Part I. Choice (48%)

1. Which decimal number is equal to octal number (34.25)_8?
   (A) 28.125    (B) 28.2    (C) 28.25    (D) 28.375    (E) none of the above

2. Which one is the default directory to create a personal home page in Unix environment?
   (A) html   (B) public   (C) bin   (D) public_html   (E) profile

3. Assume a monitor screen is set on resolution of 1024x768 and with 24 bits color quality. What is the rough memory size needed to store one screen representation?
   (A) 0.786MB   (B) 1.57MB   (C) 2.36MB   (D) 6.29MB   (E) 18.87MB

4. Which data structure is usually used in the compiler to handle the recursive call?
   (A) array   (B) linked list   (C) queue   (D) stack   (E) tree

5. Which one of the following concepts is not adopted by object-oriented programming languages?
   (A) identification   (B) encapsulation   (C) inheritance   (D) polymorphism   (E) abstract

6. Which feature is not adopted in JAVA language?
   (A) pointer   (B) thread   (C) object   (D) array   (E) string

7. Which of the following databases stores data in tables that consist of rows and columns?
   (A) network database   (B) hierarchical database   (C) object-oriented database   (D) relational database   (E) none of the above

8. Which command can be used to issue the DDL statements of SQL?
   (A) CREATE   (B) SELECT   (C) UPDATE   (D) INSERT   (E) DELETE

9. Which SQL command can perform a JOIN operation for two or more tables in a database?
   (A) CREATE   (B) SELECT   (C) UPDATE   (D) INSERT   (E) DELETE

10. Which protocol can be used to transmit E-mail?
    (A) HTTP   (B) SMTP   (C) SNMP   (D) ASP   (E) none of the above

11. The newest process technology for TSMC is 90-Nanometer. What is a nanometer?
    (A) 10^{-3}m   (B) 10^{-6}m   (C) 10^{-9}m   (D) 10^{-10}m   (E) 10^{-12}m

12. The IEEE’s 802.11g standard defines the way wireless LAN gear communicates at up to
    _____ Mbps.
    (A) 802   (B) 54   (C) 48   (D) 24   (E) 11
Part II. Discussion

13. (12%) Given the following program fragments, please perform an analysis of the time complexity for each of them (using the Big-Oh notation).

| (a) for (i=1; i < n; i=i*2) sum++; | (b) for (i=0; i < n; i++)
|                                       |      if (i % 5 == 0)
|                                        |      sum++; |
| (c) for (i=0; i < n; i++)
|     for (j=0; j < i; j++) sum++; | (d) for (i=0; i < n; i++)
|                                      |      for (j=0; j < i; j++) sum++; |

14. (10%) Please convert the infix arithmetic expression, \( A \cdot (B + C) + D / (E - F) \), into the
   (b) postfix arithmetic expression
   (c) prefix arithmetic expression

15. (10%) Assume that we have a \( k \)-ary tree (a tree with degree \( k \)) of height \( h \) and all nodes are of the same size.
   (d) What is the maximum number of nodes in such a tree? (give your answer in a more compact form)
   (e) What are the minimum number and maximum number of NULL pointers in such a tree?

16. (10%) Given a fragment of C code as follows, please discuss the result of \( F(6, 5) \).

```c
int F(int M, int N)
{
    int result;
    if (N <= 1) return M;
    else return (M + F(M, N-1));
}
```

17. (10%) Please explain in detail the following features of a digital camera.
   (a) 5 Megapixel (2592x1944)
   (b) 4X Optical Zoom
   (c) 4X Digital Zoom
   (d) Multi-point AF