MODULE - 1

2/8/19

Estimate

An estimate for any construction work may be defined as the process of calculating the quantities and cost of various items required in connection with the work.

- It is prepared by calculating the quantities from the dimensions on the drawings for the various items required to complete the project. And multiplied by unit cost of the item concerned.
- To prepare an estimate drawings consisting of the plan, elevation and sections through important points, the detailed specification giving specific discription of all workmanship, properties and proportion of materials are required.
- An estimate is never the actual cost of the work.

Purpose of estimate.

- To ascertain the necessary amount of money required by the owner to complete the proposed work. For public works it is required to get administrative approval funds etc.

- To ascertain quantities of materials required at various stages.
- To calculate the no. of different categories of workers that have to be employed to complete the work with in the scheduled time.
- To access the requirement of tools and equipment required to complete the work.
- To fix up the completion period from the volume of works involved in the estimate.
- To draw up a construction schedule and programme and to arrange the funds required according to the programme.
- To justify the investment from benefit cost ratio
- To invite tenders and prepare bills for payment.
- Estimate of an existing property is required for its valuation.

8/8/19

Types of Estimate

1. Detailed Estimate

- This includes the detailed particulars for the quantities, rates and cost 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 measurement sheet.

- Multiplying these quantities by their respective rates. In a seperate sheet, cost of all items are worked out independantly and summerised.
- Best and most accurate estimate that can be prepared.
- Detailed estimate is accompanied by
  Report
  Specifications
  Detailed drawings showing plans, section etc
  Design data and calculations
  Basis of rates adopted in the estimate.
- This prepared for technical sanction, administrative approval etc.

2. Prilimibary / Approximati / rough Estimate.

- This is an approximate estimate to find out an approximate cost in a short time and thus enables the authority concerned to consider the financial aspect of the scheme. for according sanction to the scime.
- Such an estimate is framed after knowing the rate of similar works and from practical knowledge in various ways for various types of work.

3. Revised Estimate

- It is a type of detailed estimate for the revised quantities and rate of items of works originally provided in the estimate, with out material deviations of a structural nature, from the design originally approved for a culture.
- It is accompanied with a comparative statement abstract form. showing the probable variations for quantities, rate and amount for each item of work as compared with the original estimate, side by side, stating the reasons of variation
- A revised estimate is prepared and submitted for fresh techical sanction.

→ Reasons for preparation of revised estimate

- when a sanctioned estimate, is likely to exceed the by more than 5% either from the rates being insufficiet or any other alterations.
- the expenditure of work exceeds or is likely to exceed by more than 10% of the administrative approval.
- when there are material deviations from the original proposal but not due to deviations of a

- when sanctioned estimate is more than the actual requirement.

4. Supplimentary Estimate

- While a work is in progress, some changes or additional work due to material deviation of a structural nature from the design originally approved may be thought necessary for the development of a project.

An estimate is then prepared to include all such works. This is known as supplimentary estimate.

- Method of preparation is same as that of detailed estimate and it should be accompanied by a full report of the circumstances which render its necessity.

5. Annual maintenance / Annual repair estimate [AM or AR]

- After completion of a project it is necessary to maintain the same for its proper function and an estimate is prepared for the items which require renewal replacement repairs etc. in the form of detailed estimate.

- Total estimated cost of maintenance of a structure is generally kept with in the prescribed limits on percentage basis of the cost of construction

of the structure and its importance.

TERMS

1. Contingencies - Unforeseen expenses

- The term indicates the incidental expences of a miscellaneous character which can not be reasonably predicted during preparation of the estimate. To meet such unforeseen expenses an additional amount of 3% to 5% of the estimated cost of work is provided in the total estimate.

- Provision for contingencies may not be diverted to any new work or repair, which is not provided in the estimate and of which the cost exceeds rupees 2000 with out the sanction of superintending engineer.

2. Lump- Sum Item (LS)

- It is the item of work very difficult to measure or access during its execution and a lump-sum rate is provided in the estimate.

eg: work of site clearing

3. Work-charge establishment

- It will include such temporary establishments as are employed for the execution or the immediate

technical supervision or departmental stores and machinery in connection with a specific work.

- work charged staff may be a technical person or an assistant, guard etc.
- An amount of 2-2.5% of estimated cost of work is provided in the estimate for this.
- Appointment of work charged staff is made on temporary basis according to the progress of work.
- Termination by one month notice period for 1 year continuous service and 14 days notice period for less than 1 year service.

4. Provisional sums

- It is an amount arbitrarily provided by an experience estimater in the total estimated cost of a project to carry out some special type of work whose details can not be known at the time of preparing the estimate.
- special works such as installation of lift shifting of water lines, sewer lines etc, reasonable amount is provided in the estimate as provisional sum.
- the payment for the work will depend upon the basis of excication but not necessarily by the amount of provisional sum.

1) Plinth area or square meter method

* Plinth area:

It is the built up covered area at the floor level of the basement or of any storey of a build It can be calculated by taking the external dimensions of the building excluding plinth offset.

* Floor area:

It is plinth area less, the area of walls.

* Carpet area:

It is the floor area less, the area of following portions. veranda, corridor, passage, bathroom etc.

- Estimated cost of a proposed building on plinth area basis is equal to

Plinth area of the building X
Plinth area rate of the locality. for similar buildings constructed recently.

PLINTH AREA CALCULATION

At the beginning determine the floor area for all rooms circulation area etc. according to the

requirement of the owner or from line plans.

- Add -b this area. the area of the walls to get the approximate plinth area.
- calculate plinth area from carpet area add the area of walk and horizontal circulation area to the carpet area.
- Following approximations may be provided in the calculation of wall area.

(i) For RCC framed structures 8% of floor area.
(ii) For ordinary buildings 15% - 17% of floor area.
(iii) For thick walls with rectangular shaped building 25% of floor area.

- Plinth area Rate :- deppends on the following factors.

(i) General specification → Type of building., quality of material, type of flooring etc.

(ii) Price level → Rate per square meter of the floor area is worked out knowing the cost of construction of similar buildings in the locality. Due consideration should be given for the change in the price level in between the period of construction of the similar buildings and the date of fixing plinth area for the proposed building.

(iii) shape of the building

(iv) design of building

(v) Arrangement of room, circulation area etc

(vi) Location.

2) Cubic rate or cubic meter method

It is more accurate than plinth area method

- The volume or cubic content of the proposed building is worked out and multiplied by rate per cubic volume of similar buildings in that locality constructed recently.

(i) Determination of total volume in cubic metre.

Total volume of a building = length x breadth x height

(ii) length and breadth are taken from external dimensions of building above plinth level. and thus is the plinth area of the building

(iii) To measure the height of the building bottom level may be considered from ground level or from top of the foundation concrete or from half the depth of the foundation
In India

- Height of the building from half the depth of foundation is appropriate
- Height of the building is measured from the top

of the roof in the case of flat roof with out parapet, if parapet is there height is measured from half the height of the parapet.

→ Determination of rate per cubic meter.

- Factors as same as that of plinth area method

3) Service Unit or Unit rate method

- All cost of a unit quantity such as per km for highway, per meter span for a bridge per class room for school building etc are considered first and the estimate is prepared by multiplying the cost per corresponding unit by the number of units in the structure.
- Estimate can be prepared quickly, but it requires records of the unit current rates for similar design structures having the same specifications at that locality.

→ Factors:

- variation in price level, change in specification & location of site.

no. of units provided in the structure

soil conditions etc.

- It is adopted to prepare preliminary estimate for public works

4) Bay method

Approximate estimated cost =

No. of bays in the proposed structure X

cost of one such bay

- Bays are compartments or similar portions of a structure.
- when the area of a structure consists of similar cabins or parts such as a godown, railway platform etc, then the area may be divided from centre to centre of the supports. Each such division is treated as a bay.
- The following points should be considered.

(i) End bay should be considered seperally due to its end wall

(ii) current rate per bay should be worked out from the previous recorded rate.

(iii) The location specifications and drawings should be the same.

24/8/17

SPECIFICATIONS

- Specification is a specific description of a particular subject.
- An engineering specification contains detailed description of all workmanship and materials which are required to complete an engineering project in accordance with its drawings and details.
- While using specification, the following principles shall be adopted.

(i) Description of materials — Quality and size of materials required to do an item of work shall be fully described for checking up at site.

(ii) Workmanship — complete description of workmanship the method of mixing to the proportion, method of laying shall be clearly stated.

(iii) Tools and plants. — The tools and plants to be engaged to carry out a work shall be described. The method of operation and by whome to be supplied shall be stated.

(iv) Protection of new work — The method of protection of new work against damage or the method of curing if required. The do test of completed work if necessary shall be described.

(v) Expression — The requirements of the specification shall be expressed clearly and in consised form.

avoiding repitition and unusual words.
Sentences shall be short and concised.

(vi) clauses of specifications

clauses shall be arranged in the order in which work shall be carried out. Abbreviations which are familiar can be used.

TYPES OF SPECIFICATIONS

Specifications are broadly devided in to too types.

i General specification

ii Detailed specification

→ General specification

- Nature and class of works, names of materials and proportion that should be used in the various items of works are described.
- Only a brief description of each and every item is given but they do not foom part of the contract document.

→ Detailed specification

- they foom part of the contract document.
- It specifies the qualities, quantities and proportions of materials and the method of preparation and excicution for that particular item of work in a project.

- Physical, chemical and electrical test if any requires for the furnished work to ensure the desired strength or quality are specified.
- Type of machinery equipments and special took and plants and their method of operation are also described.
- The same order of sequence as the works is to be carried out is maintained.

SPECIFICATION, ESTIMA
- COSTING

GENERAL SPECIFICATION

Item of work	First class Building	Second Class Building
1.Foundation and Plinth	• Foundation and plinth shall be of first class brick work in lime mortar over lime concrete or 1:6 cement mortar over 1 : 4 : 8 cement concrete.	• Foundation and plinth shall be of first class brick work lime mortar over lime concrete.
2.Damp Proof Course	• D.P.C. shall be 1 : 1.5 : 3cement concrete of 2.5 cm thickness with standard water proofing material mixed with cement and bitumen	• D.P.C. shall be 2 cm thick cement concrete 1 : 2, mixed with one kg of impermo per bag of cement or other standard water proofing materials. (water proofing material)
3.Superstructure	• Superstructure shall be of first class with lime mortar or 1 : 6 cement mortar. • Lintels over doors and windows shall be of R.C.C.	• Superstructure shall be of 2nd class brickwork in lime mortar. lintels over doors and windows shall be of R.B.
4.Roofing	• Roofs shall be of R.C.C slab with an insulation layers and lime concrete terracing above it • supported over R.S joists or R.C.C beams as required. • height of rooms shall not be less than 3.7 m.	• Roofs shall be of R.B slab with an 7.5 cm lime concrete terracing above • verandah roof shall be of A.C sheet or allahabad tiles.
5.Flooring	• Drawing room and dining room ,Bath room and W.C floors and dado (lower part of wall of a room) shall be of mosaic. • Floors of bed rooms shall be coloured and polished of 2.5 cm cement concrete over 7.5 cm lime concrete.	• Floors shall be of 2.5 cm cement concrete over 7.5 cm lime concrete. • verandah floor shall be of brick tile or flag stone over lime concrete, finished cement pointed.

	• Floors of others shall be of 2.5 cm cement concrete over 7.5 cm lime concrete polished.	
6.Finishing	• Inside and outside wall shall be 1: 1 : 6 cement lime 12 mmplastered • <u>inside wall:</u> - Drawing, dining and bed rooms shall be given 2 coats of distemper - Others 3 coats of whitewashing • <u>Outside wall :</u> shall be 2 coats of colour washing over one coat of white washing	• Inside and outside shall be of 12 mm cement mortar plastered 1 : 6 • Ceiling shall be cement plastered 1 : 3. • Inside shall be white washed 3 coats, • Outside shall be coloured washed two coats over one coat of white wash
7.Door and Windows	• Doors and window frames shall be seasoned teak wood. • shutters shall be teak wood 4.3 cm thick panelled glazed or partly panelled and partly glazed as required, with additional wire gauge shutters. • all fittings shall be of brass. • Doors and windows shall be varnished or painted two coats with high class enamel paints over one coat of priming. • windows shall be provided with iron grills.	• Chaukhats shall be R.C.C or well-seasonedsal wood. • shutters shall be shisham wood or deodar wood 4 cm thick, panelled, glazed or partly penelled and partly glazed as required, fitted with iron fittings. • Doors and windows shall be painted two coats over one coat of priming.
8.Miscellaneous	• Rain water pipes of cast iron or of asbestos cement shall be provided and finished painted. • Building shall be provided with 1st class sanitary and water fittings and electrical installation. • one meter wide 7.5 cm thick C.C 1 : 3 : 6 apron shall be provided around the building	• Rain water pipes shall be of cast iron finished painted. • Electrification, sanitary and water fittings may be provided if required.

- Bricks should be moulded from good earth, free from all traces of sulphates salt peter or other salts.
- They should be of uniform deep red, cherry or copper colour, thoroughly burnt without being vetrified.
- should be hard, sound and of uniform size and shape having each two adjacent plane surfaces at true right angles.
- should be free from cracks, chips, flaws or lumps of any kind.
- should not show any signs of efflorescence either in dry state or after soaking in water
- shall be homogeneous in texture, and emit a clear ringing sound on being stuck.
- Dry bricks should not absorb more than one-sixth of their weight when immersed in water for one hour.
- They should not break when two bricks in 2 hands are stack together or when dropped from chest height on the ground.
- should be of standard dimensions or per ISI (19cm x 9 cm x 9 cm) or as prescribed by PWD.

CEMENT

- The cement used for reinforced concrete works shall be OPC or rapid hardening port land cement conforming to IS - 269 up to date, or blast furnace slag cement conforming to IS 455 - 1962, or high alumina cement of approved specifications.
- The mini compressive strength of OPC as per IS 269 should be 175 kg/cm² after 7 days and the mini tensile strength after 7 days should be 25 kg/cm².
- Initial setting time should not be less than 30 minutes and the final setting time should not be more than 10 hrs.

SAND

- Fine aggregate shall confirm to either IS 383 - 1963 or IS - 515 up-to- date.
- It shall be clean, sharp, heavy and gritty to touch
- should be free from clay, mica, vegetables and organic matter or any other foreign matter.
- River & pit sand should be used as this, does not contain common salt in large quantities.
- must be cleaned by screening before its use.
- If a sample of sand contains more than 4 to 6% of clay, it should be washed thoroughly.

- should be perfectly dry before it is used, otherwise the bulking effect of sand must be taken into account.
- Sand for all cement concrete works must be coarse. It should not pass through IS sieve no. 480 (4.75 mm) and retain on No. 15 (5.5 mm) sieve
- Fineness modulus of coarse sand shall be determined by taking 500g of it from a represe. sample and passing it successively through IS sive No. 480, No. 240, No. 120, No. 60, No. 30 & No: 15
- Medium sand used is cement mortar for masonry, plastering, pointing etc. & bituminous works of road.
- Sand filling in plinth, where specified, may be done with fine sand. Finess modulus of fine sand should not be less than one.

30/8/20

MODULE - 2

General Items of work involving estimation for a building.

1. Earth work in excavation for foundation trenches.
   - quality calculated in m^3
2. Earth work in filling (Foundation trenches & plinth filling m^3)
3. Brick Flat Soling. (m^2 or sq.m)
4. Foundation , - cement or lime concrete in foundation (m^3)
5. Masonry work in foundation or plinth (Brick or stone m^3)
6. Damp proof course (DPC) - Estimated in m^2 by multiplying length & breadth, thickness is described in description column.
7. Masonry work in superstructure walls.
   for walls upto 20cm thick
8. 10 cm thick brick work. (m^2)
9. RCC or RB work (m^3)
   volume occupied by reinforcement is not detected from the volume of concrete.
10. Form work.
    centering & shuttering.
    Cost of form work is about 30% of cement concrete.
    It is measured seperatly in m^2.
11. Steel work. (for steel)
    measured by weight in quintal

including bending and binding in position.
No seperate payment is made for binding wires.
weight of reinforcement may be calculated from % volume in RCC.

(12) Lime concrete in roof in m^2.

(13) wood work for doors and windows.
Frames in m^3
shutters are measured in m^2.

(14) mild steel clamp or bold fast count by number.

(15) Flooring — m^2

(16) Plastering and pointing in m^2.

(17) white washing or colour washing m^2.

(18) Painting to wood work — m^2

PRINCIPLE UNITS FOR VARIOUS ITEMS OF WORK.

→ mass and thick works shall be taken in cubic unit or volume.

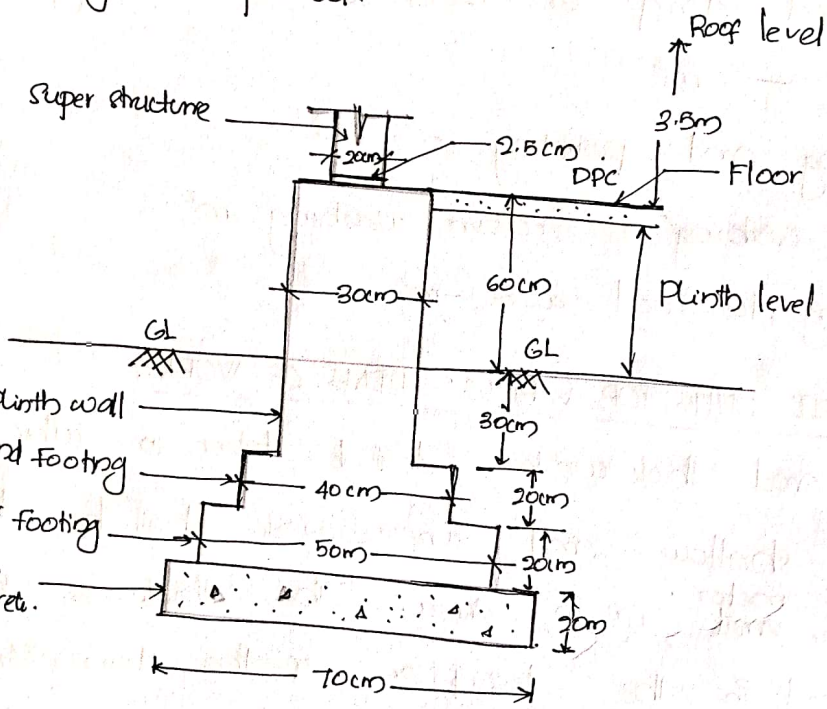
→ Thin, shallow and surface work shall be taken in square meter unit or in area. The thickness shall be specified in the description of the item. And the measurement of length and breadth shall be taken, to calculate the area

→ Long and thin work, shall be taken in linear meter or running units. And linear measurements shall be taken. [Running meter - RM]

→ Piece work shall be taken in number.

Q. Figure shows the Plan and cross section for a wall 5m in length. Prepare quantity estimate for the following items.

(i) Earth work in excavation in foundation
(ii) Lime concrete in foundation
(iii) First class brickwork in foundation & Plinth.
(iv) First class brick work in super structure wall
(v) 2.5 cm thick DPC in super structure with water proofing compound.



No	Description of Item.	No	length	breadth	height/ depth	Quantity.
1	Earth work in excavation in foundation	1	5	0.7	0.9	3.15 m^3
2	Lime concrete in foundation	1	5	0.7	0.2	0.7 m^3
3	First class brick work in foundation and Plinth					

	→2nd footing	1	5	0.5	0.2	0.5
	→Plinth wall	1	5	0.4	0.2	0.4m³
		1	5	0.3	0.90	1.35m³
4	First Super structure wall	1	5	0.2	3.5	3.5m² 3.5m³
5.	DPC	1	5	0.2		1m².

→ Different method of building estimates.

1. long wall short wall method / out to out and into in method / PWD method.

In this method longer walls in a building are considered as long walls and measures from out to out and shorter walls, in a ⊥ direction of long walls, are considered as short walls and are measured from in to in for a particular layer of work.

These length of long and short walls are multiplied seperately by the breadth + height of the corresponding layer and are added to get the quantity.

Such lengths of long and short wall in formed earth by adding to get the quantity are multiplied seperately by the breadth & height of the corresponding layer and are added to get the quantity.

Such lengths of long and short walls carries in every layer and are added to get the quantity.

Such lengths of long and short walls carries in every layer of ~~footing~~.

The length of long coall is found out by adding one breadth of the footing to the center to center length of that footing. The length of short coall is found out by subtracting one breadth of footing from the center to center length.

- The figure. represents the plan of superstructure coall of a single room building of 5m x 4m and section represents the cross sections of the walls with foundation.

Estimate the quantities of.

1- Earth work in escavation in foundation.

2- Concrete in foundation.

3 - Brick work in foundation & Plinth.

4 - Brick work in Super structure.

long coal, short coall method.

long length coall (center to center) = 5.3m

(5 + 0.15 + 0.15)

Short coall length = 4.3m.

Item No	Discription of Item	No	l	B	D/H	quantity
1	Earth work in Escavation					
	long wall	2	5.3 + 0.9/2 + 0.9/2 = 6.2	0.9	0.9	5.58 + 5.58 = 10.00
	short wall	2	4.3+0.9	0.9	0.9	15.582
2	Concrete in foundation					
	long wall	2	5.3+0.9	0.9	0.3	3.34
	short wall	2	4.3 − 0.9 = 3.4	0.9	0.3	1.83
						5.17
3.	Brick work in foundation & Plinth					
	– long wall					
	1st footing	2	5.9	0.6	0.3	2.43
	2nd footing	2	5.6	0.5	0.3	1.54
	Plinth wall	2	5.7	0.4	0.6	2.376.
	– short wall					
	1st footing	2	4.7	0.6	0.3	1.224
	2nd footing	2	4.8	0.5	0.3	1.02
	plinth wall	2	4.9	0.4	0.6	1.639
			2.12	1.69		
			1.74	1.44		
			2.73	2.38		

4. Brick work in Super structure

– long wall	2	5·3+0·3	0·3	3·5	11·76
– short wall	2	5·3 – 0·3	0·3	3·5	6·72
					18·48

Q. Estimate the quantities of following items of a 2 room building from the given plan and section.

① Earth work in excavation in foundation
② Lime concrete in foundation.
③ First class brick work in foundation and plinth
④ 2.5 cm thick damp proof course.
⑤ First class brick work in super structure.

Item No	Discription of Item	No	length	breadth	height/ depth	Quantity. m³ (l×b×h)
1	Earth work in excavation in foundation					
	→ long wall	2	10.3+0.3 = 10.6m 10.6+(1.1/2)+1.1/2 (foundation) = 11.7m	1.10m	1m	25.74
	→ short wall	3	6+0.3/2+0.3/2 – 1.1/2 – 1.1/2. = 5.2m.	1.10m	1m	17.16
						42.9 m³

2.	Lime concrete in foundation					
	→ long wall	2	11.7	1.1	0.3m.	7.722 m^3
	→ short wall	3	5.2	1.1	0.3m	5.148 m^3
						12.86 m^3
3.	First class brick work in foundation and plinth.					
	→ long wall					
	* 1st footing	2	10.6 + 0.8 = 11.4 m	0.8m	0.2m	3.648 m^3
	→ short wall 1st footing	3	6.3 − 0.8 = 5.5m	0.8 m	0.2m	2.64 m^3
	* 2nd footing					
	→ long wall.	2	10.6 + 0.7 = 11.3 m	0.7m	0.1m	1.582 m^3
	→ short wall.	3	6.3 − 0.7 = 5.6	0.7 m	0.1m	1.176 m^3
	* 3rd footing.					
	→ long wall	2	10.6 + 0.6 = 11.2	0.6	0.1m	1.344 m^3
	→ short wall	3	6.3 − 0.6 = 5.7	0.6	0.1	1.02
	* 4th footing.					
	→ long wall	2	10.6 + 0.5 = 11.1	0.5	0.1m	1.11 m^3
	→ short wall	3	6.3 − 0.5 = 5.8	0.5	0.1m.	0.87 m^3
	* Plinth.					
	→ long wall	2	10.6 + 0.4 = 11	0.4	0.8m	7.04 m
	→ short wall	3	6.3 − 0.4 = 5.9	0.4	0.8m.	5.664 m^3
						26.092 m^3

4.	2.5cm damp proof course.					
	→ long wall	2	11m (same as plinth wall)	0.4m	—	$8.8m^2$
	→ short wall	3	5.9	0.4m	—	$7.08m^2$
	→ deduct door sills	2	1.2m	0.4		0.096.
						8.8 + 7.08 − 0.096
						$14.92m^3$
5.	First class Brick work in super structure.					
	→ long wall	2	10.6 + 0.3 = 10.9m	0.3m	4.2m	$27.46m^3$
	→ short wall	3	6.3 + 0.3 = 6m	0.3	4.2m	$22.68m^3$
						$50.14m^3$
	* deductions					
	− Doors	2	1.2m	0.3	2.1m	1.512
	− window	4	1m	0.3m	1.5m	1.8
	− shelf	2	1m	0.2m	1.5	0.6
						3.912.
	− Cintel over door	2	Bearing assumed as 15cm: 1.2 + 0.3 = 1.5m	0.3	0.15	0.135
	− Cintel over window	4	1.3	0.3	0.15	0.234
	− shelf	2	1.3	0.3	0.15	0.117

deduction total

4.308

50.140 −
4.308

45.742 m³

4/9/19

2 → CENTER LINE METHOD

- In this method calculate the total center line length of walls in a building and multiply the same by the breadth and depth of the respective item to get the total quantity at a time.
- For different sections of walls in a building, the center line length for each type shall be worked out seperatly
- Estimate may be prepared more quickly and as accurate as other methods.
- For unsymmetrical walls, No advantage is there because center line length varries at each layer.

Q. The plan represents of a single of room building of 5m x 4m. Estimate the quantities of

(i) Earth work in escavation in foundation

(ii) Lime concrete in foundation

(iii) Brick work in foundation and plinth

(iv) Brick work in superstructure wall

Item. No.	Description of the Item.	No	length	breadth	height/ depth	Quant.
1.	Earth work in excavation in fomdation.	1	5.3+4.3 +4.3+5.3 = 19.2	0.9	0.9	15.552
2.	Lime concrete in fomdation.	1	19.2.	0.9	0.3	5.184
3.	Brick work in fomdation and plinth.					
	- First footing	1	19.2	0.6	0.3	3.456
	- Second footing	1	19.2	0.5	0.3	2.88
	- Plinth wall.	1	19.2.	0.4	0.6	4.608.
						10.944
4.	Brick work to Super structure.	1	19.2	0.3	3.5	20.16

Two room building.

Item No	Description of the Item.	No	length	breadth	height/ depth	Quantity
1	Earth work in escavation in foundation.		10.6+10.6+6.3+6.3+6.3 = 40.1 m (Total centre line length)			
		1	40.1 − 2 × 1.1/2 = 39	1.1	1	42.9
2.	Lime concrete in foundation.	1	40.1 − 2 × 1.1/2 = 39	1.1	0.3	12.87
3.	Brick work in foundation and plinth.					
	– First footing	1	40.1 − 2 × 1/2 × 0.8 = 39.3	0.8	0.2	6.288
	– 2nd footing.	1	40.1 − 2 × 1/2 × 0.7 = 39.4	0.7	0.1	2.758
	– 3rd footing.	1	40.1 − 2 × 1/2 × 0.6 = 39.5	0.6	0.1	2.37
	– 4th footing	1	40.1 − 2 × 1/2 × 0.5 = 39.6	0.5	0.1	1.98
	– Plinth wall	1	40.1 − 2 × 1/2 × 0.4 = 39.7	0.4	0.8	12.704

4	2.5 cm damp proof course	1	39.7	0.4	—	15.88
	deduct door sills	2	1.2	0.4	—	0.96
						14.92
5.	First class Brickwork in super structure	1	40.1 − 2×0.5 ×0.3	0.3	4.2	50.148
	deductions					
	Doors	2	1.2	0.3	2.1	1.512
	window	4	1	0.3	1.5	1.8
	shelf	2	1	0.2	1.5	0.6
	Lintel over door	2	1.5	0.3	0.15	0.135
	Lintel over window	4	1.3	0.3	0.15	0.234
	shelf	2	1.3	0.3	0.15	0.117
						deduction total
						50.148 − 4.074
						46.074

ABSTRACT OF ESTIMATED COST

Work charge establishments

- The cost under the item of work is calculated from the quantities already computed at workable rate and the total cost is worked out in a prescribed form. It is known as abstract of estimate form.
- A % of 3–5 % added for contingencies which may occur during the execution of the work.
- A % of 1.5 – 2 is also added to meet the expenditure of the work charged establishments.
- The grand total, thus obtained is the estimated cost of the work.

Item NO	description of the item.	quantity	Unit	rate	Amount

In the above forms, the description of each item should be such as to express exactly what work, material etc have been provided for.

24/10/19

MODULE -3 VALUATION

VALUE

- means worth or utility.
- It varies time to time and deppends on the supply of that particular type of property. and extend of demand for it.

COST

It means the original cost of construction and can be known after accounting all day to day expenditure from the very planning stage till the construction is completed.

PRICE

This is an amount worked out adding the cost of production, interest on investment, reward to the produces for his labour and risk.

VALUATION

- It is the art of accessing the present fair value of a property at a stated time.
- Valuation of anything is an estimate of the value of that property in terms of money.
- It is based on certain facts, and only after a detailed processing of such facts we can

suggest the value or price of the property.

GROSS INCOME,

is the total income from all sources with out reducing the out goings necessary for different purposes.

OUT GOINGS

These are the expences to be made by vertue of being in possession of the property and also the expences of maintaining the property.

out goings may be classified as

tax

repair

management and collection charges

insurance premiums

loss of rent etc.

It also includes sinking fund.

NET INCOME

It is the gross income less all out goings necessary to maintain the property in a state to command that income.

SCRAP VALUE

Scrap value is the value of dismantled materials of a property at the end of its utility period, and absolutely use less except for sale as scrap

It is usually considered as 10% of cost of construction.

It is also known as junk value or demolishing value.

SALVAGE VALUE

- Is the estimated value of a built up property at the end of its useful life. with out being dismantl
- This is generally accounted by deducting the depreciation from its new cost

MARKET VALUE

It is the value at which it can be solde in the open market at a particular time.

BOOK VALUE

It is desired as the value of the property shown in the account book in that particular year. ie, the original cost less the total depreciation till that year.

CAPITALISED VALUE

It is the sum or amount, the interest on which at the highest prevailing rate could be equal to the net income out of the property.

YEARS PURCHASE

It is defined as the capital sum required to be invested in order to recieve a net annual income of rupees 1 at a certain rate of interest.

capitalised value = Net annual income x years purchase.

$YP = \frac{100}{i}$ i = rate of interest,

$YP = \frac{1}{I_p + I_c}$ where I_p = interest on the capital

I_c = co efficient of sinking fund

OBSOLESCENCE

Defined as the lose in the value of the property due to change in fashions, designs in structure, in adequacy to present or growing needs, necessity for replacement due to new inventions etc.

ANNUITY

It is the net instalment of annual or periodical payment for retainment of the capital amount invested in a property for a specified period.

4 types.

1) ANNUITY CERTAIN

Annuity payable at the end of each period and payments are continued for certain fixed number of periods.

ii) ANNUITY DUE

Annuity payable at the beginning of each period of year and payments are continued for certain fixed

no. of periods.

PERPETUAL ANNUITY

Annuity is recievable for an indefinit period

DEFERED ANNUITY

Annuity comments after a few year from the actual date of capital investment.

25/10/19

SINKING FUND

It is an amount which has to be setaside at fixed intervals of time (annualy) out of the gross income. So that at the end of the useful life of the building or property, the fund should accumulate to the initial cost of the property.

A building, machine, vehicle etc. becomes useless after certain years, ie, at the end of its life. Hence. It is necessary to make some provision where by the owner can accumulate a sum required for rebuilding or replacing the article for this, sinking fund is periodically collected and deposited in a bank to get heighest compound interest or sinking fund insurance policy is contracted with the insurance company through out the life of the building or article.

- For land sinking fund is not required.

DETERMINATION OF SINKING FUND

- Calculation of sinking fund depperds upon the life of a building and rate of interest
- when the life of a building is over the owner can get back a certain amount on the sale of old building materials which is known as scrap value.
- This amount is considered as 10% of the building cost
- The calculation of sinking fund is made on 90% of cost of the building.

Annual sinking fund instalment $I = S \times I_c$

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

S = Total amount of sinking fund.
I = Annual fund instalment
i = rate of interest expressed in decimal.
n = no. of years
I_c = co. efficient of annual sinking fund.

Q. what annual sinking fund at 4.5% must be invested to produse rupees 1 at the end of 20 years.

I = ?
n = 20.
i = 4.5% = 0.045 = $\frac{4.5}{100}$
S = 1

$I = S \times I_c$, $I_c = \frac{i}{(1+i)^n - 1} = \frac{0.045}{(1+0.045)^{20} - 1}$

$= 0.0318$ ₹

$I = 1 \times 0.0319 = 0.0319$ ₹

Q. An owner has installed an air cooler in a building at a cost of rupees 8000/-. If the life of the air cooler is 18 yrs calculate the amount which he should set aside annualy as sinking fund to accumulate the above cost at 5% compound interest.

$S = 8000$

$i = 5\% = \frac{5}{100} = 0.05$

$n = 18$

$$I_c = \frac{i}{(1+i)^n - 1} = \frac{0.05}{(1+0.05)^{18} - 1} = 0.035$$

$$I = S \times I_c = 8000 \times 0.035 = 284.369 ₹$$

Q) A person has purchased an old building at a cost of ₹ 90000 on the basis that the cost of land is ₹ 50000 and the cost of building structure is ₹ 40000. considering the future life of the structure be 20 years work out the amount of annual sinking fund at 4% interest. Then scrap value is 10% of the cost of the building structure.

$I = ?$

$I = S \times I_c \qquad I_c = \frac{i}{(1+i)^n - 1}$

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

$i = 4\% = 0.04$

$n = 20$ years.

$S =$

$S =$ cost of building − scrap value of building.

Scrap value = 10% of cost of building. (10% of 40000)

= 4000 ₹

$= 36000$

$$I = \frac{36000 \times 0.04}{(1+0.04)^{20}-1} = 1208.94 \text{ ₹}$$

~~Capitalised~~

YEARS PURCHASE & VALUE OF PROPERTY

Q. Work out the value of years purchase for an old building. If its future life is 15 years and the rate of interest is 7% on capital and 4% for sinking fund.

$I_p = 7\% = 0.07$

$i = 4\% = 0.04$ $\quad y_p = \frac{1}{I_p + I_c}$

$$I_c = \frac{i}{(1+i)^n - 1} = \frac{0.04}{(1+0.04)^{15}-1} = 0.049.$$

$$y_p = \frac{1}{0.07 + 0.049} = 8.40$$

Q. A lease hold property is to produce a net income of 12000 per annum. for the next 60 years. what is the value of the property. Assume that the owner desires a return of 6% on his capital and the sinking fund to replace the capital is also to accumulate at 6%. what will be the value of the property if rate of interest for redumption of capital is 3%.

Net income = 12000

$n = 60.$ $\quad I_p = 6\%.$ $\quad i = 6\%.$

Value of property = Net income x y_p.

$$I_c = \frac{i}{(1+i)^n - 1} = \frac{0.06}{(1+0.06)^{60}-1} = 1.87 \times 10^{-3} = 0.001876$$

$$Y_p = \frac{1}{I_p + I_c} = \frac{1}{0.06 + 0.00876} = 16.16$$

Value of property = 12000 × 16.16 = 193920 ₹

② i = 3%.

$$I_c = \frac{0.03}{(1+0.03)^{50} - 1} = 6.13 \times 10^{-3} = 0.00613$$

$$Y_p = \frac{1}{0.06 + 0.00613} = 15.12$$

Value of property = 12000 × 15.12 = 181452.64 ₹

DEPRECIATION

Depreciation is the loss in the value of the value of the property due to its use, life, wear and tear, decay and obsolescence.

This is an accessment of physical wear and tear of the building or property and is dependend on its original condition, quality of maintenance and mode of use. Thus the value of building or property decreases gradually upto the utility period due to depreciation.

→ Book value of a property at a particular time is the original cost less all depreciation till that time.

→ General decrease in the value of a property is known as annual depreciation.

TYPES OF DEPRECIATION

(i) Physical depreciation
(ii) Functional depreciation
Obsolessence
(iii) contingen depreciation.

PHYSICAL DEPRECIATION.

- wear and tear from operation
- action of time & elements.
- functional depreciation
- inadequacy in performance.
- obsolescence.
- contingen
- accidents
- decrease of supply
- diseases

DETERMINATION OF DEPRECIATION

- **STRAIGHT LINE METHOD**

Property is assumed to lose value by a constant amount every year and thus a fixed amount of original cost is return of every year, so that at the end of the term, when the asset is burn out only the scrap value remains.

Annual depreciation = $\frac{\text{original cost} - \text{scrap value}}{\text{life in years.}}$

$$D = \frac{C - Sc}{n}$$

where C = original cost

Sc = Scrap value

n = Life of the property in years.

Q. The total cost of a new building is 150000 ₹ calculate the depreciated cost of the building after 20 years, by straight line method, if the scrap value is 15000 ₹ assuming the life of the building is 80 years

1) n = 80 yrs Sc = 15000, C = 150000

$$D = \frac{150000 - 15000}{80} = 16875 ₹$$

depreciation for 20 years = 20 × D

= 20 × 16875 = 33150 ₹

value of building at 20 years = 116250.

~~value of building at 20 years = (150000 − (20 × 16875))~~

CONSTANT % METHOD OR DECLINING BALANCED METHOD

The property is assumed to lose value anually at a constant % of its value. let, P = % rate of anual depreciation expressed in decimal

C = original cost

Sc = Scrap value.

N = Life of property in years.

$$P = 1 - \left(\frac{Sc}{C}\right)^{1/N}$$

Value after n years = $C(1-P)^n$

$1 \cdot \left(\frac{Sc}{C}\right)^{1/N}$.

$\therefore C(1-P)^n$.

Q. The present value of a machine is ₹20000. work out the depreciation cost at the end of 5 years. If the scrap value is 2000, Assume life of the machine is 16 years.

Sc = 2000

C = 20000

N = 16 years.

n = 5 years.

$$P = 1 - \left(\frac{Sc}{C}\right)^{1/N}.$$

$$= 1 - \left(\frac{2000}{20000}\right)^{1/16} = 0.1340\ \%$$

value after 5 years = $C(1-P)^n$

$= 2000(1-0.134)^5 = 9741.35$ ₹

SINKING FUND METHOD

Depreciation is assumed to be annual sinking fund plus interest of accumulated sinking fund till that year.

Annual sinking fund to provide for ₹1 in N years

$$x = \frac{i}{(1+i)^N - 1}$$

i = rate of interest in decimal at which sinking fund amount is required to be invested.

An amount of ₹1 per annum in n years.

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

Rate of depreciation in n years = xy %.

Q. A cost of construction of a new building according to present market rate is ₹ 80000, having life of 70 years. If the building is 15 years old determine the depreciation amount which should be deducted from the cost of the new building at 6% compound interest.

C = 80000

N = 70.

i = 6 % =

n = 15

$$x = \frac{i}{(1+i)^N - 1} = \frac{0.06}{(1+0.06)^{70} - 1} = 1.03 \times 10^{-3}$$

$$y = \frac{(1+0.06)^5 - 1}{0.06} = 23.27.$$

Rate of of depreciation in 15 years = $xy = 1.03 \times 10^{-3} \times 23.27 =$

= 0.0240 = 24%

METHODS OF VALUATION

Rental method

Profit based method

Depreciation method of valuation

development method of valuation.

valuation of land.