

朝陽科技大學 97 學年度碩士班招生考試試題

系(所)別：資訊管理系
組別：一般生
科目：計算機概論(含資料結構)

總分：100 分
第 1 頁共 2 頁

A. Explain the following terms (20%)

- | | |
|----------------------|-------------------------|
| 1. Machine cycle | 6. Dangling reference |
| 2. Unicode | 7. Garbage collection |
| 3. DRAM | 8. Complete binary tree |
| 4. Mutual exclusion | 9. Connected component |
| 5. Digital signature | 10. External sort |

B. Answer the following questions (80%)

11. Represent the decimal number, -120 , in (a) unsigned (b) sign-and-magnitude (c) one's complement, and (d) two's complement integer representations, respectively. Show the detailed steps of your derivation. (8%)
12. An imaginary computer has five data registers (R0 to R4), 4096 words in memory, and 20 different instructions (add, subtract, etc.). A typical instruction uses the following format: load 565 R2, where "565" is a memory address. Also, the computer uses the same size of word for data and instructions. What are the sizes in bits of each of the following: (a) instruction, (b) data, (c) instruction register, (d) data register, (e) program counter, (f) data bus, (g) address bus, and (h) control bus? (8%)
13. A program for adding two numbers is residing in memory addresses 080 to 083, and two pieces of data are already loaded in memory addresses 100 and 101, as shown in Figure 1. List the contents of the registers (R1, R2, and R3), the instruction (I), and the program counter (PC), respectively, after each instruction of the program. (8%)
14. You have a square room (side length = x) with a computer at each corner. For each of the following network topologies, calculate the lengths of cabling, respectively: (a) a bus LAN, (b) a ring LAN, (c) a star LAN with a hub at the center of the room. (3%)
15. Describe the functions of the following networking devices: (a) repeater, (b) bridge, (c) router, (d) gateway. (12%)

080	Load 100 R1
081	Load 101 R2
082	Add R1 R2 R3
083	Store 102 R3
100	+14
101	-10
102	

Figure 1

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第 2 頁共 2 頁

16. *Paging* is a non-swapping multiprogramming technique of operating systems. Please describe its mechanism. (8%)
17. Use the *insertion sort* method to sort the sequence: 23, 78, 45, 8, 32, 56. List the detailed steps of sorting. (8%)
18. Draw a binary tree to represent the following logical expression. (8%)
 $(a \vee (b \wedge \neg c) \vee (d \wedge e)) \wedge c$
19. What is the resulting relation after joining the two relations in Figure 2 based on their common attribute "Course-No"? (8%)

COURSES

<u>Course-No</u>	Course-Name	Unit
CIS15	Introduction to C	5
CIS17	Introduction to Java	5
CIS19	UNIX	4
CIS21	Operating Systems	4

TAUGHT-BY

<u>Course-No</u>	Instructor
CIS15	M.H. Lee
CIS17	K. Johnson
CIS19	L. Walter
CIS51	T.S. Goodman

Figure 2

20. Using Kruskal's algorithm, find the minimum cost spanning tree of the graph in Figure 3, in which the numbers beside the links are the costs. Show your work step by step in detail. What is the cost of the resulting spanning tree? (9%)

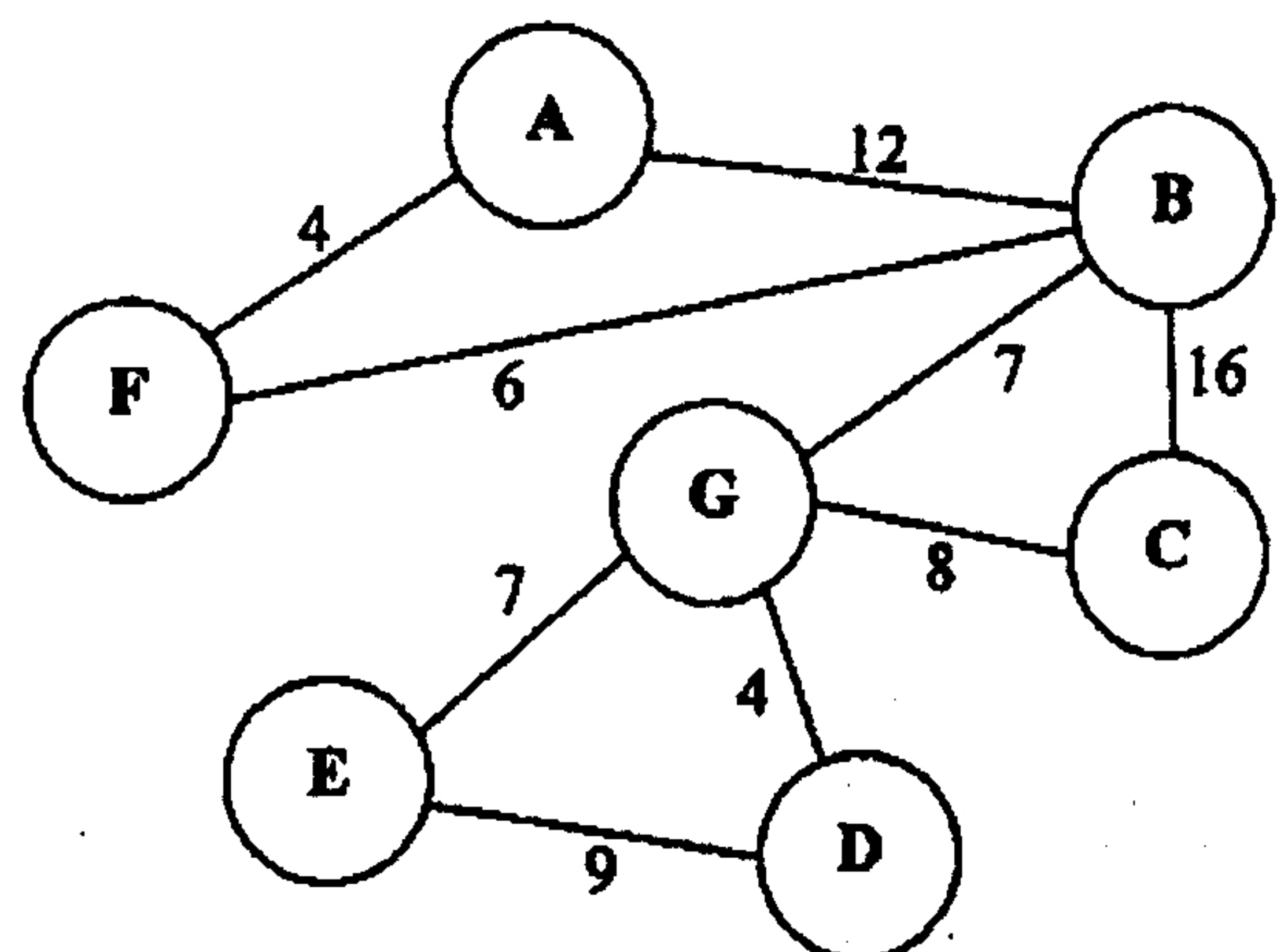


Figure 3