Answer the following questions. No Marks for any question without writing all steps.

Question 1 [Marks 15.0]

A. [5.0 Marks] In a collection of 4 Statistics books, 3 Probability books, 3 Discrete Mathematics books, and 4 English Language books, have to be arranged in bookshelf such that all the books with the same subject are together on the same shelf. How many different arrangements are possible?

B. [5.0 Marks] Assume that a user ID on an old computer system consists of 12 letters from the English alphabet followed by 4 digits between 0 and 9. How many different IDs are possible?

C. [5.0 Marks] Three players are to be randomly selected without replacement from a team of 20 players numbered from 1 to 20. What is the probability that at least one of the players that are selected has a number as larger than 17.

Question 2 [Marks 15.0]

A. [3.0 Marks] What is Central Limit Theorem?

B. [6.0 Marks] The following table shows the contingency table for 100 students to describe their knowing Java or C#. What is the probability that the student knows Java, given that he knows C#?

	Know Java	Do not know Java	Total
Know C#	0.20	0.60	0.80
Do not know C#	0.10	0.10	0.20
Total	0.30	0.70	1.00

C. [6.0 Marks] Compute $Var(X)$ if the PDF of the random variable X is given by:

$$f(x) = \begin{cases} \frac{2}{9}x, & 0 \leq x \leq 3 \\ 0, & Otherwise \end{cases}$$

Question 3 [Marks 15.0]

A. [7.0 Marks] If, on average, 5 students enter an oral exam per one hour. What is the probability that in a given hour, 7 students will enter the oral exam?

B. [8.0 Marks] In a Software Engineering lab, 15 of the 20 computers have Microsoft office installed. What is the probability that 3 of the 5 selected computers (without replacement) have Microsoft office installed?

Question 4 [Marks 15.0]

A. [7.0 Marks] The following data represent the number of computers sold during 18 days: 122, 126, 133, 140, 145, 145, 149, 150, 157, 162, 166, 175, 177, 177, 183,188, 199, 212

    i.   [2.0 mark] Find the first and third quartiles

    ii.   [3.0 marks] Represent this data set in a stem-and-leaf plot.

    iii.   [2.0 Marks] Draw the histogram

B. [8.0 Marks] For a class of 100 students, if the sample mean of their abilities to write a big project in C# is 80.0 and the standard deviation(σ) is 0.60, find the 95% confidence interval for 100 students.

With my best wishes: Dr. *Samir Elmougy*