國　立　宜　蘭　大　學

100 學年度轉學招生考試

（考生填寫）
准考證號碼：

離散數學試題

《作答注意事項》

1. 請先檢查准考證號碼、座位號碼及答案卷號碼是否相符。
2. 考試時間：80 分鐘。
3. 本試卷共有選擇題 20 題(單選)，一題 5 分，共計 100 分。
4. 請將答案寫在答案卷上。
5. 考試中禁止使用大哥大或其他通信設備。
6. 考試後，請將試題卷及答案卷一併繳交。
7. 本試卷採雙面影印，請勿漏答。

1. 1/2 + 1/3 = (a) 2/5 (b) 5/6 (c) 3/6 (d) 3/4 (e) 1/4 .

2. The least common multiple of the positive integers x and y is 120. The greatest common divisor of the positive integers x and y is 8. Then, xy = (a) 15 (b) 112 (c) 960 (d) 1208 (e) 8120

3. A and B are sets. A={1, 2, 3, 4, 5} and B={5, 6, 7}. $A - B = C$ (a) C={5} (b) C={1, 2, 3, 4} (c) C={1, 2, 3, 4, 5, 6, 7} (d) C={1, 2, 3, 4, 6, 7} (e) C={ }.

4. Let A={x}, B={y} and C={z}. D=(A×B) ×C, where × is Cartesian product. (a) x×y×z (b) { x, y , z } (c) ((x, y), z) (d) { (x, y), z } (e) { ((x, y), z) }

5. Let p, q, r are propositions, where p = **T**, q = **T** and r = **F**. Which of the following compound propositions is true? (a) $\neg q$ (b) $p \wedge r$ (c) $p \rightarrow r$ (d) $r \rightarrow p$ (e) $(p \wedge q) \rightarrow r$.

6. $f(x) = y$ is a function, the domain and codomain are the set of integers. We already know that $f(x)$ is invertible. Which of the following functions could be $f(x)$? (a) $f(x) = x+2$ (b) $f(x) = x^2$ (c)$f(x) = 2x$ (d) $f(x) = x^{1/2}$ (e) $f(x) = x/2$.

7. Function $f(x)=2x+1$, where the domain and codomain are the set of integers. Which of the following equations is correct? (a) $f(2) = 4$ (b) $f(1)+f(3)=9$ (c) $f(2)f(0)= 6$ (d) $f(f(2))=12$ (e) $f(f(3))=15$.

8. Among 1200 people there are at least x persons who were born in the same day (a) $x = 2$ (b) $x = 3$ (c) $x = 4$ (d) $x = 5$ (e) $x = 6$.

9. How many strings of length ten contain exactly three 1's? (a) 120 (b) 140 (c) 160 (d) 180 (e) 200

10. How many solutions does the equation $x_1 + x_2 + x_3 + x_4 = 7$ have, where x_1, x_2, x_3 and x_4 are nonnegative integers? (a) 100 (b) 110 (c) 120 (d) 140 (e) 160.

11. What is the probability that a die never comes up an even number when it is rolled four times? (a) 1/2 (b) 1/4 (c) 1/8 (d) 1/16 (e) 1/32

12. Give a recurrence $T(n) = 2T(n/2) + 1$ and $T(1) = 1$. Then $T(n)$ = (a) $\Theta(1)$ (b) $\Theta(\log n)$ (c) $\Theta(n^{1/2})$ (d) $\Theta(n)$ (e) $\Theta(n\log n)$.

13. R is a relation from A = {0, 1, 2, 3, 4} to B = {0, 1, 2, 3}, where (a,b) $\in R$ if and only if a + b = 4. Which of the followings is correct? (a) (0, 3) $\in R$ (b) (1, 1) $\in R$ (c) (0, 4) $\in R$ (d) (4, 2) $\in R$ (e) (4, 0) $\in R$.

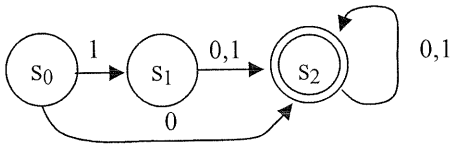
背面尚有試題

14. A relation R on a set A is called symmetric if $(b, a) \in R$ whenever $(a, b) \in R$ for $a, b \in A$. Which of the following relations has symmertic property? (a) {(1,2)} (b) {(1, 2), (2,1)} (c) {(1, 2), (2,3)} (d) {(1,2), (2,3), (1,3)} (e) {{1, 1}, (1,2)}.

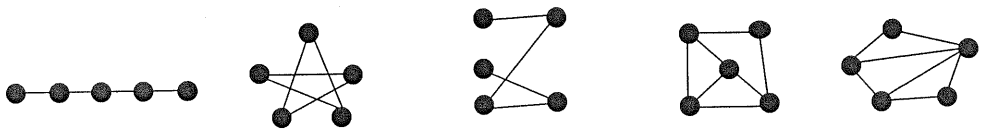
15. The degree of a vertex in an undircted graph is the number of edges incident with it, except that a loop at a vertex contributeds twice to the degree of the vertex. How many edges are there in a graph with 12 vertices each of degree 5? (a) 10 (b) 20 (c) 30 (d) 40 (e) 50.

16. A tree with 100 vertices has x edges. (a) $x = 99$ (b) $x = 100$ (c) $x = 101$ (d) $x = 102$ (e) $x = 103$.

17. Which string is **not** recognized by the following automaton? (a) 111 (b) 11 (c) 10 (d) 0 (e) 1



18. Which of the following graphs has a Euler circuit?



19. The following expression: (2^{33} mod 7 = x) (a) $x = 1$ (b) $x = 2$ (c) $x = 3$ (d) $x = 4$ (e) $x = 5$

20. What is the 20^{th} term in the sequence 1, 2, 2, 3, 3, 3, 4, 4, 4, 4,.....? (a) 3 (b) 4 (c) 5 (d) 6 (e) 7.