科技英文與邏輯判斷：

1. (30 points) A team of art historians has the task of determining approximately when certain recently discovered illustrated manuscripts, each the work of a different artist, were created. The art historians consult a chemist who will test for the presence of six pigments on the manuscripts. It is known when these pigments were first manufactured and when, in some cases, they stopped being manufactured and used, as listed below:

Pigment 1: introduced A.D. 1100; stopped being used A.D. 1300.
Pigment 2: introduced A.D. 1250.
Pigment 3: introduced A.D. 1300.
Pigment 4: introduced A.D. 1000; stopped being used A.D. 1250.
Pigment 5: introduced A.D. 1200; stopped being used A.D. 1400.
Pigment 6: introduced A.D. 1350.

(1) Which of the following pigments could NOT have been used together in the creation of a manuscript?
   (a) 1 and 5
   (b) 1 and 6
   (c) 2 and 3
   (d) 2 and 5
   (e) 2 and 6

(2) A manuscript illustrated with pigments 1 and 2 must have been created between
   (a) A.D. 1050 and A.D. 1100
   (b) A.D. 1100 and A.D. 1150
   (c) A.D. 1150 and A.D. 1200
   (d) A.D. 1200 and A.D. 1250
   (e) A.D. 1250 and A.D. 1300

(3) The earliest possible date of creation of a manuscript that is illustrated with pigments 1 and 4 is
(a) A.D. 1000
(b) A.D. 1050
(c) A.D. 1100
(d) A.D. 1150
(e) A.D. 1200

(4) The team could determine to within a fifty-year period the date of creation of a manuscript that was created with which of the following combinations of pigments:
(a) 2 and 3
(b) 2 and 5
(c) 2 and 6
(d) 3 and 5
(e) 5 and 6

(5) How many of the other five pigments could have been used in the creation of a manuscript illustrated with pigment 6?
(a) One
(b) Two
(c) Three
(d) Four
(e) Five

(6) No further tests are performed on a certain manuscript after two of the pigments are identified, because no additional information in regard to dating would be gained. Which of the following could be the two identified pigments:
(a) 1 and 4
(b) 2 and 3
(c) 2 and 6
(d) 3 and 5
(e) 5 and 6

2. (20 points) A manager who has exactly four projects-F, G, H, and I – to undertake in a given month has made the following determinations:

F has priority over G.

H has priority over I.

If one project has priority over another, the project with priority must be started earlier than the other one.

(1) Given only the determinations above, each of the following is a possible sequence in which the four projects could be started EXCEPT

   (a) F, G, H, I

   (b) F, H, G, I

   (c) F, H, I, G

   (d) H, F, I, G

   (e) H, G, F, I

(2) If each of the projects takes equally long to complete, it must be true that

   (a) F is completed before H is completed.

   (b) F is completed before I is completed.

   (c) G is completed before H is completed.

   (d) H is completed before G is completed.

   (e) H is completed before I is completed.

(3) There would be exactly one order in which the four projects would have to be started if it were determined that

   (a) F has priority over H

   (b) F has priority over I

   (c) H has priority over G

   (d) I has priority over F

   (e) I has priority over G

(4) Which of the following pairs of additional determinations would NOT conflict with the priorities initially determined?

   (a) F has priority over H, and I has priority over F.

   (b) F has priority over I, and H has priority over G.

   (c) G has priority over H, and H has priority over F.

   (d) G has priority over H, and I has priority over F.

   (e) G has priority over I, and I has priority over F.

3. (10 points) In a study of more than 8,000 people using ten beaches on two of the Great Lakes, ecologists from the University of Toronto determined that the rate of respiratory and gastrointestinal illness among people who had been swimming was 69.6 per 1,000, whereas the respiratory and gastrointestinal illness rate among those who had not been swimming was only 29.5 per 1000.

Which of the following conclusions can be most properly drawn from the date above?

(a) People tend to underestimate the risks of swimming in these lakes.

(b) Respiratory and gastrointestinal illnesses occur at a higher rate as a result of swimming in either of these lakes than they do as a result of swimming in any other lake.

(c) Illnesses of kinds other than respiratory and gastrointestinal are not likely to be associated with swimming in either of these lakes.

(d) The association between swimming in these lakes and respiratory and gastrointestinal illness is some evidence for a causal relationship between them.

(e) A large percentage of the people who swim in these lakes are immune to the diseases that swimming may cause.

中翻英（如果不知道有些專有名詞的英文如反應曲面演算法、等候線理論，可以保留原有中文代替）

5. (15 points)本篇論文的主旨是在回顧反應曲面演算法在工業應用上之缺陷，並探討可以加以改良的研究方向。

6. (15 points) 雖然等候線理論已發展數十年之久，然而在理論模型應用於實務問題上尚有一些限制，因此也有許多值得研究的問題。

精簡摘要（請用 60 個英文字以內來改寫以下論文摘要，關鍵在於如何取捨和

用更精簡的文字和結構來表達一篇學術論文最需要傳達的 key message）：(10 points)

Semiconductor manufacturing is lengthy and complex that has hundreds of process steps. Semiconductor companies compete with each other by continuously employing new technologies, increasing yield, and reducing costs. Yield improvement is increasingly important as advanced fabrication technologies are increasingly complicated, in which the factors are often interrelated with each other. In particular, wafer bin maps that present specific failure patterns provide crucial information to track the process problems in semiconductor manufacturing, yet most fabs rely on experienced engineers' judgments of the map patterns through eye-ball analysis. Thus, existing studies are subjective, time consuming, and are also restricted by the capability of human recognition. This study proposes a hybrid data mining approach to quickly extract patterns from WBM and associate with manufacturing defects. In particular, we integrated spatial statistics and ART neural networks to develop the model. An empirical study of WBM clustering was conducted in a fab in Taiwan for validation. The results showed practical viability of the proposed approach and now an expert system embedded with the developed algorithm has been implemented in a fab in Taiwan. This study concludes with a discussion on further research directions.