee shop after purchasing their beverages follows a normal distribution with a mean of 1 hours and a standard deviation of 0.5. Which of the following is/are correct? (A) The probability that a customer stays for exact 1 hour is 0.5; (B) The probability that a customer stays for more than 2 hours is 0.0228; (C) The probability that a customer stays between 0.5-1 hours is 0.1587; (D) About 10% of customers stay in the shop for at least 1.64 hours; (E) None of above.

9. Suppose that the mean daily TV viewing time per household follows a normal distribution with a mean of 4 hours and a standard deviation of 2 hours. Among a group of households that all members are obese (BMI>=35), we randomly selected a sample of 25 households and found that the sample mean was 4.5 hours. To investigate whether the mean of their TV viewing time is greater than that of the population mean with the level of significance = 0.05, which of the following are/is correct? (A) The null hypothesis is to set as $\mu=0$; (B) we can conduct z-test and the z-score = 1.25; (C) the critical value for this question is 1.96; (D) the p-value is 0.1056; (E) We should reject the null hypothesis and conclude that households with all obese members have longer TV viewing time than the population.

10. Which of the following descriptions about Type I error rate (α) and Type II error rate (β) is/are correct? (A) Rejecting a null hypothesis when the null hypothesis is true is called Type I error; (B) Rejecting a null hypothesis when the null hypothesis is false is called Type II error; (C) The power of a statistical test is measured as (1- α); (D) For a given level of α, increasing the sample size will decrease β; (E) For a given sample size, decreasing α does not affect β.

11. Supposed that a paint supply store wanted to estimate the correct amount of paint contained in one-gallon cans purchased from a nationally known manufacturer. It is known from the manufacturer's specifications that the standard deviation of the amount of paint is 0.02 gallon. A random sample of 64 cans is selected, and the average amount of paint per one-gallon can is 0.995. (A) The 99% confidence interval (CI) estimate of the true population average amount of paint included in a one-gallon can is (0.9886~1.0014); (B) The 99% CI estimate of the true population average amount of paint included in a one-gallon can is (0.9892~1.0008); (C) Given the significance level of 0.01, the store owner has no reason to believe that the volume is different from 1.0 gallon; (D) Since the population standard deviation is known and n=64, from the central limit theorem we may assume that the population of amount of paint per can is approximately normally distributed; (E) The 99%CI can be interpreted that if all possible samples of the sample size were taken, 99% of them would include the sample mean somewhere within the interval and only 1% of them would not.

12. Consider the following hypothesis test: H_0: $\mu=20$; H_a: $\mu \neq 20$. A sample of 25 provided a sample mean of 21 and a sample standard deviation of 2.5. Which of the following is/are correct? (A) The t-test is appropriate for the statistic testing and the computed statistic is 2; (B) The degree of freedom is 25; (C) The p-value <0.05; (D) At $\alpha=0.05$, the critical values are ±1.96 for the statistical testing; (E) At $\alpha=0.05$, do not reject the null hypothesis.

13. All students in one class are planned to watch a 15-minute video about promoting healthy behavior. Before watching the video, all students will take a test to evaluate their level of understanding the healthy behavior. The test is scored between 0-100. After watching the video, all students will take the same test again. The investigator wants to detect whether the video intervention increases student's understanding. The test scores are known to be normally distributed in population but, unfortunately, the population standard deviation is unknown. Which of the following methods is the best approach? (A) Treat the test scores before the intervention as one group, and the scores after the intervention as another; then conduct a two-tailed two-sample t-test for investigating the difference between the means of two independent populations; (B) Treat the test scores before the intervention as one group, and the scores after the intervention as another; then conduct a one-tailed two-sample t-test for investigating the difference between the means of two independent populations; (C) Obtain the difference in score for each student; then use the data of "difference" to conduct a two-tailed t-test; (D) Obtain the difference in score for each student; then use the data of "difference" to conduct a one-tailed t-test; (E) Obtain the difference in score for each student; then use the data of "difference" to conduct a one-tailed z-test.

14. A sample of 500 respondents was randomly selected in a department store in order to determine some information concerning consumer behavior. Among the questions asked was "Do you enjoy shopping for homeware here?" Of 240 males, 192 answered yes. Of 260 females, 221 answered yes. The investigator wants to know whether there is a higher proportion of males than females who enjoy shopping for homeware given the significance level of 0.05. Which of the following descriptions about the statistical testing is/are correct? (A) $H0$: $p_m \leq p_f$; Ha: $p_m > p_f$ (where p_m is the population proportion for males enjoying the shopping and p_f is the population proportion for females enjoying the shopping); (B) A one-tailed t-test is appropriate to use for this question; (C) The critical value for this statistical testing is 1.645; (D) The p-value < 0.05; (E) Reject the null hypothesis and conclude that there is a higher proportion of males than females who enjoy shopping for homeware.

15. In which occasions can we apply F-test for statistical testing? (A) Test the association between two categorical variables; (B) Test for goodness of fit; (C) Test whether population variances from two groups are different; (D) Test whether population means among three groups are different; (E) None of above.

16. A "Landor Assorted Chocolate Bag" contains four different types of chocolate with different colors of chocolate wrappers. Based on the standard of operation, the overall proportions for the colors are 0.3 red, 0.3 green, 0.2 gold, 0.2 silver. In a sampling survey, several bags of Landor chocolates were opened, and the color counts were summarized in the table below. A Quality Manager wants to test the hypothesis that the overall proportions for the colors meet the standard of operation as stated above. Assume the level of significance is set at 0.05.

Color	Count
Red	42
Green	39
Gold	24
Silver	15

Which of the following is/are correct? (A) The expected count of the Red wrapped chocolates is 30; (B) The degree of freedom used for the test statistic is 3; (C) The critical value for the test is 9.3484; (D) The Chi-squared statistic is 4.625; (E) The p-value is between 0.025-0.05. Therefore, we should reject the null hypothesis and conclude that the overall percentages of colors in the population of Landor Assorted Chocolate candies did not meet their standard of operation.

17. To test for any difference in seconds spent on completing four different banking tasks, a sample with 32 observations (8 for each task) were collected from bank tellers in a branch of Chase Bank. Assuming the population time used for each task are normally distributed with the same variance, a one-way ANOVA model was conducted for the statistical testing with the significance level of 0.05. The result from the Excel Output is listed below.

ANOVA

Source of Variation	SS	df	MS	F	P-value	F critical value
Between Groups	12362.5	?	①.	③.	?	④.
Within Groups	34825	?	②.			
Total	?	?				

Which of the following descriptions is/are correct? (A) ①=3090.625; (B) ②=1243.75; (C) ③=3.3132; (D) ④=2.7278; (E) There is not enough information to tell any difference in time spent on four different tasks.

二、簡答題（一大題，共六個子題，每子題 2.5 分，合計 15 分）

An operations manager of market research company would like to develop a model to predict the number of interviews conducted by interviewers on a given day. The manager believes that interviewer experience as measured in weeks worked is the primary determinant of the number of interviews that can be completed. A sample of 12 interviews was selected and some descriptive statistics are listed below:

Variables	Mean	Variance
Weeks of Experience	32.25	8.25
Number of Interviews Completed	206.3864	4.75

The simple linear regression model was developed that $\hat{y} = 5.35 + 0.09x$. Additional statistical information indicates that the sum of square due to regression is 18.3760. Please answer the following questions. (When appropriate, round decimal values to two digits after the decimal point.)

a) Compute the coefficient of determination as a percent value. (xx.xx%)

b) From a), interpret the result with real variable names.

c) Interpret the "0.09" in the developed regression model with real variable names.

d) When conducting a hypothesis testing for the regression relationship using F-test, what is the computed F value?

e) From d), assuming the significance level of 0.05, what is the critical value of the test?

f) Do you think the linear regression model provides a better fit to the data than the one without independent variables? (Simply answer, "Yes", "No", or "Not enough information".)

Appendix:

Poisson Cumulative Distribution*

$\lambda=$	1	2	3	4	5	6	7	8	9
$x=$									
0	0.3679	0.1353	0.0498	0.0183	0.0067	0.0025	0.0009	0.0003	0.0001
1	0.7358	0.4060	0.1991	0.0916	0.0404	0.0174	0.0073	0.0030	0.0012
2	0.9197	0.6767	0.4232	0.2381	0.1247	0.0620	0.0296	0.0138	0.0062
3	0.9810	0.8571	0.6472	0.4335	0.2650	0.1512	0.0818	0.0424	0.0212
4	0.9963	0.9473	0.8153	0.6288	0.4405	0.2851	0.1730	0.0996	0.0550
5	0.9994	0.9834	0.9161	0.7851	0.6160	0.4457	0.3007	0.1912	0.1157
6	0.9999	0.9955	0.9665	0.8893	0.7622	0.6063	0.4497	0.3134	0.2068
7	1.0000	0.9989	0.9881	0.9489	0.8666	0.7440	0.5987	0.4530	0.3239
8	1.0000	0.9998	0.9962	0.9786	0.9319	0.8472	0.7291	0.5925	0.4557
9	1.0000	1.0000	0.9989	0.9919	0.9682	0.9161	0.8305	0.7166	0.5874

* The table gives the probability of that a Poisson random variable X with mean= λ is less than or equal to

x. That is, the table gives $P(X \leq x) = \sum_{r=0}^{x} \frac{e^{-\lambda}\lambda^r}{r!}$

Cumulative Chi-square Probability Distribution (Upper-Tail Areas)*

p=	0.1	0.05	0.025	0.01	0.001
df=					
1	2.7055	3.8415	5.0239	6.6349	10.8276
2	4.6052	5.9915	7.3778	9.2103	13.8155
3	6.2514	7.8147	9.3484	11.3449	16.2662
4	7.7794	9.4877	11.1433	13.2767	18.4668
5	9.2364	11.0705	12.8325	15.0863	20.5150
6	10.6446	12.5916	14.4494	16.8119	22.4577
7	12.0170	14.0671	16.0128	18.4753	24.3219
8	13.3616	15.5073	17.5345	20.0902	26.1245
9	14.6837	16.9190	19.0228	21.6660	27.8772
10	15.9872	18.3070	20.4832	23.2093	29.5883

*The table shows the Chi-square values given the probability (p) as upper-tail area at the degree of freedom of 'df'.

Left-Tailed Cumulative Standard Normal Probability Distribution (Z)*

z	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

* The probabilities given in this table represent the area to the left of the z-score.

Right-tailed Cumulative Student's t Distribution

α=	0.1	0.05	0.025	0.01	0.005	0.001
df=						
5	1.4759	2.0150	2.5706	3.3649	4.0321	5.8934
6	1.4398	1.9432	2.4469	3.1427	3.7074	5.2076
7	1.4149	1.8946	2.3646	2.9980	3.4995	4.7853
8	1.3968	1.8595	2.3060	2.8965	3.3554	4.5008
9	1.3830	1.8331	2.2622	2.8214	3.2498	4.2968
10	1.3722	1.8125	2.2281	2.7638	3.1693	4.1437
11	1.3634	1.7959	2.2010	2.7181	3.1058	4.0247
12	1.3562	1.7823	2.1788	2.6810	3.0545	3.9296
13	1.3502	1.7709	2.1604	2.6503	3.0123	3.8520
14	1.3450	1.7613	2.1448	2.6245	2.9768	3.7874
15	1.3406	1.7531	2.1314	2.6025	2.9467	3.7328
16	1.3368	1.7459	2.1199	2.5835	2.9208	3.6862
17	1.3334	1.7396	2.1098	2.5669	2.8982	3.6458
18	1.3304	1.7341	2.1009	2.5524	2.8784	3.6105
19	1.3277	1.7291	2.0930	2.5395	2.8609	3.5794
20	1.3253	1.7247	2.0860	2.5280	2.8453	3.5518
21	1.3232	1.7207	2.0796	2.5176	2.8314	3.5272
22	1.3212	1.7171	2.0739	2.5083	2.8188	3.5050
23	1.3195	1.7139	2.0687	2.4999	2.8073	3.4850
24	1.3178	1.7109	2.0639	2.4922	2.7969	3.4668
25	1.3163	1.7081	2.0595	2.4851	2.7874	3.4502
26	1.3150	1.7056	2.0555	2.4786	2.7787	3.4350
27	1.3137	1.7033	2.0518	2.4727	2.7707	3.4210
28	1.3125	1.7011	2.0484	2.4671	2.7633	3.4082
29	1.3114	1.6991	2.0452	2.4620	2.7564	3.3962
30	1.3104	1.6973	2.0423	2.4573	2.7500	3.3852
31	1.3095	1.6955	2.0395	2.4528	2.7440	3.3749
32	1.3086	1.6939	2.0369	2.4487	2.7385	3.3653
33	1.3077	1.6924	2.0345	2.4448	2.7333	3.3563
34	1.3070	1.6909	2.0322	2.4411	2.7284	3.3479
35	1.3062	1.6896	2.0301	2.4377	2.7238	3.3400

The table gives the value of $t(\alpha;df)$ where $Pr(T(df)>t(\alpha;df))=\alpha$ with df degree of freedom.

科目名稱：商用統計學【企管系企管甲班碩士班甲組選考、乙組選考、丙組選考】題號：441002
※本科目依簡章規定「可以」使用計算機（廠牌、功能不拘）（混合題）　　　共9頁第9頁

The Critical values for F-distributions at (df1, df2) degree of freedom, given alpha=0.05

		Numerator degrees of freedom (df1)									
		1	2	3	4	5	6	7	8	9	10
	1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88
	2	18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385	19.396
	3	10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8867	8.8452	8.8123	8.7855
	4	7.7086	6.9443	6.5914	6.3882	6.2561	6.1631	6.0942	6.0410	5.9988	5.9644
	5	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725	4.7351
	6	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2067	4.1468	4.0990	4.0600
	7	5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767	3.6365
	8	5.3177	4.4590	4.0662	3.8379	3.6875	3.5806	3.5005	3.4381	3.3881	3.3472
	9	5.1174	4.2565	3.8625	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789	3.1373
Denominator degrees of freedom (df2)	10	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0204	2.9782
	11	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962	2.8536
	12	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964	2.7534
	13	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144	2.6710
	14	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458	2.6022
	15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876	2.5437
	16	4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377	2.4935
	17	4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943	2.4499
	18	4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563	2.4117
	19	4.3807	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227	2.3779
	20	4.3512	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928	2.3479
	21	4.3248	3.4668	3.0725	2.8401	2.6848	2.5727	2.4876	2.4205	2.3660	2.3210
	22	4.3009	3.4434	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419	2.2967
	23	4.2793	3.4221	3.0280	2.7955	2.6400	2.5277	2.4422	2.3748	2.3201	2.2747
	24	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002	2.2547
	25	4.2417	3.3852	2.9912	2.7587	2.6030	2.4904	2.4047	2.3371	2.2821	2.2365
	26	4.2252	3.3690	2.9752	2.7426	2.5868	2.4741	2.3883	2.3205	2.2655	2.2197
	27	4.2100	3.3541	2.9604	2.7278	2.5719	2.4591	2.3732	2.3053	2.2501	2.2043
	28	4.1960	3.3404	2.9467	2.7141	2.5581	2.4453	2.3593	2.2913	2.2360	2.1900
	29	4.1830	3.3277	2.9340	2.7014	2.5454	2.4324	2.3463	2.2783	2.2229	2.1768

試題請隨卷繳回，請留意背面是否有題

國立中山大學 111 學年度
碩士班暨碩士在職專班招生考試試題

科目名稱：微積分【企管系企管甲班碩士班甲組選考、乙組選考、丙組選考】

－作答注意事項－

考試時間：100 分鐘

- **考試開始鈴響前不得翻閱試題，並不得書寫、劃記、作答。**請先檢查答案卷（卡）之應考證號碼、桌角號碼、應試科目是否正確，如有不同立即請監試人員處理。

- **答案卷限用藍、黑色筆(含鉛筆)書寫、繪圖或標示，**可攜帶橡皮擦、無色透明無文字墊板、尺規、修正液（帶）、手錶(未附計算器者)。每人每節限使用一份答案卷，請衡酌作答(不得另攜帶紙張)。

- 答案卡請以 2B 鉛筆劃記，不可使用修正液（帶）塗改，未使用 2B 鉛筆、劃記太輕或污損致光學閱讀機無法辨識答案者，後果由考生自負。

- 答案卷（卡）應保持清潔完整，不得折疊、破壞或塗改應考證號碼及條碼，亦不得書寫考生姓名、應考證號碼或與答案無關之任何文字或符號。

- 可否使用計算機請依試題資訊內標註為準，如「可以」使用，廠牌、功能不拘，唯不得攜帶具有通訊、記憶或收發等功能或其他有礙試場安寧、考試公平之各類器材、物品（如鬧鈴、行動電話、電子字典等）入場。

- 試題及答案卷（卡）請務必繳回，未繳回者該科成績以零分計算。

- 試題採雙面列印，考生應注意試題頁數確實作答。

- 違規者依本校招生考試試場規則及違規處理辦法處理。

答案請按題號順序寫在答案卷上，違者扣分。

Are the following statements (Questions 1~5) true or false?
Give an explanation for your answer or a counterexample if the answer is false.

1. There is a function which is continuous on [1,4] but not differentiable at x=3. (5%)
2. Since f(x)=1/x is continuous for all x>0, and the interval (0,1) is bounded, f has a maximum on the interval (0,1) . (5%)
3. If $f(c) \neq g(c)$, then $f'(c) \neq g'(c)$. (5%)
4. The derivative of a polynomial is always a polynomial. (5%)
5. Suppose f'' and g'' exist and f and g are concave down for all x. Then $f(g(x))$ is concave down. (5%)

6. Differentiate $f(x) = \left(x + \frac{1}{x^2}\right)^3$ (5%)

7. Differentiate $f(x) = (\cos 2x)^2$ (5%)

8. Differentiate $f(x) = \ln \frac{\sin x}{x}$ (5%)

9. Evaluate $\int x e^{-x}\, dx$ (5%)

10. Evaluate $\int_1^\infty \frac{dx}{5x+1}$ (5%)

11. Determine whether $\sum_{n=1}^\infty \frac{n+3^n}{n+4^n}$ converges. (10%)

12. Integrate $\int_0^1 e^{-x^2}\, dx$ (hint: use power series to approximate) (10%)

13. Find the Taylor's 4th degree polynomial for $f(x)=\ln(1+x)$ at a=0 with the remainder. (15%)

14. You run a furniture business. You sign a deal with a customer to deliver up to 400 tables, the exact number to be determined by the customer later. The price will be $900 per table up to 300 tables, and above 300, the price will be reduced by $2.5 per table (on the whole order) for every additional chair over 300 ordered. What are the largest and smallest revenues your company can make under this deal? (15%)

國立中山大學 111 學年度
碩士班暨碩士在職專班招生考試試題

科目名稱：管理學【企管系企管甲班碩士班甲組選考、乙組選考、丙組選考】

Section A. MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. 2.5% each, 70% in total.

1. Organizational _____ is a measure of how appropriate organizational goals are and how well an organization is achieving those goals.

    A) effectiveness
    B) productivity
    C) yield
    D) efficiency

2. Harness International, a global wiring harness company, allows each customer to access its engineering drawings on the company's extranet, speeding up the design process for every project. Harness would consider this to be a(n) _____.

    A) capability
    B) resource
    C) opportunity
    D) competitive advantage

3. _____ theory explains how we judge people differently depending on what meaning we ascribe to a given behavior.

    A) Behavior
    B) Perception
    C) Stereotype
    D) Attribution

4. The human resources manager is meeting with the production manager to write job descriptions and to decide how to group jobs for a new production line. These two are engaged in _____.

    A) organizing
    B) planning
    C) controlling
    D) leading

5. While Victor was explaining a problem that was frustrating him, his manager smiled widely. Victor wanted to wipe the smirk off the manager's face in a none too friendly manner. What went wrong here?

    A) Victor was too emotional.
    B) Victor was upset over nothing, which the manager found funny.
    C) The manager's non-verbal communication did not match the seriousness of the situation.
    D) The manager was distracted.

6. Michael thought they should start by reviewing what had been done in the past. Michelle thought they should study the current situation first. This is an example of _____ conflict.

   A) procedural
   B) process
   C) functional
   D) task

7. Bill, a manager at a consulting firm, has been keenly analyzing the performance of a new recruit who turns out to be extremely intelligent. He concludes that she will be a good manager in the future even though her interpersonal skills are not half as impressive. This conclusion on Bill's part seems to be the result of _____.

   A) selective perception
   B) stereotyping
   C) assumed similarity
   D) the halo effect

8. Lila believes the global climate is changing. Every storm, every volcano eruption, every earthquake is, in her mind, evidence of this climate change. Lila has fallen victim to _____ bias.

   A) selective perception
   B) framing
   C) representation
   D) confirmation

9. Abigail is shopping for a new copier for her company. She has set her price range between $5,000 and $6,000. The copier must handle a minimum of 10,000 copies per month and have a useful life expectancy of five years. If Abigail selects the first copier she finds that meets these criteria, we would say she is _____.

   A) using bounded rationality
   B) using perfect rationality
   C) satisficing
   D) using intuition

10. The company announced it would be laying off several workers because of the loss of several large orders. Employees wondered how the workers to be laid off would be selected. They were concerned with _____.

   A) distributive justice
   B) equity
   C) need for achievement
   D) procedural justice

11. Which of the following factors calls for a more centralized organizational structure?

    A) When the company is geographically dispersed.
    B) When the decisions to be taken are significant.
    C) When the environment is complex.
    D) When the organization is facing a crisis.

12. Organizations grow by using strategies of _____.

    A) concentration, integration, or stabilization
    B) concentration, integration, or diversification
    C) integration, diversification, or functionalization
    D) integration, diversification, or differentiation

13. _____ theory says that behavior is a function of its consequences.

    A) Expectancy
    B) Reinforcement
    C) Two-factor
    D) Equity

14. Samantha is a single mom and the administrative assistant for the marketing department. Her son's soccer games begin right after school so Samantha often has to choose between supporting her son at his games and working. Samantha is experiencing role _____.

    A) ambiguity
    B) overload
    C) clarity
    D) conflict

15. Joanna has a very clear idea of what she wants her team to accomplish and often works that idea into conversations with her subordinates. She uses unconventional and sometimes controversial means to achieve her ends, but her subordinates know she has their backs. Joanna can be described as a(n) _____ leader.

    A) charismatic
    B) telling
    C) participative
    D) authoritative

16. In which of the following stages of moral development do individuals value rights of others and uphold absolute values and rights regardless of the majority's opinion?

    A) Conventional stage
    B) Preconventional stage
    C) Unconventional stage
    D) Principled stage

17. Which one of the following is true for active listeners?

A) They should not interrupt the speaker, but should feel free to ask questions about the topic.
B) They should avoid making eye contact and nodding as this will distract the speaker.
C) Developing empathy for the speaker is not advised as it proves an emotional barrier to listening.
D) They should listen for full meaning and avoid paraphrasing what the speaker is saying.

18. John is offered an attractive incentive to steal sensitive information about his company's wealthy investment customers. Which of the following statements best reflects John's thoughts if he is at the principled level of moral development?

A) By stealing from another person, I will be in violation of the moral standards I've come to expect of myself.
B) My job is to protect the information that this company deals in and I should not be violating my duties.
C) If I am convicted for this crime, I will surely be imprisoned and will probably never be employed anywhere else.
D) If my involvement is detected, my friends and family would be humiliated by my actions.

19. Roberta has been asked to complete a questionnaire about her job duties and the qualifications she believes a candidate for her position should have. Roberta is participating in a _____.

A) employee survey
B) job analysis
C) job review
D) position evaluation

20. In the early 20th century, automobiles were made one at a time by craftsmen who could perform every operation necessary to build the car. Henry Ford decided to limit the number of tasks each worker performed so each person could become expert in his position. With this practice, Ford introduced _____.

A) work specialization
B) departmentalization
C) formalization
D) centralization

21. If Melody wanted to build a strong culture, which of these actions would help most?

A) She should allow employees to pursue activities they believe will contribute to future company growth.
B) She and other managers should often tell stories about the company "heroes" and encourage employees to emulate their behavior.
C) She should hold an annual retreat at which upper management develops a values statement.
D) She should encourage employees to continue their education and establish a tuition assistance program.

22. Which one of the following would be a legal and ethical source of business intelligence?

    A) Information provided by a former employee
    B) Competitors' financial data
    C) Posts on social media
    D) Memos found in a business's trash

23. Decades ago only former military personnel and hoodlums sported tattoos. Today tattoos are considered an art form, giving rise to a plethora of tattoo shops. These body artists have taken advantage of changes in _____.

    A) market structure
    B) demographics
    C) processes
    D) perception

24. A corporation drops its organizational structure based on countries and reorganizes into industry groups. This is an example of the company becoming a(n) _____.

    A) polycentric organization
    B) ethnocentric company
    C) global company
    D) borderless organization

25. Kay is the supervisor that the employees go to for task-related decisions. Kay holds _____ power.

    A) expert
    B) reward
    C) coercive
    D) legitimate

26. "Slow down, Mary. You're making us all look bad." These comments likely came from a worker concerned about _____.

    A) group norms
    B) group roles
    C) social loafing
    D) groupthink

27. Which one of the following characteristics reflects surface-level diversity?

    A) Ethnicity
    B) Differences in values
    C) Values
    D) Personality

28. One way to lessen stress in a job is to _____.

    A) increase the task significance of the position
    B) reduce the task identity in the job.
    C) increase the interdependence of the position
    D) increase the autonomy in the job

Section B. SHORT ESSAY. Write up your answers in English or in Chinese. 30% in total.

1. Below is an excerpt from "The Perils of Intuition" column (p.52) in the October 2012 issue of Harvard Business Review:

The most common method for teaching business management is to find successful businesses, identify their common practices, and recommend that managers imitate them. Perhaps the best-known book using this method is Jim collins's Good to Great. Collins and his team analyzed thousands of companies and isolated 11 whose performance went from good to great. They then identified the practices that they believed had caused those companies to improve—including leadership, people, a fact-based approach, focus, discipline, and the use of technology—and suggested that other companies adopt them to achieve the same great results.

1.1. Explain why the approach described in the excerpt for identifying strategies that contribute to business success is problematic? (7%)
1.2. What would be a better design to study strategy to see whether it consistently led to success? (7%)

2. COVID-19 brought massive disruption to the workforce, highlighting the importance of physical proximity in work and spurring changes in business models and consumer behavior, many of which are likely to endure. Think about the long-term impact of COVID-19 on work. Name two trends that emerged during COVID-19 pandemic that could persist after the pandemic (see below for an example of one such trend) and discuss their implications for managing the workforce. (16 %)

Example:
Companies have enlisted automation and AI to cope with COVID-19 disruptions and may accelerate adoption in the years ahead, putting more robots in manufacturing plants and warehouses and adding self-service customer kiosks and service robots in customer interaction arenas.