Advanced C and Pointers

1) What is the output from excuting the following C program assuming that the base(array) is at location 10000?

```
#include <stdio.h>

void printIt(unsigned int *ptr, int rows);

int main ()
{
  unsigned int array[10] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
  printIt(array, 5);
  printf("array: %u\n", (unsigned int) array);
  printf("*array: %u\n", *array);
  printf("&array[3]: %u\n", (unsigned int)&(array[3]));
  printf("*(array + 3): %u\n", *(array + 3));

  return 0;
}

void printIt(unsigned int *ptr, int rows)
{
  int i;

  printf("Address Contents\n");

  for(i = 0; i < rows; i++)
  {
    printf("%8u %5u\n", (unsigned int ) (ptr + i), *(ptr + i));
  }

  printf("\n");
}
```

2) Study the following C program carefully.

```
#include <stdio.h>

#define MAX_NUMS 5

static unsigned IsEven(int n);

/* Main program */

int main()
{
  int i;

  for (i = 1; i <= MAX_NUMS; ++i)
  {
    if (IsEven(i))
    {
      printf("Value = %5u %5d\n", IsEven (i), i);
    }
  }

  return 0;
}

static unsigned IsEven(int n)
{
  static int sum = 0;

  sum += n;
  printf ("Sum = %i\n", sum);

  return (n % 2 == 0);
}
```

a) What is the output from executing the above program?

b) What is the purpose of the #define statement and who does it create work for: (1) the compiler, (2) the linker, (3) the loader?

c) What is the purpose of using static in a function prototype?

d) What is the purpose of using the static in front of a variable name within a function?

3) Which of the following C program segments will produce an error. If an error occurs, explain why.

a)

```
int j, *k = &j;
```

b)

```
int *k;
int l = 5;
*k = l;
```