

FINAL EXAMINATION

NAME : MUHAMMAD TALHA

RD NO : 7965

SECTION : B

SUBJECT : QUANTITY SURVEYING AND
ESTIMATION

SUBMITTED TO : SIR AMTIHAZ KHAN

DEPARTMENT : CIVIL ENGINEERING

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Question :- 01 (A)

Solution :-

$$\begin{aligned}\text{External Length of Building} &= \\ &= 14' + 14' + 2(1.125) + 0.75 \\ &= 31 \text{ ft} \cdot\end{aligned}$$

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

$$\begin{aligned}\text{Plinth Area of Building} &= 31 \times 23 \\ &= 713 \text{ ft}^2\end{aligned}$$

$$\text{Rate of Construction} = \text{Rs } 300 / \text{sft}$$

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

$$\begin{aligned}\text{Water Supply And Sanitary} &= 213900 \times 10/100 \\ &= \text{Rs } 21390\end{aligned}$$

$$\begin{aligned}\text{Cost of Electric supply} &= 213900 \times 10/100 \\ &= \text{Rs } 21390\end{aligned}$$

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

$$\begin{aligned}\underline{\text{Total Cost}} &= 213900 + 21390 + 21390 + 10695 \\ &= \text{Rs } 267375\end{aligned}$$

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

$$\begin{aligned}\underline{\text{Grand Total}} &= \text{Rs } 267375 + \text{Rs } 8021.25 \\ &= \text{Rs } 275396.25 \quad \text{Answer}\end{aligned}$$

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Question :- 01 (B)

For One Room :-

Step 01 :- (Total wall length)

~~For~~

For Room One :-

$$= 14 + 14 + 12 + 12$$

$$= 52 \text{ feet} = 15.8496 \text{ m}$$

Step 02 :- (Total area of wall, Door)

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

$$= 52 \times 3$$

$$= 15.8496 \times 3$$

$$= 47.5488 \text{ m}^2$$

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

$$= 2 \text{ sq.m}$$

Step 03 :-

$$\underline{\text{plaster Area}} = \underline{\text{Area of wall} - \text{Area of Door}}$$

$$= 47.5488 - 2$$

$$= 45.5488 \text{ sq.m}$$

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

$$\text{So, } 45.5488 \times 10.76 = 490.105 \text{ sq.ft}$$

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For Second Room :-

Same Steps should be followed

For Bath And kitchen :-

Step 01 :- (Total wall length)

$$\begin{aligned}\text{Bath} &= 4+8+4+8 \\ &= 24 \text{ feet} = 7.31 \text{ m}\end{aligned}$$

$$\begin{aligned}\text{kitchen} &= 8+8+8+8 \\ &= 32 \text{ feet} = 9.75 \text{ m}\end{aligned}$$

Step 02 :- (Total Area of wall, Door)

$$\begin{aligned}\text{Total Area of wall for kitchen} &= L \times H \\ &= 9.75 \times 3 \\ &= 29.25 \text{ m}^2\end{aligned}$$

$$\begin{aligned}\text{Total Area of wall for Bath} &= L \times H \\ &= 7.31 \times 3 \\ &= 21.93 \text{ m}^2\end{aligned}$$

Step 03 :-

$$\begin{aligned}\text{plaster Area for kitchen} &= \text{Area of wall} - \text{Area of Door} \\ &= 29.25 - 2 \\ &= 27.25 \text{ m}^2 \rightarrow \text{into sqft } 296.1152 \text{ ft}^2\end{aligned}$$

$$\begin{aligned}\text{plaster Area for Bath} &= 21.93 - 2 = 19.93 \text{ m}^2\end{aligned}$$

By changing m^2 into ft^2 will become 214.4468 ft^2

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For Total ^{Internal} Plaster Area

$$= \text{plaster Area of one Room} \\ + \text{plaster Area of Second} \\ + \text{p.A of Kitchen} + \text{p.A of Bath}$$

$$= 490.105 + 490.105 + 296.1152 + 214.4468 \\ = 1490.772 \text{ m}^2$$

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Question :- 02

Calculate the Bar Bending schedule of given Beam ----- ?

Step 1 :- (Length of bar 12mm Bottom Bars)

$$\begin{aligned}\text{Length of steel 12mm} &= (\text{Length of Beam} - \text{cover}) \\ &\quad \times \text{No of Bars} \\ &= (4000 - 2(30)) \times 2 \\ &= 7880 \text{ mm or } 7.88 \text{ m}\end{aligned}$$

Step 2 :- (Length of bar 10mm Top Bars)

$$\begin{aligned}\text{Length of steel 10mm} &= (4000 - 2(30)) \times 2 \\ &= 7880 \text{ mm or } 7.88 \text{ m}\end{aligned}$$

Step 3 :- (Weight of Bar 12mm bottom Bars)

$$\begin{aligned}&= (d^2/162) \times L \\ &= (12^2/162) \times 7.88 \\ &= 7.004 \text{ kg}\end{aligned}$$

Step 4 :- (Weight of Bar 10mm Top Bars)

$$\begin{aligned}&= (d^2/162) \times L \\ &= (10^2/162) \times 7.88 \\ &= 4.86 \text{ kg}\end{aligned}$$

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Step 5 :- (No of stirrups)

$$\begin{aligned}\text{No of stirrups} &= \text{Length of Beam} / \text{spacing} + 1 \\ &= (4000 / 200) + 1 \\ &= 21 \text{ No's}\end{aligned}$$

Step 6 :- (Cutting Length of stirrups)

$$\begin{aligned}&\{ 2(x) + 2(y) + \text{hook (10d)} - \text{bend} \\ &= \{ 2(132) + (2 \times 132) + (2 \times 10 \times 8) - (5 \times 3 \times 8) \} \\ &= 264 + 264 + 160 - 120 \\ &= 608 \text{ mm or } 0.608 \text{ m}\end{aligned}$$

Step 7 :- (Total Length of stirrups)

$$\begin{aligned}\Rightarrow &\text{Cutting Length} \times \text{No of stirrups} \\ &= 0.608 \times 21 \\ &= 12.768 \text{ m}\end{aligned}$$

Step 8 :- (Weight of stirrups)

$$\begin{aligned}&= (d^2 / 162) \times L \\ &= (8^2 / 162) \times 12.768 \\ &= 5.044 \text{ kg}\end{aligned}$$

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Step 9 :- Unit weight of steel 10 mm

$$\begin{aligned}\text{weight of steel} &= d^2/162 \\ &= (10)^2/162 \\ &= 0.61 \text{ kg/m}\end{aligned}$$

Step 10 :- Unit weight of steel 12 mm

$$\begin{aligned}\text{weight of steel} &= d^2/162 \\ &= (12)^2/162 \\ &= 0.89 \text{ kg/m}\end{aligned}$$

Location	Bar No of Bars	cut length	wt/l (kg/m)	Spacing	Total Length	Total weight (kg)	Note
12mm Bottom Bar	2	3940mm 3.94m	0.89 0.89 kg/m	-	7880mm or 7.88m	7.004 8.8191	$12^2 / 162 = 0.89$
10mm Top Bar	2	3.94m	0.61 kg/m 0.61	-	7.88m	4.86 3.86	$10^2 / 162 = 0.61$
Stirrups	21	0.608m	0.395	200 d/c	12.768m	5.044	$8^2 / 162 = 0.395$
Total						16.908kg	
Add 5% wastage						0.8454	
Gross weight						17.7534	

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Question :- 03

Step 1 :- (find the Effective Length)

$$\begin{aligned}\text{Eff Length (x)} &= \text{Length} - \text{both side Covers} \\ &= 2000 - 2 \times 50 \\ &= 1900\text{mm}\end{aligned}$$

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

Step 2 :- (find the No's of Bar)

$$\begin{aligned}\text{No of Bars (x)} &= \text{Eff Length / spacing} + 1 \\ &= (1900/150) + 1 \\ &= 14 \text{ No's}\end{aligned}$$

$$\begin{aligned}\text{No of Bars (y)} &= (1900/150) + 1 \\ &= 14 \text{ No's}\end{aligned}$$

Step 3 :- (find the Cutting Length)

$$\begin{aligned}\text{Along (x)} &= [\text{Eff Length} + (\text{bends})] - \text{bent Dev} \\ &= 1900 + 2(300 - 50 - 50) - \{2(2 \times 12)\} \\ &= 2252 \text{ mm or } 2.25 \text{ m}\end{aligned}$$

$$\begin{aligned}\text{Along (y)} &= \text{Same, Because Length is} \\ &\quad \text{Same whereas Dia of Bar} \\ &\quad \text{is also same} \\ &= 2252 \text{ mm or } 2.25 \text{ m}\end{aligned}$$

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Step 4 :- (Total length) of 12 mm Bar)

⇒ Cut length × No of Bars

$$= 2.25 \times 14$$

$$= 31.5 \text{ m}$$

Step 5 :- (Total weight of 12mm Bar)

⇒ Total length × Unit weight of steel)

$$= 31.5 \times 0.89$$

$$= 28.035 \text{ kg}$$

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Location	Bar No	No of Bars	Cut Length (m)	wt/L (kg/m)	Spacing (mm)	Total Length (m)	Total weight (kg)	Notes
X-Direction	12mm	14	2.25m	0.89	150mm	31.5m	28.035kg	$12^2/162 = 0.89$
Y-Direction	12mm	14	2.25m	0.89	150mm	31.5m	28.035kg	$12^2/162 = 0.89$
Total							56.07kg	
Add 5% wastage							2.8035kg	
Gross weight							58.87kg	

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Question :- 4(A)

Circular Column :-

$$\underline{\underline{\text{Dia of column}}} = 500 \text{ mm}$$

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

$$\underline{\underline{\text{parameter of stirrup}}} = \pi d = 3.142 \times 412 \\ = 1294.504 \text{ mm}$$

$$\underline{\underline{\text{Hook Length}}} = 6D = 10 \times 8 \\ = 80 \times 2 \\ = 160 \text{ mm}$$

Cutting Length of stirrup =

⇒ parameter of stirrup + Hook L

$$= 1294.504 + 160 \\ = 1454.504 \text{ mm} / 1000 \\ = 1.454504 \text{ m}$$

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Question :- 04 (B)

Solution :-

$$\begin{aligned} \text{Value of plot} &= \text{Rs } 350000 \\ \text{Rate or Value of Rent} &= 6\% \\ \text{plot} & \end{aligned}$$

$$\begin{aligned} \text{Annual Rent for plot} &= 350000 \times 6/100 \\ &= \text{Rs } 21000 \end{aligned}$$

$$\begin{aligned} \text{Value of Building structure} &= 420000 \\ \text{Rate of Rent} &= 8\% \end{aligned}$$

$$\begin{aligned} \text{Annual Rent for structure} &= 420000 \times \frac{8}{100} \\ &= 336000 \end{aligned}$$

$$\begin{aligned} \text{Total Annual Rent} &= 21000 + 336000 \\ &= 54600 \end{aligned}$$

$$\begin{aligned} \text{Monthly Rent} &= 54600 / 12 \\ &= 4550 \end{aligned}$$

Question :- 05

Main Types of ADR :-

① Arbitration :-

Arbitration is the adjudication of a dispute by one or more specially appointed experts or lawyers.

- Arbitration involves an independent 3rd party who actually makes suggestions and actually imposes a decision on the parties.

② Mediation :-

parties in a dispute may refer their dispute to an independent 3rd party who will act as go-btw.

- Mediation involves an impartial third party who listens and directs discussion but does not suggest outcomes.

- Mediation is not binding whereas arbitration is binding.

③ Conciliation :-

- Similar to Mediation but the Conciliator may suggest away to settle to the dispute.
- Conciliation is not Binding.

④ Negotiation :-

- Negotiation requires parties to bargain without outside assistance, exchanging compromises to reach a solution.
- Like Mediation, settlement discussions within a negotiation context are controlled entirely by the parties.
- Negotiation is not Binding.

OTHER TYPES :-

⑤ Neutral Evaluation :-

- Neutral Evaluation is where a third party, usually somebody legally qualified, gives an opinion on the likely outcome if the case went to trial.

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⑥ Ombudsmen :-

- They ~~can~~ investigate complaints against government departments, Local Councils & certain industries.
- There are a number of ombudsmen appointed by parliament.

⑦ Avoidance :-

- This is an intentional plan to avoid development of resentment by sorting out critical issues independently, without challenging or unsettling the other party.

Arbitration Act Section 1 (1996) :-

- (a) The object of arbitration is to obtain the fair resolution of disputes by an impartial tribunal (Equality) without unnecessary delay or expense.
- (b) The parties should be free to agree how their disputes 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 Section 18 (1996) :-

- (a) According to Section 18 Act, parties are free to decide by themselves whom they will appoint as an arbitrator.
- (b) When there is no agreement a party can apply to a court under the arbitration act 1996 section 18, to have one appointed by the court.

Advantages of ADR in Construction project :-

- ① Bringing up of solutions through ADR, tend to minimize uncertainty and improve working relations.
- ② Bringing up of solutions through ADR, leads towards success of project.
- ③ Bringing up of solutions, without wastage of time which is also beneficial for construction project.
- ④ Normally construction projects are with high difficulty, complex and uncertainty, dispute are commonly occurred in the project b/w the stake holder parties ^{or lower class}, which can also help them in terms of cost sanctions by the courts.
- ⑤ Easier, faster & reliable way of bringing of solutions through ADR, very less chances to effect progress of construction work.

Dis Advantages of ADR :-

- ① No guarantee for trustworthiness b/w parties which can effect the progress of Construction work.
- ② Strong-willed or well powered third party can exercise much control which results in poor relations b/w stake holders and so as will effect their potentials of work.
- ③ Mediation won't be effected when there are Overwhelming emotions involved, between the parties which results in delay of resolving problems & so as Construction project.
- ④ Unfavorable Circumstances b/w both parties results in ruining of project.
- ⑤ Effect the ~~re~~ project in terms of progress, Cost Consumption, & its well establishment, when Broken promises and unContinuing relationship b/w the parties are involved.