

## LAB MANUAL

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## EXPERIMENT NO. 1

**Aim:** Preparation of detailed estimate of building (using long wall and short wall method).

**Requirement:** given plan and section of building, find out the length of long wall and length of short wall, etc.

**Procedure:**

1. Longer walls in a building are considered as long walls and measured from out to out.
2. Shorter walls in a building are considered as short wall and measured from in to in.
3. These lengths of long wall and short wall are multiplied separately by the breadth and height of the corresponding layer and added to get quantity and it changes according to area.
4. Find length of long and short wall.
5. First calculate centre to centre lengths individually from the plan.

**Calculation:**

1. Length of long wall=parallel to x-axis=(c/c distance +width of Item).
2. Length of short wall=parallel to y-axis=(c/c distance-width of item).

**Precaution:**

1. All units of item of works are correct.
2. Calculation should be done carefully.

**Result:** Total quantity of all item of work is.....

## EXPERIMENT NO. 2

**Aim:** preparation of detailed estimate of building (using center line method).

**Requirement:** given plan and section of building, find out the length of long wall and length of short wall, etc.

**Procedure:**

1. In this method total length of wall is equal to sum of length of long wall and length of short wall.
2. These total length of walls are multiplied by the breath and height of the corresponding layer and added to get quantity.

**Calculation:**

Total centre Length of walls = centre length of long wall + centre length of short wall.

**Precaution:**

3. All units of item of works are correct.
4. Calculation should be done carefully.

**Result:** Total quantity of all item of work is.....

### EXPERIMENT NO. 3

**Aim :** Analysis of rate (for concrete work).

**Requirement:** given the grade of concrete, rate of cement, rate of sand, rate of coarse aggregate, rate of labor, etc.

**Procedure:**

1. Find out the quantity of cement.
2. Find out the quantity of sand.
3. Find out the quantity of coarse aggregate.
4. Find total rate.

**Calculation and formula:**

1. 1 bag cement =  $0.0345 \text{ m}^3 = 50 \text{ kg} = 34.5 \text{ liters}$ .
2.  $1 \text{ m}^3$  of wet concrete =  $1.54 \text{ m}^3$  of dry concrete.
3. Total rate = rate of material + rate of labor.

**Precaution:**

1. All units of item of works are correct.
2. Calculation should be done carefully.

**Result:** Total rate of concrete work is.....

## EXPERIMENT NO. 4

**Aim:** Analysis of rate (for brick work).

**Requirement:** given the size of bricks, rate of cement ,rate of sand,, rate of labor rate of brick ,etc.

### Procedure:

1. Find out the quantity of cement.
2. Find out the quantity of sand.
3. Find total no. of bricks used.
4. Find total rate.

### Calculation and formula:

1. 1bag cement= $0.0345\text{m}^3 = 50\text{kg} = 34.5\text{liters}$ .
2. vol. of 1 brick with mortar (nominal size) = $200\text{mm} * 100\text{mm} * 100\text{mm}$ .
3. vol. of 1 brick without mortar (actual size) = $190\text{mm} * 90\text{mm} * 90\text{mm}$ .
4. Total rate =rate of material +rate of labor.

### Precaution:

1. All units of item of works are correct.
2. Calculation should be done carefully.

**Result:** Total rate of bricks work is.....

## EXPERIMENT NO. 5

**Aim :** Analysis of rate (for plaster work).

**Requirement:** given the size of bricks, rate of cement ,rate of sand,, rate of labor ,etc.

### Procedure:

1. Find out the quantity of cement.
2. Find out the quantity of sand.
3. Find total no. of bricks used.
4. Find total rate .

### Calculation and formula:

1. 1 bag cement =  $0.0345 \text{ m}^3 = 50 \text{ kg} = 34.5 \text{ liters}$ .
2. vol. of 1 brick with mortar (nominal size) =  $200 \text{ mm} \times 100 \text{ mm} \times 100 \text{ mm}$ .
3. vol. of 1 brick without mortar (actual size) =  $190 \text{ mm} \times 90 \text{ mm} \times 90 \text{ mm}$ .
4. Total rate = rate of material + rate of labor.

### Precaution:

1. All units of item of works are correct.
2. Calculation should be done carefully.

**Result:** Total rate of bricks work is.....

## EXPERIMENT NO. 6

**Aim :** Estimation of quantity of reinforcement(for beam) .

**Requirement:** given the details of reinforcement (for column ,beam ,slab ,etc.).

**Procedure:**

1. Find out the quantity of bent up bars.
2. Find out the quantity of stirrups.
3. Find out the quantity of hanger/top bars.
4. Find total quantity and rate.

**Calculation and formula:**

1. Length of straight bar=overall spans +length of hooks.
2. Hook length (for one end) = $9 \times \text{dia. of bar}$ .
3. Hook length (for both end) = $18 \times \text{dia. of bar}$ .
4. Total rate =rate of material + rate of labor.

**Calculation table:**

| SN. | DESCRIPTION | NO. | LENGTH (m) | BREATH(m) | HEIGHT(m) | QUANTITY(kg) |
|-----|-------------|-----|------------|-----------|-----------|--------------|
|     |             |     |            |           |           |              |
|     |             |     |            |           |           |              |

**Precaution:**

1. All units of item of works are correct.
2. Calculation should be done carefully.

**Result:** Total rate of steels work is.....

## EXPERIMENT NO. 7

**Aim :** preparation of approximate estimate for road project.

**Requirement:** given the details of road work (like GL, natural surface level, gradient, side slopes, change of level, etc.)

**Procedure:**

1. Find out the cutting area.
2. Find out the filling area.
3. Find out the volume of cutting.
4. Find out the volume of filling.
5. Find out the total volume of cutting and filling.

**Calculation table:**

| SN. | ROAD | DISTANCE(M) | CUT AREA (M <sup>2</sup> ) | MEAN AREA(M <sup>2</sup> ) | LENGTH(M) | CUTTING VOLUME(M <sup>3</sup> ) |
|-----|------|-------------|----------------------------|----------------------------|-----------|---------------------------------|
|     |      |             |                            |                            |           |                                 |
|     |      |             |                            |                            |           |                                 |

Formula used:

1. Area =  $(p/4)*d$
2. Area of trapezoidal section =  $(b+ b)$

**Precaution:**

1. All units of item of works are correct.
2. Calculation should be done carefully.

**Result:** Total rate of road work is.....



## EXPERIMENT NO. 8

**Aim :** Estimating cost of building on plinth area method.

**Requirement:** given the details of building works and there rates.

**Procedure:**

1. Find out the total area of building (including walls, verandah, corridors ,etc.)
2. Find out the total area and cost.
3. Find out other costs (water supply ,electricity ,special services).
4. Find grand total.

**Calculation and formula:**

1. Total area/plinth area=carpet area +corridor +stair +walls +etc.

**Calculation table:**

| SN. | DESCRIPTION | LENGTH(m) | BREATH(m) | HEIGHT(m) | QUANTITY(kg) |
|-----|-------------|-----------|-----------|-----------|--------------|
|     |             |           |           |           |              |
|     |             |           |           |           |              |

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**Precaution:**

1. All units of item of works are correct.
2. Calculation should be done carefully.

**Result:** Total cost of building is.....