

⇒ Doors and windows:- Chalknets (frames) shall be of seasoned teak wood. Shutters shall be of 3 cm thick teak wood panelling. Brass fittings shall be provided. Doors and windows shall be varnished or painted two coats.

→ Miscellaneous:- Rain water pipes shall be of cast iron or asbestos cement and finished painted. All sanitary, water supply and electrical fittings shall be of first class materials.

Q-3 Draft specification for Reinforced Cement
Concrete in 1:1.5:3 C.C.

① Proportion :- The proportion of the materials shall be 1:1.5:3 i.e. 1 part of cement 1.5 parts of sand and 3 parts of aggregate by volume.

①① materials

① cement :- cement shall be Fresh Portland cement conforming to IS-269 up to date or Rapid hardening cement or blast furnace slag cement or high alumina cement of approved specifications. The minimum compressive strength of ordinary Portland cement as per IS:269 should be 17.5 N/mm^2 .

② Fine aggregate (sand) :- The fine aggregate shall conform to IS:383 up-to-date. It shall be clean, sharp, hard and angular grains and shall pass through 4.75 mm I.S sieve. It should be free from dust, dirt, vegetable and organic matters. Sea sand shall not be used. River or pit sand shall be used.

③ coarse aggregate :- Coarse aggregate shall be hard broken stone or granite or similar stone. It shall be hard, strong, durable and dense. It should be free from soft friable, thin, flat, elongated, flake particles. It should be clean and free from dust, dirt, vegetable and organic matters unless specially mentioned. The size of coarse aggregate shall be 20 mm & below down and shall be obtained

1 m or 5 mm square mesh sieve

④ Water :- Water used shall be clean and reasonably free from injurious quantities of deleterious materials such as oils, acids, alkalis, salts and vegetable growth.

⑤ Steel Reinforcement :- steel reinforcing bars shall be of mild steel (Fe 250) or high yield strength deformed bars (HYSD - Fe 415, Fe 500) or standard specifications. It shall be free from corrosion, loose rust scales, oil, grease, paint etc which may destroy or reduce bond.

The steel bars shall be round and capable of being bent without fracture.

Q. Give General specification of first class brick masonry. C.M 1:6 328

⇒

① materials

Bricks :- Bricks shall be standard size $19 \times 9 \times 9$ cm first class of standard specifications. They shall be regular in shape and size with sharp edges and corners. They shall emit a clear ringing sound on being struck. They shall be of uniform deep red or copper colour. Free from cracks, chips, efflorescence, flaws and lumps of any kind. Dry brick shall not absorb more than 20% of water by their weight when immersed in water for 24 hours. The bricks should not broken when dropped flat on hard ground from 1 m height.

② cement :- cement shall be fresh Portland cement conforming to IS-269 up-to-date or rapid hardening cement or blast furnace slag cement or high alumina cement of approved specifications. The minimum compressive strength of ordinary Portland cement as per IS:269 should be 17.5 N/mm^2 .

③ Fine aggregate (sand) :- The fine aggregate shall conform to IS:382 up-to-date. It shall be clean, sharp, hard and angular grains and shall pass through 4.75 mm I.S. sieve. It should be free from dust, dirt, vegetable and organic matters. Sea sand shall not be used. River or pit sand shall be used.

* Water :- Water used shall be clean and reasonably free from injurious quantities of deleterious materials such as oils, acids, alkalis, salts and vegetable growth. Generally portable water shall be used.

iii) mortar :- The brickwork shall be done with specified mortar, mixing the ingredients in the specified portion 01:62 in the case of cement mortar the unit of measurement for cement shall be a bag of cement and this shall be taken as 0.035 cum. Sand in specified portion shall be measured in boxes of suitable size 33cm x 23cm x 40cm. Sand shall be measured on the basis of dry volume.

materials of mortar shall be first mixed dry to have a uniform colour and a clean mass and then mixed by adding clean water slowly and gradually to have workable consistency and mixed thoroughly by turning at least three times. Freshly mixed mortar shall be used within 30 minutes time after adding water.

iii) Soaking of bricks :-

All bricks shall be thoroughly soaked in water by submerging them in clean water for a period of 12 hours immediately before use.

iv) Laying

Bricks shall be laid in English bond unless otherwise specified. Every course shall be truly horizontal and wall shall be truly horizontal and in plumb. Vertical joints of consecutive courses shall not come directly over one another.

Mortar joint shall not exceed 8mm in thickness and joints shall be fully filled with mortar on curing.

The brickwork shall be cured for a period of at least 10 days after laying. At the end of day work the tops of walls shall be flooded with water by making small weak mortar edging to contain atleast 2-5 cm deep water.

vi

scaffolding

Necessary and suitable scaffolding shall be provided to facilitate the construction of brick wall.

vii

measurement

Brickwork shall be measured in cum.

Plastering in walls specification① materials

- ① cement: cement shall be Fresh Portland cement conforming to IS-268 up to date or Rapid hardening cement or blast furnace slag cement or high alumina cement of approved specifications. The minimum compressive strength of ordinary Portland cement as per IS:268 should be 17.5 N/mm^2 .

- ② Fine aggregate (sand) :- The fine aggregate shall conform to IS:383 up-to-date. It shall be clean, sharp, hard and angular grains and shall pass through 4.75 mm I.S. sieve. It should be free from dust, dirt, vegetable and organic matters. Sea sand shall not be used. River or pit sand shall be used.

- ③ Water :- Water used shall be clear and reasonably free from injurious quantities of deleterious materials such as oils, acids, alkalis, salts and vegetable growth. Generally Potable water shall be used.

- ④ preparation of mortar :- The materials shall be first mixed dry to have a uniform colour and a clean masonary surface or platform and then mixed by adding clean water slowly and gradually by turning atleast three times, Freshly mixed mortar shall be used within 30 minutes time after adding water.

iii) Preparation of surface

The surface of the wall shall be brushed, cleaned, washed and wetted with water before plastering. In case of cement plaster on cement concrete the face shall be lightly roughened, cleaned, washed and wetted.

To ensure uniform thickness of plaster, patches of 15 cm x 15 cm strips at 1 m centres shall be applied first.

iv) Laying

First mortar shall be tuckered and pressed over the surface and then brought to a true smooth and uniform surface by means of float and trowel. External plastering shall be started from top and worked down towards floor.

v) curing

The plaster shall be kept wet for at least 10 days.

vi) measurement

Plastering shall be measured in sqm stating thickness, mortar proportion and its mix.

Assignment-3MARKET SURVEY

Q.1 Provide the prevailing market rate of the following materials in your city.

- ① 10 mm diameter ms bars
- ② Gunb trap
- ③ 53 graded portland cement
- ④ 20 mm nominal size coarse aggregate
- ⑤ 1st class bricks
- ⑥ Kothu stone
- ⑦ Oil paint

Assignment - 4Rate Analysis

Q.1 Explain in details various factors affecting rate analysis.

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

- ① material cost:- material cost is an important factor affecting rate analysis. The rate of materials like cement, steel, sand, aggregates etc. vary from place to place.
- ② labour cost:- The wage of labour is a variable factor and will vary from place to place, person to person and from time to time.
- ③ equipments/machinery cost:- If the execution of an item requires the use of some special equipment or plant, the cost of using such equipments on the rental basis should be included in the rate analysis of that item.
- ④ Nature of work:- If the work consists of large quantities of the items, the rates may be less and vice versa.
- ⑤ Location of site:- The site of work will have some effect on the rate of an item under certain conditions. If it's too far, more amount will have to be spent on carting. Similarly, if it's situated in a highly congested area, it will not be possible to take the materials directly to the site. This will increase the cost of transport of materials and consequently, the rates of the items will increase.

- 6 weather:- Extreme cold, heat or rain may increase the rates of items.
- 7 specifications:- If the specifications of work provide for rigid type tolerances and superior quality workmanship, the rates will be on the higher side.
- 8 Conditions of contract:- If the conditions of contract are very strict the rates of the various items will be high and vice versa.
- 9 Time limit:- If the time limit for the work is short, the rates will be on the higher side and vice versa.
- 10 Transportation cost:- If the materials and labours are to be transported to the work place from far places, the rates of items will increase.
- 11 Availability of water and electricity:- For almost all items of construction, water is required, to run mixer machine, vibrator, drill machine, reinforcement bar cutter, etc. electricity is required.
- 12 contractor's profit
The usual percentage of the profit of the contractor is 8 to 15%, if it is more or less, the rate of item will be accordingly affected.

- 13 overhead charges :- This includes such items as office rent, salaries of office staff, postage, lighting, travelling, telephone expenses, stationery etc.
- 14 miscellaneous :- The miscellaneous factors affecting rates of items include reputation of the contracting firm, discipline of the organization, terms of payment etc.

RATE ANALYSIS

Item Earthwork in excavation up to 1.5 m depth

For 10 m³

[illegible]

RATE ANALYSIS

Item BRICK bat cement Concrete in Foundation C.B.-B.-C.C) (1:2:5:10) 10 m³

Materials	Quantity	Rate		Per	Amount		Labour	Number	Rate		Per	Amount	
		Rs.	P.		Rs.	P.			Rs.	P.		Rs.	P.
① Brick bats	10	800/-		m ³	8000/-		male coolie	3	200		bar	600/-	
② sand	5	800/-		m ³	4000/-		female coolie	6	180/-		bar	1080/-	
③ cement	28	280/-		bag	8120/-		Whistle	2	200/-		bar	400/-	
Summaries					50/-		Summaries					50/-	
Material cost					20170/-		Labour cost :					2130/-	
							Material + Labour cost = RS.					22300/-	
							Add 1-3% water charges: RS.					335/-	
							Add 10% contractor's profit: RS.					2230/-	
							Rate for 10 m ³ RS.					24865/-	
							Rate for 1 m ³ RS.					2486.50	
							SAY RS. 2487-0						
Cost of Materials					20170/-		Cost of Labour						
							Cost of Materials						
							Total Cost						

RATE ANALYSIS

Item 230 mm brick work in cement mortar 1:6

Materials	Quantity	Rate		Per	Amount		Labour	Number	Rate		Per	Amount	
		Rs.	P.		Rs.	P.			Rs.	P.		Rs.	P.
Bricks 19 cm x 9 cm x 9 cm	5000 Nos	4000/-		10000 Nos	20000/-		Master mason	0.5	400/-		day	200/-	
Cement	14 bags	280/-		bag	3920/-		male coolie	7	300/-		day	2100/-	
Sand	2.83 m ³	800/-		m ³	2264/-		female coolie	7	180/-		day	1260/-	
Sundries					50/-		Sundries	2	200/-		day	400/-	
							Material + Labour cost				=		31644/-
							Add 15% water charges				=		RS. 4751/-
							Add 10% contractors profit				=		RS. 3165/-
							Rate for 10 m ³						RS. 35284/-
							Rate for 1 m ³ : RS. 3528/-				Cost of Labour		
							Say RS. 3530/-				Cost of Materials		
											Total Cost		

EXPLANATION

① For 1 m^3 of brickwork, 500 bricks required.

② For 10 m^3 brickwork 3.3 m^3 mortar is required

Proportion $1:3:7$

$$\therefore \text{Cement} = \frac{1}{7} \times 3.3 = 0.471 \text{ m}^3 = \frac{0.471}{0.035} = 13.46 \text{ bags}$$

say 14 bags

$$\text{Sand} = \frac{6}{7} \times 3.3 = 2.93 \text{ m}^3$$

223

Materials	Quantity	Rate		Per	Amount		Labour	Number	Rate		Per	Amount	
		Rs.	P.		Rs.	P.			Rs.	P.		Rs.	P.
① Cement	80	280		bags	22400		① Labour for mixing, transporting & placing concrete	10m ³	300		m ³	3000	
② Sand	4.14	800		m ³	3312		② Cost of hiring mixer and vibrator	L.S.				1000	
③ Aggregate	6.28	1000		m ³	6280		③ Labour for binding, cutting, placing, relaf. reembar steel	1570	3		Kg	4710	
④ Steel (2%)	1570	45		Kg	70650		④ Staples					50	
⑤ Binding wire staples	16	50		Kg	800		⑤ Labour for centering and shuttering			L.S.		5000	
					50							16900	
					103492		Material + Labour cost			RS-	122392		
							Add 1.5% Water charges			RS-	1836		
							Add 10% C.P.D			RS-	12240		
							Rate for	10 m ³			RS-	136468	
							Rate for 1m ³ : RS-13646			Cost of Labour			
							Sum RS-131630/-			Cost of Materials			
										Total Cost			

Explanations

① For 10 m³ of wet concrete, 15.2 m³ of dry conc. required
Proportion 1:1.5:3

$$1:1.5:3 = 5:5:15$$

$$\text{Cement: } \frac{1}{5.5} \times 15.2 = 2.76 \text{ m}^3 \quad \frac{2.76}{0.035} = 78.85 \text{ bags} \quad \text{say } 80 \text{ bags}$$

$$\text{Sand: } 1.5 \times 2.76 = 4.14 \text{ m}^3$$

$$\text{Aggregate: } 3 \times 2.76 = 8.28 \text{ m}^3$$

② Assume 2% steel of wet volume of concrete

$$\therefore \text{Volume of steel: } \frac{2}{100} \times 10 = 0.2 \text{ m}^3$$

$$\text{Density of steel: } 7850 \text{ kg/m}^3$$

$$\text{Density: } \frac{\text{mass}}{\text{Volume}}$$

$$\therefore \text{mass of steel } 0.2 \times 7850 = 1570 \text{ kg}$$

③ For 100 kg of steel, 1 kg binding wire is required

\therefore For 1570 kg steel 16 kg binding wire is required.

Q.4 Explain in brief about Salary, Work-charged establishment, Contingencies, Administrative approval, Schedule of Rates, Lump-sum items.

① Salary :-

② Work charged establishment :- Work charged establishment is the establishment which is charged to works directly. During the construction of a building or a project a certain number of work-supervisors, chaulkis etc are required to be employed, and their salaries are paid from the amount of work-charged establishment.

③ Administrative approval :- For any work or project required by a department, an approval or sanction of the competent authority of the department, with respect to the cost and work is necessary at the first instance. The approval authorizes the engineering department to take up the work. Administrative approval denotes the formal acceptance by the department concerned of the proposal. The engineering department prepare approximate estimate and preliminary plans and submits to the department concerned for administrative approval.

④ Schedule of rates:-

Schedule of rates is a list of rates of various items of works to facilitate the preparation of estimates, and also to serve as a guide in settling rates in connection with contract agreements. A schedule of rates for all items of work is maintained in the form of a printed book known as Schedule of Rates (SOR).

The schedule of rates consists of group of items such as excavation items, concrete items, masonry items, demolition items, plumbing items, electrification items etc.

As the rates of items mentioned in the schedule of rates are liable to vary, the SOR is periodically revised, usually after 3 years.

The CPWD, a premier construction organisation of the Government of India, maintain printed schedule of rates book for various items of work and estimate is prepared with these rates.

⑤ Contingencies :- The term contingencies indicates incidental expenses of miscellaneous character which cannot be classified under any distinct item sub-head, yet pertain to the work as a whole.

In an estimate a certain amount in the form of contingencies of 3 percent to 5 percent of estimated cost.

Q.5 Explain the term 'TASK WORK'. Discuss the Factors affecting task work.

The capacity of doing work by an artisan or skilled labour in the form of quantity of work per day (8 hours shift) is known as task work or out-turn work.

Task work depends upon various factors such as type of labour, nature of work, climatic conditions, situation of work, skill of labourer etc. This task work is the most uncertain part of the rate analysis.

The task work per day is calculated either by maintaining a record of labour employed and the work done or by experience. The task work per day is calculated either by maintaining a record of labour employed. The public organisation such as P.W.D have standardized the task work per day for different categories of labourers. For example

Quantity of earthwork was 24 m^3

Total labourers worked: $2 \times 4 = 8 \text{ nos}$

Task work for one labourer $\frac{24}{8} = 3 \text{ m}^3 \text{ day}$

i.e. one labourer can excavate 3 m^3 of earth, per day.

Assignment-3Tenders and Contracts

Q.1 What is tender? What particulars are to be given in tender notice?

A tender is an offer in writing for executing certain specified work or for supplying specified materials subject to certain terms and conditions like rates, time limit etc.

The construction of work is usually done by contract. Several tenders are invited and the work is usually entrusted to the lowest tenderer. While inviting tenders the bill of quantities, detailed specifications, conditions of contract, and plans and drawings are supplied to the contractor who wish to quote their rates on payment of the requisite tender cost.

depending upon the type of contract, the tender may be

- ① lump-sum tender
- ② item rate tender
- ③ cost plus tender
- ④ percentage rate tender
- ⑤ labour tender
- ⑥ demolition tender etc

The tenders may be invited either by private owners or public notice or by negotiation. The tender may be either open tender or selective tender.

The notice inviting tender paper is a very important document on which tenders and subsequent agreements with the contractors are based. The advertisement should come to the notice of the greatest number of potential bidders.

All the tender notices should be in the standard form of department. It is displayed in the notice board of the division and also circulated to the related subdivisions and other divisions of the department.

The important points to be included in the tender notice are

- ① Name of the authorities inviting tender
- ② Particulars of contractors eligible to submit tenders.
- ③ Name of work, and its location
- ④ Estimated cost of work
- ⑤ Cost of complete set of tender form
- ⑥ Time of completion
- ⑦ Earnest money deposit and security deposit
- ⑧ Last date, time limit and place of receipt of sealed tenders.
- ⑨ Date, time and place of opening of tenders
- ⑩ Last date of sale of tender paper
- ⑪ Accepting authority
- ⑫ Validity of tender.

Q.2 What are the duties and liabilities of owner, Engineer & Contractor?

⇒ Duties and liabilities of owner

① The owner is supposed to provide necessary land or site on which the proposed work is to be constructed

② The owner should appoint an engineer to look after the technical requirements of the work.

③ The owner should supply necessary plans, and working drawings through his architect to the contractor in time so that the work is not unnecessarily delayed.

④ The owner should respect the conditions of contract concerning his powers and duties

⑤ The owner should provide necessary work from to the contractor so that work is not delayed.

⑥ The owner should make necessary arrangement for the funds required for the construction of the work so that regular payment shall be made to the contractor.

⑦ It is desirable that owner should pass all the instructions to the contractor through his engineer.

⑧ The owner should make arrangements to record the measurement of items in time before they are covered up in the subsequent execution of work.

⑨ The owner should supply materials and issue machines if it is a part of the contract.

⑩ The owner should not interfere with the progress of the work and should not pass such instructions which will lead to the problems of extra items, nominated damages etc.

- (11) The owner should not suspend the work temporarily unless it appears to be in his interest to do so.
- (12) To take over possession of the completed work timely from the contractor.

* Duties and liabilities of the Engineer

- ① To organise and supervise the execution of work and to see that they are suitable and economically carried out with specified quality of materials.
- ② It is the duty of the executive engineer to prepare estimate of proposed works through his subordinates and submit the same to his superintending engineer.
- ③ The engineer is responsible for explaining the plans and provisions of the specifications.
- ④ The engineer is responsible for giving all lines and levels required in connection with the work.
- ⑤ The engineer should see that the workmanship complies with the provisions in the technical specifications of the work.
- ⑥ It is his duty to invite tenders for works valued within his powers, after obtaining administrative approval and technical sanction.
- ⑦ In certain complicated terms, the engineer should give the sequence of operations and should explain method of construction in detail to the contractor.
- ⑧ It is duty of the engineer to prepare specifications for the work and to see that these specifications are accurate, proper and responsible for the work.
- ⑨ The assistant engineer is responsible for taking detailed measurements of works during progress.

and to enter the same in m.B and prepare bills for payment.

M ⑩ To see that machinery likely to be used on works are properly maintained and safe houses.

I ⑪ To keep tools and plants in working conditions and arrange to protect surplus stock from deterioration.

B ⑫ To prevent encroachment on government lands under his division.

R ⑬ The engineer is responsible for the acts of his assistants or other agencies employed by him.

A ⑭ It is also the duty of the engineer is to assist the court of law or the arbitrator during the hearing of the dispute.

* duties and liabilities of the contractor

R ① The contractor is responsible to provide all the materials, labour, equipments etc. conform under the provisions of the contract for the execution of the work.

C ② The contractor should carry out the work as per plans and specifications and as per directions given by the engineer.

I ③ The contractor should inform the supervising engineer before taking up any new item and before covering up of any work.

A ④ The contractor should appoint a qualified person on site of the work to whom instructions and directions can be imparted.

L ⑤ The contractor is responsible to respect all the prevailing labour laws and should make required

payments to his labourers as well as to the sub-contractors.

6. The contractor is responsible for any damage to the persons or adjoining properties during execution of work.

7. The contractor should give all the required assistance to the engineer for establishing the times and levels of the work.

8. The contractor should submit the bills of work as and when required.

9. The contractor is responsible for arranging for the permit of the controlled materials and for paying fees and royalties for the use of patented articles or processes.

10. The contractor is responsible for the safety of all the labourers and personnel working at the site and should provide safety shoes, helmets etc. to the workmen.

11. To handover the completed work in a sound condition.

12. The contractor should submit his claims for extra items in due time.

Q.3 List different type of contracts, discuss any four in detail.

Contract:- contract is undertaking by a person or firm to do some work under certain terms and conditions. This work may be for the construction or maintenance and repairs, for the supply of materials, for the supply of labour, for the transport of materials etc.

There are different type of contract given as below.

① Lump Sum Contract:- In lump-sum contract undertakes the execution or construction of a specific work with all its contingencies, to complete it in all respects within a specified time for a fixed amount. The general specification and descriptions of different part of the building with dimensions where required are included. The quantities or schedule of different items of work are not provided. The contractor shall have to complete the work as per plan and specification or completion of the work no detailed measurement of different items of work is required but the whole work is compared and checked by with plans and drawings.

② Lump sum and Schedule Contract:- This is similar to lump sum contract but the schedule of rates is also provided in the contract agreement. For this system the contractor undertakes the execution or construction of a particular work at a fixed sum within specified time as per plans and detailed

specifications and conditions, and the schedule of rates for various items of work are also provided which regulates the extra amount to be paid or deducted for any additions and alteration. In this case also no measurement of various items of work involved for the original work is required, but measurement of extra items only shall have to be taken.

- ③ Schedule Contract or Item Rate Contract:- In schedule contract, the contractor undertakes the execution of construction of a work on the item rate basis. The amount the contractor is to receive depends upon the quantities of various items of work actually done. The contract agreement includes quantities, rates and amounts for various items of work and the total amount of contract, plan and detailed drawings, detailed specifications. The payment of the contractor is made by detailed measurement of different items of works actually done by the contractor. The system is used for all works.

Q.4 Summarize and discuss various types of tenders

Based on the method of inviting tenders, there are three types

- ① open tender or public tender
- ② selected tender or limited tender
- ③ negotiated tender

① open tender or public tender

In this type, tenders are invited by public advertisement. The open tender method is usually adopted for public works, as the law generally require that Government contracts and other public contracts be advertised publicly, to obtain the most advantageous terms.

Any contractor who is willing to undertake a piece of work and who has the requisite finance and equipment to complete it satisfactorily is allowed to submit the offer. This competition is classified into two groups

- ① Local Competitive bidding (LCB) - When submission of tenders is restricted to Indian companies only
- ② International Competitive bidding (ICB) - When it is open to all contractors including international firms.

② Selected tender or limited tender

In case of selected tender, the architect after consultation with his client, invites a limited number of contractors for filling up the tender of the project. It results into competition on a small scale. But it

Proves to be useful for specialised and skilled works. It also results in early successful completion of the project.

This procedure is usually adopted for private jobs where the owner has the right to negotiate directly and to enter into an agreement with whomsoever he chooses. This procedure can be highly recommended for monumental structures, industrial construction, and other works that specialised knowledge and equipment.

③ Negotiated Tender :-

This is the advance form of selective tender and the contract is given by negotiations with one or at the most two contractors. As such, there is no competition in this type of tender and hence, it may prove to be costly. But when the work is to be completed in target time without sacrificing for the quality, the negotiated tender may prove to be the only alternative.

This procedure can be adopted in the following circumstances

- ① The firm chosen is one in which the owner and his employees have confidence, and whose integrity and reliability are well established.
- ② The work to be carried out is within the special scope and experience of the firm.
- ③ The work is to be completed in target time without sacrificing for the quality.

Q.5

explain the 'tender'. Draft a tender notice for construction of bus hostel for engineering college.

Tender :- A tender is an offer in writing for executing certain specified work or for supplying specified materials subjected to certain terms and conditions like rates, time limit etc.

Notice inviting tender

Tender notice no _____

Sealed tenders in the prescribed form for the following works are invited from registered contractors in the appropriate class with the Government, etc., to reach this office up to _____ before _____ a.m./p.m. on _____ date.

The tenders will be opened on the same day at _____ a.m. if possible, in the presence of the intending tenderers.

Bidder tender forms will be available on payment of Rs. _____, which is not refundable, on clear working day from _____ dates to _____ dates during office hours i.e. _____ a.m. _____ p.m. on weekdays, and up to _____ p.m. on Saturdays. Contractors desirous of obtaining tender forms by post should remit by money order in advance the amount of required tender fee plus Rs. _____ to cover postage.

The earnest money by way of treasurer receipts challan should accompany the tender. Without which the tender will not be considered. Earnest money will not be accepted in cash or by cheque under any circumstances. Further particulars in connection with the work can be had from the same office. The authority competent to accept the tender reserves the right to reject the lowest or all tenders without assigning any reason.

Name of
Estimate
No.
Work

① Estimated cost

② Earnest money

③ Tender fee

④ Time limit

① Date & time of issuing blank tenders.

② Date & time of accepting

Sealed tenders.

③ Date & time of opening

The tenders

① Construction of house ② Rs. 200000

Master in Engineering ③ Rs. 20000

Concrete A' work ④ Rs. 1000

⑤ 1 year

① 21-03-2017 up to 5-PM

② 10-04-2017 up to 5-PM

③ 10-04-2017 at 5 P.M.

Date:-

Name

Designation

Office Address:-

ASSIGNMENT No. 6**VALUATION**

- Q.1 Define valuation. Explain in brief purpose of valuation.
Discuss various factors affecting valuation.

Valuation is the art of estimating or determining the fair price or value of a property such as a building, a factory, other engineering structures, land etc.

The main purposes of valuation are as follows

① **Buying or Selling property**

When it is required to buy or sell a property, its valuation is required.

② **Security of loans or mortgage**

When loans are taken against the security of the property, its valuation is required. It is also referred to as valuation for mortgage purposes.

③ **Rent Fixation**

For order to determine the rent of a property valuation is required. Rent is usually fixed on certain percentage of the amount of valuation (5% to 10% of the valuation).

④ **Insurance**

For the purpose of taking out an insurance policy of the property, the owner desires to know the replacement value of the property. For this case, the value of land is excluded or omitted.

⑤ **Taxation**

To assess the tax of a property, its valuation is required. Taxes may be municipal tax, property

tax, wealth tax, etc. and all the taxes are fixed on the valuation of the property.

② Compulsory acquisition

Sometimes, a property is acquired by law for some public purpose. In that case, the interested party is to be paid a suitable amount of compensation for the property thus acquired. To determine the amount of compensation valuation of the property is required.

③ Betterment Charges

When the property comes under some town planning scheme of the area, its value increases and consequently, the owner of the property is required to pay additional tax known as the betterment charges. It becomes, therefore, necessary for the owner of the property to know the value of his property before and after completion of town planning scheme.

④ Speculation

When a purchase is intended for sale of the property and make some profit, a short period valuation is necessary for that purpose and this is known as speculative value. Generally speculative value is lesser than the market value.

⑤ Court fees:-

When a case has to be filed with respect to a real estate, it becomes necessary to affix stamp of suitable amount. This amount is worked out after ascertaining the value of the property under dispute.

(B) Gift tax: When a property is gifted, valuation of the gifted property is necessary to pay gift tax to the government by the person whom the property has been gifted.

(C) Balance sheet: Sometimes, a company requires valuation of its premises for the purpose of showing them in the balance sheet.

Q.2 How would you determine the value of the property using rental method of valuation? Enumerate its advantages and limitations. Pg. 555

In this method, the net rental income from a property is calculated after deducting all outgoings from the gross rent, and year's purchase (Y.P.) is calculated after adopting the current bank interest.

The valuation of a property is worked out as under.

Capitalized value: Net income (rent) \times Year's purchase

$$\therefore C.V. = N.I \times Y.P.$$

Net income: Net rent: Gross rent - Outgoings

When the rent from a property is known, this method is useful for valuation of a property.

If the land is free hold, at the end of useful life of a building, land value is available.

The present value of land can be obtained

$$\text{as } \frac{1}{\text{CIF}} \text{ or}$$

\therefore Value of Property: value of land + value of building
During valuation by rental method the following particulars shall be considered

- Land and its tenure, i.e. free hold or lease hold
- Future life of building
- Cubic content of the building
- Gross rent
- Year's purchase
- Capital repairs etc.

This method is very useful for a property with a new building, once the fair rent is known, the method of calculations are straight and simple. This is a well known method and is being used to fix up taxes.

⇒ Disadvantages of valuation by Rental method

- ① The actual rent paid must be proved to be fair rent, otherwise very little reliance can be placed upon it.
- ② Judicial Judgement for outgoings under various needs is difficult.
- ③ A property consisting of land and building valued together cannot be proportioned afterwards.

Q.3 Distinguish and explain various types of value. [4.52]
 Different forms of values are as under.

- ① Market Value
- ② Book Value
- ③ Scrap Value
- ④ Salvage Value
- ⑤ Accommodation Value
- ⑥ Distress Value
- ⑦ Monopoly Value
- ⑧ Replacement Value
- ⑨ Investment Value
- ⑩ Sentimental Value
- ⑪ Speculative Value
- ⑫ Ammanue Value
- ⑬ Potential Value
- ⑭ Occupation Value
- ⑮ Present Value

① Market Value :- The market value of a property is the amount which can be obtained at any particular time from the open market if the property is put for sale.

② Book Value :- Book value is defined as the value of the property shown in the account book for that year i.e. the original cost less the total depreciation till that year.

Book value at the end of particular year
 = original cost - total depreciation till
 the end of the year.

- ③ Scrap Value :- Scrap value is the value of dismantled materials of a property at the end of its useful period. For a building when the life is over at the end of its useful period the dismantled materials such as steel, bricks, timber etc. will fetch a certain amount which is the scrap value of the building.
- ④ Salvage value :- It is the estimated value of a property at the end of its useful life without being dismantled. It is generally accounted by deducting the depreciation from its new cost.
- ⑤ Accommodation value :- The value of the surrounding agricultural land of a city which is expanding considerably will be more if the land is converted into accommodation land after obtaining approval from the competent authority. The value of such land is known as accommodation value.
- ⑥ Distress value :- In case a property is sold at a lower price than the market value at that time, it is said to have a distress value.
- ⑦ Momopoly value :- In some cases, the property possesses certain advantages with respect to obtaining property due to its location, size, shape etc. the owner may demand fancy price. Such value of a property is known as momopoly value.

8 Replacement value:-

It is the Present value of a property or portions thereof if these have to be replaced at the current market rates.

9 Investment value:-

Investment value of a property indicates the amount offered by a prudent purchaser by keeping in view the advantages of possessing the property from investment point of view.

10 Sentimental value:-

When a property is sold or purchased at a higher value than the market value due to playing of sentiments in the mind of the owner or the purchaser, this is known as sentimental value.

11 Speculative value:-

A proposal to construct a national highway or airport or water line or the like is an undeveloped area will cause a rise in value. Speculators purchase such properties at a low price as far as possible.

12 Annual value:-

The local authority has to decide the annual value of the property so that taxes can be calculated on that basis.

13 Potential value :-

When a property is capable of fetching more return due to its alternative use or by advantageous planning or by providing some development works, such inherent value of a property is known as potential value.

14 Occupation value :-

When the purchasers are attracted to own the property for occupying for their personal uses which is regarded as a necessary and a satisfactory substitutes exist then this is known as occupation value.

15 Present value

The value of a property calculated from present market rate is known as present value.

Q.4 Discuss the methods to determine depreciation.

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

The various methods of calculating depreciation are as follows.

- ① Straight line method
- ② Constant percentage method
- ③ Sinking fund method
- ④ Quantity survey method

① Straight line method :-

In this method, it is assumed that the property loses its value by the same amount every year. A fixed amount of the original cost is deducted every year. So that at the end of the useful period only the scrap value is left.

Annual depreciation: Annual decrease

in value of a property

$$\frac{n \cdot C - S}{n}$$

② Where D : Annual depreciation

C : original cost

S : scrap value

n : life in years

Depreciation of the property after m years

$$\frac{C - S}{n} \times m$$

$$= m \times D$$

Constant percentage method or declining balance method.

In this method it is assumed that the property will lose its value by a constant percentage of its value at the beginning of every year.

By this method, decrease in the value of property in the beginning years is at faster rate, while decrease in value in the later years is at slower rate. This method is more suitable for calculating depreciation of machines.

percentage rate of annual depreciation

$$P = 1 - \left[\frac{S}{C} \right]^{1/n}$$

Where,

P: Percentage rate of annual depreciation

S: Scrap value

C: Original cost

n: life in years

If age of property is m years value of property after m years after depreciation

$$= C \left[\frac{S}{C} \right]^{m/n}$$

(3) Sinking Fund method

In this method the depreciation of the property is assumed to be equal to the annual sinking fund plus the interest on the sinking fund for that year.

\therefore Depreciation = Annual sinking fund + interest on the sinking fund for that year.

Serial No.	Life in years	Annual sinking fund	Interest on sinking fund	Depreciation for that year	Total depreciation
		A	$\frac{1}{100} A$	A + B	$2A + B$
		A	$\frac{1}{100} (A + B)$	A + C	$2A + B + C$
		A	$\frac{1}{100} (2A + B + C)$	A + B	$3A + B + C$
		A	$\frac{1}{100} (3A + B + C + D)$	A + B + C	$4A + B + C + D$
		A	$\frac{1}{100} (4A + B + C + D + E)$	A + B + C + D	$5A + B + C + D + E$
		A	$\frac{1}{100} (5A + B + C + D + E + F)$	A + B + C + D + E	$6A + B + C + D + E + F$
		A	$\frac{1}{100} (6A + B + C + D + E + F + G)$	A + B + C + D + E + F	$7A + B + C + D + E + F + G$
		A	$\frac{1}{100} (7A + B + C + D + E + F + G + H)$	A + B + C + D + E + F + G	$8A + B + C + D + E + F + G + H$
		A	$\frac{1}{100} (8A + B + C + D + E + F + G + H + I)$	A + B + C + D + E + F + G + H	$9A + B + C + D + E + F + G + H + I$
		A	$\frac{1}{100} (9A + B + C + D + E + F + G + H + I + J)$	A + B + C + D + E + F + G + H + I	$10A + B + C + D + E + F + G + H + I + J$

A = Annual sinking fund

B, C, D, ... (E) = Interest on the sinking fund for subsequent years.

C = Original cost

→ If r is the rate of interest, annual sinking fund installment has to accumulate 1% in n years

$$P = \frac{1}{C(1+r)^n - 1}$$

If r is the rate of interest, and 1% is deposited every year, total sinking fund accumulated at the end of n years is

$$Q = \frac{C(1+r)^n - 1}{r}$$

∴ Rate of depreciation in n years

$$= CP \times Q \%$$

Q.5 Calculate amount of annual sinking fund at 5% interest for a building constructed at cost of Rs 10,00,000. Assume the future life of building to be 30 years and scrap value of the building to be 15% of cost of construction.

$$C = 10,00,000$$

$$S = 0.15 \times 10,00,000$$

$$= 1,50,000$$

$$\therefore C - S = 10,00,000 - 1,50,000$$

$$= 8,50,000 \text{/- Amount of S.F. required}$$

$$i = 5\%$$

Annual instalment of S.F.

$$P = \frac{C - S}{i} \times \frac{1}{C(1+i)^n - 1}$$

$$= \frac{8,50,000 \times 0.05}{C(1+0.05)^{30} - 1}$$

$$= \boxed{\text{Rs. } 8959.64}$$

Q.6 Work out the rent per annum of a property from following details

- ① cost of land: RS. 7,00,000/-
- ② cost of construction: RS. 25,50,000/-
- ③ Required return of land: 8%.
- ④ Required return of building: 8%.
- ⑤ Estimated life of building: 75 years
- ⑥ Rate of interest of sinking fund: 8%.
- ⑦ Annual repairs: RS. 25,000/-
- ⑧ All other outgoings: 30% of gross rent

Take scrap value of building as 10%.

Cost of Land: RS. 7,00,000/-

Cost of Construction: RS. 25,50,000/-

∴ Expected annual return

$$= 0.08 \times 7,00,000 + 0.08 \times 25,50,000$$

$$= 2,85,500/-$$

Cl's outgoings = 0.30 G.I

Cl's repairs = RS. 25,000/-

Cl's: Sinking fund = $0.08 \times 25,50,000/-$

$$= 2,04,000/-$$

∴ Total outgoings = $0.30 G.I + 25,000 + 2,04,000$

$$= 0.30 G.I + 2,29,000$$

Net Income: Gross income - total outgoings

$$N.I = G.I - (0.30 G.I + 2,29,000)$$

$$= 2,85,500 - G.I - 0.30 G.I - 2,29,000$$

monthly rent

$$= 51,500 - G.I = 71,35,000 \quad \boxed{RS. 61,250/-}$$