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Q No # 1 Part (1)

Solution :-

$$\begin{aligned} \text{External length of building} \\ &= 14 + 14 + 2(1.125) + 0.75 \\ &= 31 \text{ ft.} \end{aligned}$$

$$\begin{aligned} \text{External breadth of building} \\ &= 12 + 8 + 2(1.125) + 0.75 \\ &= 23 \text{ ft} \end{aligned}$$

$$\begin{aligned} \text{Plinth area of the building} \\ &= 31 \times 23 \\ &= 713 \text{ ft} \end{aligned}$$

$$\text{Rate of construction} = \text{Rs } 300/\text{SFT}$$

$$\begin{aligned} \text{Cost of construction} &= 713 \times 300 \\ &= 213900 \end{aligned}$$

Cost of water supply and Sanitary is 10%

$$\begin{aligned} \text{water supply and sanatory} &= 213900 \times \frac{10}{100} \\ &= 21390 \end{aligned}$$

$$\begin{aligned}\text{Cost of electricity supply} &= \frac{213900 \times 10}{100} \\ &= 21390\end{aligned}$$

$$\begin{aligned}\text{Cost of Gas supply} &= \frac{213900 \times 5}{100} \\ &= 10695\end{aligned}$$

$$\begin{aligned}\text{Total cost} &= 213900 + 21390 + 21390 + 10695 \\ &= \text{Rs } 267375/-\end{aligned}$$

$$\begin{aligned}\text{Contingencies} &= \frac{267375 \times 3}{100} \\ &= \text{Rs } 8021.25/-\end{aligned}$$

$$\text{Grand Total} = 267375 + 8021.25$$

$$\text{Grand Total} = \boxed{\text{Rs } 275396.25 /-}$$

Q No # 1 Part (ii)

Solution:

Step # 1

(Total wall length)

$$\begin{aligned} \text{length of wall} &= 14+14+12+12+12+12+14+14+8+8+8 \\ &\quad +8+8+4+8+4 \\ &= 164 \text{ sq.ft.} \end{aligned}$$

$$\text{As } 1 \text{ sq.m} = 10.76 \text{ sq.ft}$$

$$x \text{ sq.m} = 164 \text{ sq.ft}$$

$$164 = 10 \times x$$

$$x = \frac{164}{10}$$

$$x = 16.4 \text{ sq.m}$$

Step # 2

$$\text{Total area of wall} = L \times H$$

$$= 16.4 \times 3 \text{ m}$$

$$= 49.2 \text{ m}^2$$

$$\text{Total area of door} = 2 \times 1$$

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

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Step #3

Deduct are of doors from
total area of wall

$$\text{Plaster Area} = 49.2 - 4(2\text{m}^2)$$

$$\text{Plaster Area} = 41.2 \text{ m}^2$$

Q No # 2

Solution :-

Step # 1

(length of bar 12mm bottom bars)

$$\begin{aligned} \text{length of steel 12mm} &= (\text{length of beam} - \text{cover}) \times \text{No of bar} \\ &= (4000 - 2(30)) \times 2 \\ &= 7880 \text{ mm} \\ &= \overset{\text{or}}{=} 7.8 \text{ m} \end{aligned}$$

Step # 2

(length of bar 10mm top bars)

$$\begin{aligned} \text{length of steel 10mm} &= (\text{length of beam} - \text{cover}) \times \text{No of bars} \\ &= (4000 - 2(30)) \times 2 \\ &= 7880 \text{ mm} = 7.8 \text{ m} \end{aligned}$$

Step # 3

(Weight of bar 12mm bottom bars)

$$\begin{aligned} &= \left(\frac{d^2}{162} \right) \times L \\ &= \left(\frac{12^2}{162} \right) \times 7.8 = 6.9 \text{ kg} \end{aligned}$$

Step # 4

(Weight of bar 10 mm top Bars)

$$= \left(\frac{d^2}{162} \right) \times L$$

$$= \left(\frac{10^2}{162} \right) \times 7.8$$

$$= 4.81 \text{ kg}$$

For stirrupsStep # 5

(No of stirrups)

length of beam / spacing + 1

$$= \left(\frac{400}{200} \right) + 1$$

$$= 21 \text{ Nos}$$

Step # 6

(Cutting length of stirrups)

$$2(x) + 2(y) + \text{hook}(10d) - \text{bend}(2 \text{ at } 90^\circ)$$

$$= 2(132) + 2(132) + (2 \times 10 \times 8) - (5 \times 2 \times 8) + 264 + 264 + 160 - 80$$

$$= 608 \text{ mm} = 0.608 \text{ m}$$

Step #7

(Total length of stirrup)

Cutting length \times No of stirrups

$$= 0.608 \times 21$$

$$= 12.76 \text{ m}$$

Step #8

(Weight of stirrup)

$$\left(\frac{d^2}{162} \right) \times L$$

$$\left(\frac{8^2}{162} \right) \times 12.76$$

$$W. \text{ of stirrup} = 5 \text{ kg.}$$

S.No	Type of bar	Dia (mm)	No.'s	length (m)	Total length (m)	Unit weight (kg)	Total weight	Notes	
1	Top bars	10	2	7.8	15.6	0.61	9.51	$\frac{d^2}{162} = \frac{10^2}{162} = 0.61$	
2	Bottom bars	12	2	7.8	15.6	0.89	13.88	$\frac{d^2}{162} = \frac{12^2}{162} = 0.89$	
							23.394		
Total									
Add 5% wastage								1.16	
Gross Total								24.56 kg	

Q No # 3

Solution:-

Step # 01

(Effective length)

$$\begin{aligned} \text{Eff. length (x)} &= \text{length} - \text{both side covers} \\ &= 2000 - (12 \times 50) \\ &= 1900 \end{aligned}$$

$$\begin{aligned} \text{Eff. length (y)} &= 2000 - (2 \times 50) \\ &= 1900 \text{ mm} \end{aligned}$$

Step # 02

(Finding Number of bars)

$$\begin{aligned} \text{No of bars (x)} &= \frac{\text{Eff length}}{\text{spacing}} + 1 \\ &= \left(\frac{1900}{150} \right) + 1 \\ &= 13.67 \\ &= 14 \text{ bars.} \end{aligned}$$

Step #03

(Find cutting length)

$$\text{Along (x)} = (\text{Eff. length} + \text{bends}) - \text{bend deduction}$$

$$= (1900 + 2(300 - 50 - 50)) - [2 \times (2 \times 12)]$$

$$= 2300 - 48$$

$$= \boxed{2252 \text{ mm}} \quad \text{or} \quad \boxed{2.25 \text{ m}}$$

$$\text{Along (y)} = [\text{Eff. length} + \text{bends}] - \text{bend deduction} \times 2$$

$$= (1900 + [2(300 - 50 - 50)]) - 2(2 \times 12)$$

$$= \boxed{2252 \text{ mm}}$$

or

$$= \boxed{2.25 \text{ m}}$$

Sr.No	Type of bar	Dia (mm)	No	length (m)	Total length (m)	Weight (kg/m)	Total weight (kg)	Notes
1	x-direction	12	14	2.25	31.5	0.89	28	$\frac{12^2}{162} = 0.89$
2	y-direction	12	14	2.25	31.5	0.89	28	$\frac{12^2}{162} = 0.89$

Total = 56 kg

Add 5% wastage = 2.8 kg

Gross weight = 58.8
or
59 kg

Answer # 04 Part (i)

Solution:-

$$\text{Dia of Column} = 500 \text{ mm}$$

$$\text{Dia of stirrup c/c} = 500 - (2 \times 40) - (4 \times 4) \\ = 412 \text{ mm}$$

Parameter of stirrup

λd

$$= 3.14 \times 412$$

$$= 1294.5$$

$$\text{Hook length} = 10D$$

$$= 10 \times 8$$

$$= 80 \times 2$$

$$= 160 \text{ mm}$$

$$\text{Length of stirrup} = \text{Parameter of stirrup} + \text{Hook L}$$

$$= 1294.5 + 160$$

$$= 1454.5 \text{ mm}$$

$$= 1454.5 / 1000$$

$$= 1.45 \text{ m}$$

Q No # 4 Part (ii).

Solution :-

$$\text{Value of Plot} = 350,000$$

$$\text{Rate of rent} = 6\%$$

$$\text{Annual rent of Plot} = 350,000 \times (6/100) = 21,000$$

$$\text{Value of building structure} = 420,000$$

$$\text{Rate of rent} = 8\%$$

$$\begin{aligned} \text{Annual Rent for structure} &= 420,000 \times (8/100) \\ &= 33,600 \end{aligned}$$

$$\begin{aligned} \text{Total annual rent} &= 21,000 + 33,600 \\ &= 54,600 \end{aligned}$$

$$\text{Monthly rent} = \frac{54,600}{12}$$

$$\text{Monthly rent} = 4,550$$

Answer # 05

Ans Types of Alternative dispute resolution :-

Main Types of ADR :-

(i) Arbitration :-

- => Arbitration is the adjudication of a dispute by one or more specially appointed experts or lawyers.
- => Arbitration involves an independent third party who actually make suggestion and actually imposes a decision on the parties.
- => People who work as arbitrator often belong to the Chartered Institute of Arbitrators.
- => Arbitration is governed by the Arbitration Act 1996.
- => Arbitration is binding.

(ii) Mediation :-

- => Parties in a dispute may refer their dispute to an independent third party who will act as a go-between.
- => Mediation involves an impartial third party who listens and directs discussion

- but does not suggest outcomes.
- => The mediator will help the Parties discuss their dispute in order to try settle it.
- => Mediation is not binding.

(iii) Negotiation :-

- => Negotiation requires Parties to bargain without outside, exchanging compromises to reach a solution. In this approach Parties can begin bargaining discussion at the beginning of a dispute without the presence of legal representation.
- => Like mediation, settlement discussion within a negotiation context are controlled entirely by the Parties.

(iv) Conciliation :-

- => Similar to mediation but the Conciliator may suggest a way to settlement to the dispute.
- => If Parties in litigation refuse an offer of conciliation without good reason then even if they win their cases the Judge can refuse to award them some or all of their legal costs.
- => Conciliation is not binding.

Arbitration Act - 1996 (Section-9)

- Where a Party tries to ignore an arbitration clause agreed in a contract, the court in which he or she is trying to make his claim will order a 'stay' of proceedings so that the matter may be referred to arbitration as agreed in the contract.

Arbitration Act - 1996 (S-1)

- (a) The object of arbitration is to obtain the fair resolution of disputes by an impartial tribunal without unnecessary delay or expense.
- (b) The Parties should be free to agree how their dispute are resolved, subject only to such safeguards as are necessary in the public interest.
- (c) In matters governed by this Part the court should not intervene except as provided by this Part.

Arbitration act 1996 (S-18)

The Parties are free to agree what is to happen in the event of a

Procedure for the appointment of the arbitral tribunal. There is no failure if an appointment is duly made under section (17) unless that appointment is set aside.

Advantages of ADR:-

- Reduce time in dispute. It takes time to reach a final decision.
- Reduce cost in relating to the dispute resolution. It requires less money.
- Produce good results settlement rates upto 85%.
- Improved satisfaction with the outcome or manner in which the dispute is resolved among disputants.

Disadvantage of ADR:-

- It can be used as a stalling tactic.
- Parties are not compelled to continue negotiation or mediation.
- Does not produce legal precedents.
- Exclusion of pertinent weakness final agreement.