一、Answer the following multiple choice questions. (15%)

1. ______ is a code used by the Java language to represent characters.
   a. Unicode
   b. EBCDIC
   c. ASCII
   d. Extended ASCII

2. In the ______ graph method of representing an image in a computer, the image is decomposed into a combination of curves and lines.
   a. vector
   b. quantized
   c. bitmap
   d. all of the above

3. The ______ method of integer representation is the most common method to store integers in computer memory.
   a. unsigned integer
   b. sign-and-magnitude
   c. 1’s complement
   d. 2’s complement

4. In 2’s complement representation with a 5-bit allocation, you get ______ when you add 10 to 10.
   a. -11
   b. -12
   c. -13
   d. none of the above

5. The ______ controller features a parallel interface and daisy-chained connection for I/O devices.
   a. USB
   b. SCSI
   c. IDE
   d. FireWire
6. ______ is a memory type with capacitors that need to be refreshed periodically.
   a. SRAM
   b. PROM
   c. DRAM
   d. EPROM

7. In the ______ method to synchronize the operation of the CPU with an I/O device, a large block of data can be passed from the I/O device to memory directly.
   a. DMA
   b. isolated I/O
   c. interrupt-driven I/O
   d. all of the above

8. The ______ layer of the OSI model compresses and decompresses data.
   a. data-link
   b. network
   c. transport
   d. presentation

9. The ______ layer of the OSI model is responsible for source-to-destination delivery of an individual packet.
   a. data-link
   b. network
   c. transport
   d. presentation

10. An Internet address in IPv4 consists of ______ bits; whereas the address in IPv6 consists of ______ bits.
    a. 32; 128
    b. 32; 192
    c. 48; 128
    d. 48; 192

11. ______ can occur if a process holds too many resource restrictions in a computer.
    a. Starvation
    b. Deadlock
    c. Paging
    d. Partitioning

12. Use a ______ search for an ordered list; whereas use a ______ search for an unordered list.
    a. binary; bubble
    b. random; sequential
    c. random; binary
    d. binary; sequential

13. Of the various database models, the ______ model is the most prevalent today.
    a. network
    b. hierarchical
    c. relational
    d. queue

14. A string of two hundred 0s is replaced by two markers, a 0 and the number 200. This is ______.
    a. Morse coding
    b. Lempel Ziv encoding
    c. run-length encoding
    d. none of the above

15. ______ is a lossy compression method for pictures and graphics; whereas ______ is a lossy compression method for video.
    a. MPEG; JPEG
    b. MPEG; DCT
    c. JPEG; DCT
    d. JPEG; MPEG

注意：背面尚有試題
二、According to the following C program segments, present their execution results. (20%)

1. void main()
   
   ```c
   int n=10, k;
   int digit=0;
   for(k=1; k<=n; k++)
   {
     digit=Fib(k)%10;
     printf("PW_%d = %d\n", k, digit);
   }
   
   int Fib(int n)
   {
     if(n==1 || n==2)
       return(1);
     else
       return(Fib(n-1)+Fib(n-2));
   }
   ```

2. void main()
   
   ```c
   char code[]="PAPLEcpu";
   int len=8, idx, j;
   for(idx=len-1; idx>1; idx--)
   {
     Decode(code, idx);
     printf("\n Pass_%d : ", idx);
     for(j=0; j<len; j++)
       printf("%c", code[j]);
   }
   ```

三、Consider the six processes, \( P_1, P_2, P_3, P_4, P_5, \) and \( P_6 \), arrived at different time, as listed below. Determine the order of processes to be finished, and compute the average waiting time, based on the following non-preemptive CPU scheduling algorithms: (a) First-Come, First-Served, (b) Shortest-Job-First, and (c) Priority, respectively. (15%)

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst Time (ms)</th>
<th>Arrival Time</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P_1 )</td>
<td>20</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>( P_2 )</td>
<td>10</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>( P_3 )</td>
<td>30</td>
<td>14</td>
<td>5 (highest)</td>
</tr>
<tr>
<td>( P_4 )</td>
<td>15</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>( P_5 )</td>
<td>5</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>( P_6 )</td>
<td>25</td>
<td>26</td>
<td>4</td>
</tr>
</tbody>
</table>

四、Extending the basic CMOS inverter circuit, design a CMOS gate circuit to implement the function \( Y = \overline{C} + \overline{A} \cdot \overline{B} \). Indicate the inputs \( (A, B, \text{ and } C) \) and output \( (Y) \) on the circuit. (15%)
五、Find out the logic function, \( Y = f(A, B, C, \bar{C}) \), implemented by the following circuit, as shown in Fig. 1. (10%)

![Fig. 1.](image)  

六、Assuming the following op amplifier to be ideal, derive an expression for the closed-loop gain, \( G_1 = \frac{v_o}{v_i} \), in terms of \( R_1 \) and \( R_2 \), as shown in Fig. 2. (15%)

![Fig. 2.](image)  

七、The closed-loop gain, \( G_x = \frac{v_o}{v_i} \), is adjustable by setting \( x \) on the potentiometer \( R = 10K\Omega \), as shown in Fig. 3. Determine the value of \( x \) such that \( G_x \) equals \( G_1 \) when \( R_2 = 2R_1 \) in the above circuit (Fig. 2). (10%)

![Fig. 3.](image)