Date: 20-09-2022

Introduction

What is Estimate:-

- It is the process of calculating the Quantities and costs of the various items required in connection with the work.
- It is prepared by calculating the Quantities from the dimensions on the drawing for the various items required to complete the project and manipulated unit cost of items concerned.

Purpose of estimate:-

- To know the necessary amount of money required by the owner to complete the purposed work.
- For public construction work, estimate are required in order to obtain administrative approval, allotment of funds and technical sanction.
- To a certain Quantity of material required in order to programme their timely Procurement.
- To calculate the no of different catagories of work that are to be employed to complete the work within the scheduled time of completion.

- To assos the requirement of tools, plants and equipment required to complete the work according to the programme.
- To fix up the completion period from the volume of work involved in the estimate.
- To draw up a construction schedule and programme and also to arrange the funds required according to the programming.
- To justify the investment from benifit cost ratio.
- To invite tenders and prepare bills for payment.
- An estimate for an existing property is required for valuation.
- In general all estimates are approximate in nature and difference between the estimated cost and actual cost is vital issue which must be minimum.

Different types of Estimate

1. Detailed Estimate
2. Approximate or rough Estimate
3. Quantity estimate or Quantity survey
4. Revised Estimate
5. Supplementary Estimate

(1) A detailed Estimate:-

- This include the detailed particulars for the Quantities, rates and costs of all the items involved for satisfactory completion of a project.
- Quantities of all items of work are calculated from their respective dimensions on the drawing on a measurment sheet.
- Multiplying these Quantities by their respective rates in a separate sheet, the cost of all items of work are worked out individually and then summarised i.e abstracted (which is the detailed actual estimated cost of work.)
- All others expenses required for satisfactory completion of the project are added to the above cost to frame the total of a detailed estimate. This is the best and most accurate estimate that can be prepared.
- A detailed estimate is accompanied by (a) report
(b) specifications
(c) Details of drawings showing plans, different sections, key or index plan, etc.
(d) Design data and calculations

(e) Basic of Rates adopted in the estimate.

Such a detailed estimate is prepared for technical sanction administrative approval and also for the execution of a contract with the contractor.

(2) Approximate or rough Estimate.

This is an approximate estimate to find out an approximate cost in a short time and thus enable the authority concerned to consider the financial aspect of the scheme for according sanction to the same. Such an estimate is framed after knowing the rate of similar work and from practical knowledge in various way for various types of work such as:

(i) Plinth area or square metre Method.
(ii) Cubical rate or cubical metre method.
(iii) service unit or unit rate method
(iv) Cost method
(v) Approximate Quantities with bill method.
(vi) cost Comparison method.
(vii) cost From material and labour.

Metric system and units:

For civil Engineering work the units which are commonly used are.

(i) Metre for length
(ii) Square metre for area
(iii) Cubic metre for volume.
(iv) Kilogram for mass
(v) Litre for capacity

The sub-units are named by adding the suitable prefixes as milli (one thousandth), centi (one-hundredth) and deci (one tenth). The multiple units are named by adding the prefixes as deca (ten times), hecto (hundred times) and kilo (thousand times).

Prefix	Multiplying Factor	~~Prefix~~
Tera (T)	10^{12}	1000 000 000 000
giga (G)	10^{9}	1000 000 000
mega (M)	10^{6}	1000 000
kilo (k)	10^{3}	1000
hecto (h)	10^{2}	100
deca (da)	10^{1}	10

Prefix		Multiplying Factor
deci (d)	0.1	$= 10^{-1}$
centi (c)	0.01	$= 10^{-2}$
milli (m)	0.001	$= 10^{-3}$
micro (μ)	0.000 001	$= 10^{-6}$
nano (n)	0.000 000 001	$= 10^{-9}$
pico (p)	0.000 000 000 001	$= 10^{-12}$
femto (f)	0.000 000 000 000 001	$= 10^{-15}$
atto (a)	0.000 000 000 000 000 001	$= 10^{-18}$

Illustrations

1 kilometre = 1 km = 1×10^{3} m = 1000 metre
1 kilogram = 1 kg = 1×10^{3} g = 1000 gram
1 kilo litre = 1 kL = 1×10^{3} L = 1000 Litre
1 millimetre = 1 mm = 1×10^{-3} m = .001 m
1 milligram = 1 mg = 1×10^{-3} g = .001 gram
1 millilitre = 1 mL = 1×10^{-3} L = .001 litre

Unit of mass and Capacity:

In metric System there is simple relationship among these units - length, Capacity and weight. The capacity of a cube whose side measures as one decimetre (one-tenth of a metre) is designed as litre the standard unit of capacity. For practical purpose the weight of pure water contained in the above cube (cubic decimetre) is known as kilogram the unit of mass. The weight of 1 cubic centimetre of pure water is one gram. 1000 gram is equal to one kilogram. Litre is the volume occupied by one kilogram of pure water at the temperature of its maximum density (4°C) and under normal pressure. The prototype of kilogram is a platinum cylinder whose diameter and height are the same. viz. 39 mm.

Square measure and cubic measure:-

In engineering work square and cubic measures are very often required. Square metre and cubic metre are the standard unit for area and volume respectively. Square metre is the area equivalent to that of square of sides each equal to one metre cubic metre is the volume equivalent to that of a cube of sides each equal to one metre.

Basic SI units

1. Units of length - metre (m)
2. Units of mass - kilogram (kg)
3. Units of time - second (s)
4. Units of Electric current - Ampere (A).
5. Units of thermodynamic Temperature - Kelvin (K).
6. Unit of Luminous Intensity - Candela

Supplementary Units:

1. Plan angle - radian (rad)
2. Solid angle - steradian (sr)

Radian: One radian is the angle between two radii of a circle which cuts off on the circumference an equal in length to the radius.

Steradian: One steradian is the solid angle which having its vertex in the centre of a sphere cuts off an area of the surface of the sphere.

equal to that of square with sides of length equal to the radius of the sphere.

Derived units:-

The expressions for the derived SI units are stated in terms of the basic units, as the SI unit for velocity is metre per second (m/s). For some of the derived units special name have been adopted together with special letters symbols as the SI unit for force is newton(N). For energy is(J). For power is watt (W). etc. Some derived SI units are also expressed in terms of the units from which they are derived as the SI unit for area is square metre (m^2) for volume is cubic metre(m^3) for density is kilogram per cubic metre(kg/m^3) etc.

Date-28-09-22

① Plinth area or Square metre method.

- plinth area estimate is prepared is the basic of plinth area of building which is the area covered by internal dimension of building at the floor and level or plinth area rate of building which is the cost of which specification in the locality. plinth area estimate is otten by multiplying plinth area of the building with plinth area rate.

ex:- To we prepared plinth area estimate of 100 sqm in particular locality in plinth area rate of building in same locality is 2000 sqm methen than the area estimate is $100 \times 2000 = 200000$

Apon area courtyard etc are etc. are plinth area of building this multistored the plinth area estimate is prepared ~~separed~~ is for each floor level

Method of Estimating

Actual cost

- The actual cost of a work is known at the completion of the work. Account of all expenditure is maintained day to day during the execution of work in the account section and at the end of the completion of the

work when the account is completed the actual cost is known. The actual cost should not differ much from the estimated cost worked out at the beginning.

Detailed Estimate:-

Preparation of detailed estimate consists of working out the quantities of different items of work and then working out the cost i.e. the estimate is prepared in two stages:-

① Details of Measurements and calculation of Quantities:-

- The whole work is divided in to different items of work as earthwork, concrete, brickwork etc.
- The items are classified and grouped under different sub-heads, and details of measurement of each item of work are taken out and quantities under each item are computed in prescribed form.

Details of Measurement Form:-

Item No	Description of particulars	No	Length	Breadth	Height or Depth	Content or Quantity

② Abstract of Estimated cost:-

The cost under item of work is calculated from the quantities already computed at workable rate, and the total cost is worked out in a prescribed form. Abstract of Estimate Form. A percentage of 3 to 5 per cent is added for contingencies to allow for petty contingent expenditures, temporaries expenditures, changes in design, changes in rates, etc. which may occur during the execution of the work. A percentage of 1½ to 2 percent is also added to meet the expenditure of work-charged establishment. The grand total thus obtained is the estimated cost of the work.

Abstract of Estimate Form:-

Item No.	Description of particular	Quantity	Unit	Rate	Amount

Main items of work:-

1- Earthwork:-

- Earthwork in excavation and Earthwork in filling are usually taken out separately under different items and quantities are calculated in cubic metre.

- Foundation trenches are usually dug to the exact width of foundation with vertical sides. Earth work in excavation in foundation is calculated by taking the dimensions of each trench length x breadth x depth.
- Earthwork in plinth filling is calculated by taking the internal dimensions of the plinth wall (length x Breadth) which are usually less than the internal dimensions of the room by two off-sets of plinth width i.e. 10 cm and height is taken after deducting the thickness of concrete in floor usually 7.5 cm. Its sand filling is done in plinth. This should be taken separately. The length and breadth for each filling may be same as the internal dimensions of the room if there is no off-set in plinth wall.

2- **Concrete in Foundation:-**
The concrete is taken out in cubic metre by length x breadth x thickness. The length and breadth of foundation concrete are usually

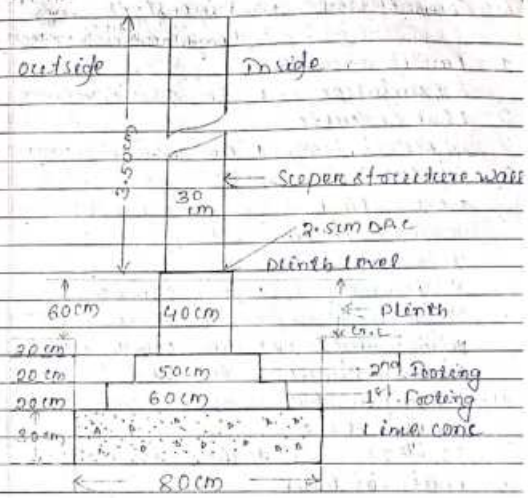
the same as for excavation only the depth or thickness differs. The thickness of concrete varies from 20 cm to 45 cm. usually 30 cm. Foundation concrete consists of lime concrete or weak cement concrete. The proportion of cement concrete in foundation may be 1:4:8 or 1:5:10.

Soling :-
When the soil is soft or bad. One layer of dry brick or stone soling is applied below the foundation concrete. The soling layer is computed in sq m (length x Breadth) specifying the thickness.

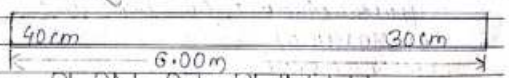
Damp Proof course :-
- D.P.C. usually of 2.5 cm. thick rich cement concrete 1:1½:3 or 2 cm. thick rich cement mortar 1:2 mixed with standard waterproofing material, is provided at the plinth level to full width of plinth wall, and the quantities are computed in sq. m. (length x Breadth).
- Usually D.P.C. is not provided at the sills of doors and verandah openings, for which deductions are made.

Masonry :-
- Masonry is computed in cu m. (Length x Breadth x Height).
- Foundation and plinth masonry is taken under one item, and masonry in superstructure is taken under a separate item.
- In storeyed building the masonry in each storey as ground floor above plinth level, First Floor, etc. is computed separately.
- In taking out quantities the walls are measured as solid and then deductions are made for openings as doors, windows etc.
- Proportions as necessary.

Date:-26-09-22



CROSS SECTION



PLAN AT PLINTH

Item No.	Description of items of work	No.	Dimensions Length	Breadth	Height or depth	Quantities of contents	Total quantities
1	Earth in excavation in Foundation	1	6m	0.8m	0.9m	4.32	4.32 m^3
2	Lime Concrete in Foundation	1	6m	0.8m	0.3m	1.44	1.44 m^3
3	1st class brick work in lime mortar in Foundation and plinth.						
	1st Footing	1	6m	0.6m	0.2m	0.72	
	2nd Footing	1	6m	0.5m	0.2m	0.60	
	plinth wall upto G.L	1	6m	0.4m	0.2m	0.48	3.24 m^3
	Plinth wall above G.L	1	6m	0.4m	0.6m	1.44	
4.	2.5 cm Damp proof course (D.P.C) C.C 1:1½:3	1	6m	0.4m	-	2.4	2.4 m^2
5.	First Class Brick Work in lime mortar For Superstructure.	1	6m	0.4m	3.50m	6.3	6.3 m^3
6.	12mm plaster of cement sand 1:6						
	Inside	1	6m	—	3.5m	21.0	
	Outside including 10 cm below G.L	1	6m	-	4.2m	25.2	46.2 m^2
7	White washing 3 coats inside	1	6m	-	3.5m	21.0	21.0 m^2

Item No.	Description of items of work	No.	Dimensions Length	Breadth	Height or depth	Quantities of contents	Total quantities
8	Colour washing 2 coats over one coat of white washing (out side above G.L).	1	6m	-	4.1m	24.6	24.6 m^2

Abstract of Estimated cost (Ex:2)

Item No.	Description of items of work	Quantity	Unit	Rate Rs.	per	Amount Rs.
1	Earthwork in excavation in Foundation	4.32	m^3	350	%. m^3	15.12
2	Lime concrete in Foundation with white lime, Surkhi and broken ballast 1:4:4	1.44	m^3	220	%. m^3	316.8
3	1st class brick work with white lime and Surkhi mortar 1:2 in Foundation and plinth.	3.24	m^3	300	%. m^3	972
4	2.5 cm thick C.C 1:1½:3 DPC with water Proofing Compound	2.4	m^2	20	%. m^2	48
5	1st class Brick work with white lime and Surkhi 1:2 mortar in Superstructure	6.3	m^3	320	%. m^3	2016
6	12 mm cement and local sand plaster 1:6	46.2	m^2	8.5	%. m^2	392.7
7	White washing 3 coats	21	m^2	0.75	%. m^2	15.75

Item No.	Description of items of work	Quantity	Unit	Rate Rs.	per	Amount Rs.
8	Colour washing 2 coats over one coat of white washing.	24.6	m^2	0.82	%. m^2	20.1
	Total - 3796.5					
	Add for contingencies 3% - 113.9					
	Add for Work charged Establishment 2% - 75.9					
	Grand Total - 3986.3					

Date - 27.09.2022

1) ⇒ Estimate the quantities of the following items of a two room building from the given plan & section.

① Earth work in excavation in Foundation
② Lime Concrete in Foundation.
③ 1st class brick work in cement mortar 1:6 in Foundation and Plinth.
④ 2.5 cm C.C DPC and
⑤ 1st class brick work in lime mortar in Superstructure.

TWO ROOM BUILDING

Formula :- Long wall

* Long wall length out-to-out centre to centre length + ½ breadth and one side + ½ breath on other side.

Cont wall length in to in + centre to centre length - one breadth.

Long wall length to centre to centre length.

Item No.	Description of items of work	No.	Dimensions Length	Breadth	Height or depth	Quantities of contents	Explanatory note
							Long wall c/c Length = 4+6+0.3 $\times \frac{0.3}{2}$ = 10.6 m.
							Short and inter wall c/c Length = 6+2$\times \frac{0.3}{2}$ = 6.3 m
1	Earth work in excavation in Foundation						L = 10.6 + $\frac{1.10}{2}$ + $\frac{1.10}{2}$ = 11.70 m
	Long wall	2	11.70	1.10	1m	25.74	L = 6.3 - 1.10 *
	short wall	3	5.2	1.10	1m	17.16	= 5.2 m
					Total	42.90	cum
2.	Lime concrete in Foundation						Length same for excavation Quantity = 3/10 excavation.
	Long wall	2	11.70	1.10	0.3	7.72	
	Short wall	3	5.2	1.10	0.3	5.14	
						12.87	cum
3.	1st class brick work in C.M cement mortar in Foundation & Plinth						
	Long wall						
	1st Footing	2	11.4	0.8	0.2	3.65	L = 10.6 + $\frac{0.8}{2}$ + $\frac{0.8}{2}$ = 11.4 m
	2nd "	2	11.3	0.7	0.1	1.58	L = 10.6 + $\frac{0.7}{2}$ + $\frac{0.7}{2}$ = 11.3
	3rd "	2	11.2	0.6	0.1	1.34	L = 10.6 + $\frac{0.6}{2}$ + $\frac{0.6}{2}$ = 11.2
	4th "	2	11.1	0.5	0.1	1.11	L = 10.6 + $\frac{0.5}{2}$ + $\frac{0.5}{2}$ = 11.1
	Plinth wall						
	Above Footing	2	11	0.4	0.8	7.04	L = 10.6 + $\frac{0.4}{2}$ + $\frac{0.4}{2}$ = 11

S/no	Description of items of work	No	Length	Breadth	Depth	Quantity	Explanatory note
	Short wall						
	1st Footing	3	5.5	0.8	0.2	2.64	L=6.3-0.8=5.5m
	2nd Footing	3	5.6	0.7	0.1	1.17	L=6.3-0.7=5.6m
	3rd Footing	3	5.7	0.6	0.1	1.03	L=6.30-0.6=5.7m
	4th Footing	3	5.8	0.5	0.1	0.87	L=6.30-0.5=5.8m
	plinth wall above Footing	3	5.9	0.4	0.8	5.66	L=6.30-0.4=5.9m
4	Damp Proof course 2.5cm thick c.c -						
	long walls	2	11.00	0.4	—	8.8	Lengths same as for plinth wall item 3.
	short walls	3	5.9	0.4	—	7.08	
					Total	15.88	
	deduct door sills	2	1.2	0.4	—	0.96	
					Net Total	14.92 sq.m	
5	1st class brick work in line mortar in Superstructure						
	long walls	2	10.9	0.3	4.2	27.47	L=10.60+0.3=10.9
	short walls	3	6.0	0.3	4.2	22.68	L=6.3-0.3=6.0
					Total	50.15 cum	
	Deduct						
	Doors Openings	2	1.2	0.3	2.1	1.51	Shelve thick-ness is 10cm.
	window openings	4	1.0	0.3	1.5	1.80	
	Shelves	2	1.0	0.2	1.5	0.6	
	Lintel over doors	2	1.5	0.3	0.15	0.14	Bearing 15cm
	Lintels over windows	4	1.3	0.3	0.15	0.23	Bearing 15cm
	Lintels over shelves	3	1.3	0.3	0.15	0.12	Bearing 15cm
					Total of deduction	4.48	
					Net total	45.75	

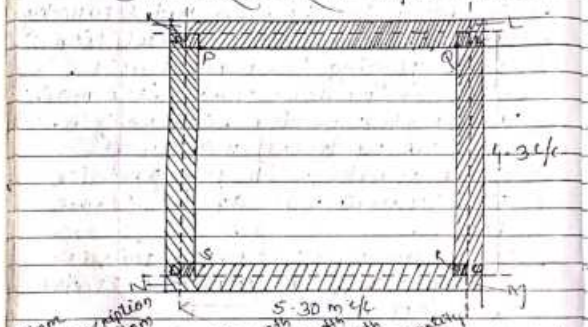
Date-14-10-22

Centre Line Method

- In this Method of Estimation the total centre length of a walls in a building is Part calculated then the centre line length which Multiplied with the breadth & depth of the respective items to gake the total Quantity at a time.
- The centre line length of different section of wall in a building sell be work out separately For varanda wall or partition wall joining the main walls.. the centre line joining the main walls, the centre line length. sell be reckoned main wall that joints with the partition of varanda wall at the same level.
- The numbers of secsch join is stradies Part to open the centre line length.
- By using this Method estimation can be finished more quickly. This Method is as applied as other Method (except on comendrical walls). This Method is suitable used for estimating embankment.

rectangle, Hexagonal, octagonal etc have window.

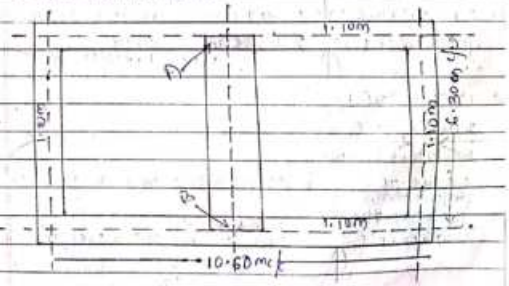
Example 3(b) - Estimate by centre line Method the Quantities of the following items of a single room building of example 3a of Earthwork in excavation in Foundation
(2) Concrete in Foundation
(3) Brickwork in Foundation and plinth and
(4) Brick work in superstructure.



S/no	Description of items	No	Length	Breadth	Depth	Quantity	Explanatory note
1	Earthwork in excavation in Foundation	1	19.20	0.9	0.9	15.55	Total centre length of all walls = 19.20 m
2	Concrete in Foundation	1	19.20	0.9	0.3	5.18	
3	Brick work in						

Foundation and plinth						
1st Footing	1	19.2	0.6	0.3	3.46	
2nd Footing	1	19.2	0.5	0.3	2.88	
plinth wall	1	19.2	0.4	0.6	4.61	
				Total	10.95 cum	
4 Brickwork in Superstructure	1	19.2	0.3	3.50	20.16	Doors and windows Opening, lintels etc. to be deducted

Example 4(a) - Estimate by centre line Method the Quantities of the following items of a two roomed building.
1. Earthwork in excavation in Foundation
2. Line concrete in Foundation
3. 1st class brickwork in cement mortar 1:6 in Foundation and plinth.
4. 2.5 cm c.c. damp Proof course, and
5. 1st class brickwork in line mortare in Superstructure.



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Item No	Particulars of Items	No	Length	Breadth	Depth	Quantity	Explanatory notes
1	Earthwork in excavation in foundation	1	39.0	1.10	1.0	42.90	Total centre length = 40.10, L = 40.10 − 2 × $\frac{1.10}{2}$ = 39.00 m
2	Lime concrete in foundation	1	39.0	1.10	0.3	12.87	L same as above
3	1st class brick-work in 1:6 cement mortar in foundation and plinth -						
	1st footing	1	39.3	0.8	0.2	6.29	L = 40.10 − 2 × $\frac{0.8}{2}$ = 39.3
	2nd footing	1	39.4	0.7	0.1	2.76	L = 40.10 − 2 × $\frac{0.7}{2}$ = 39.4
	3rd footing	1	39.5	0.6	0.1	2.37	L = 40.10 − 2 × $\frac{0.6}{2}$ = 39.5
	4th footing	1	39.6	0.5	0.1	1.98	L = 40.10 − 2 × $\frac{0.5}{2}$ = 39.6
	Plinth wall above footing	1	39.7	0.4	0.8	12.70	L = 40.10 − 2 × $\frac{0.4}{2}$ = 39.7
						Total = 26.10 cum	
4	DPC 2.5 cm c.c	1	39.7	0.4	–	15.88	L = 40.10 − 2 × $\frac{0.4}{2}$ = 39.7
	deduct door sill	2	1.2	0.4	–	0.96	
						Net = 14.92 cu m	
5	1st class brick-work in lime mortar in super-structure	1	39.8	0.3	4.2	50.15	L = 40.10 − 2 × $\frac{0.3}{2}$ = 39.8
	deduct door, window, shelve opening and lintels	1	same as page 37	detail in		4.40	Deduction to be made as
						Net = 45.75 cu.m	

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Date-15-10-22

1m = 1000 mm 1mm = $\frac{1}{1000}$ mt

1m = 100 cm

1cm = 10 mm

1' feet = 12" Inch

1" Inch = 2.54 cm = 25.4 mm

1' feet = 30.48 cm = 304.8 mm

1m = 3.28 feet

$1m^2 = 10.764\ feet^2$

$1m^3 = 35.28\ feet^3$

1 yard = 3 feet

$1\ yard^2 = 9\ feet^2$

12" = 1'

1" = $\frac{1}{12}$ = 0.83 feet

2" = $\frac{2}{12}$ = 0.166 feet

3" = $\frac{3}{12}$ = 0.25

4" = $\frac{4}{12}$ = 0.33

5" = $\frac{5}{12}$ = 0.416

6" = $\frac{6}{12}$ = 0.5

7" = $\frac{7}{12}$ = 0.583

8" = $\frac{8}{12}$ = 0.66

9" = $\frac{9}{12}$ = 0.75

10" = $\frac{10}{12}$ = 0.833

11" = $\frac{11}{12}$ = 0.916

12" = $\frac{12}{12}$ = 1

Ex:- 1'4" x 2'9" x 3'8"

= 1.333 x 2.75 x 3.666 = 13.44 cubic feet

Ex:- 1'4" x 2'9" x 3'8"

$\left(\frac{12+4}{12}\right) \times \left(\frac{12\times2+9}{12}\right) \times \left(\frac{12\times3+8}{12}\right)$

$= \frac{16}{12} \times \frac{33}{12} \times \frac{44}{12} = 13.44\ feet^3$

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Ex:- 1'6" x 1'7"

$= \left(\frac{12+6}{12}\right) \times \left(\frac{12+7}{12}\right)$

$= \left(\frac{18}{12}\right) \times \left(\frac{19}{12}\right) = 2.37$

Weight Measurement of steel

Density of steel = $7850\ kg/m^3$ * 1 ton = 1000 kg

1 ton = 1000 kg 1 kg = $\frac{1}{1000}$ ton

Density of steel = $7.85\ t/m^3$ 7850 x $\frac{1}{1000}$ = $7.85\ t/m^3$

1 kg = 9.81 ≃ 10 N * 1 kg = 10 N

Density of steel = $78500\ N/m^3$

Let take = L = 1

Total wt of steel = Volm x Density = 1 x A

wt of steel per unit Length

= Area x Density

$= \frac{\pi}{4} d^2 \times 7850\ kg/m^2$

$= \frac{\pi}{4}\left(\frac{d}{1000}\right)^2 \times 7850\ kg/m^2$ $(1000)^2 = 10,00000$

$= \frac{\pi}{4}\left(\frac{d^2}{10^6}\right) \times 7850$

$= 0.785\left(\frac{d^2}{10^6}\right) \times 7850$

$= \frac{d^2}{162.19}\ kg/m^3$

$= 0.00617 d^2\ kg/m^2$

Dia of Bar	wt per unit length
6 mm	0.222 kg/m^3
8 mm	0.394
10 mm	0.616
12 mm	0.887

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Dia of Bar	wt per unit length
16 mm	1.578
20 mm	2.466
25 mm	3.853
28 mm	4.833

Date-18-10-2022

Q 1'6" x 1'7"

=> 1.5 feet x 1.583 feet

= 2.37 sq feet

Unit Measurement

Earth work	unit
1- Earth work in excavation in Hard and Ordinary soil Rock	m^3
2- Earth filling in foundation & plinth	m^3
3- Earth work in Borrow pit & depth of is not exist 30 cm	m^2
4- Surface dressing in Leveling	m^2
Miscelaneous	
1- G.I sheets, A.C sheets	m^2
2- All type of floor wall	m^2
3- Centring and shuttering	m^2
4- Plaster work, Painting work, White washing colorings, vernish, distemper	m^2
5- Jungle clearing	m^2
6- Glazing work	m^2
7- Electric work	points
8- Cronic work	running meter

Brick work
1. Brick work in Foundation plinth, superstructure, with 9 inch thickness or more — m^3
2- Brick work in Arch — m^3
3- Reinforcement brick work (R.B) — m^3
4- Brick work in Rain place Chulha, Chimney — m^3
5- Brick work in String coarse — Running meter
6- Honey comb brick work — m^2
7- Brick work in partition wall, Half wall — m^2
8- Brick work in capping — Running meter
9- Brick rising Scaffing — Running meter

Steel work
1- Rolled steel Joist (R.S.J) (I.C section) — Quintal
2- Steel reinforcement wall — Quintal
3- Bending wire — Quintal
4- Bending of steel Fabrication — Quintal
5- Grassed plate, Thread Part washer, removed bolt — Quintal
6- Fabric reinforcement wire netting — Quintal

Iron work
1- Iron gate — m^2
2- Rolling Shutter — m^2

3- T-door, T-window, Iron wire — m^2
4- Iron railing — m
5- C.T pipe (cast Iron pipe) — Running m
6- Wire Finishing — Running m
7- Iron work in roof truss — Quintal

Stone Work
1- Random rubble stone masonry Foundation — m^3
2- Stone reseed in lintel work in beam — m^3
3- Stone rising slab roof, selves, stone chhajja, wall Fencing stone reseed — m^2
4- Stone rising wall Fencing — m^2

Wood Work
1- Wood work in door, window, Frame, beam, roof truss — m^3
2- Door, window, batten panel wall — m^2
3- Timber boarding — m^2
4- Wood work in partition wall — m^2
5- Casing of timber — m^2

Concrete Work
1- Lime concrete in foundation P.C.C, C.C.C.C, Pre cast concrete R.C.C chhajja — m^3
2- Lime concrete in roof terrace — m^3
3- Concrete work in Jelly — m^2
4- 2 cm thick G.C — m^2

5- Cement concrete in floor — m^2

Deduction work in plaster & Painting
- If the area to be deducted for plaster & painting walls is less than 0.5 m^2 then there will be no deduction work.
- If the area to be deducted for plaster & painting wall in between 0.5 m^2 to 2 m^2 then there will be one side deduction.
- If the area to be deducted for plaster and painting is more than 2 m^2 then deduction of both side will be done.
- There will be not deduction in less than wall in case of end of beams and at end of pole end of water, end of purlin.

Deduction in masonry wall
- No deduction if deducted is less than 0.1 m^2 (all kind)
- No deduction in arch at end of beam post rafter purlin etc. deduction bed plate wall plate opening plates.

Analysis of Rate
1. What is analysis of rate?
- The basis of arriving at a correct and reasonable rate per unit work or supply for a particular item following its specification and detailed survey of materials, labour, equipments etc. are required for the unit work and their prevailing rates may be called as an analysis of rate.
2. Purpose of rate analysis :-
- Main purposes of rate analysis are the following :-
(a) To determine the current rate per unit of an item at the locality.
(b) To examine the viability of rates offered by contractors.
(c) To correlate the quantity of material and labour strength, required for project planning and.
(d) To fix up labour contract rates.
3- How to fix up rate per unit of an item :-
- A unit means unit of rate viz. cum of brick work, R.C.C work, concrete work etc). The following five sub-heads are estimated and a summation of these is the rate per unit of an item.
(a) Quantity of materials and cost.
(b) Laborer cost.

(c) Costs of equipments or Tools and Plant (T and P),
(d) Overhead or establishment charges (including incidental) and
(e) Profit.

(a) Quantity of materials and cost:-
- The estimator takes off the quantities of various materials required per unit quantity of an item following the detailed specification and calculates costs from local market rates.

Quantities of materials are these required per unit rate of work delivered at work site and its cost include Direct cost, Freight, transportation, sales-tax and insurance charges as applied in question. In case when materials like cement, steel, stone chips and bitumen are supplied departmentally, then profit on the cost of materials is not allowed but cost of carriage from godown to work site shall be added.

(b) Labour cost:- To obtain labour costs the number and wages of the different categories of labourers, skilled, and unskilled, namely mason or carpenter, Mazdoor, boy etc. required for each unit of

work should be known and this number is to be multiplied by the respective wage per day (or per hour).

(c) Cost of equipments Tools and plant (T&P)
Wherever possible the cost of equipments and ordinary T. & P. These are required for general use should be spread over those items of rates for which it is allocated to specific item of rate. For example, the cost of operating a concrete mixer should be spread over those items of rates for which it is used. For certain tools and plants it is difficult to allocate their use to an individual item of rates and it is therefore, suggested to add costs in such cases of expenditure to Over-head i.e. establishment charges.

Special Tools and plants:-
- For big work or project it becomes necessary to use special type of tools and plants, viz, Special type of concrete mixing machines named as Batching plants, special type of mixed concrete transport vehicles named as Tipping wagon or Dumpers, Cranes etc. are in use. To order to purchase such type of special

equipments an amount 1% to 1½% of the estimated cost is provided in the estimate.

(d) Over head or Establishment charges
- This includes such items as office rent and depreciation of its equipments, salaries of office staff, postage, lighting, travelling, telephone account, plan and specification etc. small tools, planks, ladders, ropes and such hand tools as the contractor provides for his workmen should also be included in the Overhead charge as suggested in (c) This is usually 2½% of the net cost of a unit of rate and may rise up to 5%.

Overhead charges increase if the progress of a project is delayed. Overhead charges may be divided under two categories:
(A) General Overheads and
(B) Job Overheads.

(a) General Overheads:-
- A contractor firm need to maintain office throughout the year irrespective to running works in hand. At times there may be no work or several works under execution

But general expenses to maintain the office have to be borne and all such expenses are considered general overheads such as:
(i) Salaries of office staff:
(ii) Purchase of stationery articles, Printings, postages, repairs etc.
(iii) Office rent:
(iv) Telephone and electric bills.
(v) Travellings etc:
and all such expenses required to run the office. General Overhead is a recurring known expenditure and does not depend on the volume of work under execution. This account is spread proportionately on all work in a year. A Construction Firm has to bear such expenditure even though there is no work in hand. For a big firm general Overhead is high. On the other hand small firms require nominal general Overhead. Any amount for such expenses can not be recovered from the work. Volumes of work can be executed with proportionally low general Overhead establishment.

(B) Job Overheads :-

These are the nature of expenses directly incurred to construct a job or project such as

1- Salaries of all personnels (technical or non-technical) engaged for the work.
2- Temporary sheds or horse and godown rents for the work.
3- Small tools, planks, ladders, ropes and hand tools as the contractor provides for his workmen.
4- Repairs and depreciation for Tools and plant.
5- Lighting at site
6- Mobilization of establishments, Tools and plant.
7- Public relations.
8- Labour welfare and safety measures.
9- Workmen's compensation, Insurance etc.
10- Interest on investment.
11- Theft or loss etc.

All (with other expenses required till the work is completed and handed over to the owner for which no separate payment is received by a contractor against the work. Job overhead

is not a known expense, depends on the volume of work under execution when there be no work no expense is required. In case there be idle labour or maintenance due to owner's fault recovery of expenses for such part of job overhead becomes possible.

c- Profit :-

Generally a profit of 10% should be considered reasonable for ordinary contracts after allocating all charges of equipments, establishments etc. For small Jobs 15% profit and for large Jobs 8% profit should be considered as reasonable.

The method of preparation of an analysis of rate has been based on all India standard schedule of rates which is documentary and prepared by the National Building Organisation and U.N. Regional Housing centre ESCAP (India). The conference of state Housing Ministers held at Bhopal during October 1975 has recommended that the standard schedule of rates being a

necessary adjunct to the National code should also be adopted by all construction agencies in the country. There may be some variations between the prevailing practice and the provisions made in the analysis of rates but All India standard schedule of rates" may be considered as authentic and a basic document.

Water Charge :-

- For drinking purpose of the workers and for the work, arrangement of water either by sinking tube well or by taking temporary water connection from the corporation or Municipality becomes necessary. In order to meet up the expense an amount of 1% of the total cost of materials and labour has been provided in the analysis of rate as per provision made in the standard Analysis of rates.

Factors effecting the rate analysis :-

- The rate of an item of work mainly depends on the following factors :-

(i) Specification of the item which indicates the quality and proportion of materials, the Methods of construction and Protection of work.
(ii) The present rate of materials for the item of work upto the worksite.
(iii) Daily wages of different categories of labourers at the locality with their respective outputs.
(iv) The range of lead and lift required for deposition of materials to carry out the item of work.
(v) Percentage charge for overheads which includes insurance and the possibility of theft of loss etc.
(vi) The range of profit and availability of water in connection with the construction work.

Beside these the site Organisation and cost-control during execution etc. should be considered as these factors affect the cost per unit of work done at site.

not complete
Deduct 2 to 3

Date: 21-10-2022

$1m^3 = 500$ Brick

Density of steel = 7.85 ton/m^3

78.50 KN/m^3

Es = 2.500 Gpa

$= 2.50 \times 10^3$ N/mm^2

Grade of Cement

O.P.C - Ordinary portland cement

1- 33 Grade

2- 43 Grade

3- 53 Grade

* Weight of 1 bag 50kg

No of bag in 1 ton = 20

20 bag = 1m^3

1 bag = $\frac{1}{20}$ volume = 0.0347m^3

$1m^3$ = 1000 Litre

1 bag = 0.0347 × 1000 = 43.70 litre

- specific gravity 3.15

* Density of cement = 1440 kg/m^3

Nominal mix (Grade be volume)

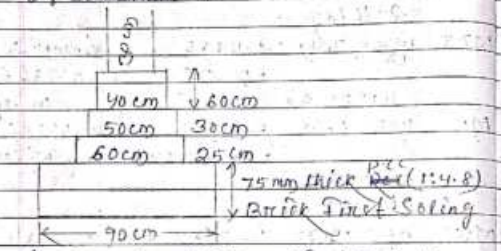
N/mm^2	kg/cm^2	ratio: cement sand aggregates
M5	M50	1:5:10
M7.5	M75	1:4:8
M10	M100	1:3:6
M15	M150	1:2:4
M20	M200	1:1½ (1.05):3
M25	M250	1:1:2

Dry volume of cement (1.52, 1.55)

cement = Dry volume / sum of ratio

Grade	No of cement required for 1cum con	sand required for 1cum con	Aggregate required for 1cum con
M5	1.55/16 = 0.096 cum	0.096 × 5 = 0.48 cum	0.96 × 10 = 0.96 cum
	0.096 × 30 = 2.90 bag		
M7.5	1.55/13 = 0.119	0.119 × 4 = 0.476	0.119 × 8 = 0.952 cumaggg
	0.119 × 30 = 3.57		
M10	1.55/10 = 0.115	0.155 × 3 = 0.465 cum	0.155 × 6 = 0.93 cum
	0.155 × 30 = 4.65		
M15	1.55/7 = 0.22	0.22 × 2 = 0.44	0.22 × 4 = 0.88
	0.22 × 30 = 6.6		
M20	1.55/4.5 = 0.344	0.344 × 1½ = 0.172	0.344 × 3 = 1.032
	0.344 × 30 = 10.32		
M25	1.55/4 = 0.387	0.387 × 1 = 0.387	0.387 × 2 = 0.774
	0.387 × 30 = 11.625		

- In nominal mixed of concrete the volume of constant M5, M10, M20, represents strength of 28 Ds.
- The 28th days of concrete is known as chanact characteristics strength of concrete.



- In the above Figer find out the Qreantity P.C.C per unit length

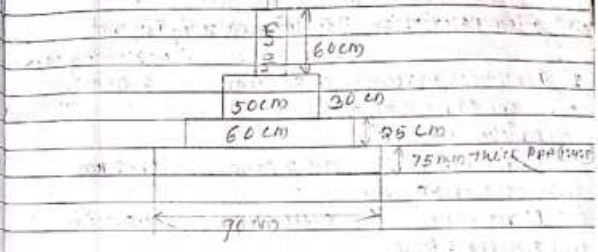
L = 1m

B = 90 cm = 0.9m

D = 75cm = 0.075m

P.C.C = 1 × B × h = 0.0675m^2

Dry unit cement	Sand	Aggregate
1.55/13 = 0.119	0.23 × 4 = 0.92	0.23 × 8 = 1.84m^3
= 0.23 m^3		
Beg = 0.23 × 30 = 6.9		



* In above Fig Find Out the Qreantity of P.C.C per unit Length

- Qreantity of P.C.C L × b × h

= 1m × 0.9m × 0.75m

Qreantity = 0.0675 cm

Qreantity of B.R.S = L × b × h

= 1 × 0.90 × 0.10 = 0.090 cum

cement Beg = Dry volume / sum of the ratio × P.C.C

= 1.65/13 × 0.067 = 0.22

* Dry volume of different type of Items:

Sl no	Item Description	Dry volume for 1m^3 wet mix	Dry volume of 10^{3} work
1	P.C.C Work C.C @ 1:5:10 to 1:5:5 all types of concrete work excluding c.c Floor.		15.2 to 15.5

★ Dry volume of Brick masonary and stone Masonary.

S.no	Item description	For 1m³ masonary work	For 10m³ masonary work
1	For brick masonary	0.30 cum	3.0 cm
2	Stone masonary		
(i)	Random Rubble Masonary	0.42 cum	4.2 cm
(ii)	Coursed Rubble Masonary	0.40 cum	4.0 cum
(iii)	Ashlar stone masonary	0.25 cum	2.5 cum

S.no	Item description	For 1m² Area	For 100 m² Area
1	12 mm thick plaster work	0.02 m3 or (0.196) cum	2.0 m³ or 1.96 cum
2	Pointing work	0.006 m³	0.60 m³
3	2.5 cm thick C.C Floor	0.0425 m³	4.125 m³
	5 cm thick C.C Floor	0.0825 m³	8.250 m³
	7.5 cm thick C.C Floor	0.12375 m³	12.375 m³

★ Qreantity of cement, Sand Brick masonary : 30 dry volume

cement - Dry volume
Sum of the ratio

Mortar ratio
For 1 m³ mix

	Cement	Sand
1:6	0.30 / 7 × 0.42 × 30 = 1.26 Bag	0.25 cm
1:5	0.30 / 6 × 0.050 × 30 = 1.50	0.25 cm
1:4	0.30 / 5 × 0.60 × 30 = 1.80	0.24 cm
1:3	0.30 / 4 × 0.75 × 30 = 2.25	0.22 cm

Dry volume = 0.02 cm

★ Qreantity of cement, Sand for 12 mm thick plaster :

Qreantity of cement, Sand
= cement = Dry volume × 2
Sum of ratio

Mortar ratio
For 100m² plaster Area

	Cement	Sand
1:6	2 = 0.285 cum Bag = 0.285 × 30 = 8.55 Bag	1.71 cum
1:5	0.33 cum No of Bag = 9.90	1.65 cum
1:4	0.40 cum No of Bag = 12	1.60 Cum

1:3	0.50 cum No of Bag = 15	1.50 cum
1:2	0.666 cum No of Bag = 19.80	1.33 cum

★ Work done per day per mason for a particular item.

S.no	Item description	Work done per day per mason
A	Brick Item	1.50 cum
(i)	Brick work in Foundation and plinth with Mud mortar	
(ii)	Brick ~~wate~~ work in super Structure mud mortar	1.25 m³
(iii)	Brick work in Foundation and plinth (sub-structure) with lime or cement mortar	1.25 m³
(iv)	Brick work in super structure with lime Mortar and cement	1 m³
(v)	Brick work in Arched	0.55 m³
(vi)	R.B. Work (Reinforced Brick Work)	1 m³
(vii)	Brick work in partition wall - Half brick wall 4½ wall	5.0 sqm

S.no	Item Description	Work done per day per mason
B	Stone Masonary Work	
(i)	Random Rubble stone Masonary	1.0 cum
(ii)	Coarse rubble stone Masonary	0.80 cum
(iii)	Ashlar Stone Masonary	0.40 cum
(iv)	Stone masonary in Arch	0.40 cum
C	C.C.C = Cement Concrete Work	
(i)	Lime Concrete or cement Concrete (P.C.C) in Foundation and Floor	8.5 Cum
(ii)	Lime Concrete in roof terracing	6.0 Cum
(iii)	1:2:4 C.C Work	5.0 Cum
(iv)	R.C.C Work	5.0 Cum
(v)	2½ - thick C.C. Floor	7.5 Sq meare meter
D	Earth Work c/w items	
(i)	Earth Work in excavation in rock	1.0 m³
(ii)	Earth Work in excavation	2.0 m³
(iii)	Earth Work in excavation	3.0 m³
(iv)	Earth Work Filling in plinth of Foundation	4 m³

E Miscellaneous Item	
(i) 12 m thick plaster work	8.0 square meter
(ii) pointing work	10.0 Square meter
(iii) white washing or colour washing in single coat (layer)	250 square meter
(iv) white washing or colourne washing in double coat	110 to 105 Square meter
(v) white washing or colour washing in three coat	70 square meter
(vi) Painting on distemper for larger surface area	25 square meter
(vii) painting on distem per varnish in glass window frame	0.5 m²

For labour requirement for different type of work
National Building Organization

S.NO	Work	Quantity of work	Labour requirement
1	Earth work in excavation in foundation for ordinary soil	28.30 m³ (1000 cft)	Beldar = 6 nos Mazdoor = 4 nos

Note: Earth work calculation
standard lead = 30 m
standard lift = 1.5 m consider

2 Earthwork filling in foundation and plinth	28.30 m³ (1000 cft)	Beldar: 3 Mazdoor: 2 Bhisti: ½
3 cement concrete works	2.83 m³ (100 cft)	Beldar: 2 Mazdoor = 2 Bhisti = ¾ Mason = ¾
4. R.C.C work	2.83 m³ (100 cft) cubic feet	Mazdoor = 3 Beldar = 3 Bhisti = 1/3
5. centering or shuttering	9.6 m²(100 kg)	Red carpenter = 4 Beldar = 4
6. reinforcement or steel work	1 quintal (100 kg)	Black smith = 1 Beldar = 1
7 stone masonary work (random rubble stone	2.83 m³(100) cft	Beldar = 3 Mazdoor = 2 Bhisti = 1/4 Mason = 3
8 Brick work	2.83 m³ (100) cft	Nill Mazdoor = 4.5 Bhisti = ½ Mason = 2.25

* Factor affecting the rate analysis:
1- Quality of Material.
2- Mix proportion of mortar content.
3- Construction Facilities available on site.
4- Location of site.

5- Transportation Charges and transportation facilities.
6. Over head Charges
7- Rate of labour or mason, Materials.

Date - 26-10-22

Valuation

- The process to known the actual cost of any properties is known as valuation. The valuation of any properties is done for following purposes.
1- Buying & selling of properties.
2- Fixation of Tax on properties
3- Rent fixation of properties.
4- security against loan properties.

Gross Income

- The income that total income from any properties is known as gross income of the property.

Net income

- The income we get after deducting the out going from gross income is known as net income.

Net income = Gross income - Outgoing

Out going: The following are the out going of any properties.

Repair: The properties needs annual repair for proper maintains and

cost from annual repair are following.
(i) 1% to 1.5% month Rent
(ii) 10% to 15% Gross income
(iii) 1% to 1.5% Total cost of project.

Taxes: The taxes of any property are as follow.
(i) Municipal Tax.
(ii) Wealth Tax
(iii) Property Tax

Management & collection charges
- To maintain any properties we need to engage staff from such as sweeper, watchman etc.
- The management cost is 5% to 10% of Gross income.

Sinking Fund

Loss of rent

Scrap value
- When the life of any structure or property ends than the income generated by dismantalling the property and selling it is known as scrap value.
- In building structure scrap value is 10% of total construction cost.

Salvage value:
- The income generated by saving a property obtain sang on it

life without dismentaling is known as ~~as~~ salvage value.
Salvage value is always positive.
Market value:
The income generated a selling any property or structure in open market at any time is known as market value.
- Market value changes time to time and depend upon demand and supply of market.

Book value
= Original cost of structure - Annual depriciation in previous years.
- After the end of life on any property the book value become = The scrap value.

Retable value
- The income which we get after deducting annual repair on maintain. From gross income is known as retable value.

Sinking Fund
- A fund from by principally setting a side money for the gradual repairment of debit or replacement of westing cost.

Annual Instalment of sinking Fund

$$I = \frac{Si}{(1+i)^n - 1}$$

S = Total sinking Fund
i = Rate of interest
n = life of structure

Q An old building has been purches as a person ~~date~~ at a cost of 35000 excluding the cost of land calculate the amount of annual sinking Fund at 4% interest rate considering the life of structure 20 year and scrap value of building 10% of the cost of purches.
- Total cost = 30,000
$i = 4\% = \frac{4}{100} = 0.04$

Scrap value = $\frac{10}{100} \times 30000 = 3000$

Sinking Fund = 30000 - 3000 = 27000

$$I = \frac{Si}{(1+i)^n - 1}$$

$= \frac{27000 \times 0.04}{(1+0.04)^{20} - 1} = 906.707$

Date - 1.11.22

Year purchase
- Year purchase is defined as the capital some required to be invested in order to recieve a renity of es Rupees 1 at certain rate of interest.

Year purchase = $\frac{100}{\text{rate of interest}}$

Q Find out the value of year purchase at 6% rat of interest.

$Y.P = \frac{100}{6} = 16.66$

Obsolescence
- When a property is created, it become out it after a sum time and value become less than property market rate. The ceiling prait of this property of

Capital cost
- Construction cost of any property of structure Land cost.

Capitalize value
- The capitalized value of a property is the amount of many whose annual interest height preveling rate interest

will be equal to the net income of the property, is called capitalized value.

Capitalize value = Y.P x Net annual income

Q Find out the value of capitalize value of a properties at 8% preveling rate of interest whose net annual income 200000

$= \frac{100}{8} \times 200000 = 25,00000$

Q A building owner received an annual fees of 100000. Total annual cost of repaired is Fees 15000. The capitalize value of the Find and capitalize value of the building at the 5% among

$\frac{100}{8} \times 9000 = 112500$

Depreciation
- The monitary value of a properties of structure decrease time due to use, were, entire or obsolens.
- This decrease on account of decreasion. There is method of of Finding decreaciation.

1- Straight line Method
2- Constant percentage Method
3- Sinking Fund Method
4- Quantity survey Method

Straight line Method

- In the Method the annual depreciation on the property each year taken same amount For each year and depreciation will be multiplied a number of year for is depreciation is be calculated.

- Annual depriciation = C-S / n
  = original cost - scrap value / life of the structure.

2- Constant percentage Method

- In this Method it is assume that the property will loss will value by % of it value at the Digining on every year.
- This Method is also known as declining balance Method.

Annual depriciation(D) = $1-\left(\frac{S}{C}\right)^{1/n}$

Sinking Fund Method

- In this Method the depreciation of the asset to be equal to the annual sinking fund + the interest on the fund for 1st year, which is supposed to be invested on interest bearing investment.
- If 'A' is the annual sinking fund and (b, c, d) etc. are present on interest in the sinking fund for subsequent year and C = Total original cost.

At the end of	depriciation for the year	Total depriciation	Book value
1st year	A	A	C-A
2nd year	A+b	2A+b	C-(2A+b)
3rd year	A+c	3A+b+c	C-(3A+b+c)
4th year	A+d	4A+b+c+d	C-(3A+b+c+d)

4- Quantity survey Method

- In this Method the properties is strogies is and loss on value due to life, wear and tear decay, obsolence etc. worked out each an every best on some logical ground with out any fixed percentage cost of the properties

Only experience value can worked out the amount of depriciation and present value of properties by this Method.

Freehold property

- A Free hold property mean that the owner is in absolute position of the property, and the owner can utilized the same line any manner he like subjected to rule of regulation of government an local authorities. He may resed the property by himself, he may grant leases on tenancies for a short period or any period.

Lease hold property:-

- It indicates the Projection of the property at the resed of it may be allowed by the originally owner (lessor) as for lease agreement. The owner of Free hold property may give permission to any other person to rese his Free hold which is known as giving property on lease. The person who takes lease is known as lease holder at the owner hold ground lease is known as lessor.

Date-4-11-22

A three-storied building is standing on a plot of land measuring 500 sq.m. The plinth area of each storey is 400 sqm. The building is of R.C.C. framed structure and the Picture life may be taken as 70 years. The building fetches a gross rent of Rs 1500. per month. Work out the capitalized of value of the property on the basis of 6% net yield. For sinking Fund 8% compound interest may be assumed. cost of land may be taken Rs. 40. per sqm. other data required may be assumed suitable.

Gross income per year = 1500 X 12 = 18,000

Out goings per year assuming suitable data

(i) Repair 1/12 of gross income
= 1/12 X 18000 = 1500

(ii) Municipal tax 20% of gross income
= 18000 X 20% = 3600

(iii) Property tax 5% of gross income
= 18000 X 5% = 900

(iv) Insurance premium 1/2% gross income
1/2 % X 18000 = 90

(v) Miscellaneous charges 2% gross income
= 2% x 18000 = 360

(vi) Management charges 6% of gross annual income
= 6% x 18000 = 1080

(vii) Sinking fund required to accumulate the cost of the building (which is the rate of Rs. 1500 per sqm. of plinth area
1500 x 3 x 150 = 180000

$= \frac{180000 \times 0.03}{(1+0.03)^{70}-1} = 780.59$

= 1500 + 3600 + 900 + 90 + 360 + 1080 + 780.59

= 8310.59

→ capitalized value
180000 = 8310.59 / 9690

= $9690 \times \frac{100}{6} = 161.500$

Total value of whole property
161.500 + 32000 = 193500

- Distress value
- when a property comes in water zone. earthy waterfall or the owner of a properties have emergency financial needs then the properties should chipen them the market value is called distress value.
- Monopoly value
- when a property should at heighen rate due to its advance feature then the value each could Monopoly value.
- Sentimental value
- when the owner is attech to a properties sentimentary then the taipto property at high way the rate often why the is called sentimental value.
- Speculative value
- Point of properties pouches so as to sale the land at anopuit after some duration, the prize pay is known as speculative value.
- Accumulation value
- value of sounding agricultural land a city which is expanding will be more if the land is converted to accumulation land after of Pruining approval from certain authority

Determine the deficiation of building
- when deficiation of building structure is calculated then average life a building structure taken 80 years.

Sl no	Life of structure	Annual Depreciation	Total Depreciation	Commulative Depreciation
1	0-5 year	zero	0	0%
2	5-10 years	1/2% per yr	2.5%	2.5%
3	10-20 years	3/4% per yr	7.5%	10%
4	20-40 years	1% per yr	20%	30%
5	40-80 years	1/2 per yr	60%	90%

Mortage Lease
- Mortage → An owner can borrow money against the security of his property, and for that purpose he is required to warrant and decreased to the party advancing the loan. The loan is required to be returned in specified time. The person who takes the loan is known as Mortgagor and the person who advances the loan is known as Mortgagee, and the relevant document for the mortgage transaction is known as mortgage deed.

Date-15-11-22

Q-1 Analysis the rate of any one of the following item by taking cost of labour as for schedule of rate 2022 of PWD and following. Material cost - cement - 380 for 1cum. qtl, sand - 120 cum, chips - 600 cum.

→ cement Rs - 440 per qtl
Sand Rs = 67.35 cum
chip Rs = 1120.89 cum
cement concrete = (1:2:4)

Sno	Description	Quantity required	Unit	Rate	Amount	Remark
1	Cement concrete (1:2:4) with 12mm size hand broken granit chips per 1cm					
(a)	Materials					
	Hand broken granit chips 12mm size	0.90 cum	cum	1120.89	1008	
	sand (screened) & washed	0.45	cum	67.35	30.30	
	cement	0.225	cum	440	2.835	
		0.225 x 15 = 3.375				

Sl no	Description	Quantity required	Unit	Rate	Amount	Remark
(b)	Laborer					
	Laborer some as per item 2 man mulia for mixing stone, sand and cement and getting water.	1.340		315	944.1	
	Mason and class 0.50			405	202.5	

Q. Find the Material and labour component required for 10 cum cement concrete (1:2:4) with graded stone chips 20mm down for 8 mm for R.C. work including curtoning and Reinforce as for OPWD course.

→ Volume = 10 cum

Dry volume = 15.2

C.C = (1:2:4)

$= \frac{15.2}{7} = 2.17$ cum

$2.17 \times 2 = 4.34$ cum

Sand $= 2.17 \times 2 = 5.34$

Chips $= 2.17 \times 4 = 8.68$

Sl no	Labour component	Quantity
1	Bhisti	$3.5 \times 2 = 7$
2	Mazdoor	$3.5 \times 2 = 7$
3	Mason	$3.5 \times \frac{3}{4} = 0.375$
	Bhisti	$2.5 \times \frac{1}{2} = 1.75$

Dsahoo 18-11-22

Date - 18-11-22

Q - Write down the unit of measurement for the item.

(i) Honey comb brick work Masonary

(ii) Reinforcement

(iii) Surface dressing

(iv) Earth work in Filling

Ans (i) Honey comb brick masonary

→ c (sqm /m²)

(ii) reinforcement

→ Quintal

(iii) surface dressing

→ m^2

(iv) Earth work in Filling

→ m^3

Q-2 What is the multiplier of the Factor Painting in both side Surface of pannelled door and that for Grillgate.

→ The multiplying factor for painting in both side surface of pannelled door & that for a Grillgate is 2.25.

Q-3 Mason the types of inclined roof available.

→ Ridge and Gable roof

(ii) Hipped roof and valley roof

(iii) Beam to roof or verandah roof etc.

Q-4 What do you mean by lead and lift.

→ Normally earth work is Estimated for both lead from distance and 1.5 m lift for height or depth, and the distance of 0.5 m once known as lead and lift.

- Normal rate for earth work is for 30m lead and 1.5m lift. For greater lead or lift the rate will be different for every unit of 30m lead and for every unit of 1.5m lift.

Q-5 What are the 2 main role of divisional accounter.

→ Main role of divisional accounter

(i) The divisional accounter play singularly vital role in Proper accounting of Public work Transaction, receipt, Amount.

- Timely advice to divisional officer.

- They have the write to send to receiver of divisional account objection book.

Q-6 Briefly Outline the duty and responsibility of Junior Engineer.

→ The Junior Engineer are directly Incharge of Works they have to look after the execution and Management of all the work in their section and there required to all work connecting store, account, and execution of work.

- They should have sufficient fund side and that plan where is advance.

- They have to stay at the site of work and supervise the work and to maintain Quality and the Progress the work.

- They have to take measurement the work done under their charge and proper bills and payment.

- In general duties of Junior Engineer may be classified and they are to control the quality of under 3 heads.
1- Work
2- Stored
3- Account

1- Work:
- They are to supervise the executing the works on building, road, etc and see the progress of work as there directly in charge.

2- Stored
- They are entirely responsible for all stocks, tools, and plants etc. To maintain the account of stocks uptodate correctly. They have save and the store properly and maintain the articles and stored with any damage.

3- Accounts
- Regarding accounts Junior Engineer has to maintain correctly with day to day receive and issue.
- The case account has to maintain regularly and submit the the same account to SDO. or executive Engg Engineer after closer is monthly basis.

Q-7. Name different Govt & public section organisation employing civil diploma holder in odisha state.
⇒ Govt organisation in odisha state are OPSC, SSC.
i) Housing wild organisation.
ii) PWD, Irrigation Department, HPC, R&D department, RWSS etc.
- Public sector organisation employing civil diploma holder in odisha state.
- Indian oil
- Hindal
- Tata
- ONGC
- OPTCL
- NALCO
- Sail
- HDL

Q-8 - write down notes on plinth area & or carpet area of building?
- Plinth area is the buildup area measure at the floor level observe of the basement or of any storey of a building.
- Plinth area of the calculating by taking the external dimension of the building excluding plinth

Observe.
- The carpet area is the floor area less the area of the following person.
- verandah, corridor, passage, entrance hole and doors, stair case and stair over canting, shaft and machine room for lift air conding duct & plant room shaft for sanitary pairing.

Q-9 Briefly discuss sunrise & over head charges.
- It is the item of work which can't be measured but it is required at site.
- A lumpsum account is copied as provision to rise expenditure such as shifting work played anything one happed.

Overhead charges
- It includes general office expenses, rent, feed, stationeries of temporary building, of paper, telephone bill, Electrics bill and postage etc.

Q-10 what is the standard weight of 12 mm diameter actual a bar of 1m 7850 kg/m³ Density.
- d = 12 mm = 0.012 m
- l = 1m
- D = 7850 kg/m³
- wt = 7850 × D · 0.00113 04 = 0.887
- volume = $\frac{\pi}{4} d^2 \times l$
- $= \frac{\pi}{4} \times (0.012)^2 \times 1$
- $= 1.1304 = 0.000113 04 m^3$ ans
  10000

Q Prepare a detailed estimate of a building from the given plan and cross-section as shown in Fig-2
(a) Earthwork excavation for foundation in hard soil.
(b) 1st class brickwork in (1:4) in foundation and plinth.
(c) 2.5 cm thick DPC of cement concrete in (1:3:6).
(d) 1st class brick work in 1:6 in super structure.
(e) 12mm thick cement plastering inside and outside the building.

⇒ Long wall
- Out to out distance of long wall = 8.4m
- centre to centre distance of long wall = $8.4 - \frac{0.3}{2} - \frac{0.3}{2}$
  $= 8.1 m$

No of long wall = 4

Long wall for Foundation (Earth filling & lime concrete) = 8.1 + 0.40 + 0.40 = 8.9m

Long wall for plinth = 8.1 + 0.20 + 0.20 = 8.5m

Long wall for brick wall = 8.1 + 0.15 + 0.15 = 8.4m

Short wall

Short wall 1 (SW1)

Cement concrete distance

SW1 = 2.4 + 0.15 + 0.15 = 2.7m

no of (W1) = 3

Short wall (SW1) = 2.7 - 0.3/2 - 0.3/2 = 2.4m

(SW2)

no of SW2 = 3

SW2 = 4.2m

(SW3)

NO OF SW3 = 2

SW3 = 1.5m

Note:-

Inner walls are having thickness = 20cm

Outer walls thickness = 30cm

Schedule:-

Doors

D = 100 × 210 = (1 × 2.1)m

D1 = 90 × 210 = (0.9 × 2.1)m

Windows:-

W = 110 × 120 = (1.1 × 1.2)m

W1 = 90 × 120 = (0.9 × 1.2)m

CW = 75 × 45 = (0.75 × 0.45)m (ventilation over door's)

CW1 = 60 × 45 = (0.60 × 0.45)m (ventilation over door's)

Shelf:-

S = 110 × 140 = (1.1 × 1.4)m (take half wall - thickness)

Date- 22-11-22

- Long wall & short wall Method

Rooms

- Back & Front long wall (2 nos)

→ 4 + 3.5 + 0.20 + 2 × 0.190/2 = 8.1m

Short wall (6 nos)

4.2 + 2 × 0.30/2 = 4.5m

Short wall (partition wall) = 4.5m

Varandah

- Entire back & Front long wall 2nos)

(2c + 0.20 + 2.5 + 2.5) + 2 × 0.25/2 = 8.2m

Front varandah short wall (2nos)

→ 1.8 + 0.20/2 - 0.20/2 = 1.85

Back varandah short wall (3nos)

2.4 + 0.3/2 + 0.2/2 = 2.65

S.No	Description / Item	No	L (m)	B (m)	H (m)	Qty	Explanatory Notes
(a)	Earth work in Excavation						
	Rooms						
	Long wall	2	8.9	0.6	0.90	12.816	Long wall c/um = 8.1 + 0.2/2 + 0.2/2 = 8.9
	Short wall	2	3.7	0.8	0.90	5.328	short wall c/um = 4.5 - 0.8 = 3.7
	Partition						
	Short wall	1	3.7	0.6	0.65	1.443	c/um
	Varandah						
	Long wall	2	8.9	0.6	0.65	6.942	
	Front short wall	2	1.5	0.6	0.65	0.117	Front short wall = 1.85 - 0.2/2 - 0.2/2 = 1.65m
	Back short wall	3	1.95	0.6	0.65	2.282	Back short wall = 2.65 - 0.3/2 - 0.2/2 = 1.95m
	Total Earth work = 29.708 c/um						
(b)	1st class brick work in cement plinth						
	Rooms						
	1st Footing	2	8.6	0.5	0.2	1.72	1st Footing Long wall 8.1 + 0.5/2 + 0.5/2 = 8.6

S.No	Description / Items	No	L (m)	B (m)	H (m)	Qty	Explanatory Notes
	plinth	3	8.5	0.4	0.9	6.12	Long wall plinth 8.1 + 0.4/2 + 0.4/2 = 8.5
	Short wall						
	1st Footing	2	4	0.5	0.2	0.80	SW1 1st Footing 4.5 - 0.5/2 - 0.5/2 = 4
	Plinth	2	4.1	0.4	0.9	2.95	SW1 Plinth 4.5 - 0.4/2 - 0.4/2 = 4.1
	Partition						
	Short wall						
	1st Footing	1	4	0.4	0.2	0.32	
	Plinth	1	4.1	0.3	0.7	0.86	
	Varandah						
	Back & Front Long wall						Back & Front varandah long wall
	1st Footing	2	8.6	0.4	0.2	1.37	8.2 + 0.4/2 + 0.4/2 = 8.6
	Plinth	2	8.5	0.3	0.7	3.57	Long wall, Plinth 8.2 + 0.3/2 + 0.3/2 = 8.5
	Front Varandah						
	SW 1st Footing	2	1.4	0.4	0.2	0.22	Front varandah SW 1st Footing 1.85 - 0.4/2 - 0.4/2 = 1.4

Plinth	2	1.5	0.3	0.7	0.63	SW. Plinth = 1.85 − 0.4/2 − 0.4/2 = 1.5	
Back varandah short wall							
1st Footing	3	2.2	0.4	0.2	0.52	B.V. SW. for Footing. 2.6 − 0.5/2 − 0.4/2 = 2.2	
Plinth	3	2.3	0.4	0.7	1.93	B.V. SW. plinth 2.65 − 0.4/2 − 0.3/2 = 2.3	

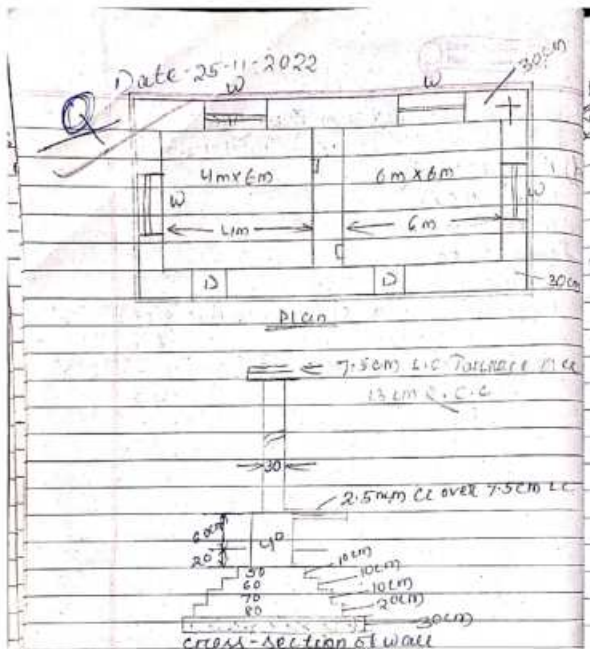
(c) 2.5 cm thick DPC of cement concrete (1:2:6)

long short wall room							
long wall	2	5.4	0.3	−	5.04	L = 8.1 + 0.3/2 + 0.3/2 = 8.4	
short wall	2	4.2	0.3	−	2.52	L = 4.5 − 0.3/2 − 0.3/2 = 4.2	
					7.56 cum		
Partition short wall varandah	1	4.25	0.2	−	0.85	L = 4.5 − 0.2/2 − 0.2/2 = 4.25	
long wall	2	8.4	0.2	−	3.36	L = 8.1 + 0.2/2 + 0.2/2 = 8.4	
Front short wall	2	1.6	0.2	−	0.64	L = 1.8 − 0.2/2 − 0.2/2 = 1.6	
Back short wall	2	2.4	0.2	−	0.96		
					5.81		

	2.5	cum	thick DPC				
			Total = 13.37 cum				

(d) 1st class brick work in 1:6 in superstructure

Long short wall room							
long wall	2	8.4	0.3	3.60	19.15	8.1 + 0.3/2 + 0.3/2 = 8.4	
short wall	2	4.2	0.3	3.60	9.56	4.5 − 0.2/2 − 0.3/2 = 4.2	



Cross-section of wall

Q-1 Earthwork in excavation in foundation
(ii) Line concrete in foundation
(iii) 1st class brick work in cement mortar 1:6 in foundation and plinth.
(iv) 2.5cm CC DPC and
(v) 1st class brick work in line mortar in superstructure.
Prepared a detail estimation of the building from the given plan and construction.

Description	No	L	B	H	Qty	Remark / Explanatory
1 Earthwork in excavation in foundation						c.c. distance of long wall = 4+6+0.3+0.3/2+0.3/2 = 10.8 m. c.c. distance short wall. 6+0.3/2+0.3/2 = 6.3 cm.
Long wall	2	11.7	1.1	1	25.74	Long wall for Foundation = 10.8 + 1.1/2 + 1.1/2 = 11.7 m
Short wall	3	5.2	1.1	1	17.16	Short wall for Foundation = 6.3 − 1.1/2 − 1.1/2 = 5.2 m
2 Line concrete in foundation						
Long wall	2	11.7	1.1	0.3	7.72	
Short wall	3	5.2	1.1	0.3	5.14	
					12.86	
3 1st class brick work in cement mortar 1:6 in foundation and plinth						
1st Footing						
Long wall	2	11.4	0.8	0.2	3.64	L = 10.6 + 0.8/2 + 0.8/2 = 11.4

Short wall	3	5.5	0.8	0.2	2.64	L = 6.3 − $\frac{0.8}{2}$ − $\frac{0.8}{2}$ = 5.5
2nd Footing						
Long wall	2	11.3	0.7	0.1	1.58	L = 10.6 + $\frac{0.7}{2}$ + $\frac{0.7}{2}$ = 11.3
Short wall	3	5.6	0.7	0.1	1.15	L = 6.3 − $\frac{0.7}{2}$ − $\frac{0.7}{2}$ = 5.6
3rd Footing						
Long wall	2	11.2	0.6	0.1	1.34	L = 10.6 + $\frac{0.6}{2}$ + $\frac{0.6}{2}$ = 11.2
Short wall	3	5.7	0.6	0.1	1.02	= 6.3 − $\frac{0.6}{2}$ − $\frac{0.6}{2}$ = 5.7
4th Footing						
Long wall	2	11.1	0.5	0.1	1.11	L = 10.6 + $\frac{0.5}{2}$ + $\frac{0.5}{2}$ = 11.1
Short wall	3	5.8	0.5	0.1	0.87	L = 6.3 − $\frac{0.5}{2}$ − $\frac{0.5}{2}$ = 5.8
Plinth						
Long wall	2	11	0.4	0.8	7.04	L = 10.6 + $\frac{0.4}{2}$ + $\frac{0.4}{2}$ = 11
Short wall	3	5.7	0.4	0.8	5.66	L = 6.3 − $\frac{0.4}{2}$ − $\frac{0.4}{2}$ = 5.9

Date - 29-11-22

Q. Calculate the dry material 52 cm² per 25 mm thick on cement concrete (1:2:4)

→ Dry volume = 1.55

cement = $\frac{1.55}{5}$ = 0.31

= 0.31 × 30

= 0.31 × 55.0 = 17.05

Sand = 0.31 × 1

= 0.31 × 55.0 = 17.05

Aggregates = 0.31 × 3

0.93 × 55.0 = 49.5

Q.2 Find the labour component required for C.C (1:5:10) with graded stone ballast 4 cm down in foundation. Take 10 cum and adopt OPWD. Find out the labour component?

Labour	Qty	Rate	Cost
Mason 2nd class =	1.8	405 per day	729
Man Mulia	= 18	315 per day	5670
Women Mulia	= 14	315 per day	4410
Man Mulia (Mixing stone sand, cement, Getting water)	7	315 per day	2205
		Total	= 13014

Q.3 Find the material required per 10 m³ C.C 1:2:4 with graded stone chip 20 mm down to 6 mm per R.C.C work excluding shuttering reinforcement as per R.1 OPWD.

→ Volume of concrete = 10 cum

Dry volume = 15.2 cm

C.C = 1:2:4

$\frac{15.2}{7}$ = 2.171

cement = 2.171 × 30 × 65 bag

Sand = 2.171 × 2 = 4.34

Aggregate = 8.68

Q.4 Duty of Assistance Engineer?

→ Assistance Engineer are directly incharge of work falling under their charge and have to execute, supervise and manage the works and have to execute, supervise and manage the work and have to maintain the quality and progress of work. There may be more Assistance Engineer (A.E) in a sub-division if the work is heavy, who directly responsible to the Executive Engineers with respect to the works. The SDO or AE is 10 to 15 lacs. Before preparing a bill, the JE must himself, that work has actually been executed in accordance with the detailed measurement recorded and personally inspect all works of any magnitude before recommending final payment. The A.E. take measurement of all important works and he must satisfy himself about the correctness of all the measurement recorded.

Q.5 Write the unit of measurement and unit of payment for following item of work.

① Supply of Reinforcement
- Quintal

② Brick on as following

③ Painting & 4 point Earth work
- m²

Q.6 How many bags of cement required for 1 cum of C.C (1:2:4) ratio of concrete.

- Dry volume = 15.2

cement = $\frac{15.2}{7}$ = 2.17

= 2.17 × 30 = 65.1

Q.7 How the labour are classified as for the schedule of rate of govt of Odisha

① unskilled
② semiskilled
③ skilled
④ highly skilled

Q.8 Calculate the plinth area of building with given plan of building.

Q.9 Write the unit of lead of excavation of 30 sq metres.

Scanned with OKEN Scanner

Q-10 How many standard bricks are required per 3.5 cum of brick work.

- 1 cum = 500 brick
- 3.5 x 500 = 1750 nos.

Q-11 Write down the unit of measurement for the item.

① 1 Honey combwork Masonry
- Sqm (m^2)

② Reinforcement
- Quintal.

ORGANISATION OF ENGINEERING DEPARTMENT

- The Engineering departments of the Govt. deal with the construction and maintance of Public works as building, roads, bridges and culverts, canals and connecting works, dams, sanitary and water supply works, Electrification work etc. The engg dept are therefore known as public work Department (P.W.D) These are different Engineering departments dealing with the different branches of works as:-

1- Public work department :- Building and road (B. and R.) branch which deals with the building, roads and culverts etc. and connecting works.

2- Irrigation Department :- which deals with the canals and work connecting with canal, irrigation, Navigation etc.

3- Public Health Engineering Department :- which deals with water supply works, sanitary work

4- Electricity Department :- Deals with the electrification of power lines and connecting works. Electricity Department now comes under an autonomous Electricity Board.

→ Each the Engineering Department has a Chief Engineering (C.E) who is the administrative Head of the Department and is directly responsible to the Dept etc → When there are large amount of work, there may be Regional chief engineers, additional chief Engineers and Deputy chief Engineers to assist the main chief Engineer.

→ The whole area and work under chief Engineers is divided into Number of circles Each circle is headed by Superintendant Engineer (S.E) or (P.W.D) Certain classes of the Superintending Engineers are also designated as Survey of works (S.W)

→ Each circle is divided in to number of Division which are the executive units of the department. Each division is under an executive Engineer (E.E) or divisional Engineer. He is also responsible for the maintenance of accounts correctly and submission of account monthly to the accountant General. He is also responsible for the preparation of projects, desing, estimates etc.

→ Each division is divided into number of Sub-divisions each under charge of a Subdivisional Officer or Engineer (S.D.O) who is of the rank of Assistant Engineer. Assistance Engineer are directly incharge of the works falling under their charge and have to execute. They may be more Assistant Engineers (A.E) in a subdivision if the work is heavy. The Sub-division is divided into number of sections each under the charge of an overseen and sectional officer or Sub ordinate who is directly incharge of works in the field. Overseers have to maintain accounts of materials, tools and plants, labour, etc. They have maintain the required registers, records, accounts, etc. upto date correctly in details.

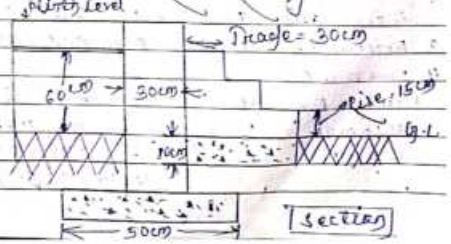
→ Normally, there are 4 or 5 division under a circle in each Division an E.E under an E.E. there are 4 or 5 S.D.O officer or Assistant Engineers under each S.D.O or A.E there are 4 or 5 Overseers. The work load of a division may be Rs. 50 to Rs. 75 lakhs for S.D.O or A.E. Rs. 10 to 15 lakhs and for an overseen Rs. 3 to 4 lakhs.

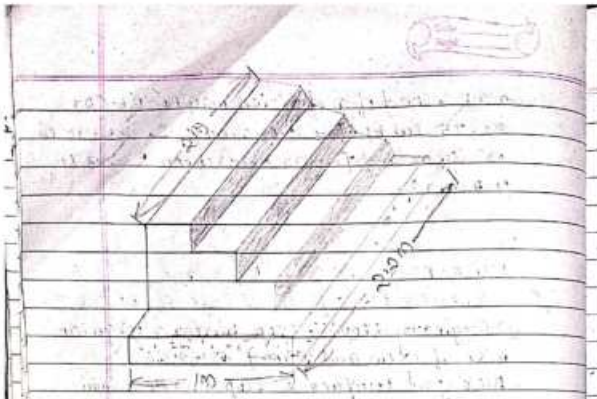
Date - 12-12-2022 Tuesday

Q Calculation of diff type of steps ?

① Ordinary Step :- Step having a regular rise of 15 cm and tread of 30 cm.
- An exposed surface of step shall be 20mm thick cement plaster with neat cement finished.

Q Determine a complete Quantity survey to construct a flight of steps with
- If the rise of first that is bottom step be 25 cm with 10 cm below ground level and all other particulars been same then Calculate the Quantity of works.
- If the number of steps be unknown in stage of 900 with a regular rise of 15 cm and tread of 30 cm then calculated the Quantity of brick work only.



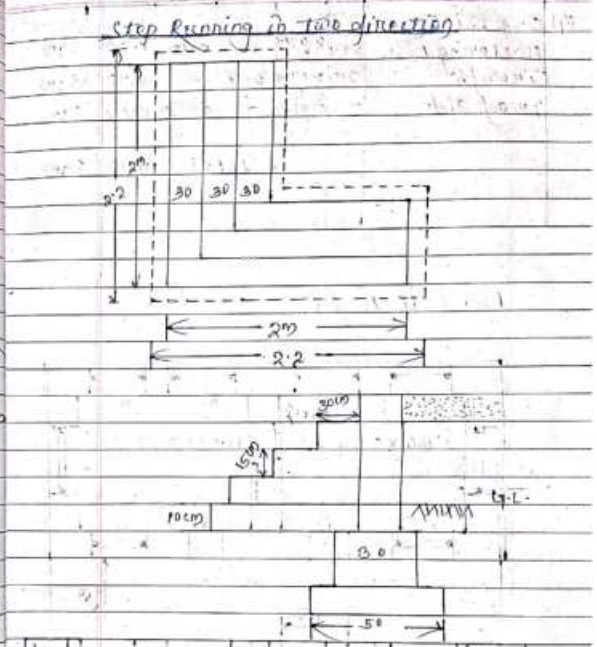


→ To calculate the quantity of brick work a trapizium ABCD may be formed by joining BC. The portion excluded from the actual fig. will be equall to the addition portion included of Area of two trapizium ABCD equals to Sum of parallel side devided by into hight.

Quantity of brick work = 0.27 × 2 = 0.54 m³

Sl. No.	Description	No	Length	Breadth	Height	Quantity	Unit
1	Earth work in excavation	1	2 m	2.2	0.1	0.22	cum
2	concrete work in foundation	1	2.2	1	0.10	0.22	cum
3	Brick work	1	2	0.6	0.45	0.54	cum
4	2cm thick plastering (a) Rise	4	2	–	0.15	1.2	sqm
	(b) Treads	3	2	0.3	–	1.8	sqm
	(c) Sides	2	–	$\frac{0.3+0.9}{2}$	0.45	0.54	sqm
				Total =		3.54	sqm

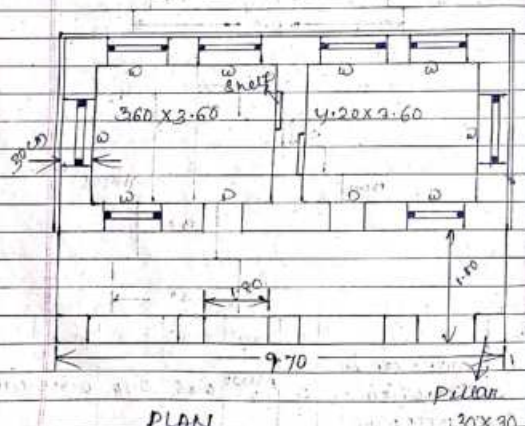
Step Running in two direction

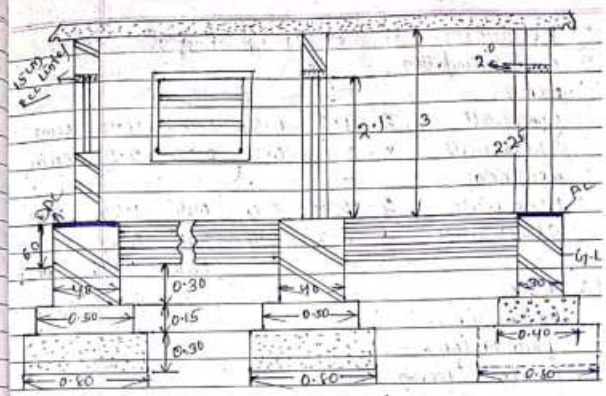


Sl. No.	Description	No	Length	Breadth	Height	Quantity	Unit
1	Earth work in Excavation	2	$\frac{1.35\times2}{2}$	0.85	0.10	0.302	cum
2	concrete work two side	2	$\frac{2+2.2}{2}$	1	0.1	0.35	cum
3	Brick work for 2 side	2	$\frac{2+1.1}{2}$	$\frac{0.3+0.9}{2}$	0.45	0.837	cum

(4)	2mm thick plastering rise	2×4	$\frac{2.0+1}{2}$	–	0.15	1.86	sqm
	Treads	2×4	$\frac{2.0+1}{2}$	0.3	–	3.72	sqm
	Tread side	2	$\frac{0.3\times9}{2}$	–	0.45	0.54	sqm
					Total =	6.12	sqm

Date 16-12-2022





Q.1 Calculate the Quantity of following item of wall from Given Plan and Sectional elevation in fig.

(i) Earth work in excavation
(ii) C.C in foundation
(iii) Brick work in foundation in plinth
(iv) Brick work in Superstructure.

Sl. No.	Description	No	Length	Breadth	Height	Quantity	Unit
1	Earthwork in excavation in foundation						
	long wall	2	9.2	0.8	0.75	11.04	cum
	Short wall	3	3.1	0.8	0.75	5.58	cum
2	verandah						
	long wall	2	10.35	0.4	0.45	3.7	cum
	Short wall	5	0.3	0.4	0.45	0.27	cum
					Total =	20.59	cum

S.No	Description	NO	Length	Breadth	Height	Quantity	Unit
(2)	C.C in Foundation						
	Room						
	Long wall	2	9.2	0.8	0.30	4.4	cum
	Short wall	3	3.1	0.8	0.30	2.23	cum
	Verandah						
	Long wall	2	10.35	0.4	0.15	1.24	cum
	Short wall	5	0.3	0.4	0.15	0.09	
					Total=	7.96	cum
(3)	Room						
	Brickwork in foundation & plinth 1st footing						
	Long wall	2	8.9	0.5	0.15	1.34	cum
	Short wall	3	3.4	0.5	0.15	0.76	cum
	Plinth above footing						
	Long wall	2	8.8	0.4	0.9	6.34	cum
	Short wall	3	3.5	0.4	0.9	3.78	cum
	Verandah						
	Plinth above footing						
	Long wall	2	10.25	0.3	0.9	5.5	cum
	Short wall	5	1	0.3	9.9	1.35	cum
					Total =	12.22	cum
(4)	Brick work in Superstructure						
	Room						
	Long wall	2	8.7	0.3	3.0	15.66	cum
	Short wall	3	3.6	0.3	3.0	9.72	cum

S.No	Description	NO	Length	Breadth	Height	Quantity	Unit
	Verandah						
	Long wall	2	10.15	0.2	2.45	9.94	cum
	Short wall	5	1.1	0.2	2.45	2.69	cum
	Deduct						
	Door opening	2	1.2	0.3	2.1	1.51	cum
	Window opening	8	0.90	0.3	1.5	3.24	cum
	Shelves	2	0.90	0.3	1.5	0.81	cum
					Total =	45.57	cum

Date - 20.12.2022

Q-1 - What are the unit of dimensions of the following material and works:

(1) Glass Panes
→ Length and breadth in cm or m, Thickness in mm.

(2) Stone block
→ All dimensions are in mm.

(3) Reinforcement
→ Quintal

(4) Formwork
→ Sqm

Q-2 What is the size of Nominal brick and standard brick
→ Size of Nominal brick - 20cm X 10cm X 10cm
Size of Standard brick - 19cm X 19cm X 19cm

Q-3 Define Lump Sump ?
→ Sometimes a lump sump rate is provided for certain small item for which Detailed Quantities can't be taken out easily or it takes sufficient time to find the details as front architectural or decoration work of a building. Like place site clearing and dressing etc.

Q-4 How the labours are classified as per schedule of rate of Govt of Rajasthan
→ 4 skill
Misti - High skill
Mason - Skill
Mazdoor - Unskill
Men women multa - Unskill
Bhisti - Skill
Carpenter - Skill
painter - Skill

Q-5 What is the standard weight of 12 mm diameter HYSD Bar of unit
- 12mm - 0.887 kg/m

Q-6 How can you estimate the requirement of bending wire ?
→ According to I.S 2502 - 1963, Bar crossing each other where required, shall be firmly secured by binding Binding by 16 SWG but not less than 0.90 mm. in such a manner that they will not slip over each other at the time of fixing and concreting.
- Every compression bar shall be tied at least in two perpendicular directions.

Q-7 Explain the term A.R. Estimate ?
- A.R. Estimate is also known as annual repaired estimate. It is also name this annual maintainance estimate (A.M.)
- After completion of a work it is necessary to maintain the same for its Proper function and for the same, an estimate is prepared for the item which required renewable replacement repaired etc. in the form of detailed estimate.

Q-8 Explain the duties and responsibilities of owner, Engg and contractor
- The Duties and Responsibilities of the owner to work on his behalf, He will also a point other staff in consultation with the Engineer to carry out the Project work.
- To appoint an Engineer and give him power to staff in consultation with the Engineer to carry out the project work.
- To intimate the Engineer about the requirement of the project including his desired time of complete.
- To give necessary section of the estimated cost to the engineer.
- To give necessary possession of the site to the contractor.
- To enter a contract with the contractor by signing the contract documents.

(ii) The duties and liabilities of the Engg.

> The contract imposes heavy responsibilities upon the engg. The owner employs a consulting Engineer who may cover the terms, condition and scope of work for design and detailed engineering cost control and similar items. Specially the owner may appoint an Engineer to act as a representative of the owner in order to perform the following duties and responsibilities.

- To prepare the necessary drawings Specifications and estimate in accordance with the requirements of the owner.
- To check up the Soil condition
- Preparation of tender paper, inviting tender on behalf of the owner, sale of the tender paper after investigation the soundness of the contractors, prepared of comparative statement and advising the owner regarding acceptability of the tender.

> To supervise the work and to see that the drawings and specification are faithfully followed.

- It is the duties of the Engineer to give necessary
- Instructions to supply working Drawing to the contractor so that the progress of work is not hampered due to his delay direction.

(iii) Contractor's Duties and liabilities

- In prescribing the duties and liabilities of the contractor, it should be kept in mind that the main objective of the contract method is that the work shall be done by a skilled contractor in order to relief the owner of all responsibility in connection with management / purchase of materials employment of labour and construction operation. The contract price is assumed to include a reasonable profit to the contractor for the accomplishment of the objective.
- The vital duties and liabilities of a contractor are covered by the condition's of contract. Some specific duties and liabilities are mentioned below.
- It is the duty of a contractor to inspect the site and study soil condition before tendering. He should investigate the accessibility, electric power, water supply condition for construction purposes, and the local law and order condition.
- The should collect the local rates of materials and labour and accordingly

Prepare analysis of rates for all the item in the Schedule attached to the tender.

- It is the duty of a contractor to through the different clauses of the conditions of contract, biscuit rates of material, tools and plants if may before submission of tender.
- After receiving the work order it is the duties of a contractor to start the work in the time and carry out the work in accordance with the contract drawings and specification. Any corrections in the specification, or any extra work required should be brought to the notice of the engineer and his written direction or approval should be obtained before starting such work.
- The contractor should be required to designate a representative who is authorised to act for him on matters pertaining to the contract when he himself is not available.
- All royalties and licence fees are to be paid by the contractor and he shall be responsible in all cases of suites or claims for infringement of patents rights. The contractor is usually required to provide all watching permits is connection with the work.

D Saha
13/01/2023