Q. 1

Ans.

Using centre line method,

$$c/c = (2.8 + 4.2 + 0.3 + 0.3) \times 3 + (4.4 + 4 + 0.3 + 0.3) \times 2$$

$$+ (4.4 + 0.3)$$

$$= 22.8 + (9 \times 2) + 4.7$$

$$= 45.5 \text{ m.}$$

No. of junctions = 4.

S.N	Particulars	length	breadth	height	quantity	remarks.
1.	lime concrete in foundation	45.5	1	0.3	$13.05 m^3$	$l = 45.5 - (4 \times \frac{1}{2})$ $= 45.5$
2.	1st Brickwork in cement mortar.	44.9	0.3	3.	$40.41 m^3$	$l = 45.5 - \left(4 \times \frac{0.3}{2}\right)$ $= 44.9$
	Deductions.					
	i) Lintel.	44.9	0.3	0.15	$2.0205 m^3$	$l = 45.5 - 4 \times \left(\frac{0.3}{2}\right)$ $= 44.9$
	ii) door (D)	1	0.3	2	$0.6 m^3$	
	iii) door (D_1)	0.8	0.3	2	$0.48 m^3$	
	iv) window (w)	1.2	0.3	1.25	$0.45. m^3$	
					$= 0.4905 m^3$ //	

S.N	Particulars	length	breadth	height	quantity	Remarks
3.	Roofing	9.3	7.9	~~0.1~~ -	73.47 m^2	
4.	white washing					
	outside	34.4	-	3	103.2 m^2	
	deductions.					
	door (D)	1	-	2	2 m^2	
	door (D_1)	0.8	-	2	1.6 m^2	
	window (W)	1.2	-	1.2	1.44 m^2	
					= 98.16 m^2 //	

Q.2.

Answer

→ Given:-

lime : sand : stone = 1 : 2 : 4

Total ratio = 1+2+4 = 7

Wet volume = $10 m^3$

Dry volume = $10 \times 1.54 = 15.4 m^3$

Volume of lime = $\frac{1}{7} \times 15.4 = 2.2 m^3$

Volume of sand = $\frac{2}{7} \times 15.4 = 4.4 m^3$

Volume of stone ballast = $\frac{4}{7} \times 15.4 = 8.8 m^3$.

Description	unit	quantity	rate	amount
A) Materials	m^3			
i) lime	m^3	2.2	Rs 3165	6963
ii) sand	m^3	4.4	Rs 220	968
iii) stone ballast	m^3	8.8	Rs 770	6776
B) labour.				
i) Head mason	day	0.5	Rs 125	62.5
ii) Mason	day	1	Rs 115	115
iii) Mazdoor	day	20	Rs 80	1600
				Total = 16,484.5
C) Cost for contingencies and tools and plants	= 0.5% of 16,484.5		= 82.4225	

Total cost = Rs 16484.5 + Rs 82.4225

= Rs 16, 566922 5.

For $1m^3$ it will cost Rs 1656.69 // ans

Q.3.

→ Valuation is the method of estimating and determining the value of a property. The property here includes buildings, industries etc.

Through valuation we can understand if necessary maintenance shall be carried out for profit or not. The present value of property depends upon the income received. Thus, we can know as a civil engineer if it will be worth while to construct a structure

There are various types of values. Some of them are listed below.

Book value: It is the value of the property shown in the account book in that particular year.

Assessed value: It is the value of a property recorded in the register of a municipality in order to determine the amount of municipal taxes to be collected.

Scrap value: It is the value of the dismantled materials of the property at the end of its utility period.

Salvage value: It is the estimated value of a built up property at the end of its useful life without being dismantled.

Q.4.

Answer

→ Given:-

Load = 2500kg

1 Tonne = 1000kg.

2500kg = 2.5 ton

According to the question,

Total mechanical distance = 6km - 0.075km

= 5.925km.

Mechanical cost = Rs 106.07 + (0.925 X 7.72)

= Rs. 113.211

Manual transport cost = Rs 144.20 + Rs 21.16

= Rs 165.36

For one trip, our cost = Rs 278.571.

For one trip, only one tonne can be carried, for 2.50 ton, it costs

= Rs 278.571 X 2.5

= Rs 696.43 ans//

Q.5. The different methods of calculating depriciation are explained below:-

i) Straight line method: Here, the property is assumed to be depriciated at a constant amount every year.

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

ii) Constant percentage method: Here, the property is assumed to loose its value annually at a constant percentage of its book value

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

$Sc \rightarrow$ scrap value

$C \rightarrow$ original cost

$n \rightarrow$ no. of years

$p \rightarrow$ percentage rate of annual depriciation, in decimal.

iii) sinking fund method: Here, the depriciated amount is assumed to be annual sinking fund plus the interest of the accumulated sinking fund till that year.

iv) Quantity survey method: Here, the property is studied in detail and extent of physical deterioration worked out to calculate depriciation.

Q.6

Sinking fund is the amount that has to be set aside at fixed intervals out of the gross income so that at the end of the useful life of the building, the fund accumulates to initial cost of building.

Coefficient of sinking fund is the yearly installment of sinking fund to get Rs 1- as total sinking fund in 'n' years at a certain rate of interest (i)

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

Q.7.

Answer.

→ Area of land = 900 sq.m

Plinth area of each storey = 400 sq.m (3 storey building).

Plinth area rate = 150/- per sq.m

Future life(n) = 70 years

Net ~~annual~~ monthly rent = Rs 1600 ~~*12~~ .

Ip = 6 % = 0.06

i = 3 % = 0.03

Cost of land = Rs 40/- sq.m

Scrap value = 10 %

Capitalized value of property = ?

i) Total cost of the building originally

$$\text{Total cost} = 400\text{m}^2 \times 3 \times 150$$

$$= \text{Rs } 1,80,000/-$$

ii) Calculating coefficient of sinking fund,

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

or,
$$= \frac{0.03}{1.03^{70} - 1}$$

$$\therefore Ic = 0.0043366$$

iv) Sinking fund required,

$$I = Ic \times S$$

where,

S = 90% of 1,80,000/- (10% scrap value).

∴ S = Rs 1,62,000/-

∴ I = Rs 702.5292 per annum.

v) Net annual rent = Rs 1600 × 12

= Rs 19,200/- (Gross income).

vi) Total outgoings.

a) Repair & maintenance = 10% of gross income

$= \frac{10}{100} \times 19,200$

= Rs 1920/-

b) Municipal taxes & property tax = 20% of 19,200

= Rs 3840/-

c) Property tax = 5% of 19,200 = Rs 960/-

d) Insurance premium = 0.5% of 19,200 = Rs 96/-

e) Management and collection charges a = 6% of Rs 19,200

= Rs 1152/-

f) Miscellaneous charges at 2% of gross income = 2% of Rs 19,200

= Rs 384/-

Now,

Total outgoings = Rs 8352 + Rs 702.5292 (sinking fund)

= Rs 9054.5292

vii) Calculating Year's Purchase.

$$Y.P = \frac{1}{I_b + I_c}$$

$\therefore Y.P = 15.543$

viii) Calculating Net income,

Net income = Gross income − Total outgoings

= 10,145.4708

ix) Capitalized value = Net income × Y.P

= 10145.4708 × 15.543

= 1,57,691.0526 ans