All large clods should be broken as the work proceeds and allowance made for settlement which so equal to 10% of the height of the embankment.

The side slopes of the formation should preferably be about 4 to 1 except in high embankments with goods soil where the slope be increased to 2 to 1.

SOLING COAT

Soling shall always be provided under the wearing coat except when the road is founded on a very hard natural surface such as on rock.

Width

The width of the soling shall always be 30 cms. More than the proposed width of the carriage way. For instance, if the carriageway is 3.60 m., the width of soling shall be 3.90 m. In case where brics on end edging is provided the width of soling shall be same as that of the width of carriageway.

COLLECTION OF SOLING

Where soling coat of bricks is to be provided, all bricks shall be fully burnt or over burnt. The bats which are less than half a brick in size shall not be used.

Stacking

The bricks or stones collected shall be stacked parallel to the centre line of the road and clear from the formation width. Gaps at least 1.5 m. wide must be left in every line of the bricks, for drainage etc.

Stone

The stone shall be hard, durable and tough in texture and be obtained from an approved quarry.

Kankar

The kankar shall be tough and heavy, with a bluish fracture. After digging, it must be spread out for at least a month before being brought to the road side.

Laying

The soling shall be laid at a stretch, the depth of which be equal to the depth of soling. The trench shall be filled and the camber should be the same as that o the finished surface.

The soling shall be laid carefully, hand packed with interstices filled with smaller pieces of the same material. Before laying the soling coat the sub-grade shall be thoroughly leveled and care shall be taken to see that the sub-grade is hard and well consolidated and there are no soft pots and depressions.

Kankar

After lying the soling, earth or sand shall be spread over it to a thickness of 2.5 cm. so that joiners of the soling may be filled up by sand or earth.

Measurement

In case of soling of stone boulders, stacks shall be measured 35 cm. high but paid as 30cm. to allow for loose stacking, in case of kankar, the stacks shall be measured 32.5 cm. high but shall be paid as 30 cm.

WEARING COAT (CONSOLIDATION).

The metal shall be broken from hard durable tough stone of uniform texture from an approved quarry. Where metal has been broken from water worn boulders, no individual boulder shall weigh less than 3.6 kg. a piece.

Measurement

In order to allow for loose stacking, shall be 32.5 cm. high but shall be paid as 30 cm.

WEARING COAT (CONSOLIDATION)

Preparation of surface

The surface of the soling shall be thoroughly cleaned of all dirt and brought to the camber that the finished road is to have. Two parallel bunds of clay puddle, 23 cm. wide and 15cm. deep shall be made along the other edges of the medaling.

The bunds shall be strong enough to prevent the new metal from spreading as well as to retain the water used in consolidation.

Spreading of metal

The metal shall be carefully packed, the bigger pieces being placed below and the smaller pieces on the interstices of the bigger pieces. The templates shall be used at a distance of approximately 7.5 m. from one another.

Rolling and consolidation

The metal shall then be rolled with a road roller commencing at the edges and working towards the centre. The metal is to be rolled dry until well compacted and there is no appreciable wave in front of an advancing roller.

The whole medaling shall then be thoroughly water and kept saturated rolling continued until the consolidation is finished to the satisfaction of the engineer-in charge.

Bajri binding

After the consolidation is practically complete, the binding material such as fine bajri obtained from screening or from a quarry shall be spread and the rolling and watering continued to such an extent that the binding material is formed into slurry and is grouted into interstices.

Camber

The camber of the template shall be 1 in 60 if the road is intended to be painted, 1 in 72 if a cement concrete

surface is to be provided and 1 in 48 if it is to remain water bound. For example in case of camber 1 in 72 the height at the centre above the outer edges shall be 1 cm. for each 1.44 meters of road width.

Progress

A power roller should be able to consolidate amount 34 cubic ketres of stone metal or 56 m^2 of kankar in a day.

Test of good consolidation

Rough tests are as below:

(a) A loaded cart should not leave indentation when passing over the finished work.

(b) A piece of metal about the size of a wall nut of put on the surface and a roller passed over it, it should be crushed or driven into surface.

INTRODUCTION, NECESSITY OF VALUATION OF BUILDING

Valuation means fixation of cost or return expected of a building, engineering structure project (Govt. or private), at present days rates. The value of a structure may be more or less depending upon the present utility of a structure. For example, a house having a number of rooms but smaller in size will fetch less value than a house, may be smaller in area but having well planned and proper sized of rooms.

Necessity of Valuation

The following reasons necessitates the valuation of property:

(i) Rent fixation. It is generally taken as 6% of the valuation of the property.

(ii) For buying and selling.

(iii) Acquisition of property by Govt.

(iv) To be mortgaged with bank or any other society to raise loan.

(v) For various taxes to be given and fixed, by the Municipal Committee.

(vi) Insurance: For taking out on insurance policies.

Roll of an Engineer

The roll of an Engineer in valuation is felt when an Engineering structure is to be valued, if and when it is:

(a) To be acquired

(b) To be divide

(c) To be allotted to a claim holder.

The following factors require consideration for valuation :

(i) Locality

In case a building is located in such an area, where there is easy access to market, schools and is located on road side. The Orientation of the building is according to Engineering rules. It will fetch more cost than a building which is in a neglected condition and is locate at unhealthy site.

(ii) Structure

The structure of a building is also an important consideration while evaluating a building. Workmanship I attractive and the building is properly maintained, it will fetch more cost than the building in a neglected form with poor quality of material used.

Value : Present day cost of a Engineering structure (Saleable value)

Cost : Original cost of construction. It is used to find out the loss of value of property due to various reasons.

Net Income : Total amount of the income received from a property during the year, without deducting outgoing.

Gross Income : Total amount of the income received form a property during the year, without deducting outgoing.

Net income : An amount left at the end of the year after deducting all usual outgoings.

Out goings : These are expenses which are incurred on a building so that it may give back revenue. The following are-various outgoings.

(i) Taxes : These are annual taxes paid by the owner, such as wealth tax, property tax and municipal taxes (varies from 10% to 25% of net income).

(ii) Management : Upto 10% of the gross revenue is kept aside for this expenses. This includes, chowkidar sweeper etc. this is applicable only for big buildings or apartments

(iii) Repairs : For this 1 ½ % of the total construction is set aside for annual repairs of the building. These repairs are must to maintain the building. It is also calculated as 10% of the gross income.

(iv) Sinking fund : This is also taken as outgoings (For details see definition)

(v) Miscellaneous : This is again suitable for big buildings. Lighting of common place, expenditure of liftman etc. are to be paid by the owner.

(vi) Loss of Rent : This is also an outgoing in case a building in not fully occupied by the tenants. This has to be deducted from gross income.

(vii) Insurance : Premium given against fire or for theft policy.

Obsolescence : The value of property decreases if its style and design are outdated i.e. rooms not properly set, thick walls, poor ventilation etc. the reasons of this is fast changing techniques of construction, design, ideas leading to more comfort etc.

Free hold Property : Any property which is in complete possession f the owner is known as free hold property. The owner can use the property in an way he likes. But he will have to follow constraints fixed by town planners or Municipality before doing any construction.

Lease hold : If a property is given to some person on yearly payment basis by the free holder, then the property is called „lease hold property. and the person who take s the property is called Lease-holder. In case of building, the lease is for 99 years to 9 years.

Easement : An owner getting over the property of another person, the following faculties is known as easements.

(i) Facility of running water and sewer pipes through other.s land.

(ii) Facility of air and light.

(iii) Facility of drainage of rain water.

(iv) Facility of access.

The owner who gives facilities is known as Servant owner and who enjoys facilities is called

Dominant Owner

Scrap Value : If a building is to be dismantled after the period of its utility is over, some amount can be fetched from the sale of old materials. The amount is known as Scrap Value of a building. If varies from 8% to 10% of the cost of construction according to the availability of the material.

In case where Wood & Steel are available, the scrap value is more than as R.C.C structure, as in the latter case, the material has less reuse value.

Salvage Value : If property after being discarded at the end of the utility period is sold without being broken into pieces, the amount thus realized by sale is known as its Salvage Value.

For example, railway sleepers can be re-used as posts and even old iron rails taken out can be used as beams in a roof or sheds of a building.

Building Cost Index

A building cost index indicates the increase and decrease of the cost above the cost above the cost at a certain base year and is expressed by a percentage rise & fall. For instance taking 1960 as a base year, the present 1980 as Building Cost Index may be taken 1.25% to 150% above the cost during the year 1960

This index depends upon cost of material, labour, transport etc.

Capitalized value : It is defined as the amount of money whose annual interest at the highest prevailing rate will be equal to the net income received from the property. To calculate the capitalized value, it is necessary to know highest rate of interest prevailing on such properties and net income form the property.

Sinking Fund : A fund which is gradually accumulated and aside to reconstruct the property after the expiry of the period of utility is known as sinking Fund. The sinking funds may be found out by taking a sinking fund policy with any insurance company or depositing some amount in the bank. Generally while calculating the sinking fund, life of the building is considered. 90% of cost of construction is used for calculations & 10% is left out as scrap value.

The forumulaused to find out the annual sin king fund is I $\frac{Si}{(1+i)^n - 1}$

Where I = Annual instalment required

N = Number of years required to creat sinking fund.

I = Rate of interest expressed in decimal i.e.5% as.05.

S = Amount of sinking fund.

Example:

A printing machine is to be installed at a cost of 30000 in a press. Assuming the life of the machine as 20 years. Calculate the amount of annual instalment of sinking fund to be deposited to accumulate the whole amount of 5% compound interest.

Solution:

The annual sinking fund

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

$$= \frac{30000x.05}{(1+0.5)^{20} - 1}$$

$$= \text{Rs. } 906.30$$

$$D = P\left(\frac{100 - rd}{100}\right)^n$$

The owner will have to deposit Rs. 906.30 per year in 5% compound interest for 20 years to accumulate Rs. 30,000

Example: An old shop in the main market has been purchased by a person as a cost of Rs. 20000/-. Work out the amount of annual sinking fund at 3% interest assuming future life of the building as 15 years and scrap value of the building as 10% of the cost of purchase.

Solution:

Cost of the shop = Rs. 20000
Less scrap value = Rs. 2000
Net Rs. 18000

Amount of sinking found to be accumulated after 15 years

= Rs. 18000

Annual instalment of sinking fund.

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

$$= \frac{18000x.03}{(1+.03)^{15} - 1}$$

= Rs. 971.20

Annuity :

The return of capital investment in the shape of annual instalments (monthly, quarterly, half yearly & yearly) for a fixed number of years is known as annuity.

Market Value :

It is defined as the value which a property can fetch when sold out in open market. This value is variable, depending upon the will to buy or sell.

Book Value :

It is the amount of a property shown in the books, after allowing necessary depreciations year-wise. The book value is independent of market-value.

Deprecation :

A structure, after sometimes gradually losses some of its value due to its constant use and some other similar reasons, such as

(a) The property in neglected condition

(b) The property being away from schools & market

(c) Design being out of fashion

(d) Poor specifications followed which requiring maintenance. The loss thus involve in the value of properties known as Depreciation.

$$D = P\left(\frac{100 - rd}{100}\right)^n$$

Where D =Deprecated Value

P = Present Value

Rd = Fixed percentage of deprecation

N = number of year the building has been constructed in existence

P = Present Value

The present value of building can be found out using any of the following methods

(i) Value depending upon Plinth Area.

The plain the area is multiplied with plinth area rate.

(ii) value from detailed measurement:

Detailed measurements of the building are taken and multiplied by current rates, sub-head-wise. The current rates are taken from schedule of rates and premium is added to it.

(iii) Value from records on M.B

The value of the total construction is found out from the records entered in the measurement book. In this method, old cost is noted and is multiplied by the increase in price index i.e. percentage of increase.

Rd = Fixed percentage of depreciation

Experience has also shown that the time passes, due to constant use, wear and tear, the cost of the building depreciates. This depreciation increases with the time. The following are the values of rd for different structures.

Structure	with	80-100	years	life	rd = 1
”	”	70-75	”	”	” = 1.3
”	”	50	”	”	” = 2
”	”	25	”	”	” = 4
”	”	20	”	”	” = 5

A = Life of Structure

Experience has also shown that well contracted structure can last upto 100 years. This life depends upon the durability of various materials used. Thus by seeing specification the life of a structure can be found out. The following chart shown expected life of the various materials and constructions.

The following are the various methods of valuation:

(i) Depreciation method of valuation

(ii) Valuation based on cost

(iii) Valuation based on profit

(iv) Valuation by Development method

(v) Rental method of valuation

(i) Depreciation method of valuation

In this method, the structure is divided into four parts for calculating depreciation:

(i) Walls

(ii) Roofs

(iii) Floors

(iv) Doors and Windows

The measurement is done accurately and the cost is found out using current rates. Life of each portion is found out using Table A. to find out depreciated value, the formula used is

$$D = P\left(\frac{100 - rd}{100}\right)^n$$

where all the values are given, 'D' can be calculated.

This value does not in clued cost of land, water supply, sanitary fitting, electric installations etc.

The cost of above items are added to get the total valuation of property.

The table C gives calculate values of depreciation for different values of 'n' and 'rd'.

Table

rd→ n↓	1	1.3	2	4	5
20	.818	.770	.668	.442	.358
30	.740	.675	.546	.294	.214
40	.670	.593	.446	.195	.125
50	.605	.520	.364	.130	.077
60	.547	.456	.298	.086	.046
70	.495	.400	.243	.057	.027
80	.447	.351	.199	.038	.016
100	.366	.270	.133	.017	.006

(ii) Valuation based on cost

In this method, the actual cost of the construction is found out and valuation is done after considering depreciations and also caring for type of construction and design of the construction.

(iii) Valuation based on profit

Under this sub-head, valuation of cinemas, theatres, hotels, banks, big shop etc. Located at suitable places is done where profit is of capitalized value. The capitalized value is calculated by multiplying year.s purchase with net profit. The net profit is worked out after deducting all possible outgoings and expenditures from the gross income. In such cases the cost will be too high as compared with the cost of construction actually incurred.

(iv) Valuation by development method

This method is also used for working out the value of a building. In certain cases, some additions, alterations and improvements are carried out which increases the cost of the building. The valuator should be careful while doing evaluation about this.

In cases, when the building is still under development. In this case the future development of the building and profits from it should be anticipated while evaluating.

(v) Rental method of valuation

Rent of a building is used as a base for calculating value of a building. In this method the net income by the war of way of rent is found out after deducting all out goings from the gross income. A suitable rate of interest prevailing in the market is also to be assumed of such type of buildings. Based on the above rate of interest, the Y. P. is obtained. The net income is multiplied with Y.s P. to obtain capitalized value.

EXERCISE - I

1. For earthy work in excavation in ordinary soils, earth work in mixed soil with kankar, bajri etc. when depth of excavation does not exceed 30 cm, the unit measurement is in

(*a*) meter (*b*) cubic meter

(*c*) square meter (*d*) 100 square meter

2. The unit of measurement for concrete work in RCC is in

(*a*) meter (*b*) cubic meter

(*c*) square meter (*d*) square cm

3. The unit of measurement for wood work in door and window frames, rafters, beams, roof trusses etc. is in

(*a*) meter (*b*) square meter

(*c*) quintal (*d*) cubic meter

4. The unit of measurement for steel works in trusses and its parts is in

(*a*) quintal (*b*) cm

(*c*) numbers (*d*) kilograms

5. The unit of measurement for electric wiring or of electrification of light, fan, plug points is in

(*a*) point (*b*) meter

(*c*) numbers (*d*) no unit

6. The unit of payment for blasting of rock including stacking is in

(*a*) square meter (*b*) cubic meter

(*c*) % square meter (*d*) % cubic meter

7. The unit of payment for road side brick edging is in

(*a*) cubic meter (*b*) meter

(*c*) running meter (*d*) kg

8. Generally the unit of measurement for partition wall is in

(*a*) cubic meter (*b*) square meter

(*c*) running meter (*d*) numbers

9. The unit of payment for excavation in trenches for pipes, cables etc. upto 1.5 depth in ordinary rock/hard rock is in

(*a*) cubic meter (*b*) square meter

(*c*) meter (*d*) tonne

10. The unit of payment for A.C. sheet roofing is in

(*a*) cubic meter (*b*) square meter

(*c*) meter (*d*) quintal

11. The unit of payment for fixing of glass panes or cleaning is in

(*a*) kg (*b*) number

(*c*) square meter (*d*) cubic meter

12. The process of evaluating cost of construction of a project is called

(*a*) estimate (*b*) rough cost

(*c*) actual cost (*d*) workable cost

13. While estimating for lintels over openings, if dimension for bearing is not given, then bearing is usually taken equal to

(*a*) thickness of lintel with a minimum of 12 cm whichever is higher

(*b*) thickness of lintel with a minimum of 12 cm

(*c*) twice the thickness of lintel with a minimum of 12 cm

(*d*) none of these

14. While estimating for plastering, usually no deduction is made for

(*a*) ends of beams

(*b*) small openings upto 0.5 sq m

(*c*) ends of rafters

(*d*) all of these

15. In the absence of detailed design, the percentage of steel in concrete columns is usually taken as

(*a*) 10 to 15 per cent (*b*) 5 to 10 per cent

(*c*) 1 to 5 per cent (*d*) 15 to 20 per cent

16. Which of the following items is overhead expenditure?

(*a*) Rent and taxes

(*b*) Establishment charges

(*c*) Office stationary items

(*d*) Workmen's compensation

17. In a detailed estimate the provision for contingencies is, usually

(*a*) 1 per cent (*b*) 3 to 5 per cent

(*c*) 10 per cent (*d*) 12 to 15 per cent

18. Generally the provision for supervision is

(*a*) 1 per cent (*b*) 2 to 3 per cent

(*c*) 3 to 5 per cent (*d*) 5 to 10 per cent

19. Estimate expected to be least accurate is

(*a*) supplementary estimate

(*b*) plinth area estimate

(*c*) detailed estimate

(*d*) revised estimate

20. The useful part of liveable area of a building is called

(*a*) carpet area

(*b*) circulation area

(*c*) horizontal circulation area

(*d*) plinth area

21. Total expenditure of annual repair and special repairs to a building should not be more that.... of the capital cost.

(*a*) 1.5% (*b*) 2%

(*c*) 2.5% (*d*) 5%

22. Ratio of cost of labour to the total cost of the building is

(*a*) 1 : 10 (*b*) 1 : 4

(*c*) 1 : 1 (*d*) 6 : 10

23. Thickness of 25 gauge sheet is

(*a*) less than 1 mm

(*b*) 1 mm

(*c*) between 1 mm and 1.5 mm

(*d*) 2 mm

24. In preparing cement concrete by volume, size of the wooden box used to measure sand aggregate is

(*a*) (35 × 25 × 40) cm (*b*) (30 × 30 × 30) cm

(*c*) (40 × 25 × 30) cm (*d*) (35 × 30 × 40) cm

25. As a thumb rule, percentage of steel in R C C columns is taken as

(*a*) 1.0 to 5.0 per cent

(*b*) 5.0 to 10.0 per cent

(*c*) 10.0 to 15.0 per cent

(*d*) 15.0 to 20.0 per cent

26. In specification of earth work in foundation trenches, drains etc. lift ordinarily specified is

(*a*) 30 m (*b*) 5 m

(*c*) 3 m (*d*) 1.5 m

27. Damp proof course (D.P.C.) is measured in

(*a*) cubic meter (*b*) square meter

(*c*) meter (*d*) none of these

28. While mixing cement mortar by volume, the volume of a cement bag is specified as

(*a*) 50 litres (*b*) 35 litres

(*c*) 0.050 cubic meter (*d*) 0.35 cubic meter

29. Generally for analysis of rates, the reduction in volume of wet mixed mortar over the sum total volume of ingredient material is taken as

(*a*) 5% (*b*) 10%

(*c*) 25% (*d*) 50%

30. In measuring for work, no deduction is made for opening upto

(*a*) 1 m^2 (*b*) 0.5 m^2

(*c*) 0.4 m^2 (*d*) 0.01 m^2

31. In analysis of rates, contractor profit is taken at the rate of

(*a*) 1% (*b*) 5%

(*c*) 10% (*d*) 20%

32. While analysing the rates, water charges are added on those items, which require water in construction and these charges are added at the rate of

(*a*) $1\frac{1}{2}\%$ (*b*) 3%

(*c*) 5% (*d*) 10%

33. How many mazdoors will be required for the disposal of 30 cu m of surplus earth within a lead on 30 m in one day?

(*a*) 1 (*b*) 5

(*c*) 10 (*d*) 30

34. Number of bricks of size 20 cm × 10 cm × 10 cm required for 100 cubic meters of masonry wall is

(*a*) 500 (*b*) 5000

(*c*) 50000 (*d*) 500000

35. The expected out turn of brick work in cement mortar in foundation and plinth per mason per day, in

(*a*) 1.00 m^3 (*b*) 1.25 m^3

(*c*) 1.50 m^3 (*d*) 1.75 m^3

36. The expected out turn of half brick partition wall per mason per day is

(*a*) 1.5 m^3 (*b*) 2.5 m^3

(*c*) 3.0 m^2 (*d*) 5.0 m^2

37. The expected out turn of cement concrete 1 : 2 : 4 per mason per day is

(*a*) 1.5 m^3 (*b*) 2.0 m^3

(*c*) 3.5 m^3 (*d*) 5.0 m^2

38. The expected out turn of 12 mm plastering with cement mortar is

(*a*) 25 square meter (*b*) 5.0 square meter

(*c*) 6.10 square meter (*d*) 8.0 square meter

39. The expected out turn of 2.5 cm cement concrete floor per mason per day is

(*a*) 2.5 square meter (*b*) 5.0 square meter

(*c*) 7.5 square meter (*d*) 10 square meter

40. The expected out turn for earth work in excavation in ordinary soil per mazdoor per day is

(*a*) 1 cubic meter (*b*) 2 cubic meter

(*c*) 3 cubic meter (*d*) 4 cubic meter

41. Number of bricks usually carried by a truck is

(*a*) 3000 (*b*) 4000

(*c*) 4500 (*d*) 5000

42. Volume of sand carried in a truck is approximately

(*a*) 4 cubic meter (*b*) 6 cubic meter

(*c*) 8 cubic meter (*d*) 10 cubic meter

43. Number of bricks that can be carried by 8 tonner truck is

(*a*) 2500 (*b*) 3000

(*c*) 3500 (*d*) 4000

44. While doing analysis of rate, the number of bricks taken into account per cubic meter is

(*a*) 2000 (*b*) 500

(*c*) 100 (*d*) 50

45. In analysis of rate, the quantity of dry mortar for 10 cubic meter brick work is taken as

(*a*) 10 m^3 (*b*) 3 m^3

(*c*) 2 m^3 (*d*) 1 m^3

46. The quantity of stone required for 10 cubic meter of rubble stone masonry is

(*a*) 10 cubic meter (*b*) 8 cubic meter

(*c*) 13.5 cubic meter (*d*) 12.5 cubic meter

47. One cubic meter of cement concrete (1 : 2 : 4) is to be mixed by volume. Number of cement bags required will be approximately

(*a*) 1 (*b*) 5

(*c*) 6 (*d*) 11

48. The estimated quantity of cement required in cement mortar (1 : 6) per cubic meter will be

(*a*) 5.6 bags (*b*) 6.4 bags

(*c*) 6.8 bags (*d*) 8 bags

49. Thickness of plastering is usually

(*a*) 6 mm (*b*) 12 mm

(*c*) 25 mm (*d*) 40 mm

50. One cubic meter of mild steel weights about

(*a*) 1000 kg (*b*) 3625 kg

(*c*) 7850 kg (*d*) 12560 kg

51. For 100 cubic meter of roof surface, the area of A.C. corrugated sheets required will be

(*a*) 80 m^2 (*b*) 100 m^2

(*c*) 115 m^2 (*d*) 128 m^2

52. For 100 square meters of plastered surface, the quantity of lime required for one coat of white washing will be

(*a*) 10 kg (*b*) 6.5 kg

(*c*) 5 kg (*d*) 4 kg

53. In a detailed estimate, the provision for contingencies is, usually

(*a*) 1% (*b*) 3% to 5%

(*c*) 10% (*d*) 12% to 20%

54. Annual rent is generally fixed at _____ of value of building.

(*a*) 1% to 2% (*b*) 2% to 5%

(*c*) 5% to 10% (*d*) 10% to 25%

55. Original cost of property minus depreciation is

(*a*) book value (*b*) salvage value

(*c*) rateable (*d*) obsolence value

56. The cost of a machine is Rs. 50,000 with a useful life of 10 years. Its depreciated cost, after 5 years, if salvage value is Rs. 10,000 on straight line basis, will be

(*a*) 35,000 (*b*) 30,000

(*c*) 25,000 (*d*) 20,000

57. The valuation of a building depends upon

(*a*) its structure and durability

(*b*) size, shape and type

(*c*) quality of material used

(*d*) All of these

58. The gradual reduction in value with age of a property is called

(*a*) devaluation (*b*) revaluation

(*c*) depreciation (*d*) appreciation

59. The total estimated cost of a building electrification usually accounts for

(*a*) 1% (*b*) 2%

(*c*) 8% (*d*) 12%

60. The valuation of a property is done when

(*a*) owner of the property wants to sell it

(*b*) municipal tax, wealth tax estate duty etc. have to be fixed

(*c*) insurance of the property has to be done

(*d*) all of these

61. The value of property that can be obtained at any particular time from the open market if the property is put for sale, is called

(*a*) market value (*b*) book value

(*c*) current value (*d*) obsolence value

62. The net annual letting out value of a property, which is obtained after deducting the amount of yearly repairs from the gross income, is called

(*a*) market value (*b*) book value

(*c*) current value (*d*) rateable value

63. Municipal taxes are assessed on percentage of the net income from the property and it varies from

(*a*) 3 to 5% (*b*) 5 to 10%

(*c*) 10 to 12% (*d*) 15 to 20%

64. Any treasure and valuables or materials found during excavation shall be the property of

(*a*) contractor (*b*) owner of building

(*c*) government (*d*) none of these

65. Capacity of flushing cistern is usually

(*a*) 10 litres (*b*) 25 litres

(*c*) 12 to 15 litres (*d*) 20 to 25 litres

66. Sludge from a septic tank should be removed in
(*a*) 1 to 2 years (*b*) 2 to 3 years
(*c*) 3 to 4 years (*d*) 4 to 5 years

67. The capacity of septic tank for 100 users will be roughly
(*a*) 50 mm (*b*) 75 mm
(*c*) 100 mm (*d*) 150 mm

68. In a galvanised corrugated iron sheet the pitch (centre to centre distance) of corrugation is usually
(*a*) 50 mm (*b*) 75 mm
(*c*) 100 mm (*d*) 150 mm

69. Besides standard length and width of a corrugated sheet, one important dimension usually considered is
(*a*) pitch of corrugation (*b*) depth of corrugation
(*c*) shape of corrugation (*d*) gauge of the material

70. Which one of the following is not the standard length of asbestos cement corrugated sheets?
(*a*) 1.5 m (*b*) 1.75 m
(*c*) 2.5 m (*d*) 3.0 m

71. The standard width of asbestos cement corrugated sheet is
(*a*) 0.9 m (*b*) 1.0 m
(*c*) 1.05 m (*d*) 1.25 m

72. The number of corrugations per sheet in case of asbestos cement corrugated sheet is
(*a*) 3 (*b*) 5
(*c*) 7 (*d*) 10

73. A semi-corrugated or trafford sheet has a standard width of
(*a*) 0.9 m (*b*) 1 m
(*c*) 1.05 m (*d*) 1.10 m

74. Annual financial statement of the anticipated receipts and expenditures, is called
(*a*) balance sheet
(*b*) financial statement
(*c*) budget
(*d*) expenditure-receipt statement

75. A work costing less than Rs. 20000 is called
(*a*) petty work (*b*) minor work
(*c*) major work (*d*) casual

76. A work costing more than rupees one crore is called
(*a*) substantial work (*b*) minor work
(*c*) major work (*d*) project

77. While submitting a tender, the contractor is required to deposit some amount with the department, as guarantee of the tender called
(*a*) bank guarantee (*b*) earnest money
(*c*) security (*d*) caution money

78. When a contractor is paid certain percentage over the actual cost of the construction as his profit, such contract is called
(*a*) lump-sum contract
(*b*) work order
(*c*) schedule contract
(*d*) cost plus percentage contract

EXERCISE - II

(Questions From Previous SSC CPWD Exams)

2008

1. The grouping of pile will not reduce the load carrying capacity in case of
(*a*) Friction piles (*b*) End bearing piles
(*c*) Both (*a*) and (*b*) (*d*) None of the above

2009

2. A septic tank is:
(*a*) settling tank. (*b*) A digestion tank.
(*c*) Both (*a*) and (*b*). (*d*) None of the above.

2011

3. The correction in elevations due to the curvature and refraction is proportional to
(*a*) D/R (*b*) D^2/R
(*c*) R/D^2 (*d*) R/D
where R is the radius of curvature of Earth and D is the horizontal distance.

4. Which of the following is a non-recording raingauge ?
(*a*) Symon's raingauge
(*b*) Tipping bucket type raingauge
(*c*) Weighing type raingauge
(*d*) Floating type raingauge

5. Minimum depth of ballast cushion for a Broad Gauge wooden sleeper of size 275 × 25 × 13 cm with 75 cm sleeper spacing is
(*a*) 15 cm (*b*) 20 cm
(*c*) 25 cm (*d*) 30 cm

6. According to Unwin's formula, the relation between diameter of rivet hole (*d*) in mm, and thickness of plate (*t*) in mm is given by
(*a*) $d = t$ (*b*) $d = 6.01\sqrt{t}$
(*c*) $d = 2t$ (*d*) $d = 2.6\sqrt{t}$

7. The lacing bars in steel columns should be designed to resist

(*a*) 0.5% of column load

(*b*) 1.5% of column load

(*c*) 2.5% of column load

(*d*) 3.5% of column load

2012

8. Bottommost layer of pavement is known as

(*a*) Sub base course (*b*) Sub grade

(*c*) Wearing course (*d*) Base course

9. The population of a town as per census records were 2,00,000; 2,10,000 and 2,30,000 for the year 1981, 1991 and 2001 respectively. Find the population of the town in the year 2011 using arithmetic mean method. The answer is

(*a*) 250000 (*b*) 255000

(*c*) 240000 (*d*) 245000

10. The simplest geometrical form of a truss is a

(*a*) Trapezium (*b*) Square

(*c*) Triangle (*d*) Parallelogram

11. The slenderness ratio $\frac{l}{r}$ of a lacing bar should be less than

(*a*) 250 (*b*) 350

(*c*) 145 (*d*) 180

12. The member of roof truss which supports the purlins is called as

(*a*) Sag rod (*b*) Main strut

(*c*) Principal rafter (*d*) Principal tie

13. Doglegged stairs are

(*a*) Quarter turn stairs

(*b*) Three quarter turn stairs

(*c*) Half turn stairs

(*d*) Straight stairs

14. If d is the constant distance between the sections, then the correct prismoidal formula for volume is

(*a*) $\frac{d}{3}$ [first area + last area + 4 $\sum$ Even area + 2 $\sum$ odd areas]

(*b*) $\frac{d}{6}$ [first area + last area + 2 $\sum$ Even area + 4 $\sum$ odd areas]

(*c*) d [first area + last area + $\sum$ Even area + 2 $\sum$ odd areas]

(*d*) $\frac{d}{3}$ [first area + last area + 2 $\sum$ Even area + 4 $\sum$ odd areas]

15. The measurement is NOT made in square metres in case of

(*a*) Damp proof course (*b*) Form works

(*c*) Concrete Jaffries (*d*) R. C. Chhajja

16. For one sq.m. single brick flat soling (conventional size), the number of brick required is

(*a*) 54 (*b*) 62

(*c*) 32 (*d*) 44

17. The number of bricks (conventional size) required for one square metre of brick on edge soling is

(*a*) 54 (*b*) 64

(*c*) 34 (*d*) 44

18. For 1 sq.m. of 7.5 cm thick lime terracing in roof with brick khoa, surki, lime (2 : 2 : 7) including finishing, the quantity of surki required is

(*a*) 0.023 cu. m. (*b*) 0.025 cu. m.

(*c*) 0.019 cu. m. (*d*) 0.022 cu. m.

19. In straight line method, the annual depreciation of the property is

(*a*) $\frac{\text{Original cost} - \text{Annual sinking fund}}{\text{Life in years}}$

(*b*) $\frac{\text{Life in years}}{\text{Original cost} + \text{Scrap value}}$

(*c*) $\frac{\text{Original cost} - \text{Scrap value}}{\text{Life in years}}$

(*d*) $\frac{\text{Original cost} + \text{Scrap value}}{\text{Life in years}}$

2013

20. A surge tank is provided in hydropower schemes to

(*a*) reduce water hammer pressures

(*b*) reduce frictional losses

(*c*) increases the net head

(*d*) strengthen the penstocks

21. The populations of a town as per census records were 200000, 210000 and 230000 for the years 1981, 1991 and 2001 respectively. The population of the town as per geometric mean method in the year 2009 is

(*a*) 244872 (*b*) 245872

(*c*) 246820 (*d*) None of the above

22. You are asked to construct a massive concrete dam. The type of cement you will use is

(*a*) Ordinary portland cement

(*b*) Rapid hardening portland cement

(*c*) Low heat cement

(*d*) Blast furnace slag cement

23. A retaining wall of trapezoidal section having base width 'b' retains earth at its back. For no tension to be developed at base, the resultant force will intersect the base from centre line of the base, within a distance of

(*a*) b/3 (*b*) b/4

(*c*) b/5 (*d*) b/6

2014

24. The following document contains detailed description of all items of work excluding their quantities, along with the current rates :

(*a*) Analysis of rates (*b*) Tender document

(*c*) Abstract estimate (*d*) Schedule of rates

25. To construct a massive dam the type of cement used is :

(*a*) blast furnace slag cement

(*b*) low heat cement

(*c*) rapid hardening cement

(*d*) ordinary Portland cement

26. The size of a fillet weld is indicated by:

(*a*) Size of the plate

(*b*) Side of the triangle of fillet

(*c*) Throat of the fillet

(*d*) Length of fillet weld

27. The plane of a building is in the form of square with centreline dimensions of outer walls as 14.7 m × 14.7 m. If the thickness of the wall in superstructure is 0.30m , then its plinth area is :

(*a*) 234 m^2 (*b*) 150 m^2

(*c*) 216 m^2 (*d*) 225 m^2

28. The value of property during its useful life based on purchase value and depreciations etc. is known as :

(*a*) Junk value (*b*) Salvage value

(*c*) Scrap value (*d*) Book value

29. The relationship between atmosphere pressure (P_{atm}), gage pressure (P_{gage}) and absolute pressure (P_{abs}) is given by :

(*a*) $P_{atm} = P_{abs} - P_{gage}$ (*b*) $P_{abs} = P_{atm} + P_{gage}$

(*c*) $P_{abs} = P_{atm} - P_{gage}$ (*d*) $P_{atm} = P_{abs} + P_{gage}$

30. In a structure, cables and wires are used generally as :

(*a*) to resist shear stress (*b*) tension member

(*c*) compression member (*d*) flexural member

31. The height of instrument is equal to :

(*a*) Reduced level of bench mark – back sight

(*b*) Reduced level of bench mark + back sight

(*c*) Reduced level of bench mark + fore sight

(*d*) Reduced level of bench mark + Intermediate sight

32. The correct prismoidal formula for valume calculation is :

(*a*) $\frac{D}{6}$[first section area + last section ares + 2Σ even numbered section area + 4 Σ odd numbered section area

(*b*) D [first section area + last section area + Σ even numbered section area + 2 Σ odd numbered section areas]

(*c*) $\frac{D}{3}$[first section area + last section area + 4Σ even numbered section area + 2Σ odd numbered section area

(*d*) $\frac{D}{3}$[first section area + last section area + 2Σ even numbered section area + 4Σ odd numbered section areas]

33. Using straight line method annual depreciation D is equal to

(*a*) $\frac{\text{Life in year–Scrap value}}{\text{Orginial cost}}$

(*b*) $\frac{\text{Scrap value – life in year}}{\text{Original cost}}$

(*c*) $\frac{\text{Original cost – life in year}}{\text{scrap value}}$

(*d*) $\frac{\text{Original cost – scrap value}}{\text{life in year}}$

34. Most accurate method of estimation is base on

(*a*) Building cost index estimate

(*b*) Plinth area estimate

(*c*) Detailed estimate

(*d*) Cube rate estimate

35. The annual instalment (I) of the sinking funds (S) over n years, at i rate of interest may be calculated from the formula

(*a*) $I = Si/(1+i)^{n-1}$ (*b*) $I = S/(1+i)^{n-1}/i$

(*c*) $I = S(1+i)^{n+1}/(1+i)$ (*d*) $I = Si/(1+i)^{n+1}$

36. The plan of a building is in the form of a rectangle with centre line dimensions of the outer walls as 10.3 m × 15.3 m. The thickness of the walls in superstructure is 0.3 m. Then its carpet area is

(*a*) 150 m^2 (*b*) 157.59 m^2

(*c*) 165.36 m^2 (*d*) 170 m^2

37. Pick up the item of work **not** included in the plinth area estimate.

(*a*) Wall thickness (*b*) Room area

(*c*) Verandah area (*d*) Courtyard area

38. One brick thickness of wall is roughly equal to

(*a*) 10 cm (*b*) 15 cm

(*c*) 20 cm (*d*) 30 cm

39. A work costing ₹ 20,000 is termed as

(*a*) Petty work

(*b*) Minor work

(*c*) Major work

(*d*) Minor project

40. The damp proof course (D.P.C.) of uniform thickness in a building having walls of different widths is measured in

(*a*) m^4 (*b*) m^3

(*c*) m^2 (*d*) m

41. Volume by Trapezoidal Formula Method determined by the formula

(*a*) $D\left\{\frac{A_0+A_n}{2}+A_2+A_4+A_6+...A_{n-1}\right\}$

(*b*) $D\left\{\frac{A_1+A_n}{2}+A_0+A_1+A_3+...A_{n-1}\right\}$

(*c*) $D\left\{\frac{A_0+A_1}{2}+A_1+A_3+A_5+...A_{n-1}\right\}$

(*d*) $D\left\{\frac{A_0+A_n}{2}+A_1+A_2+A_3+A_4+...A_{n-1}\right\}$

42. The value of the property at the end of its useful life (without being dismantled) is known as

(*a*) Salvage value

(*b*) Scrap value

(*c*) Book value

(*d*) Junk value

2015

43. For building project estimate which method is generally used in PWD?

(*a*) Long wall and short wall method

(*b*) Centre line method

(*c*) Crossing method

(*d*) Short wall method

44. An estimate is

(*a*) cost of the structure using thumb rules

(*b*) random guess of cost of structue

(*c*) probable cost arrived at before construction

(*d*) actual cost of construction

45. Estimate for electrical wiring is prepared on the basis of

(*a*) Voltage

(*b*) Power

(*c*) Number of appliances

(*d*) Number of points

46. Which of the following tax generally not applicable to residential building is

(*a*) Municipal tax (*b*) Property tax

(*c*) Sales tax (*d*) Wealth tax

47. The value of demolished material is known as

(*a*) Scrap value (*b*) Salvage value

(*c*) Resultant value (*d*) Material value

ANSWERS

EXERCISE - I

1. (*c*)	**2.** (*b*)	**3.** (*d*)	**4.** (*a*)	**5.** (*a*)	**6.** (*b*)	**7.** (*c*)	**8.** (*b*)	**9.** (*b*)	**10.** (*b*)
11. (*b*)	**12.** (*a*)	**13.** (*b*)	**14.** (*d*)	**15.** (*c*)	**16.** (*d*)	**17.** (*b*)	**18.** (*d*)	**19.** (*b*)	**20.** (*a*)
21. (*c*)	**22.** (*b*)	**23.** (*a*)	**24.** (*a*)	**25.** (*a*)	**26.** (*d*)	**27.** (*b*)	**28.** (*b*)	**29.** (*c*)	**30.** (*c*)
31. (*c*)	**32.** (*a*)	**33.** (*c*)	**34.** (*c*)	**35.** (*b*)	**36.** (*d*)	**37.** (*d*)	**38.** (*d*)	**39.** (*c*)	**40.** (*c*)
41. (*b*)	**42.** (*a*)	**43.** (*a*)	**44.** (*b*)	**45.** (*b*)	**46.** (*d*)	**47.** (*c*)	**48.** (*a*)	**49.** (*b*)	**50.** (*c*)
51. (*c*)	**52.** (*a*)	**53.** (*b*)	**54.** (*c*)	**55.** (*a*)	**56.** (*b*)	**57.** (*d*)	**58.** (*c*)	**59.** (*c*)	**60.** (*d*)
61. (*a*)	**62.** (*d*)	**63.** (*c*)	**64.** (*c*)	**65.** (*c*)	**66.** (*a*)	**67.** (*c*)	**68.** (*b*)	**69.** (*d*)	**70.** (*c*)
71. (*c*)	**72.** (*c*)	**73.** (*d*)	**74.** (*c*)	**75.** (*a*)	**76.** (*c*)	**77.** (*b*)	**78.** (*d*)		

EXERCISE - II

1. (*c*)	**2.** (*c*)	**3.** (*b*)	**4.** (*a*)	**5.** (*c*)	**6.** (*b*)	**7.** (*c*)	**8.** (*b*)	**9.** (*d*)	**10.** (*c*)
11. (*c*)	**12.** (*c*)	**13.** (*d*)	**14.** (*a*)	**15.** (*d*)	**16.** (*c*)	**17.** (*a*)	**18.** (*d*)	**19.** (*c*)	**20.** (*a*)
21. (*b*)	**22.** (*d*)	**23.** (*d*)	**24.** (*d*)	**25.** (*b*)	**26.** (*b*)	**27.** (*d*)	**28.** (*d*)	**29.** (*b*)	**30.** (*b*)
31. (*b*)	**32.** (*c*)	**33.** (*d*)	**34.** (*c*)	**35.** (*a*)	**36.** (*a*)	**37.** (*d*)	**38.** (*c*)	**39.** (*a*)	**40.** (*c*)
41. (*d*)	**42.** (*a*)	**43.** (*b*)	**44.** (*c*)	**45.** (*d*)	**46.** (*c*)	**47.** (*a*)			

EXPLANATIONS

1. Both Friction piles and End bearing piles will increase the load carrying capacity.

2. A septic tank combines the function of a sedimentation tank, a sludge digestion tank and a sludge storage tank.

5. Minimum depth of Ballast cushion

$$D_b = \frac{s - \omega}{2}$$

s = spacing of sleeper = 75 cm

w = width of sleeper = 25 cm

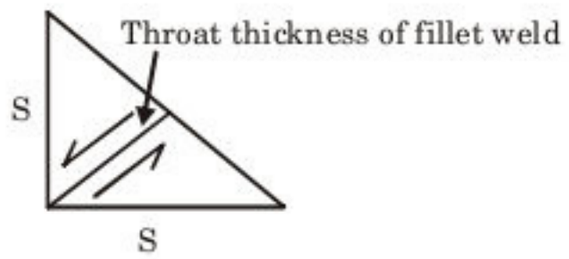
$$\because \quad D_b = \frac{75 - 25}{2} = 25 \text{ cm}$$

20. Reduce water hammer pressure.

22. Blast furnace slug cement used in concreting in dams, bridge abutmant and retaining wall.

24. **Schedule of Rate** is a list of rates of various items of works. This type of document contains detailed description of all items of work excluding their quantities, along with the current rates.

26. The size of a fillet weld (S) depends on side of the triangle of fillet.



27. The Plinth area should be calculated for the covered area by taking external dimension of the building at the floor level.

Hence Plinth area = $(14.7 + 0.3)\,\text{m} \times (14.7 + 0.3)\,\text{m}$

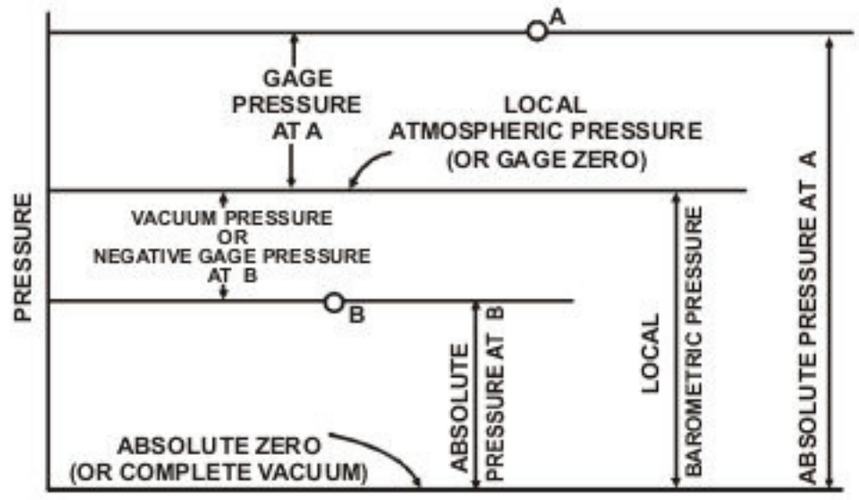
$= 225\ \text{m}^2$

28. **Salvage value-** It is the value at the end of the utility period without being dismantled.

Scrap value- It is the value of dismantled materials. Now this can be sold only at **junk.**

Book value- It is the amount shown in the account book after allowing necessary depreciations.

29.



Relationship between absolute, gage and vacuum pressures

Absolute Pressure = Atm Pressure + Gage Pressure

Absolute Pressure

= Atm Pressure – Vacuum Pressure

30. In a structure, cables and wires are used generally as tension member.

31. The height of instrument is equal to Reduced level of bench mark + back sight.

33. Using straight line method annual depreciation (D)

$$D = \frac{\text{Original cost} - \text{Scrap value}}{\text{Life in year}}$$

43. Centre line method estimates prepared or most accurate and quick.

■■