**UNIT 1 ESTIMATE OF BUILDINGS**

**TWO MARKS**

1. **Mention the types of arches. (April/May 2017)**

The common types of arches are Circular, pointed and parabolic. The various types of arches used in construction are segmental arch, flat arch, semicircular arch, bell arch, corbelled arch, skewed arch, foil arches etc.

1. **What are the methods of estimate? (Nov/Dec 2016, May/June 2013)**
   1. Detailed estimate
   2. Abstract estimate
2. **What are the types of estimate? (Nov/Dec 2012)**
   1. Preliminary Estimate or Rough cost estimate
   2. Plinth area estimate
   3. Cube Rate Estimate or Cubical Content Estimate
   4. Approximate Quantity Method Estimate
   5. Detailed Estimate or Item Rate Estimate
   6. Revised Estimate
   7. Supplementary Estimate and Revised Estimate.
   8. Annual Repair or Maintenances Estimate
   9. Supplementary Estimate
3. **Briefly explain about preliminary Estimate.**

The estimate which prepared using any rough method to get the approximate cost construction anticipated in a project is called an approximate or rough estimate. Since this estimate is normally prepared in the preliminary estimate.

1. **Estimate the quantities of brickwork and plastering required in a wall 4m long, 3m high and 30 cm thick. Calculate also the cost if the rate of brickwork is Rs.32.00 per cu.m and of plastering is Rs. 8.50 per sq.m**

Quantities of brickwork = LxBxH = 4m x 3m x 0.30m

= 3.6 cu.m

Quantity of plastering (two faces) = 2 x 4m x 3m = 24sq.m

Cost of brickwork =3.6 x 320.00 = Rs.1152.00

Cost of plastering = 24x 8.50 = Rs.204.00

Total cost =1152.00 + 204.00 = Rs.1356.00

1. **Define detailed estimate**

The estimate, which provides the item wise quantities of works, item wise unit rates and item wise expenditure anticipated in the project/construction, is called a detailed estimate

1. **Define Abstract estimate**

This is the third and final stage in a detailed estimate. The quantities and rates of each item of work, arrived in the first two stages, are now entered in an abstract form. The total cost of each item of work is now calculated by multiplying the quantities and respective rates.

1. **Define quantity surveyor**

A qualified or experienced person who does the above mentioned works (taking off, squaring, abstracting and billing) is called a quality surveyor

1. **Write the duties of quantity surveyor*.*** 
   1. Preparing bill of quantities (Taking off, squaring, Abstracting and billing)
   2. Preparing bills for part payments at intervals during the execution of work.
   3. Preparing bill of adjustment in the case of variations ordered during the execution of work
   4. Giving legal advice in case of court proceedings
2. **Write the essential qualities of a good surveyor*.*** 
   1. The quality surveyor must be well versed with the drawings of work.
   2. He should be able to read the drawing correctly and bill the quantities accurately
   3. He should have a thorough knowledge of the construction procedure to be adopted, the various items of works involved in the execution: and the different materials to be used in the work.
   4. He should be able to prepare schedule to be priced by tenderer.
3. **Define estimate. (May/June 2014)**

An estimate is a computation or calculation of the quantities required and expenditure likely to be incurred in the construction of a work. The estimate is the probable cost of a work and is determined theoretically by mathematical calculation based on the plans and drawing and current rates.

1. **Write the recommendation for degree of accuracy in measurements.** 
   1. Dimensions of works shall be measured to an accuracy of 0.01 m
   2. Thickness of R.C works shall be measured to an accuracy of 0.0005 m
   3. Areas of works shall be calculated to the nearest 0.01 m2
   4. Volumes of work shall be calculated to the nearest 0.01 m3
   5. Volumes of wood shall be calculated to the nearest 0.001 m3
2. **Briefly explain about revised estimate the estimate, which is prepared**

• When any major change or alteration is made in the plan / structural arrangement, with or without affecting the estimate cost, and

When the estimated cost is likely to exceed by more than 5% during execution, due to increase in the cost of materials and labour or due to increase in the cost of materials and labour or due to alterations in the items of works to get the revised quantities /rates/ amount is called a revised estimate

1. **Calculate the quality of brickwork in an arch over a 1.80m span opening. The arch is 40cm.thick and the breath of a wall is 40 cm.**

Radius of the arch =1.8m Thickness of arch = 40 cm The breath of wall = 40cm Mean dia = 3.60+0.40 = 4 m Mean length of the arch given = 1/6 \*(22/7)\* 4 = 2.1m Quantity of brickwork = 2.1\*0.40\*0.4 = 0.34cu.m

No of bricks required = 0.34cu.m @ 550 bricks per cu.m = 187

1. **Define Floor area**

It defined as covered area i.e plinth area excluding area of walls (generally 10% -15 %) sills of the doors are not included in floor area. The floor area of very storey shall be measured separately.

1. **Define Carpet area (Nov/Dec 2016)**

This means area in a building which is useful one i.e area of drawing room, dining room bedroom etc. Areas of kitchens, staircase, stores, verandahs, entrance hall, bathroom, basement etc. are excluded. It is generally 50% to 60% of the plinth area.

1. **Define Plinth area (May/June 2014, Nov/Dec 2015)**

It is defined area of a building measured at floor level. It is measured by taking external dimensions excluding plinth offset if any.

1. **What are the methods of taking out estimates?** 
   * Centre line method
   * Crossing method
   * Out to Out and in to in method
   * Bay method
   * Service unit method
2. **Briefly explain about Out to Out and in to in method. (Nov/Dec 2015)**

This method is most practicable under all circumstances and is generally followed in the P.W.D for computing the quantities of various items.

1. **Briefly explain about bay method.**

This method is useful and is generally followed in case of buildings having several bays. The cost of the typical bay is worked out and is then multiplied by the number of bays in that building. The extra cost for the end walls and difference in framing, if there is any, should be made, so as to arrive at the correct cost

1. **Workout the quality of stone metal required for 2Km.Length for wearing coat of a 4m wide road. The thickness of the metal road required is 12cm loose.**

Solution

Quality of metal = 1 X 2 X 1000 X 4 X 0.12 = 960.00cu.m

1. **Calculate the quality of earthwork for the construction of an approach road**

Length = 1Km

Width of formation = 10 m

Height of embankment = 60 cm

Side slope = 1:2

Solution

Quantity of earth work = L (Bd+Sd2)

B=10cm; d =0.60m; S = 2

Quantity of earth work = 1000 x (10 x 0.60) +2 x 0.60 x 0.60 = 6720 cu.m

1. **What are the methods of measurements of earthwork?**

The work shall be measured as given below

* Each dimension shall measured nearest to 0.01
* Area shall be worked out nearest to 0.01 m2

Volume shall be worked out nearest to 0.01 m3

1. **Briefly explain about Out to Out and in to in method. (April/May2015)**

This method is most practicable under all circumstances and is generally followed in the P.W.D for computing the quantities of various items.

**24.** **Mention the types of arches. (Nov/Dec 2014)**

The common types of arches are Circular, pointed and parabolic. The various types of arches used in construction are segmental arch, flat arch, semicircular arch, bell arch, corbelled arch, skewed arch, foil arches etc.

**25**. **List the materials used for handrails. (Nov/Dec 2014)**

It is a rail that is designed to be grasped by the hand so as to provide stability or support. Some of the materials used are wood, iron, steel and aluminum.

26. **How accurate should measurements be? (April/May2015)**

The degree of closeness between measurements of a quantity and that quantity’s actual (true) value. The measurement of a system can be accurate but not precise, precise but not accurate or both or neither. It can be hard to discover a quantity’s true value, so the more the sample size is increased, the closer we can get to correctly identifying a quantity’s true val

**SIXTEEN MARKS**

1. **Estimate the quantities of the residential building from the given drawings**

**(April/May 2017)**

**Method of building estimate**

Estimate the quantities of the following items of residential building from the given drawings

(1) Earth work in excavation in foundation (2) Lime concrete in foundation (3) First class brickwork in 1: 6 cement sand motor in foundation and plinth (4) 2.5 cm Damp proof course and (5) First class brickwork in lime motor in superstructure

**Centre to centre lengths of wall**

For estimate it is convenient to find centre to centre lengths of different walls first. The centre to centre lengths of different walls have been worked put below:-

**Drawing and left hand side bed room combined**

c. to . c long walls = 6.00+ 4.00 + 30 + 2 x 15 = 10.60 m

c . to c short walls = 5. 00 + 2 x 15 = 5.30 m

**Bed rooms right side (both combined)**

c. to . c long walls = 5. 00+ 4.00 + 30 + 2 x 15 = 9.60 m

c. to . c short walls = 4. 50 + 2 x 15 = 4. 80 m

**front verandah**

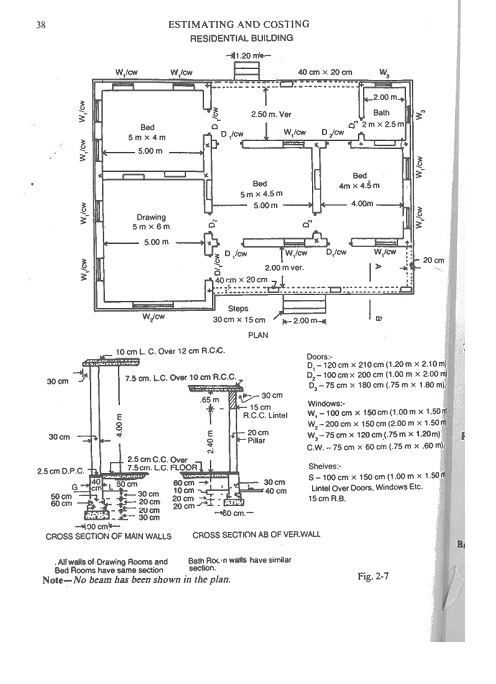
Front wall c. to . c length = 5.00 + 4.00 + 2 x 30 + 30/2 – 20-2 = 9.65 m

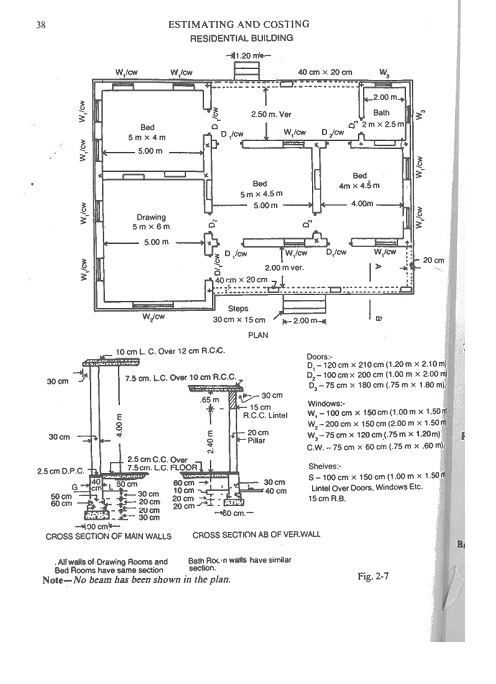
Side wall c. to . c length = 2.00 + 15 + 10 = 2.25 m

**Back verandah including bath room**

c. to . c long wall (rear wall including bath room) 9.65 m same as front ver. Wall

c. to. C length side wall of bath room = 2.50 + 15 + 10 = 2.75 m





Doors:



Windows:-



Shelves:-



Linsol Over Doors, Windows Etc.

15cm R. B

All walls of drawing rooms and bath roc n walls have similar section bed rooms have same section

Note”- No beam has been shown in the plan

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Particulars of items | No | Length | Breath | Height of Depth | Quantity | Explanatory note | |
| 1. | **Earth work** in excavation foundation Drawing rooms and left bed room | | | | | | | |
|  | Long walls | 2 | 11.50m | .90m | 1.00m | 20.70 | L= 10.60 + 90 = 11.50m | |
|  | Short walls | 3 | 4.40m | .90m | 1.00m | 11.88 | L = 5.30 - .90 = 4.40m | |
|  | Bed rooms right side (both) - | | | | | | | |
|  | Long walls | 2 | 9.60m | .90m | 1.00m | 17.28 | L = 9.60 – 45+45 = 9.60m | |
|  | Short walls | 2 | 3.90m | .90m | 1.00m | 7.02 | L = 4.80 – 90 = 3.90 m | |
|  | Front verandah Front long walls | 1 | 9.50m | .60m | .50m | 2.85 | L = 9.65 – 45+30 = 9.50m | |
|  | Side long walls | 1 | 1.50m | .60m | .50m | 0.45 | L = 2.25 – 45 – 30 = 1.50m | |
|  | Back verandah including bath room | | | | | | | |
|  | Long wall (rear wall including bath) | 1 | 9.50 | .60m | .50m | 2.85 | | L = 9.65 – 45+30= 9.50 m |
|  | Short walls (remaining walls of batch) | 2 | 2.00m | .60m | .50m | 1.20 | | L = 2.75 – 45 – 30 = 2.00m |
|  |  |  |  |  | Total | 64.23 cu m | |  |
| 2. | **Lime concrete** in foundation – Drawings and left bed and left bed room | | | | | | | |
|  | Long walls | 2 | 11.50m | .90m | .30m | 6.21 | L same as for earthwork in excavation | |
|  | Short walls | 3 | 4.40m | .90m | .30m | 3.56 |  | |
|  | Ber rooms right side (both) | | | | | | | |
|  | Long walls | 2 | 11.50m | .90m | .30m | 5.18 | L same as for earthwork in excavation | |
|  | Short walls | 2 | 3.90m | .90m | .30m | 2.11 |  | |
|  | Short walls front verandah Front long wall | 1 | 9.70 | .60m | .20m | 1.16 | L = 9.65- 25 + 30 = 9.70m | |
|  | Side short wall | 1 | 1.70m | .60m | .20m | .20 | L = 2.25-25+30 = 1.70m | |
|  | Back verandah, including bath room | | | | | | | |
|  | Long wall including bath | 1 | 9.70m | .60m | .20m | 1.16 | L = 9.65 – 25+30 = 9.70m | |
|  | Short wall(remaining walls of bath) | 2 | 2.20m | .60m | .20m | 0.53 | L = 2.75-25+30 =2.20m | |
|  |  |  |  |  | Total | 20.11 cu m |  | |

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| S.No | Particulars of items | No | | Length | Breadth | Height of Depth | Quantity | Explanatory note |
| 3. | **1st class brick work** in foundation and plinth in 1:6 cement mortar Drawing and left bed room Long walls | | | | | | | |
|  | 1st footing | | 2 | 11.20m | .60m | .20m | 2.69 | L = 10.60+.60 = 11.20m |
|  | 2nd footing | | 2 | 11.10m | .50m | .20m | 2.22 | L = 11.20 – 2 x 0.5 = 11.10m |
|  | Plinth wall above footing | | 2 | 11.00m | .40m | .90m | 7.92 | L = 11.10-.10 = 11.00m |
|  | Short walls  1st footing | | 3 | 4.70m | .60m | .20m | 1.69 | L = 5.30 - .60 = 4.70m |
|  | 2nd footing | | 3 | 4.80m | .50m | .20m | 1.44 | L = 4.70 + 2x 0.5 = 4.80m |
|  | Plinth wall above footing | | 3 | 4.90 | .40m | .90m | 5.29 | L = 4.80+10 = 4.90m |
|  | Bed rooms right side (both)  Long walls | | | | | | | |
|  | 1st footing | | 2 | 9.60m | .60m | .20m | 2.31 | L = 9.60 – 30+30 = 9.60m |
|  | 2nd footing | | 2 | 9.60m | .50m | .20m | 1.92 | L = 9.60 – 25+25 = 9.60m |
|  | Plinth above walls | | 2 | 9.60m | .40m | .90m | 6.91 | L = 9.60-20+20 = 9.60m |
|  | Short walls  1st footing | | 2 | 4.20m | .60m | .20m | 1.01 | L = 4.80 – 60 = 4.020m |
|  | 2nd footing | | 2 | 4.30m | .50m | .20m | 0.86 | L = 4.20 + 2 x 0.5 = 4.30m |
|  | Plinth wall above footing | | 2 | 4.40 | .40m | .90m | 3.12 | L = 4.30 + 10 = 4.40m |
|  | Front verandah Front wall | | | | | | | |
|  | Footing | | 1 | 9.65m | .40 | .20m | 0.77 | L = 9.65 -20+20= 9.65m |
|  | Plinth wall above footing | | 1 | 9.60m | .30m | .70m | 2.02 | L = 9.65 – 20+ 15 = 9.60 m |
|  | Side short wall footing | | 1 | 1.85m | .40m | .20m | 0.15 | l = 2.25-20-20= 1.85m |
|  | Plinth wall above footing | | 1 | 1.90m | .30m | .70m | 0.40 | L = 2.25 – 20 – 15 = 1.90m |
|  | Back verandah including bath room | | | | | | | |
|  | Long wall footing | | 1 | 9.65m | .40m | .20m | 0.77 | Length same as for front verandah long wall |
|  | Plinth wall above footing | | 1 | 9.60 | .30m | .70m | 2.02 | Length same as for front verandah long wall |
|  | Shorts walls (remaining walls of bath) | | | | | | | |
|  | Footing | | 2 | 2.35m | .40m | .20m | 0.38 | L = 2.75-20-20 = 2.35m |
|  | Plinth wall above footing | | 2 | 2.40m | .30m | .70m | 1.01 | L = 2.75 – 20 – 15 = 2.40m |
| 4. | **2.5cm Damp proof course** Drawing and left bed rooms | | | | | | | |
|  | Long walls | | 2 | 11.00m | .40m | - | 8.80 | L same as plinth wall. |
|  | Short walls | | 3 | 4.90 | .40m | - | 5.88 | L same as plinth wall |
|  | Bed rooms inner side | | | | | | | |
|  | Long walls | | 2 | 9.60m | .40m | - | 7.68 | L same as plinth wall |
|  | Short walls | | 2 | 4.40m | .40m | - | 3.52 | L same as plinth wall |
|  | Verabdah pillars | | 4 | 0.50m | .30m | - | 0.75 | L = 2.20 + 2 x .15 = 2.50m |
|  | Bath room rear wall | | 1 | 2.50m | .30m | - | 0.75 | L = 2.20+2 x .15 = 2.50m |
|  | Side and inter walls | | 2 | 2.40m | .30m | - | 1.44 |  |
|  |  | |  |  |  | Total | 28.67 sq m |  |
|  | **Deduct** | | | | | | | |
|  | Door sills D1 | | 6 | 1.20m | .40m | - | 2.88 |  |
|  | Door sills D2 | | 2 | 1.00m | .40m | - | 0.80 |  |
|  | Door sills D3 | | 1 | 0.75m | 0.30m | - | 0.23 |  |
|  |  | |  | Total of deduction | | | 3.91 sq m |  |
|  |  | |  |  | Net | Total | 24.76 sq m |  |
|  |  | |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Particulars of items | No. | | Length | Breadth | Height of Depth | Quantity | Explanatory note |
| 5. | **1st class brick – work in super structure** in lime mortar – Drawing and left bed room | | | | | | | |
|  | Long walls | | 2 | 10.90m | .30m | 4.00m | 26.16 | L = 10.60 + .30 = 10.90m |
|  | Short walls` | | 3 | 5.00m | .30m | 4.00m | 18.00 | L = 5.30 - .30 = 5.00m |
|  | Bed room right side | | | | | | | |
|  | Long walls | | 2 | 9.60m | .30m | 4.00m | 23.04 | L = 9.60-15+15= 9.60m |
|  | Short walls | | 2 | 4.50m | .30 | 4.00m | 10.80 | L = 4.80 - .30= 4.50m |
|  | Front verandha  Front wall as solid | | 1 | 9.60m | .20m | 3.05m | 5.86 | L = 9.65 – 15+10 = 9.60m |
|  | Side wall as solid | | 1 | 2.00m | .20m | 3.05m | 1.22 |  |
|  | Back verandah including bath room | | | | | | | |
|  | Back long wall as solid | | 1 | 9.60m | .20m | 3.05m | 5.86 | L same as front veranda |
|  | Side and inter walls of bath | | 2 | 2.50m | .20m | 3.05m | 3.05 |  |
|  |  | |  |  |  | Total | 93.99 cu m |  |
|  | **Deduct –** Door openings | | | | | | | |
|  | D openings D1 | | 6 | 1.20m | .30m | 2.10m | 4.54 |  |
|  | D opening D2 | | 2 | 1.00m | .30m | 2.00m | 1.20 |  |
|  | D opening D3 | | 1 | 0.75m | .20m | 1.80m | 0.27 |  |
|  | **Window opening** | | | | | | | |
|  | W. opening W1 | | 11 | 1.00m | .30m | 1.50m | 4.95 |  |
|  | W opening W2 | | 1 | 2.00m | .30m | 1.50m | 0.90 |  |
|  | W opening W3 | | 2 | 0.75m | .20m | 1.20m | 0.36 |  |
|  | **Clerestory window** | | | | | | | |
|  | (C.W) opening | | 18 | 0.75 | .30m | 0.60m | 2.43 |  |
|  | Shelves opening | | 5 | 1.0m | .20m | 1.50m | 1.50 | Back of shelves 10cm third wall |
|  | Front veranda opening in between pillars | | 1 | 8.40m | .20m | 2.40m | 4.03 | L = 9.60 – 3x 40 = 8.40 m |
|  | Opening side | | 1 | 2.00m | .20m | 2.40m | 0.96 |  |
|  | Back veranda | | 1 | 6.80 | .20m | 2.40m | 3.26 | L = 9.60 – 2.40 - .40 = 6.80m |

Note – It may be noted that for length of long walls of right side bed rooms, half breadth on the left side has been deducted, and half breadth on the right side has been added.

For long walls of front and back verandah half breadth of main walls on the left hand side at the same level, has been deduced and half breadth of the verandah wall on the right hand side has been added to get lengths

For across walls of the rooms and side wall of front verandah, half breadth of main walls at the same level has been deduced for inner side, and half breadth of verandah wall has been deducted for the outer side to get the lengths.

1. **Explain about the types of estimates (Nov/Dec 2013)**

**The estimates may be divided in to the following categories:-**

(1) Preliminary or Approximate estimate.

(2) Rough cost estimate based on plinth area.

(3) Rough cost estimate based on cubic contents.

(4) Detailed estimate.

(5) Annual repair estimate.

(6) Special repair estimate.

(7) Revised estimate

(8) Supplementary estimate.

**Preliminary or Approximate estimate**

This estimate is prepared to decide financial aspect, policy and to give idea of the cost of the proposal to the competent sanctioning authority. It should clearly show the necessity of the proposal and how the cost has been arrived at

The calculations for approximate estimate can be done with the following data. The data can be had from a similar construction already complete in the nearby area, executed by the department.

For example: To calculate approximate estimate for a Hospital, per bed cost is calculated from the recent campleted hospital and is multiplied with the number of beds required. Similarly for a house, per square metre plinth area is calculated and is multiplied with the proposed covered area. The specifications should also be same. For a road, expenditure of per kilometer length is taken, width also plays the role.

The following documents should be attached with it.

(a) Detailed report

(b) Site plan of the proposal

(c) It should also clearly mention about the acquisition of land, Provision of electric and water supply etc.

**2. Plinth area Estimate (Based on Rough Cost)**

Plinth area of a building means Length x Breadth ( roofed portion only ) excluding plinth offsets. The estimates are prepared on the basis of plinth areas of the various buildings proposed to be constructed. The rates are being arrived at the dividing the total cost of construction with its plinth area. For example if total cost of a building is Rs. 2 lac and its plinth area is 50 sq. m. then plinth area rate =2,00,000 = Rs.4000/- per 50 sq.m.

Using this rate as basis of the next construction, approximate or rough cost of the proposal can be arrived at by multiplying the plinth area of the proposed building with this plinth area rate.

The following documents are attached with the estimate.

(a) Line plan with brief specifications.

(b) Cost of various services added i.e. electric and water supply etc.

(c) North line should be shown clearly on line plan.

1. **Cubic Contents Estimate (Based on Rough Cost)**

The cubic contents of a building means plinth area x height of the building. The height is taken from top of floor level to top of roof.

The cubic contents of the proposed building are multiplied with cubic rates arrived at for the similar construction i.e. total cost of construction divided by cubic contents = cost per cubic meter.

1. **Detailed Estimate**

After getting Administrative approval on rough cost estimate, detailed estimates are prepared.

In this, the estimate is divided in to sub-heads and quantities of various items are calculated individually.

The detailed estimate shall also provide for the cost of approach road, water supply, electric installations and acquisition of land etc, so as to call it a comprehensive estimate.

1. **Annual repair estimate**

In order to keep building and roads in perfect condition, annual repairs should be carried out as follow:-

1. In case of a building-white washing, oiling and painting of doors and windows, cement plaster repairs (inside & outside), repairs of floors etc. In no case this annual repair amount should increase more that 11/2% to 2% of the capital cost of the building.

(ii) In case of a road-filling patches, maintenance of berms etc

**6. Special repair estimate**

If the work cannot be carried out of the annual repair funds due to certain reasons resulting in the genuine increase in cost, then special repairs estimate is to be prepard. The reason of increase may be:- (i) In case of a building-opening of new doors, change of floors, replastering walls etc. (ii) In case of roads-if the whole surface is full of corrugation & patches, then the total surface is to be scarified. The old metal is taken out, consolidation by adding more metal is done and top surface is repainted.

1. **Revised estimate**

When the sanctioned estimate exceeds by 5% either due to the rate being found insufficient or due to some other reasons, a fresh estimate is prepared which is called a Revised Estimate. A comparative statement on the last page of the estimate is attached giving there in the reasons of the increase of cost in case of each item.

1. **Supplementary Estimate**

This is fresh detailed estimate in addition to the original sanctioned estimate prepared when additional works are deemed necessary during the progress of a work to supplement the original works. The abstract of cost should show the amount of the original sanctioned estimate as well as the supplementary amount of the original sanctioned estimate as well as the supplementary amount for which sanction is required.

1. **Explain the methods of taking out quantities (May/June 2014)**

The quantities like earth work, foundation concrete, brickwork in plinth and super structure etc., can be workout by any of following two methods:

1. Long wall - short wall method
   1. Centre line method.
   2. Partly centre line and short wall method.

**LONG WALL-SHORT WALL METHOD**

In this method, the wall along the length of room is considered to be longwall while the wall perpendicular to long wall is said to be short wall. To get thelength of long wall or short wall, calculate first the centre line lengths of individual walls. Then the length of long wall, (out to out) may be calculated after adding half breadth at each end to its centre line length. Thus the length of short wall Measured into in and may be found by deducting half breadth from its centre line length at each end. The length of long wall usually decreases from earth work to brick work in super structure while the short wall increases. These lengths are multiplied by breadth and depth to get quantities.

**CENTRE LINE METHOD**

This method is suitable for walls of similar cross sections. Here the total centre line length is multiplied by breadth and depth of respective item to get the total quantity at a time. When cross walls or partitions or verandah walls join with main all, the centre line length gets reduced by half of breadth for each junction. Such junction or joints are studied carefully while calculating total centre line length. The estimates prepared by this method are most accurate and quick.

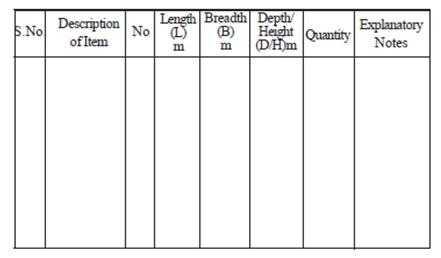
**PARTLY CENTRE LINE AND PARTLY CROSS WALL METHOD**

This method is adopted when external (i.e., around the building) wall is of one thickness and the internal walls having different thicknesses. In such cases, centre line method is applied to external walls and long wall-short wall method is used to internal walls. This method suits for different thicknesses walls and different level of foundations. Because of this reason, all Engineering departments are practicing this method.

**DETAILED ESTIMATE**

The preparation of detailed estimate consists of working out quantities of various items of work and then determines the cost of each item. This is prepared in two stages.

**I) DETAILS OF MEASUREMENTS AND CALCULATION OF QUANTITIES**

The complete work is divided into various items of work such as earth work concreting, brick work, R.C.C. Plastering etc., The details of measurements are taken from drawings and entered in respective columns of prescribed preformed. The quantities are calculated by multiplying the values that are in numbers column to Depth column as shown below:**Details of measurements form**

**ii) Abstract of Estimated Cost:**

The cost of each item of work is worked out from the quantities that already computed in the details measurement form at workable rate. But the total cost is worked out in the prescribed form is known as abstract of estimated form. 4%of estimated Cost is allowed for Petty Supervision, contingencies and Unforeseen items.

**Types of Estimates**

**ABSTRACT OF ESTIMATE FORM**



The detailed estimate should accompanied with

I) Report

1. Specification
2. Drawings (plans, elevation, sections)
   * 1. Design charts and calculations

Standard schedule of rates

1. **Explain the methods of preparation of approximate estimate (Nov/Dec 2013)**

Preliminary or approximate estimate is required for studies of various aspects of work of project and for its administrative approval. It can decide, in case of commercial projects, whether the net income earned justifies the amount invested or not. The approximate estimate is prepared from the practical knowledge and cost of similar works. The estimate is accompanied by a report duely explaining necessity and utility of the project and with a site or layout plan. A percentage 5 to 10% is allowed for contingencies. The following are the methods used for preparation of approximate estimates.

1. Plinth area method
2. Cubical contents methods
3. Unit base method.

**Plinth area method**

The cost of construction is determined by multiplying plinth area with plinth area rate. The area is obtained by multiplying length and breadth (outer dimensions of building). In fixing the plinth area rate, careful observation and necessary enquiries are made in respect of quality and quantity aspect of materials and labour, type of foundation, height of building, roofwood work, fixtures, number of storey’s etc., As per IS 3861-1966, the following areas include while calculating the plinth area of building

**Types of Estimates**

1. Area of walls at floor level.
2. Internal shafts of sanitary installations not exceeding 2.0m2, lifts, air-conditioning ducts etc.,
3. Area of barsati at terrace level: Barsati means any covered space open on one side constructed on one side constructed on terraced roof which is used as shelter during rainy

season.

1. Porches of non cantilever type.

Areas which are not to include

1. Area of lofts.
2. Unenclosed balconies.
3. Architectural bands, cornices etc.,
4. Domes, towers projecting above terrace level.
5. Box louvers and vertical sun breakers.

**Cubical Contents Method**

This method is generally used for multi-storeyed buildings. It is more accurate that the other two methods viz., plinth area method and unit base method. The cost of a structure is calculated approximately as the total cubical contents (Volume of buildings) multiplied by Local Cubic Rate. The volume of building is obtained by Length x breadth x depth or height. The length and breadth are measured out to out of walls excluding the plinth off set. The cost of string course, cornice, corbelling etc., is neglected. The cost of building= volume of buildings x rate/ unit volume

**Unit Base Method**

**Example 1.3:** Prepare an approximate estimate or rough cost estimate of a hospital buildingfor 50 beds. The cost of construction altogether for each bed is Rs. 60,000/ -. Determine the total cost of hospital building.

**Solution:**

No. of beds = 50

Cost of construction = Rs. 60,000/-

Total Cost of Hospital building = 50x 60,000= **Rs. 30,00,000/-**

1. **Prepare an approximate estimate of building project with totalplinth area of all building is 800 sqm. and from following data.**
2. **Plinth area rate Rs. 4500 per sqm**
3. **Cost of water supply @7½ %of cost of building.**
4. **Cost of Sanitary and Electrical installations each @ 7½% of cost ofbuilding.**
5. **Cost of architectural features @1% of building cost.**
6. **Cost of roads and lawns @5% of building cost.**
7. **Cost of P.S. and contingencies @4% of building**

**cost. Determine the total cost of building project**.

**Solution:**

Data given:

Plinth area = 800m2

Plinth area rate = Rs. 4500 per Sq.m

Cost of building = 800 x 4500 = Rs. 36,00,000=00

Add the cost of the water supply charges @ 71/2 %



Add the cost of sanitary and electrical installation @15%



Add the cost of architectural feature @ 1%



Add the cost of Roads Laws @5%



add the cost of P.S and contingencies @4%



Total Rs. 47, 70, 000 = 00

Assume add supervision charges 8% on over all cost



Grand total Rs. = 51,51,600 = 00

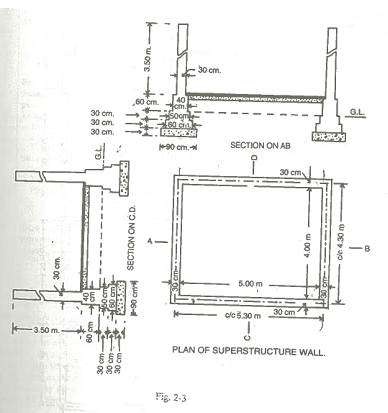
Total cost Rs. = 7,19,750, 00

1. **Estimate the quantities of the plan of superstructure wall of a single room building (May/June 2013, Nov/Dec 2012)**

**Example 3(a). –** The plan represented the plan of superstructure wall of a single room building of 5m x 4m, and section represent the cross – sections of the walls with foundation

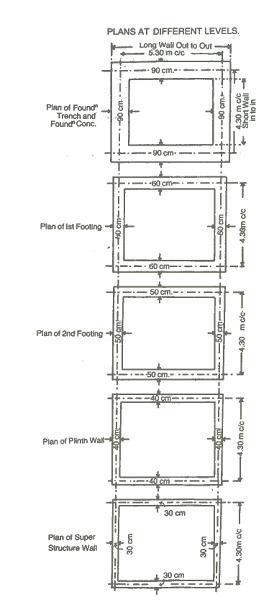
(1) Earth work in excavation in foundation, (2) Concrete in foundation, (3) Brickwork in foundation and plinth and (4) Brick work in syperstructure

The length of long wall centre to centre = 5,00 + ½ x 30 + ½ x 30 = 5.30m. The length of short wall centre to centre = 4.00 + ½ x 30 + ½ x 30 = 4.30 m



**Estimating and Costing**

To estimate the quantities, the plan of foundation trench and foundation concrete , the plan of each footing or steps of wall may be imagined as given Then the long wall in to in and the short wall in to in each part may be dealt one by one.



**Method of building estimate**

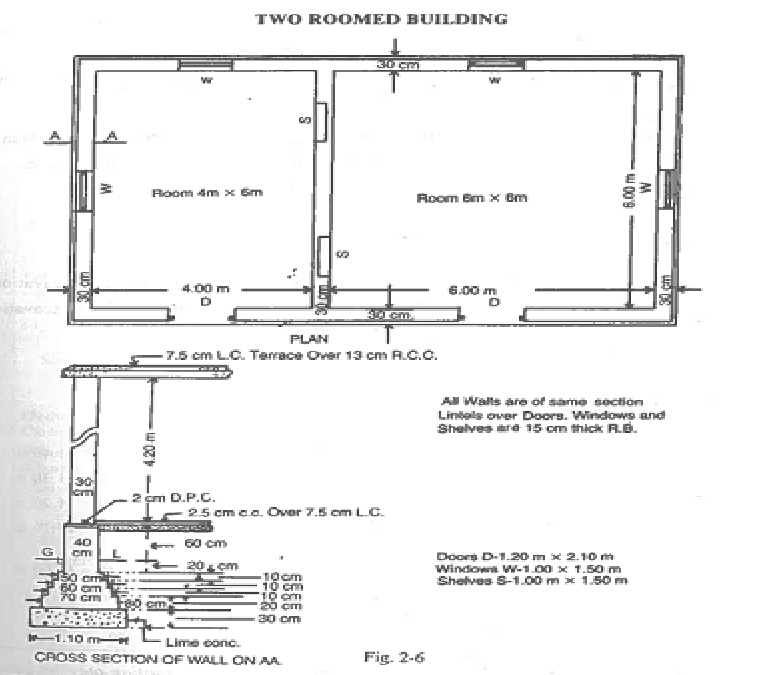
Details of measurement and calculation of quantities

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S. no | Particulars of items | No. | | | Length | Breadth | Height or Depth | Quantity | Explanatory note |
| 1 | **Earth work in excavation in foundation** | | | | | | | | |
|  | Long walls | 2 | | 6.20 m | | .90 m | .90 m | 10 .04 | Length = 5.30+ 90 = 6.20 m |
|  | Short walls | 2 | | 3.40 m | | .90 m | .90 m | 5.51 | Breadth = 4.30 - .90 = 3.40 m |
|  |  |  | |  | |  | **Total** | **15.55 cu m** |  |
| 2. | **Concrete in foundation** | | | | | | | | |
|  | Long walls | 2 | | | 6.20 m | .90 m | .30 m | 3.35 | Length same as for excavation |
|  | Short walls | 2 | | | 3.40 m | .90 m | .30 m | 1.83 | Quantity = 1/3 of excavation |
|  |  |  | | |  |  | **Total** | **5.18 cu m** |  |
| 3. | **Brick work in foundation and plinth** | | | | | | | | |
| Long walls | | | | | | | | | |
|  | 1st footing | | 2 | | 5.90 m | .60 m | .30 m | 2.13 | Length = 5.30 + 60 = 5.90 m |
|  | 2nd footing | | 2 | | 5.80 | .50 m | .30 m | 1.74 | Length = 5.30 + 50 = 5.80 m |
|  | Plinth walls | | 2 | | 5.70 m | .40 m | .60 m | 2.74 | Length = 5.30 + .40 = 5.70 m |
| Short walls | | | | | | | | | |
|  | 1st footing | | 2 | | 3.70 m | .60 m | .30 m | 1.33 | Length = 4.30 = 60 = 3.70 m |
|  | 2nd footing | | 2 | | 3.80 m | .50 m | .30 m | 1.14 | Length = 4.30 - .50 = 3.80 m |
|  | Plinth walls | | 2 | | 3.90 m | .40 m | .60 m | 1.87 | Length = 4.30 – 40 = 3.90 m |
|  |  | |  | |  |  | **Total** | **10.95 cu m** |  |
| 4. | **Brick work in superstructure** | | | | | | | | |
|  | Long walls | 2 | | 5.60 m | | .30 m | 3.50 m | 11.76 | Length = 5.30 + .30 = 5.60 m |
|  | Short walls | 2 | | 4.00 m | | .30 m | 3.50 m | 8.40 | Length = 4.30 - .30 = 4.00 m |
|  |  |  | |  | |  | **Total** | **20.16 cu m** |  |

1. **Estimate the quantities of a two room building from the given plan and section (Nov/Dec 2015)**

**Method of building estimate**

**Example –** Estimate of the following items of two roomed building from the given plan and section.

(1) Earth work in excavation in foundation (2) Line concrete in foundation (3) 1st class brickwork in cement motor 1”6 in foundation and plinth (4) 2.5 cm c.c damp proof course, and (5) 1st class brick work in lime motor in superstructure 



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S. no | Particulars of items | No | | Length | Breadth | Height of Depth | Quantity | Explanatory note |
| 1. | **Earth work** in excavation foundation | | | | | | | |
|  | Long walls | 2 | | 11.70 m | 1.10 m | 1.00 m | 25.74 | L = 10.60 + 1.10 = 11.70 m |
|  | Short walls | 3 | | 5.20 m | 1.10 m | 1.00 m | 17.16 | L= 6.30 – 1.10 = 5.20 m |
|  |  |  | |  |  | Total | 42.90 cu m |  |
| 2. | **Lime concrete in foundation** | | | | | | | |
|  | Long walls | | 2 | 11.70 m | 1.10 m | .30 m | 7.72 | Length same for excavation |
|  | Short walls | | 3 | 5.20 | 1.10 m | .30 m | 5.15 | Quantity = 3/10 of excavation |
|  |  | |  |  |  | Total | 12.87 cu m |  |
| 3. | **1st class brick work** in 1:6 cement mortar in foundation and plinth | | | | | | | |
| Long walls | | | | | | | | |
|  | 1st footing | | 2 | 11.40 m | .80 m | .20 m | 3.65 | L = 10.60+ 80 = 11.40 m |
|  | 2nd footing | | 2 | 11.30 m | .70 m | .10 m | 1.58 | L = 10.60 + 70 = 11.30 m |
|  | 3rd footing | | 2 | 11.20 m | .60 m | .10 m | 1.11 | L = 10.60+.60 = 11.20 m |
|  | 4th footing | | 2 | 11.10m | .50m | .10m | 1.11 | L= 10.60+.50 = 11.10 m |
|  | Plinth above footing | | 2 | 11.00 | .40 | .80m | 7.04 | L= 10.60+.40 = 11.00 m |
| Short walls | | | | | | | | |
|  | 1st footing | 3 | | 5.50m | .80m | .20m | 2.64 | L = 6.30-.80= 5.50 m |
|  | 2nd footing | 3 | | 5.60m | .70m | .10m | 1.18 | L = 6.30 - .70=5.60m |
|  | 3rd footing | 3 | | 5.70m | .60m | .10m | 1.03 | L = 6.30-.60 = 5.70m |
|  | 4th footing | 3 | | 5.80 | .50m | .10m | 0.87 | L = 6.30 - .50 = 5.80 m |
|  | Plinth wall above footing | 3 | | 5.90m | .40m | .80m | 5.66 | L = 6.30 - .40 = 5.90m |
|  |  |  | |  |  | Total | 26.10 cum |  |
| 4. | **Damp proof course** 2.5 cm thick c.c ---- | | | | | | | |
|  | Long walls | 2 | | 11.00m | .40m | - | 8.80 | Lengths same as for plinth |
|  | Short walls | 3 | | 5.90m | .40m | - | 7.08 | Wall in item 3. |
|  |  |  | |  |  | Total | 15.88 |  |
|  | Deduct door sills | 2 | | 1.20 | .40m | - | 0.96 |  |
|  |  |  | |  | Net | Total | 14.92 sq m |  |
| 5. | **1st class brick work** in time mortar in superstructure | | | | | | | |
|  | Long walls | 2 | | 10.90m | .30m | 4.20m | 27.47 | L = 10.60+.30 = 10.90m |
|  | Short walls | 3 | | 6.00m | .30m | 4.20m | 22.68 | L = 6.30 - .30 = 6.00m |
|  |  |  | |  |  | Total | 50.15 cu m |  |
| 6. | **Deduct** | | | | | | | |
|  | Door openings | 2 | | 1.20m | .30m | 2.10m | 1.50 |  |
|  | Window openings | 4 | | 1.00m | .30m | 1.50m | 1.80 |  |
|  | Shelves | 2 | | 1.00m | .20m | 1.50m | 0.60 | Back of shelves 10cm thick wall |
|  | Lintels over doors | 2 | | 1.50m | .30m | .15m | 0.14 | Bearing 15 cm |
|  | Lintels over windows | 4 | | 1.30m | .30m | .15m | 0.23 | Bearing 15 cm |
|  | Lintels over shelves | 2 | | 1.30 m | .30m | .15m | 0.12 | Bearing 15 cm |
|  |  |  | | Total of deduction | | | 4.40 cu m |  |
|  |  |  | |  | Net | Total | 45.75 cu m |  |

1. **Estimate the quantities of the residential building from the given drawings**

**(Nov/Dec 2015, Nov/Dec 2016)**

**Method of building estimate**

Estimate the quantities of the following items of residential building from the given drawings

(1) Earth work in excavation in foundation (2) Lime concrete in foundation (3) First class brickwork in 1: 6 cement sand motor in foundation and plinth (4) 2.5 cm Damp proof course and (5) First class brickwork in lime motor in superstructure

**Centre to centre lengths of wall**

For estimate it is convenient to find centre to centre lengths of different walls first. The centre to centre lengths of different walls have been worked put below:-

**Drawing and left hand side bed room combined**

c. to . c long walls = 6.00+ 4.00 + 30 + 2 x 15 = 10.60 m

c . to c short walls = 5. 00 + 2 x 15 = 5.30 m

**Bed rooms right side (both combined)**

c. to . c long walls = 5. 00+ 4.00 + 30 + 2 x 15 = 9.60 m

c. to . c short walls = 4. 50 + 2 x 15 = 4. 80 m

**front verandah**

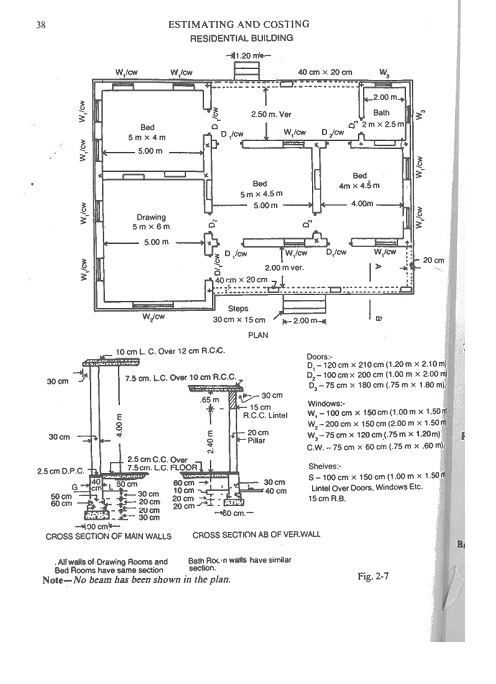
Front wall c. to . c length = 5.00 + 4.00 + 2 x 30 + 30/2 – 20-2 = 9.65 m

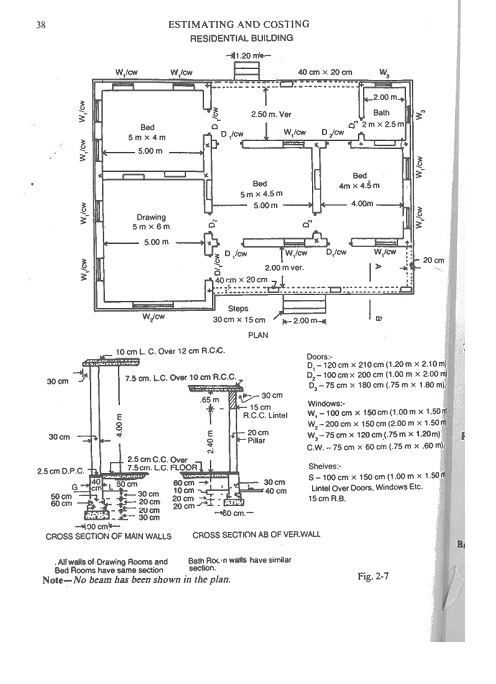
Side wall c. to . c length = 2.00 + 15 + 10 = 2.25 m

**Back verandah including bath room**

c. to . c long wall (rear wall including bath room) 9.65 m same as front ver. Wall

c. to. C length side wall of bath room = 2.50 + 15 + 10 = 2.75 m





Doors:



Windows:-



Shelves:-



Linsol Over Doors, Windows Etc.

15cm R. B

All walls of drawing rooms and bath roc n walls have similar section bed rooms have same section

Note”- No beam has been shown in the plan

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Particulars of items | No | Length | Breath | Height of Depth | Quantity | Explanatory note | |
| 1. | **Earth work** in excavation foundation Drawing rooms and left bed room | | | | | | | |
|  | Long walls | 2 | 11.50m | .90m | 1.00m | 20.70 | L= 10.60 + 90 = 11.50m | |
|  | Short walls | 3 | 4.40m | .90m | 1.00m | 11.88 | L = 5.30 - .90 = 4.40m | |
|  | Bed rooms right side (both) - | | | | | | | |
|  | Long walls | 2 | 9.60m | .90m | 1.00m | 17.28 | L = 9.60 – 45+45 = 9.60m | |
|  | Short walls | 2 | 3.90m | .90m | 1.00m | 7.02 | L = 4.80 – 90 = 3.90 m | |
|  | Front verandah Front long walls | 1 | 9.50m | .60m | .50m | 2.85 | L = 9.65 – 45+30 = 9.50m | |
|  | Side long walls | 1 | 1.50m | .60m | .50m | 0.45 | L = 2.25 – 45 – 30 = 1.50m | |
|  | Back verandah including bath room | | | | | | | |
|  | Long wall (rear wall including bath) | 1 | 9.50 | .60m | .50m | 2.85 | | L = 9.65 – 45+30= 9.50 m |
|  | Short walls (remaining walls of batch) | 2 | 2.00m | .60m | .50m | 1.20 | | L = 2.75 – 45 – 30 = 2.00m |
|  |  |  |  |  | Total | 64.23 cu m | |  |
| 2. | **Lime concrete** in foundation – Drawings and left bed and left bed room | | | | | | | |
|  | Long walls | 2 | 11.50m | .90m | .30m | 6.21 | L same as for earthwork in excavation | |
|  | Short walls | 3 | 4.40m | .90m | .30m | 3.56 |  | |
|  | Ber rooms right side (both) | | | | | | | |
|  | Long walls | 2 | 11.50m | .90m | .30m | 5.18 | L same as for earthwork in excavation | |
|  | Short walls | 2 | 3.90m | .90m | .30m | 2.11 |  | |
|  | Short walls front verandah Front long wall | 1 | 9.70 | .60m | .20m | 1.16 | L = 9.65- 25 + 30 = 9.70m | |
|  | Side short wall | 1 | 1.70m | .60m | .20m | .20 | L = 2.25-25+30 = 1.70m | |
|  | Back verandah, including bath room | | | | | | | |
|  | Long wall including bath | 1 | 9.70m | .60m | .20m | 1.16 | L = 9.65 – 25+30 = 9.70m | |
|  | Short wall(remaining walls of bath) | 2 | 2.20m | .60m | .20m | 0.53 | L = 2.75-25+30 =2.20m | |
|  |  |  |  |  | Total | 20.11 cu m |  | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Particulars of items | No | | Length | Breadth | Height of Depth | Quantity | Explanatory note |
| 3. | **1st class brick work** in foundation and plinth in 1:6 cement mortar Drawing and left bed room Long walls | | | | | | | |
|  | 1st footing | | 2 | 11.20m | .60m | .20m | 2.69 | L = 10.60+.60 = 11.20m |
|  | 2nd footing | | 2 | 11.10m | .50m | .20m | 2.22 | L = 11.20 – 2 x 0.5 = 11.10m |
|  | Plinth wall above footing | | 2 | 11.00m | .40m | .90m | 7.92 | L = 11.10-.10 = 11.00m |
|  | Short walls  1st footing | | 3 | 4.70m | .60m | .20m | 1.69 | L = 5.30 - .60 = 4.70m |
|  | 2nd footing | | 3 | 4.80m | .50m | .20m | 1.44 | L = 4.70 + 2x 0.5 = 4.80m |
|  | Plinth wall above footing | | 3 | 4.90 | .40m | .90m | 5.29 | L = 4.80+10 = 4.90m |
|  | Bed rooms right side (both)  Long walls | | | | | | | |
|  | 1st footing | | 2 | 9.60m | .60m | .20m | 2.31 | L = 9.60 – 30+30 = 9.60m |
|  | 2nd footing | | 2 | 9.60m | .50m | .20m | 1.92 | L = 9.60 – 25+25 = 9.60m |
|  | Plinth above walls | | 2 | 9.60m | .40m | .90m | 6.91 | L = 9.60-20+20 = 9.60m |
|  | Short walls  1st footing | | 2 | 4.20m | .60m | .20m | 1.01 | L = 4.80 – 60 = 4.020m |
|  | 2nd footing | | 2 | 4.30m | .50m | .20m | 0.86 | L = 4.20 + 2 x 0.5 = 4.30m |
|  | Plinth wall above footing | | 2 | 4.40 | .40m | .90m | 3.12 | L = 4.30 + 10 = 4.40m |
|  | Front verandah Front wall | | | | | | | |
|  | Footing | | 1 | 9.65m | .40 | .20m | 0.77 | L = 9.65 -20+20= 9.65m |
|  | Plinth wall above footing | | 1 | 9.60m | .30m | .70m | 2.02 | L = 9.65 – 20+ 15 = 9.60 m |
|  | Side short wall footing | | 1 | 1.85m | .40m | .20m | 0.15 | l = 2.25-20-20= 1.85m |
|  | Plinth wall above footing | | 1 | 1.90m | .30m | .70m | 0.40 | L = 2.25 – 20 – 15 = 1.90m |
|  | Back verandah including bath room | | | | | | | |
|  | Long wall footing | | 1 | 9.65m | .40m | .20m | 0.77 | Length same as for front verandah long wall |
|  | Plinth wall above footing | | 1 | 9.60 | .30m | .70m | 2.02 | Length same as for front verandah long wall |
|  | Shorts walls (remaining walls of bath) | | | | | | | |
|  | Footing | | 2 | 2.35m | .40m | .20m | 0.38 | L = 2.75-20-20 = 2.35m |
|  | Plinth wall above footing | | 2 | 2.40m | .30m | .70m | 1.01 | L = 2.75 – 20 – 15 = 2.40m |
| 4. | **2.5cm Damp proof course** Drawing and left bed rooms | | | | | | | |
|  | Long walls | | 2 | 11.00m | .40m | - | 8.80 | L same as plinth wall. |
|  | Short walls | | 3 | 4.90 | .40m | - | 5.88 | L same as plinth wall |
|  | Bed rooms inner side | | | | | | | |
|  | Long walls | | 2 | 9.60m | .40m | - | 7.68 | L same as plinth wall |
|  | Short walls | | 2 | 4.40m | .40m | - | 3.52 | L same as plinth wall |
|  | Verabdah pillars | | 4 | 0.50m | .30m | - | 0.75 | L = 2.20 + 2 x .15 = 2.50m |
|  | Bath room rear wall | | 1 | 2.50m | .30m | - | 0.75 | L = 2.20+2 x .15 = 2.50m |
|  | Side and inter walls | | 2 | 2.40m | .30m | - | 1.44 |  |
|  |  | |  |  |  | Total | 28.67 sq m |  |
|  | **Deduct** | | | | | | | |
|  | Door sills D1 | | 6 | 1.20m | .40m | - | 2.88 |  |
|  | Door sills D2 | | 2 | 1.00m | .40m | - | 0.80 |  |
|  | Door sills D3 | | 1 | 0.75m | 0.30m | - | 0.23 |  |
|  |  | |  | Total of deduction | | | 3.91 sq m |  |
|  |  | |  |  | Net | Total | 24.76 sq m |  |
|  |  | |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Particulars of items | No. | | Length | Breadth | Height of Depth | Quantity | Explanatory note |
| 5. | **1st class brick – work in super structure** in lime mortar – Drawing and left bed room | | | | | | | |
|  | Long walls | | 2 | 10.90m | .30m | 4.00m | 26.16 | L = 10.60 + .30 = 10.90m |
|  | Short walls` | | 3 | 5.00m | .30m | 4.00m | 18.00 | L = 5.30 - .30 = 5.00m |
|  | Bed room right side | | | | | | | |
|  | Long walls | | 2 | 9.60m | .30m | 4.00m | 23.04 | L = 9.60-15+15= 9.60m |
|  | Short walls | | 2 | 4.50m | .30 | 4.00m | 10.80 | L = 4.80 - .30= 4.50m |
|  | Front verandha  Front wall as solid | | 1 | 9.60m | .20m | 3.05m | 5.86 | L = 9.65 – 15+10 = 9.60m |
|  | Side wall as solid | | 1 | 2.00m | .20m | 3.05m | 1.22 |  |
|  | Back verandah including bath room | | | | | | | |
|  | Back long wall as solid | | 1 | 9.60m | .20m | 3.05m | 5.86 | L same as front veranda |
|  | Side and inter walls of bath | | 2 | 2.50m | .20m | 3.05m | 3.05 |  |
|  |  | |  |  |  | Total | 93.99 cu m |  |
|  | **Deduct –** Door openings | | | | | | | |
|  | D openings D1 | | 6 | 1.20m | .30m | 2.10m | 4.54 |  |
|  | D opening D2 | | 2 | 1.00m | .30m | 2.00m | 1.20 |  |
|  | D opening D3 | | 1 | 0.75m | .20m | 1.80m | 0.27 |  |
|  | **Window opening** | | | | | | | |
|  | W. opening W1 | | 11 | 1.00m | .30m | 1.50m | 4.95 |  |
|  | W opening W2 | | 1 | 2.00m | .30m | 1.50m | 0.90 |  |
|  | W opening W3 | | 2 | 0.75m | .20m | 1.20m | 0.36 |  |
|  | **Clerestory window** | | | | | | | |
|  | (C.W) opening | | 18 | 0.75 | .30m | 0.60m | 2.43 |  |
|  | Shelves opening | | 5 | 1.0m | .20m | 1.50m | 1.50 | Back of shelves 10cm third wall |
|  | Front veranda opening in between pillars | | 1 | 8.40m | .20m | 2.40m | 4.03 | L = 9.60 – 3x 40 = 8.40 m |
|  | Opening side | | 1 | 2.00m | .20m | 2.40m | 0.96 |  |
|  | Back veranda | | 1 | 6.80 | .20m | 2.40m | 3.26 | L = 9.60 – 2.40 - .40 = 6.80m |

Note – It may be noted that for length of long walls of right side bed rooms, half breadth on the left side has been deducted, and half breadth on the right side has been added.

For long walls of front and back verandah half breadth of main walls on the left hand side at the same level, has been deduced and half breadth of the verandah wall on the right hand side has been added to get lengths

For across walls of the rooms and side wall of front verandah, half breadth of main walls at the same level has been deduced for inner side, and half breadth of verandah wall has been deducted for the outer side to get the lengths.

1. **Estimate by Centre line method the quantities of the two roomed building**

**Estimating and Costing**

Estimate by centre line method the quantities of the following items of a two roomed building.

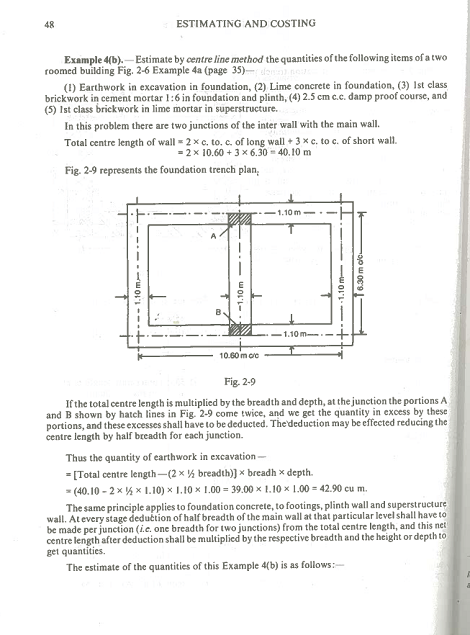
(1) Earth work in excavation in foundation (2) Lime concrete in foundation (3) 1st class brick work in cement motor 1:6 in foundation and plinth (4) 2.5 cm c.c damp proof course, and (5) 1st class brick work in lime mortar in superstructure

In this problem there are two junctions of the inter wall with the main wall

Total centre length of wall = 2 x c. to . c of long wall + 3 x c. to. C of short wall.

= 2 x 10.60 + 3 x 6.30 = 40.10 m

Represents the foundation trench plan,



If the total centre length is multiplied by the breadth depth at the junction the portion A and B shown by hatch lines. Come twice, and we get the quantity in excess by these portions, and these excess shall have to be deducted. The deduction may be effected reducing the centre length by half breadth for each junction

Thus the quantity of earth work in extraction

= [Total centre length – (2 x ½ breadth)] x breadth x depth

= (40.10 – 2 x ½ x 1.10) x 1.10 x 1.00 = 39.00 x 1.10 = 42.90 cu m.

The same principle applies to foundation concrete, to footings, plinth wall and superstructure wall. At every stage deduction of half breadth of the main wall at that particular levels shall have to be made per junction (i.e, one breadth for two junction) froms the total centre length, and this meet centre length after deduction shall be multiplied by the respective breadth and the height or depth to get quantities.

Total centre length = 40.10

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Particulars of items | No | Length | Breadth | Height or Depth | Quantity | Explanatory notes |
| 1. | Earth work in foundation | 1 | 39.00m | 1.10m | 1.00m | 42.90cu m | L = 40.10 – 2 x 0.55 = 39.00m |
| 2. | Lime concrete in foundation | 1 | 39.00m | 1.10m | .30m | 12.87cu m | L same as above |
| 3. | **1st class brick – work in 1:6 cement mortar in foundation and plinth** | | | | | | |
|  | 1st footing | 1 | 39.30 | .80m | .20m | 6.29 | L = 40.10-2 x 40 = 39.30m |
|  | 2nd footing | 1 | 39.40m | .70m | .10m | 2.76 | L = 40.10 – 2 x 35 = 39.40m |
|  | 3rd footing | 1 | 39.50m | .60 | .10 | 2.37 | L = 40.10 – 2 x 30 = 39.50m |
|  | 4th footing | 1 | 39.60m | .50m | .10m | 1.98 | L = 40.10 – 2 x 25 = 39.60m |
|  | Plinth wall above footing | 1 | 39.70m | .40m | 80m | 12.70 | L = 40.10 – 2 x 20 = 39.70m |
|  |  |  |  |  | Total | 26.10cu m |  |
| 4. | Damp proof course 2.5 cm c.c course 2.5 cm c.c | 1 | 39.70m | .40m | - | 15.88 | L = 40.10 – 2 x 20 = 39.70m |
|  | Deduct door sill` | 2 | 1.20m | .40m | - | 0.96 |  |
|  |  |  |  |  | Net | 14.92cu m |  |
| 5. | 1st classbrick work in lime mortars in super structure | 1 | 39.80m | .30m | 4.20m | 50.15 | L = 40.10 – 2 x 15 = 39.80m |
|  | Deduct door, window, shelve openings and lintels | 1 | Same page 37 | As per | Detail in | 4.40 | Deduction to be made as usual |
|  |  |  |  |  | Net | 45.75cu m |  |

Note:- The length of 2nd footing can be obtained simply by adding 10 cm (i.e, 2 x 5cm) to the length of the b1st footing, the length of 3rd footing by adding 10cm to the length of the 2nd footing and so on.

This may be compared with the solution by method I worked out in pages 36 - 37

1. **Explain report on estimate for the construction of residential building. (Nov/Dec 2015, Nov/Dec 2016, Nov/Dec 2013, Nov/Dec 2012)**

**Report On Estimates for the Construction of Residential Building.**

The detailed estimate for construction of a residential building for the Executive

Engineer at Udaynagar has been prepared in compliance of S.E.’s letter no……………. dated…………………..

There is no building for the residence of the Executive Engineer at Udaynagar and he has to live in a rented building with meager accommodation at a very high rent. It has, therefore, been proposed to construct a residential building for the Executive Engineer. The head of the accounts will be 50 civil original works, building.

The estimate provides for the following accommodation:-

One drawing room, one dining room, three bed rooms, one guest room, and the necessary store kitchen, baths, front and back verandahs and motor garage per plan enclosed.

A site has already been selected having a land of 60 m  30 m (200  100’) for the construction of the building having good soil and proper drainage and this much of land has to be acquired. The building shall be oriented to face north direction.

The building shall have lime concrete foundation and first class brick masonry with lime mortar up to plinth level and the superstructure shall be of first class brick work in cement mortar, 1 :6 Lintels shall be of R.B. work and roof shall be R.C.C with lime concrete terrace finishing. The drawing and dining rooms shall have mosaic floor and other rooms

2.5 cm(1‛) c.c. floor over 7.5 cm (3‛) lime concrete. Inside and outside walls shall be 12 mm (1/2 ‚) cement line plastered 1:1:6, and ceiling shall be 6 mm (1/2‛) cement plastered 1:3.

Inside of drawing and dining rooms shall be colour washed and inside of remaining rooms shallbe white washed and outside wall be colour washed. Doors and windows shall be 4.5

cm 13 4 "thick teak wood with chaukhat o sal wood and enamel painted. All work shall be



strictly as per detailed P.W.D. Specification.

The estimate has been prepared at P.W.D Schedule of rates, and for non-schedule items on analysis of rates. The foundation has been designed for a safe load of 9 tonne per sq m (8 ton per sq ft) and the R.C.C roof has been designed for a safe load of 150 kg per sq m (30 1bs per sq ft) with 1400 kg per sqcm (20000 1bs per sq in) as sage tensile stress of steel and 50 kg sq cm (750 1bs per sq in) as safe compressive stress of concrete. All designs and calculations have been included in the estimate. Plans and drawings and site plans are also enclosed with the estimate.

Provision has been made for electrification and sanitary and water supply works and 20% of the estimated cost of the building works ahs been included for these works. As there is no sewer line in the area a septic tank shall have to be constructed for which lump sum provision of Rs.700,00 has been made in the estimate.

Provision for compound with a gate in the front and barbed wire fencing on the sides and back, and approach road have also been made in the estimate.

A statement of important materials as cement, steel, coal, etc., which shall have to be arranged by the department is also enclosed with the estimate. A rent statement is also enclosed.

The work shall be carried on contract by inviting tenders. The work shall be completed within six months from the date of start.

The estimate work out as Rs. 5,000,00 and is submitted for sanction and allotment of

fund.