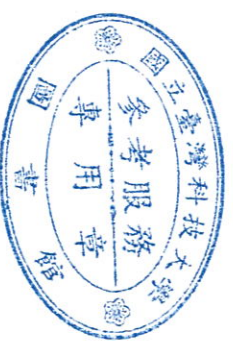


國立臺灣科技大學103學年度碩士班招生試題

系所組別：企業管理系碩士班甲組、乙組、丙組
科目：統計學

(總分為100分)

1. (10%) For a customer visit number and income study, the variance of the visit number (X) was 0.81. Then income related to the visit number is $W=449+0.25X$. Please estimate the variance of income.
2. (10%) For sampling size decision-making, the desired margin of sampling error is set to ± 5 ; the desired confidence coefficient $\alpha=0.05$; the planning value for the population standard deviation $\sigma=85$, please estimate the needed sample size for the survey. Note. $z(0.975)=1.96$.
3. (10%) Let V and W be two independent Poisson random variables with parameters .65 and .81, respectively. Please estimate the parameter with respect to the sum of $V+W$.
4. (5%) Regression model $Y_i = \beta_0 + \beta_1 X_i + \beta_2 D_i + \varepsilon_i$ includes a dummy variable D_i , where the value is either zero or one. Please estimate the value of $E\{Y\}$ given the dummy variable is zero.
5. Let e_i be the least square residuals for the regression model $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$. Please estimate
 - (5%) (a). $\sum e_i$
 - (5%) (b). $\sum X_i e_i$
 - (5%) (c). $\sum \hat{Y}_i e_i$



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6. When the names of winners are revealed on Oscar night, months of suspense give way to tears, smiles and speeches. Yet when the curtain falls, one question remains: Who cast the votes?

About 37 million people tuned in to the Academy Awards last year, and a great deal rides on the show's outcome. Winning a golden statuette can vault an actor to stardom, add millions to a movie's box office and boost a studio's prestige. Yet the roster of all 5,765 voting members of the Academy of Motion Picture Arts and Sciences is a closely guarded secret. Even inside the movie industry, intense speculation surrounds the academy's composition and how that influences who gets nominated for and wins Oscars. The organization does not publish a membership list.

A Los Angeles Times study found that academy voters are markedly less diverse than the moviegoing public. Oscar voters are nearly 94% Caucasian. Blacks are about 2% of the academy, and Latinos are less than 2%. The Times found. Oscar voters have a median age of sixty-two, the study showed. People younger than fifty constitute just 14% of the membership.

The academy is primarily a group of working professionals, and nearly 50% of the academy's actors have appeared on screen in the last two years. But membership is generally for life, and hundreds of academy voters haven't worked on a movie in decades. Some are people who have left the movie business entirely but continue to vote on the Oscars — including a nun, a bookstore owner and a retired Peace Corps recruiter. Under academy rules, their votes count the same as ballots cast by the likes of Julia Roberts, George Clooney and Leonardo DiCaprio.

To conduct the study, Times reporters spoke with thousands of academy members and their representatives to confirm the identities of 5,100 voters — more than 89% of the voting members. Those interviews revealed 73% male. Some members see the varying opinions about the academy's race, sex and age breakdown simply as a mirror of hiring patterns in Hollywood, while others say it reflects the group's mission to recognize achievement rather than promote diversity. Many said the academy should be much more representative.

(For the following questions, show all the calculation, and then circle your answer to get full credit.)

- 6a) Find an estimated proportion of academy voters with an age between 50 and 62. (6 %)
- 6b) Find a 95% interval estimate of the proportion of male members of the academy voters. Please carry 4 decimal places in your calculation. (10 %)

