1. If a float number is stored in one byte such that the first bit is the sign, the next three bit represent the exponent in Eexcess-4 notation, and the last four bits represent the mantissa, then the bit pattern 00110100 represents (in decimal)

   a. 0.75
   b. 0.625
   c. 0.325
   d. 0.125
   e. None of the above

2. What is the size of the following declarations (alignment of int is at multiple of 4 and short is at multiples of 2). Data type sizes are: int 4 bytes, short 2 bytes,

```
struct vehicle {
        int carId;
        short wheels:3;
        short fuelTank : 6;
        short weight;
}
```

   a) 6 b) 8 c)10 d) 12 e) none of the above

3. Variable x is declared as follows

```
struct vehicle {
        long carId;
        short wheels:3;
        short fuelTank : 6;
        short weight;
} x[5][5];
```

   if the address of x is 0xAA and memory is aligned at multiples of 4 then what is the address of x[1]

   a) 0xD2 b) 0xEA c)0xDC d) 0xAB e) none of the above

4. What is the output of the following program?

```
int f(int x, int *y) {
   x += 2;  *y += 1;
   return x + *y;
    }
int g(int *x, int y) {
   y = ++*x;
   return *x + y;
    }
int main( ) {
   int x = 2, y = 3;
   printf("%d   ",f(x, &y));
```

```
    printf("%d   ",g(&x, y));
    printf("%d   %d \n",x, y);
       return 0;
}
```

(A) 8 6 3 4 (B) 8 10 4 4 (C) 8 6 3 3 (D) 8 10 3 4 (E) none of the above

5. (5 pts) Which of the following two functions (printStarsA and printStarsB) can produce the following output when each is called with numStars==5 (namely printStarsA(5) and printStarsB(5):

```
*****
***
*
```

```
void printStarsA(int numStars)
{
   int i=0;

   for (i = numStars ; i >= 0; i--) {
         if (i %2 == 0) {
               int j;
               for (j = 0; j < i+1; j++) {
                     printf("*");
               }
               printf("\n");
         }
   }
}
```

```
void printStarsB(int numStars)
{
   int i = 0;
   i = (numStars % 2 == 1) ? numStars : numStars + 1;
   while (i >= 1) {
         int j;
         for (j = 0; j < i; j++) printf("*");
         printf("\n");
         i-=2;
   }
}
```

(A) printStarsA(5) and printStarsB(5)
(B) printStarsA(5) but not printStarsB(5)
(C) printStarsB(5) but not printStarsA(5)
(D) neither function
(E) None of the above

6. Given a byte in 2's complement representation, what is 0x56 in decimal?

a) -13

b) –110
c) 38
d) 86
e) None of the above

7. if x = 0x36 then which of the following statements is incorrect
   a) if y = 0x42 then x | y is 0x76
   b) if y = 0x12 then x & y is 0x2
   c) if y = 0x42 then x & y is 0x2
   d) if y = 0x41 then x & y is 0x0
   e) All statement are correct

8. if x = 0x25 then which of the following statements is correct
   a) if y = x | (1<<1) then y is 0x26
   b) if y = x << 1 then y is 0x4A
   c) if y = x & 0x37 then y is 0x35
   d) if y = x | 0x37 then y is 0x35
   e) All of the above statements are incorrect

9. What will be the output of the following code segment?

```
int u = 0x2;
int v = 0x35;
if (u & v) printf("Great!! \n");
else printf("Fantastic!! \n");
```

   a. Great!!
   b. Fantastic!!
   c. Run time error
   d. None of the above

10. Given the following declaration

```
char x = -12;
char y = 63;
```

   if the computer uses 2's complement to represent the numbers then which statement is correct:
   a. The number of bits in x is equal to the number of bits in y
   b. The number of bits in x is less than the number of bits in y
   c. The number of bits in x is greater than the number of bits in y
   d. None of the above

11. int x = 5;
    int y = 2;

    f(x,y);

    printf("%s \n", (x/y > 2) ? "x is more than two times larger than y" : "x is less than or equal to 2*y\n ");

    f(int x, int y)
    {
      x = 2*y;

      printf("%s \n", (x/y > 2) ? "x is more than two times larger than y" : "x is less than or equal to 2*y \n");
    }

    a. x is less than or equal to 2*y
       x is less than or equal to 2*y

    b. x is less than or equal to 2*y
       x is more than two times larger than y

    c. x is more than two times larger than y
       x is less than or equal to 2*y

    d.x is more than two times larger than y
       x is more than two times larger than y

12. If a float number is stored in one byte such that the first bit is the sign, the next three bit represent the exponent in excess-3 notation, and the last four bits represent the mantissa, then if the number is 3.25 then what is the bit pattern
    a. 00111101
    b. 01011101
    c. 00110110
    d. 01011110
    e. None of the above

13. Given four statements below: Which of the following statements is not correct

    1) gcc stats.c produces an executable a.out
    2) gcc –c stats.c produces an executable a.out
    3) gcc –g stats.c produces an executable a.out that can be used in GDB
    4) gcc –o stats.c produces an executable a.out

    Which of the following options is correct. If none of options a), b), c) or d) are true then choose option e)

Options

a) Statement 1 is true and statement 2 is true
b) Statement 1 is true and statement 3 is true
c) Statement 2 is not true and statement 4 is true
d) Statement 2 is true and statement 3 is not true
e) None of the above options is true

14. Given the following declaration

```
char x = -12;
char y = 63;
```

if the computer uses 2's complement to represent the numbers then which statement is correct:

Options:

a) The number of bits in x is equal to the number of bits in y
b) The number of bits in x is less than the number of bits in y
c) The number of bits in x is greater than the number of bits in y
d) None of the above

15. What is the output of the following code?

```
int x = 5;
int y = 2;

f(x,y);

printf("%s \n", (x/y > 2) ?  "x is more than two times larger than y" : "x is less than or equal to 2*y\n ");

f(int x, int y)
{
  x = 2*y;

  printf("%s \n", (x/y > 2) ?  "x is more than two times larger than y" : "x is less than or equal to 2*y \n");
}
```

Options:

a) x is less than or equal to 2*y
x is less than or equal to 2*y

b) x is less than or equal to 2*y
x is more than two times larger than y

c) x is more than two times larger than y
x is less than or equal to 2*y

d) x is more than two times larger than y
x is more than two times larger than y