

I. Decide the theta notation θ for the following expressions: (50%)

1. $3n + 2$
2. $6n^2 + 2n - 5$
3. $3n^2 + 2n \log n$
4. $2 + 4 + 6 + 8 + \dots + 2n$
5. $\theta(n^2) + \theta(n^3)$

II. Write the recursive equation ($T(n)$) for the run time of the following static method and solve the equation in terms of n . (25%)

```
public static int factorial(int n)  
{  
    if (n == 0)  
        return 1;  
    else  
        return n * factorial(n-1);  
}
```

III. Find the answer for factorial (5) by drawing a stack method. (25%)