What are the recurrence equations of the time complexity of the following algorithms. (Here A is an array of integers and p and r are its indices; moreover, assume that $\boldsymbol{n = r - p + 1}$).

(i)

```
Algo_1(A, p, r)
     if p<r
          q=(p+r)/2
          Algo_1(A, p, q)
          Algo_1(A,q+1,r)
          q=(p+q)/2
          Algo_1(A, p, q)
          Algo_1(A,q+1,r)
          for i=p to q
               j=i+1
```

$T(n) =$ _____

(ii)

```
Algo_2(A, p, r)
     if p<r
          q=n/3                  // Recall n=r-p+1
          Algo_2(A, p, p+q)
          Algo_2(A,p+q+1,r)
          for i= 1 to n/2
               for j = 1 to n
                    k = i*j
```

$T(n) =$ _____

(iii)

```
Algo_3(A, p, r)
     if p<r
          q=n/4
          Algo_3(A, p, p+q)
          Algo_3(A, p+q, r)
          Algo_3(A,p+3q+1,r)    // Note that it is 3q
```

$T(n) =$ _____

(iv)

```
Algo_4(A, p, r)
     if p<r
          q=n/100
          Algo_4(A, p, p+q)
          Algo_4(A,p+3q+1,r)
          for i= 1 to n^2
               for j = 1 to n
                    k = i*j
```

$$T(n) = \_\_\_\_\_$$

(v)

```
Algo_5(A, p, r)
     if p<r
          q=n/10
          Algo_5(A, p, p+q)
          Algo_5(A,p+5q+1,r)
          for i= 1 to n^(1/2)
               for j = 1 to n
                    k = i*j
```

$$T(n) = \_\_\_\_\_$$