試題一：< 10 分>
In your own words, explain the difference between (a) SEM and TEM. (5 pts) (b) DSC and DTA. (5 pts)

試題二：< 5 分>
Increasing temperature in general reduces the viscosity of polymer solutions. How might the magnitude of this effect compare in a “poor” solvent and a “good” solvent?

試題三：< 10 分>
Draw a modulus versus temperature curve and define the five regions of viscoelastic behavior of an amorphous polymer.
試題四：< 20 分 >

Which polymer in each of the following pairs would you expect to exhibit the higher glass transition temperature? Explain your choice in each case. (each 5 pts, total 20 pts)

(a) 

(b) 

(c) 

(d)
試題五：＜ 10 分＞

Define the viscosity of polymer flow. (5 pts) What are the factors that affect it? (5 pts)

試題六：＜ 15 分＞

If one were to react 50.0g of terephthalic acid (TPA) (1,4-benzenedicarboxylic acid) with 20.0g of ethylene glycol, how many grams of TPA would have to be consumed in order to obtain a degree of polymerization of 20?

試題七：＜ 15 分＞

Calculate $\bar{M}_n$ and $\bar{M}_w$ for a hypothetical polymer sample that contains the same mole of polymer having molecular weights of $1.25 \times 10^6$, $1.35 \times 10^6$, $1.50 \times 10^6$, $1.75 \times 10^6$, $2.00 \times 10^6$.

試題八：＜ 15 分＞

A polymeric material has a relaxation time of 100 days at 27℃ when a stress of 4.0 MPa is applied.

(a) How many days will be required to decrease the stress to 3.2 MPa? (7 pts)

(b) What is the relaxation time at 40℃ if the activation energy for this process is 20 KJ/mol? (8 pts)