

Question bank

Q₁/ for the project that include the following activities, draw the arrow diagram and find the critical path duration, Then find out the total float for each activities

Activity	Duration (days)	Precede
A	2	-----
B	6	-----
C	3	-----
D	8	C
E	5	C
F	8	B,E
G	5	A,F
H	7	B,E
I	6	B,E
J	8	B,E
K	3	D,J
L	3	G,H
M	6	I,K,L

Q₂/ Find the volume of concrete (15 cm thick), cement plaster (2 cm thick), and gypsum plaster (2 cm thick) required to construct a hemispherical dome of radius (inner) 5 m.

Q₃/choose a roller for compaction of **500,000m³** soil such that by using **5** rollers you can finish the job in one month?

Lift thickness =**0.25m**, Speed of roller =**6 km/hr** ,

Assume number of passing for best production and excellent job efficiency

Working hours (**1day=12hrs**)

Q₄/ A truck (**12m³**) wanted to haul soil (**20KN/m³**) upward on a grade road for the following data, find at which grade the truck cannot do the job ?? then determine the speed of the truck at **2nd gear**.

Pull on 1st gear =**10500** kg (speed=**18** km/hr)

Pull on 2nd gear =**8200**kg

Rolling resistance =**80** kg/ton

Weight truck empty =**36ton**

Q5/ For the plan shown: find the following **ignoring all openings:-**

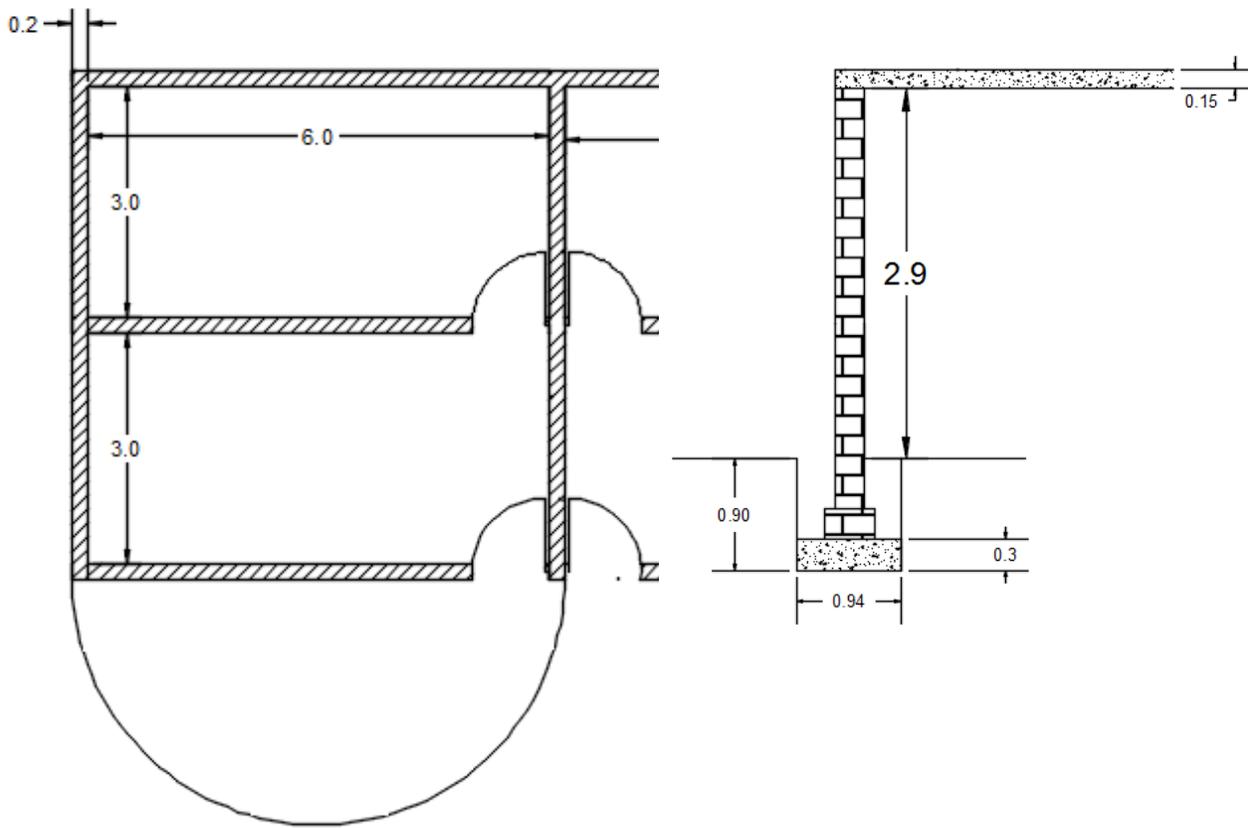
Estimate by **long wall short wall method** quantities of following items:

1. Excavation work
2. Cement sacks needed for footing , mix design **(1:3:6)**
3. **Block number** used for wall.

4. Concrete material **(1:2:4)** for slab.
5. internal plastering in (kg)
6. amount of exterior plastering,

find Cost of materials (blocks , cement, sand) if: -

- *Plastering mix = 1:3 (0.02 m thick)
- *Price of one ton of cement = \$130.
- *Price of 1 m³ of sand = \$20
- *Price of one block = \$1



Q6/

for the project that include the following activities, draw the arrow diagram and find the critical path duration ,Then find out the total float for each activities

Activity	Duration (days)	Precede	Follow
A	2	None	B,C
B	4	A	D,E
C	3	A	E,F,I
D	6	B	G
E	5	B,C	H
F	9	C	H
G	8	D	J
H	5	E,F	K
I	4	C	L,K
J	3	G	M
K	6	H,I	N
L	6	I	O
M	7	J	P
N	4	K	P
O	2	L	P
P	3	M,N,O	None

Q7/ choose a width of roller for compaction of 400,000m³ soil such that by using 5 rollers you can finish the job in one month?

Lift thickness =0.25m, Speed of roller =6km/hr ,

No of passing =12 ,Job efficiency =0.85

1day=10hrs

Q8/ Find the expected production in **BCM/h** of a small hydraulic excavation with the bucket capacity of **0.95 m³**. The excavation will be done in firm soil. The average and maximum depths of cut are **5 m** and **6.2 m** respectively. The average swing angle is **75** degrees. Assume that the earthwork has excellent job and management conditions, and standard cycles for hard clay =130 cycles /hr

Material	Bucket Fill Factor	Depth of Cut (% of Maximum)	Angle of Swing (deg)					
			45	60	75	90	120	180
Common earth, loam	0.80-1.10							
Sand and gravel	0.90-1.00							
Hard clay	0.65-0.95							
Wet clay	0.50-0.90							
Rock, well-blasted	0.70-0.90							
Rock, poorly blasted	0.40-0.70							
		30	1.33	1.26	1.21	1.15	1.08	0.95
		50	1.28	1.21	1.16	1.10	1.03	0.91
		70	1.16	1.10	1.05	1.00	0.94	0.83
		90	1.04	1.00	0.95	0.90	0.85	0.75

Swing-depth factor for backhoes

Q9/Find the gradability of the crawler tractor pulls a rubber tired scraper with the following data ,drawbar pull 12ton, weight of tractor 30 ton weight of scraper 50 ton with soil rolling resistance for tractor 80kg/ton the rolling resistance for scraper 95 kg/ton considering 80 %of the design pull only.

Note :the scraper is being operated on a haul road with a tire penetration of 5 Cm

Q10/ For the plan shown: find the following

1. internal plastering in (kg)
2. amount of exterior plastering, mix design (1:3)

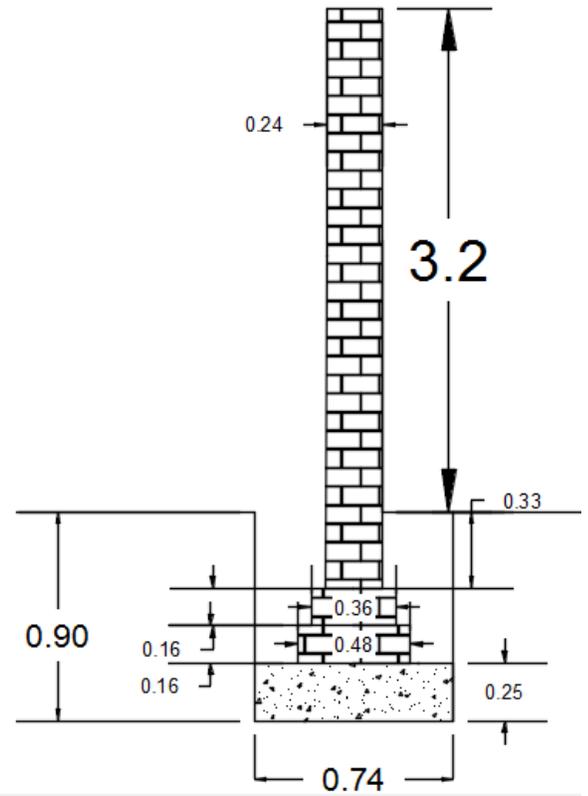
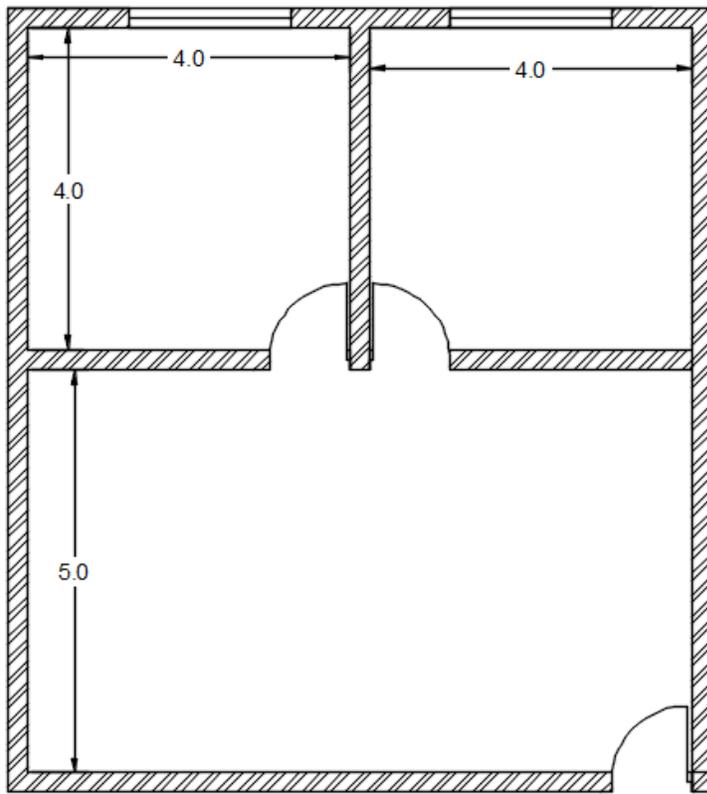
Estimate by long wall short wall method quantities of following items:

7. Excavation work
8. Cement sacks needed for foundation, mix design (1:3:6)
9. find cost of material (**for foundation only**) if 1 ton cement cost 110\$,1m³ sand cost =16\$
10. Brickwork in foundation and in super structure.

2 window =1.5*2

3 door=2.1*1

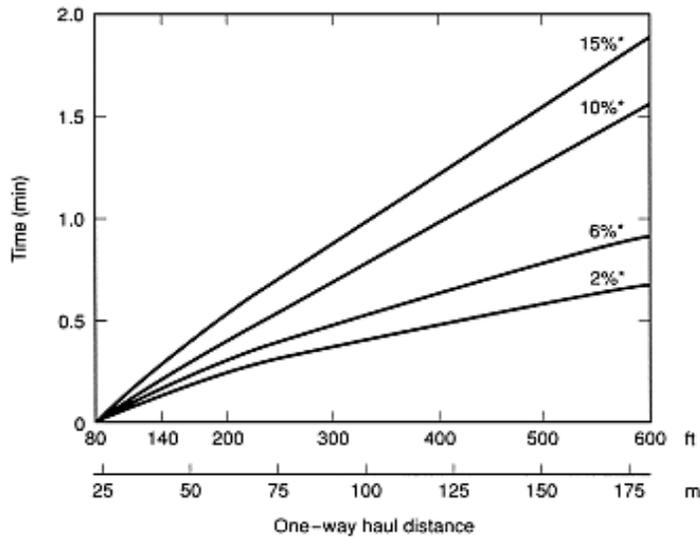
Note :All dimensions in meter



Q11/for the project that include the following activities, draw the arrow diagram and find the critical path duration.

Activity	Duration (days)	follow
A	4	D
B	4	E,G
C	4	F
D	7	G
E	8	H
F	9	H
G	2	I
H	11	J
I	12	J
J	10	-----

Q12/ Estimate the hourly production in loose measure of a 4.6m^3 wheel loader moving loose material from a stockpile into dump trucks. The average one-way haul distance is 107m the effective grade is 6% and bucket fill factor is 0.9 job efficiency is estimated at 50min/hr.



*Effective grade

Q13/ Vehicle of $10m^3$ of soil, if weight of soil $1730kg/m^3$ bank measure $1442kg/m^3$ loose measure **find truck vehicle capacity in bank measure.**

Q14/ rubber tired tractor of weight (**26.5**) tons & engine power of **250hp** used on road 5% grade and rolling resistance 36kg/ton .show if the tractor can pull other loads on all the gears or not ??if not state at which gears it fail?

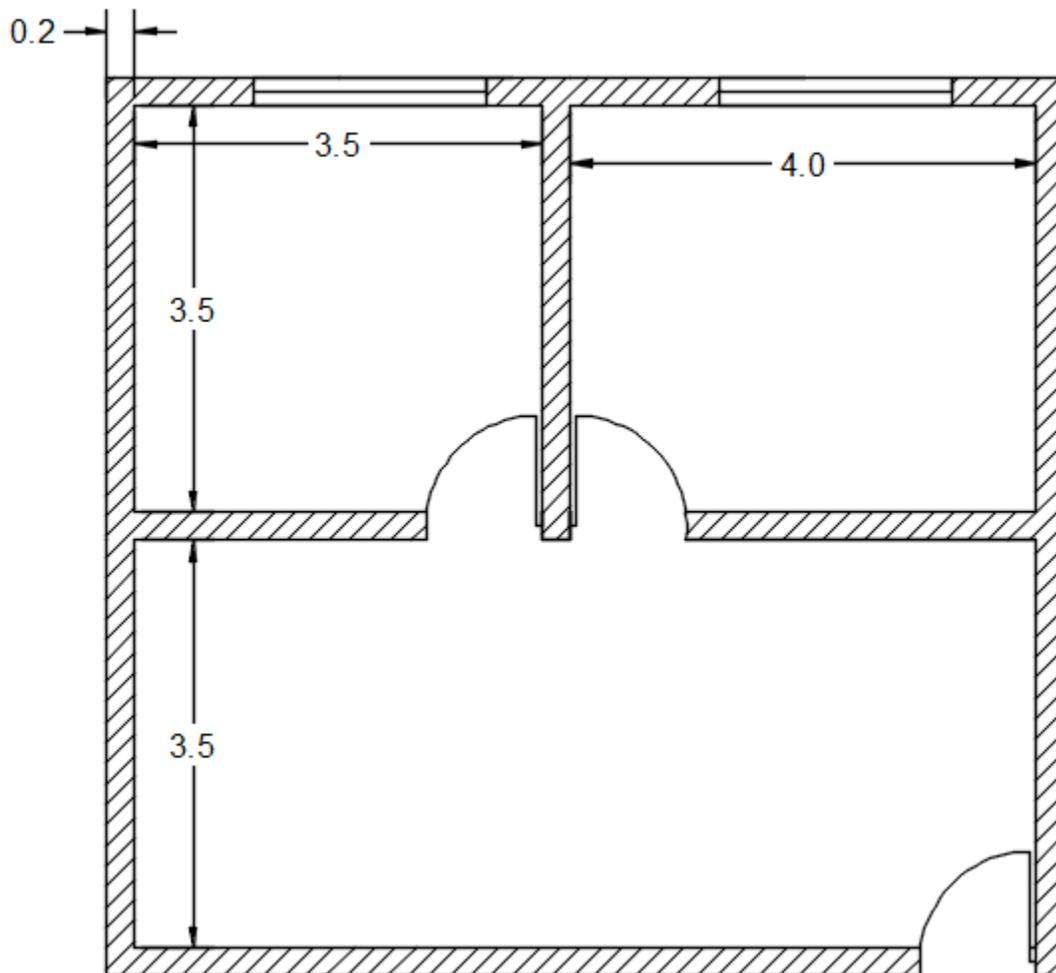
Assume any missing data

Gear	Velocity km/hr
1	6.2
2	11.5
3	19.8
4	34.6
5	50.3

Q15/ For the plan shown: find the following items

- 1.No. of block for super structure ,assume size of **1 block**
- 2.Interior plastering (wall height=**2.75m**) are required kg of gypsum
- 3.cement sacks needed for footing concrete, mix design (1:3:6), width of footing = **1m**, height of footing=**0.25m**

4. amount of cement, sand and gravel for slab concrete, if mix design= (1:2:4), thickness of slab=15cm



2 window =1.5*2

3 door=2.1*1

Note :All dimensions in meter

Q₁₆/A wheel tractor of weight **20tons** &and engine power of **250hp**, pulls a crawler scraper with the following data ,weight of scraper **35ton (empty)** the scraper capacity **14m³** and soil density **18KN/m³**. The rolling resistance for tractor **40kg/ton** and rolling resistance for scraper **90kg/ton**. The road have grade of **+6**.show if the tractor can pull other loads on all the gears or not??if not , state at which gears it fail to do that ? **assume efficiency=80%**

Gear	Velocity km/hr
1	6
2	11
3	20
4	34
5	52

Q17/ a wheel tractor shovel convey soil from location **A** to **B**

At which the trucks will take it (**50km**) away if the following data were given

How many trucks we will need to finish this work ?

* velocities of the shovel =**4.8 &6 km/hr?**

*bucked size =**1.9m³** heaped

*distance between **A and B =40m**

*truck velocity =**45&70km/hr**

*swelling factor =**33%**

*truck capacity= **12m³** (loose measure)

Q18/for the table shown ,find the **critical path and its duration considering (only 8 events) then find all starts and finishes for the activities.**

Activities	Duration	Precede
A	10	-----
B	8	-----
C	8	-----
D	7	A
E	9	B,D
F	4	A
G	7	D
H	6	F,G
I	11	C,E
J	5	H,I

Q19/ **Two hundred and fifty thousand cubic meters** of soil wanted to be compacted for a road project , the following roller was used: -

*width of roller = **2.1 m** (speed = **120 m/min.**) (lift thickness = **0.25 cm**)

*job efficiency = **78%** ,number of passes = **13**

How many rollers needed to finish the job in one month?

Q₂₀/ five hundred thousand cubic meters of soil wanted to be compacted for a road project, the following roller was used: -

*width of roller = 2.2 m (speed = 8 km/h) (lift thickness = 22 cm)

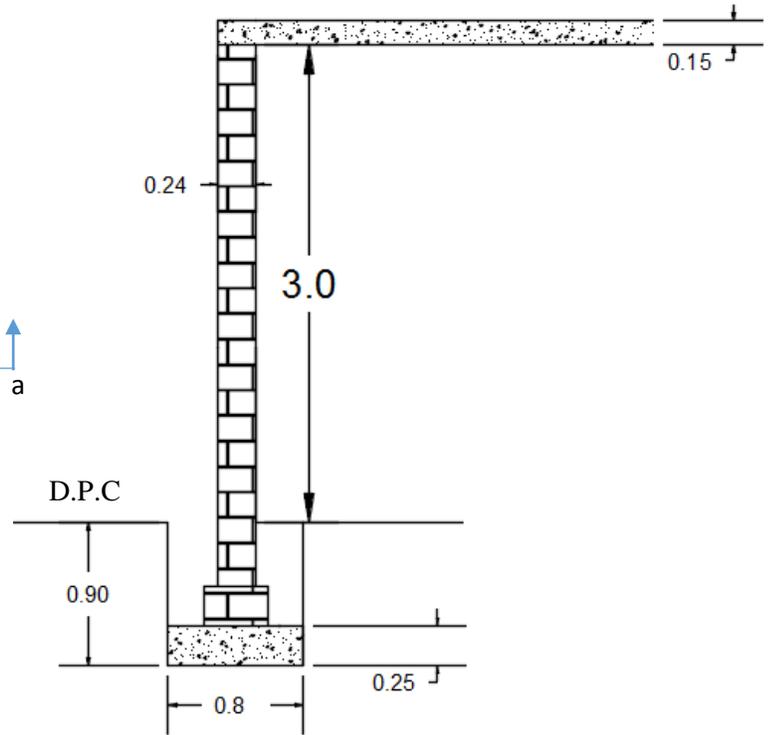
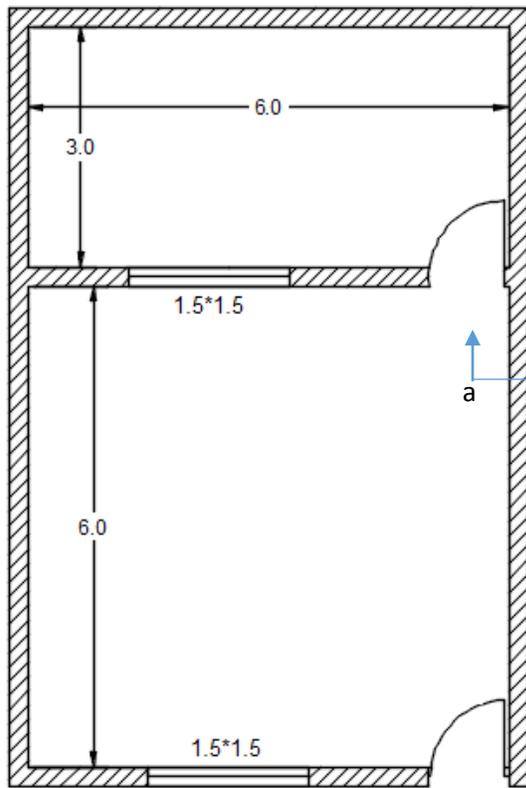
*efficiency = 86%. assume any missing data

How many roller will you use to finish the job during one month, considering 10 hrs = 1 day. Also find the total cost of using these machines if cost of using one roller/hr = \$40.

Q₂₁/ Consider a new crawler tractor. Its purchase price is \$100,000 and the assessed resale value after using for 5 years is 25% of the delivered price. Determine the depreciation and book value for each of 5 years using double declining balance method

Q₂₂/ for the plan shown find:

1. length of footing
2. volume of excavated soil for foundation
3. internal plastering in (kg)
4. amount of exterior plastering, mix design (1:3)
5. no. of brick used for wall (above d.p.c) (**assume size of 1 brick**)
6. cement sack needed for concrete slab (slab thickness 15cm), mix design(1:2:4)



Section a-a

Foundation detail

Note: all dimensions in meter

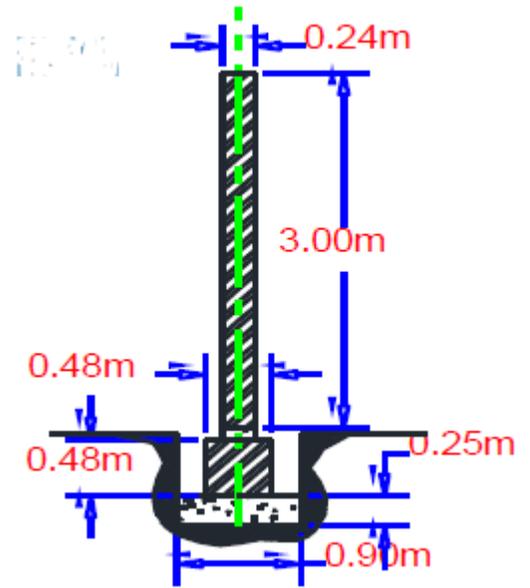
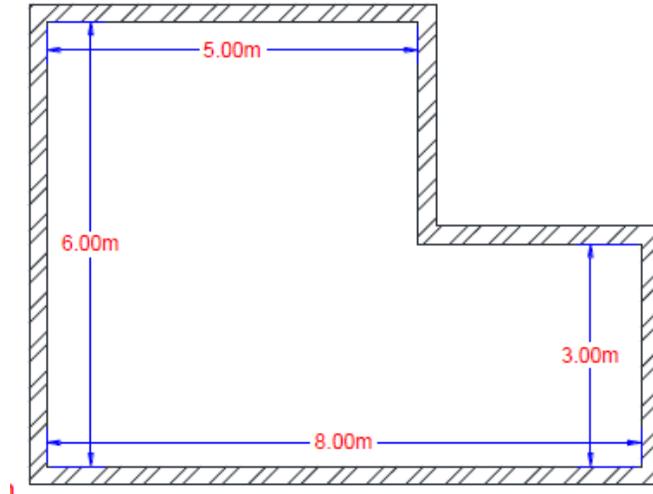
Q23/For the plan shown below, determine the following;

1- Footing concrete (width = 90 cm, and thick. = 25 cm)

2- Brick no. for walls (h = 3.00 m)

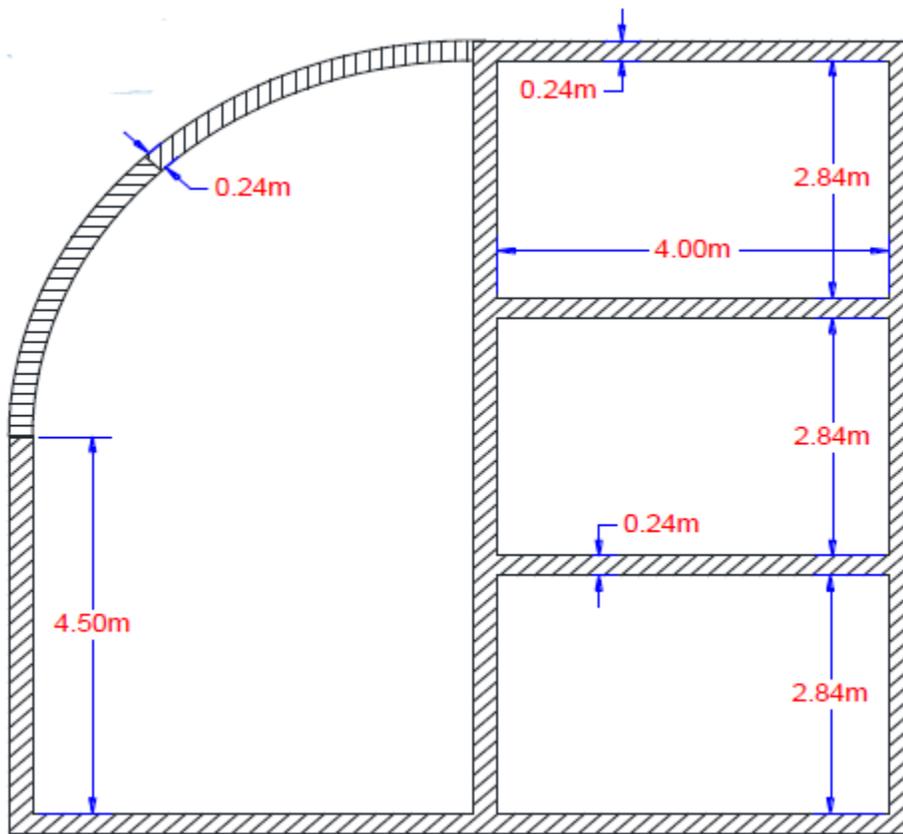
3- Interior plastering.

Note: (ignore openings)



Q24/For the plan shown, find the following:

- 1- Length of footing? (width = 84 cm)**
- 2- No. of bricks for walls ($h = 2.85$ m) (ignore opening)**
- 3- Concrete materials for floor (5 cm) (1:3:6)**
- 4- Interior plastering for walls ignore opening.**



Q25/

A tractor whose weight is (12.4 tons) has a maximum rim pull in the first gear of (6228 kg), is operated up a haul road with a slope of (2%) and a rolling resistance of (45 kg/ton); determine the rim pull required for towing a load.

Q26):

A wheel-type tractor with a (250 hp) engine weights (14 tons) has a maximum speed of (8Km/hr) in the first gear, is operated up a haul road with a slope of (2%) and a rolling resistance of (50 Kg/ton); determine the rim pull required for towing a load if the efficiency was 80%.

Q27/A crawler tractor whose weight is (15 tons) has a drawbar pull of (2000 kg) in sixth gear when operated on a level road having a rolling resistance of (50 kg/ton); if the same tractor is operated on another level road having a rolling resistance of (82 kg/ton) then:

1. Will the drawbar pull of the tractor be reduced or increased, find the effective drawbar pull?
2. If the road have a slope of (3%), what will the effective drawbar pull be, if the tractor moves:
 - a) Up the road.
 - b) Down the road.

Q28/Assume that a rubber-tired tractor has a total weight of (18000 kg) on the two driving tires. The maximum rimpull in low gear is (9000 kg). If the tractor is operating in wet sand, with a coefficient of traction of (0.3):

- 1. Find the maximum possible rim pull prior to slippage of the tires.
- 2. Find the maximum possible rim pull prior to slippage of the tires, if the same tractor is operating on dry clay, with a coefficient of traction of (0.6).

Q29/its required to use a tractor on a road of a grade 4% and have a rolling resistance factor of 40kg/ton, what will be the netpull opposite to each gear. Tractor weight is 20ton,engine horse power equal to 200kg.m/sec.

Gear	V(km/hr)
1	6.2
2	11.5
3	19
4	33
5	50

Q30/A crawler tractor weighing 36 ton is towing a rubber-tired scraper weighing 45.5 t up a grade of 4%. What is the total resistance (kg) of the combination if the rolling resistance factor is 50kg/ton?

- **Q31/A wheel tractor-scraper weighing 91 t is being operated on a haul road with a tire penetration of 5 cm. what is the total resistance (kg) and effective grade when, assume R.R=20kg/ton**
- (a) the scraper is ascending a slope of 5%;
- (b) the scraper is descending a slope of 5%?
-

Q31/A four-wheeled truck intended to be used in transporting earth material from site E to site F on a soft, rutted dirty road with +6% grade and 2990 m elevation. The soil density = 1.8 ton/m³, the truck capacity = 12 m³, the designed pull power for the truck = 14 ton, the coefficient of traction = 0.45, and the truck weight = 10 ton. Find;

- A. The net pull for truck to be used for the job.
- B. Maximum grade at which the truck can still do the job under the above condition
- C. The effective grade.

Q32/A four-wheel-drive tractor weighs 20,000 kg and produces a maximum rimpull of 18160 kg at sea level. The tractor is being operated at an altitude of 3050 m on wet earth. A pull of 10,000 kg is required (total resistance) to move the tractor and its load. Can the tractor perform under these conditions?

Q33/a wheel tractor weight with the soil 40ton move on road of grade 5%and rolling resistance =100kg/ton according to the following data given for velocity of moving upward in table below. Find grade that the tractor cannot do the job

Gear	Velocity
1	3.2
2	4.1
3	5.5
4	6.2
5	7
6	11

Q34/crawler tractor pulls a wheel scraper with the following data drawbar pull 12000kg weight tractor 20ton weight of scraper 40ton with soil rolling resistance for tractor 80kg/ton rolling resistance for scraper 120kg/ton considering 80%of the design pull only. Find the gradability of the tractor.

Q35/find velocity of tractor with weight 68000 total resistance 10% derating factor =25%.

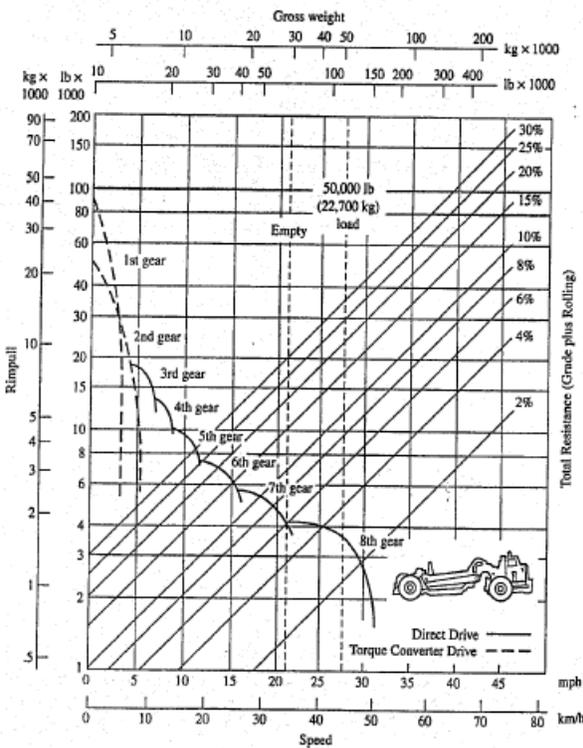


FIGURE 6.10 Rimpull performance chart for a wheel tractor scraper.

Q36/ With the following given data shown below, how many smooth wheel rollers are needed to compact 2500 m3 of subbase material in one hour?

$L = 0.25\text{ m}$, $W = 2.5\text{ m}$, and maximum job efficiency.

Q37/Estimate the production of a roller under the following condition:

a) Distance travelled in one minute = 100 m.

b) Lift thickness = 20 cm

c) Roller width = 3 m

d) Job efficiency = 80%

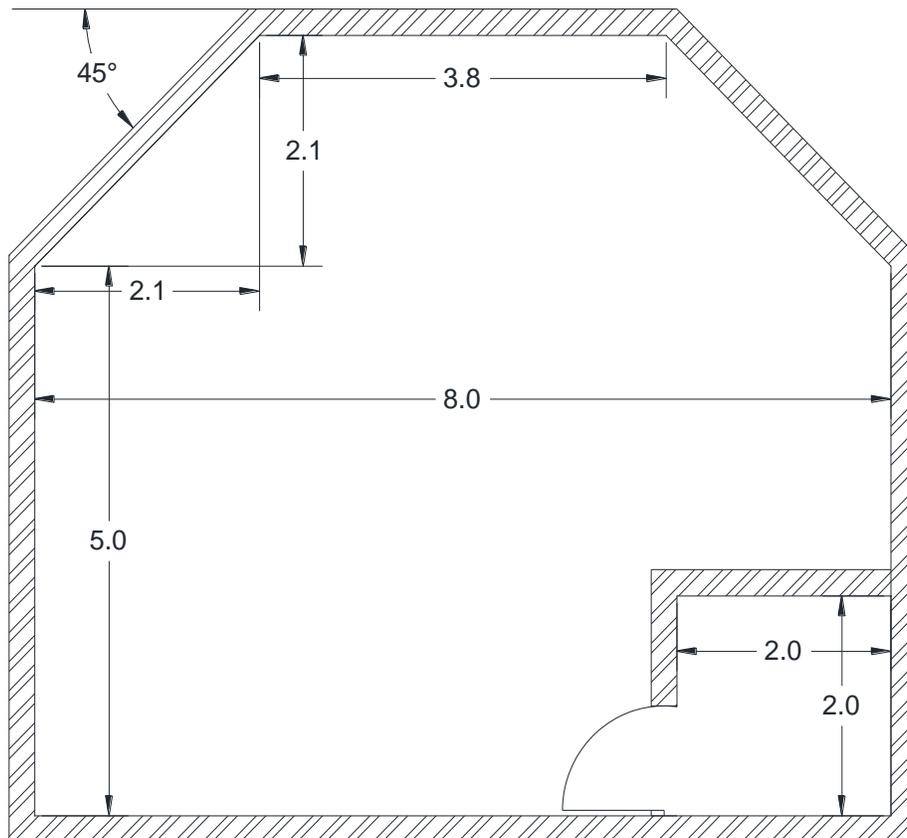
e) No. of passes = 9

Q38/ For the plan shown, find the following:

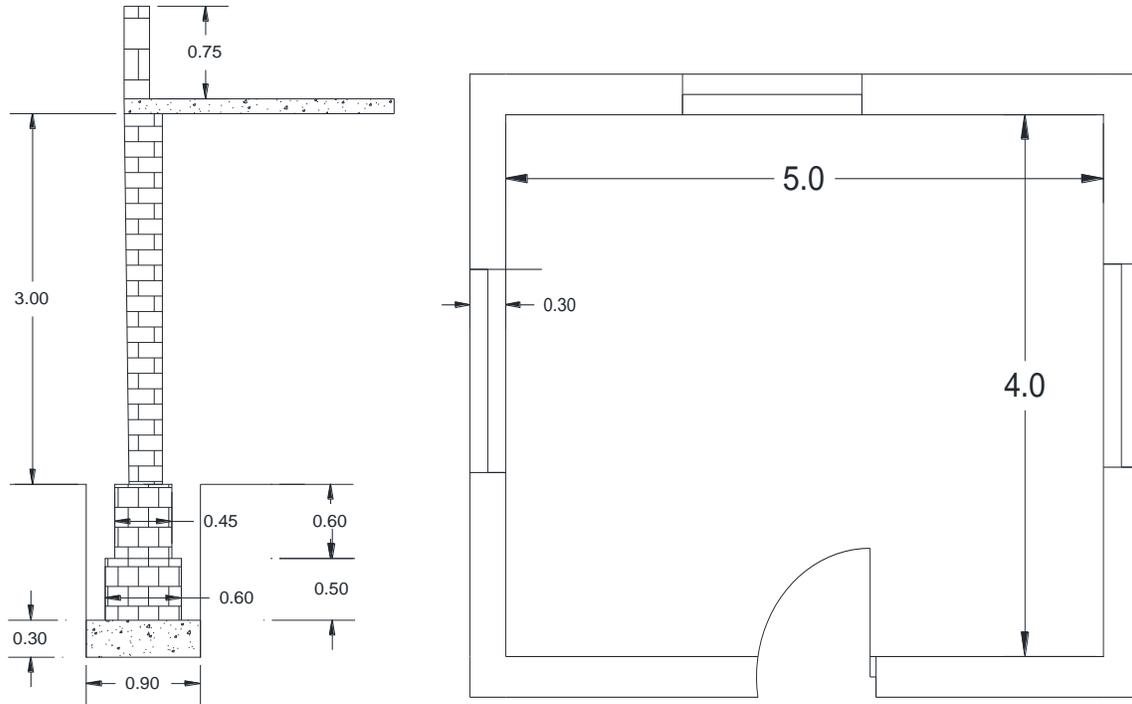
1- Length of footing? (width = 84 cm)

2- Cement sacks needed for floor concrete (1:3:6)

3- Cement sacks needed for continuous lintel over exterior walls only (15 cm thick - 1:3:6).



Q39/From the given figure below calculate the detailed and abstract estimate for the single roomed building (Load bearing type structure)



Q40/Estimate quantities of the following items of a two roomed 6 m x 6 m and 4m x 6 m building. Use the same data in example 1. Check your calculation using long and short wall method.

-Excavation (m^3) [70 cm breadth, 70 cm depth]

-Concrete in foundation (m^3) [25 cm depth]

-Masonry work (m^3)

1st step [60 cm breadth, 30 cm depth]

2nd step[50 cm breadth, 30 cm depth]

3rd step [40 cm breadth, 60 cm depth]

-Masonry work above DPC [20 cm breadth; D = 3.5 m]

Q41/Find the number of cement sacks (50 kg) and the amount of sand (m^3) needed for one cubic meter of mortar if the mix was 1:3.

Q42/ Find the number of cement sacks (50 kg) and the amount of sand and gravel (m^3) needed for one cubic meter of concrete if the mix was 1:1.5:3.

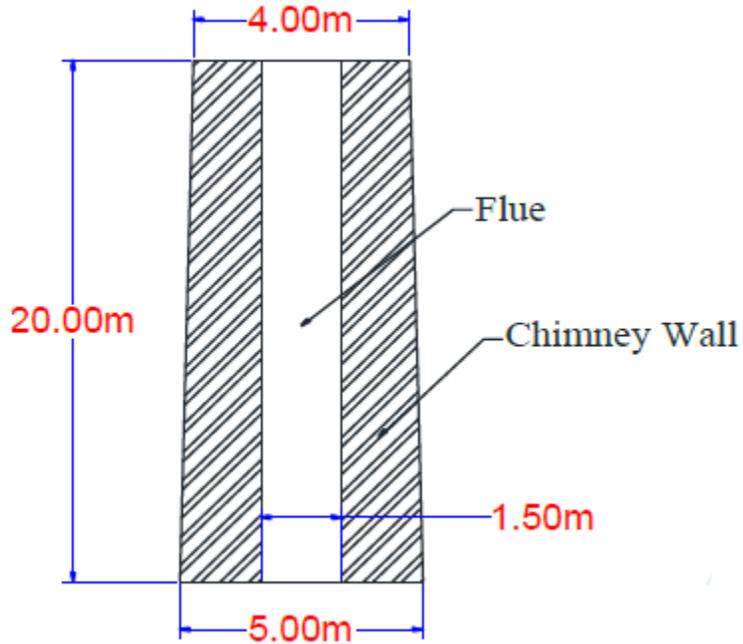
Q43/A circular chimney was built of brick of height 20 m and inner constant diameter of 1.5 m. The upper outer diameter = 4 m and the lower outer diameter = 5 m. calculate the following

1- No. of bricks

2- Lateral surface plastering (m^2).

3- Cost of materials (bricks, cement, sand) if: -

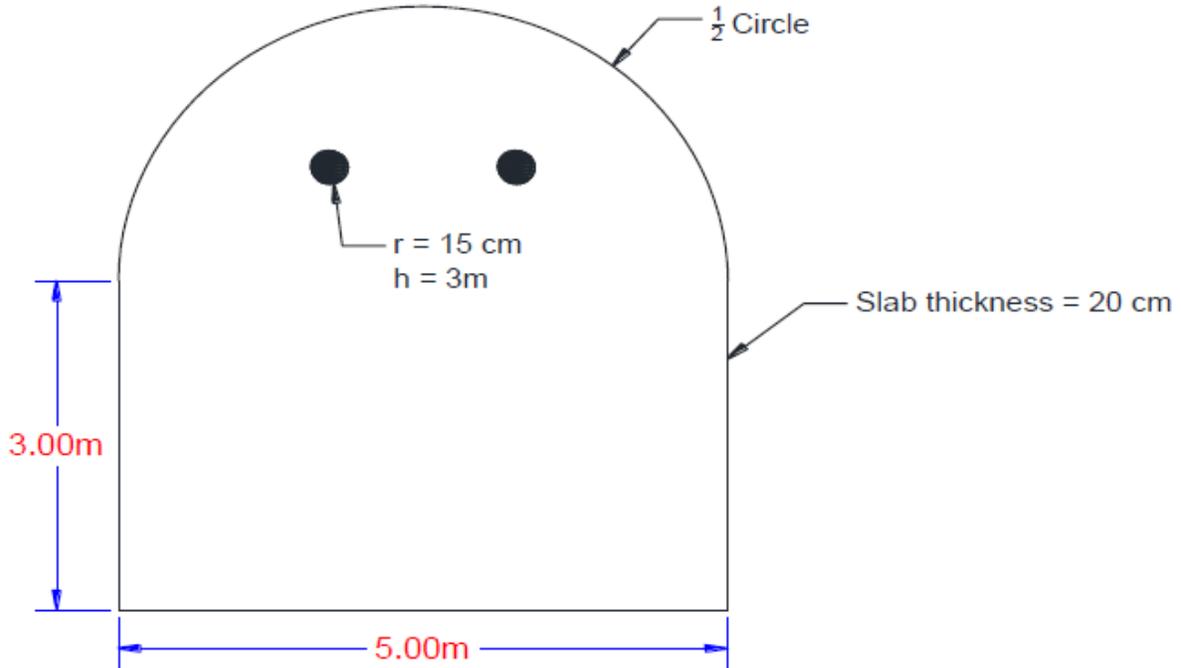
- *Plastering mix = 1:3 (0.02 m thick)
- *Price of one ton of cement = \$130.
- *Price of 1 m³ of sand = \$20
- *Price of one brick = \$1



Q44/For the slab shown, which is supported by two circular columns ($r = 15\text{ cm}$), find the following:

1- Concrete material (1:2:4) for slab & columns.

2- No. of blocks built around the edge of the slab at height = 50 cm & thick = 20 cm.



Q45/Find the volume of concrete (15 cm thick), cement plaster (2 cm thick), and gypsum plaster (2 cm thick) required to construct a hemispherical dome of radius (inner) 5 m.

Q46/From the given figure below calculate the detailed and abstract estimate for the single roomed building (Load bearing type structure) .

Q47/ Design the formwork for an elevated concrete floor slab 152 mm thick. Sheathing will be nominal 25 mm lumber while 50x200 mm lumber will be used for joists. Stringers will be 100x200 mm lumber. Assume that all members are continuous over three or more spans. Commercial 17.8 kN shores will be used. It is estimated that the weight of the formwork will be 0.24 kPa. The adjusted allowable stress for lumber being used are as follows:

<i>Symbols</i>	<i>Sheathing (kPa)</i>	<i>Other Members (kPa)</i>
<i>F_b</i>	7412	8619
<i>F_v</i>	1200	1241
<i>F_{ck}</i>		2792
<i>F_c</i>		5861
<i>E</i>	9.4×10^6	9.7×10^6

Q48/Design the formwork for a slab (180 mm) thick to find (joist, stringers & shores). Sheathing will be nominal (25 mm) lumber while (3x12) in. & (6x12) in. lumber will be used for joists & stringers respectively. Assume all members are continuous over three spans. Shores will be (2.5 m) length & (80x80) mm in cross section. It is estimated that the weight of formwork = 0.4 kPa & live load = 2.6 kPa also assume max/ def. is limited to L/180.

<i>Stresses</i>	<i>Sheathing (kPa)</i>	<i>Members (kPa)</i>
F_b	7550	8800
F_v	1200	1260
E	10^7	11×10^6

**Q49/a crawler tractor weight with the soil 40ton move on road of grade 5%and rolling resistance =100kg/ton according to the following data given for velocity of moving upward in table below. Find grade that the tractor cannot do the job. 20ton,
• engine horse power equal to 250kg.m/sec.**

Gear	Velocity
1	3.2
2	4.1
3	5.5
4	6.2
5	7
6	11

Q50/bulldozer move a distance of 60m with a velocity of 2.4km/hr and return back with 5.6km/hr if its blade was of dimension ($x=1$, $L=3$)and swelling =25%.find the production of bulldozer.

Q51/find the production of bulldozer for these data:

- **Blade=**
- **$L=2.9m$**
- **$x=0.9m$**
- **Distance =30m**
- **velocity (travel time)=4km/hr**
- **velocity (return time)=6km/hr**
- **swelling factor =25%**
- **fixed time = 0.35min**

Q52/Estimate the hourly production in loose volume (LCM) of a 2.68- m^3 wheel loader excavating sand and gravel (average material) from a pit and moving it to a stockpile. The average haul distance is 61 m, the effective grade is 6%, the bucket fill factor is 1.00, and job efficiency is 50 min/h.

Q53/Find the expected production in LCM/h of a small hydraulic excavation with the bucket capacity of 0.57 m^3 . The excavation will be done in firm soil. The average and maximum depths of cut are 4.3 m and 6.1 m respectively. The average swing angle is 60 degree. Assume that the earthwork has excellent job and management conditions.

Q54/Find the expected production in LCM/h of a hydraulic shovel equipped with a front-dump bucket having 2.3 m^3 volume. The excavation will be done in common earth. Assume that both job and management conditions are good, and the average swing angle is 75 degrees.

Q55/Find gradability of a crawler tractor pulling a rubber tired loaded scraper using the following data:-

- Horse power =180hp
- Available pull=14ton
- Scraper weight=40ton
- Tractor weight =20.5ton
- Rolling resistance of tractor =73kg/ton
- Rolling resistance of scraper =100kg/ton.

Q56/a shovel bucket capacity =1.72m³ try to load a truck in loose measure with soil to be taken to the destination place using the following data obtain the production of shovel and no. of trucks needed.

Shovel data	Truck data
Distance traveled=50m	Distance traveled =25km
Forward speed =50m/mint	Forward speed =40 km/hr
Return speed =80m/mint	Return speed=60 km/hr
Fixed time =0.375min	Fixed time =10.5 mint
Swelling =25%	

Q57/A wheel –tractor pullig a scraper of 5m³ capacity filling with soil $\gamma = 18kn/m^3$ moving on a road of 7% grade if the following data were given .find out whether the tractor can do the job??

- Hp of tractor =300hp speed =10km/hr eff.=80% R.R.T.R R.R.sc=90kg/ton
- wt .tr=15ton wt.sc=25ton empty

Q58/for awll (20*20*0.24)m find cement sacks needed and the amount of sand if mix was (1:3).

Q59/ estimate the amount of reinforcement in 1m³ of the concrete slab shown below:

Thickness of slab is 15 cm

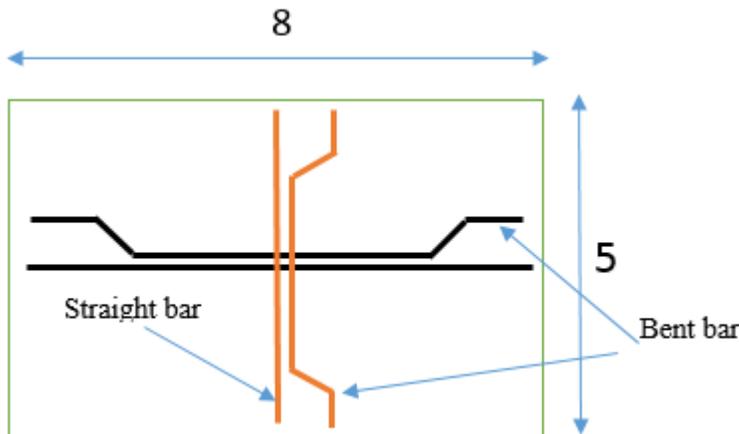
2. Mix design (1:2:4)

3. Available length of steel bar=6m

4. Reinforcement;

1. \varnothing 12mm @15cm c/c both direction one straight one bent alternatively

2. \varnothing 10 mm @30cm c/c additional bars

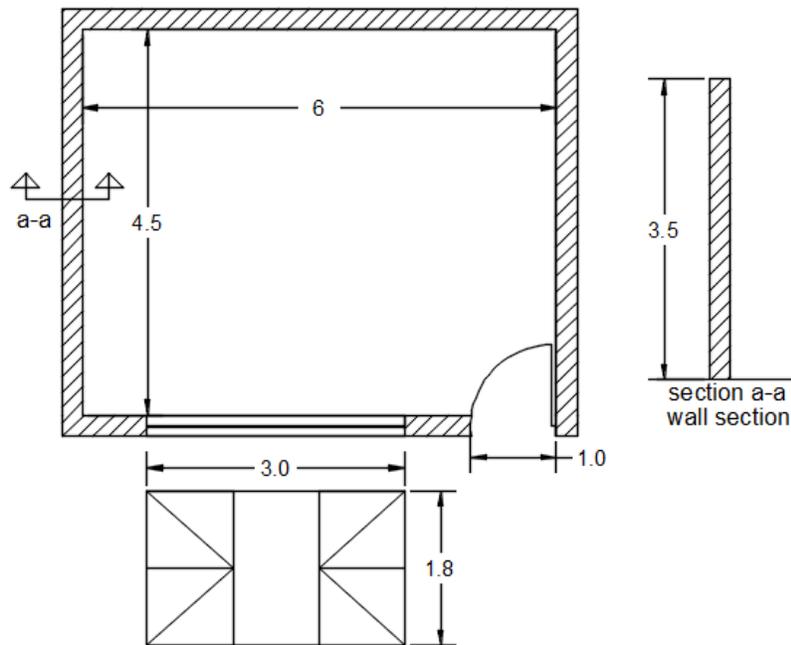


Q60/ for the room shown find:

1.volume of plastering

2.no. of cement sacks needed if mix proportion 1:3

3. cost of material only if 1 ton cement cost 110\$, 1m³ sand cost =16\$

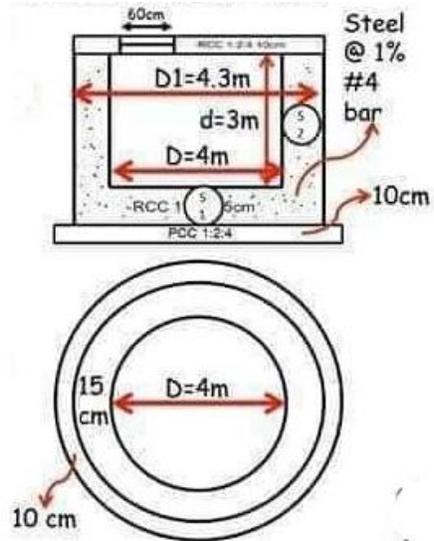


Q61/Forms are being designed for a wall 3.8 m high to be poured at rate of greater than 3.1 m/hr at 40 °C. Sheathing will be (28.5) mm actual thick. Class 1 Plyform with face grain across support, def. = L/180. Determine studs spacing only assuming (3 spans).

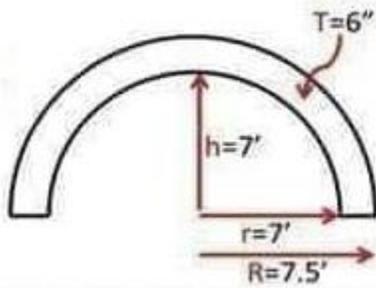
Q62/Forms are being designed for a 2.44 m wall high concrete wall to be poured at a rate of 1.219 m/h, internally vibrated, at a temperature of 32° C. The concrete mixture will use Type I cement without retarders and is estimated to weight 2203 kg/m³. Sheathing will be 1.2x2.4 m sheets of 19 mm thick plywood with face grain perpendicular to studs. Studs double wales will be 50x100 mm lumber. Snap ties are 13.34 kN capacity with 38 mm-wide wedges bearing on wales. Bracing will be 50x100 mm lumber placed *as shown in the figure below*. Assume that local code wid requirements are less stringent than Table 13-3. Deflection must not exceed l/360. Determine stud, wale, and tie and brace spacing. Use plywood section properties and lumber section properties from.

Q63/prove that the derivation equation for 1m length of steel bar equal $D^2/162.27$..where D in (mm).

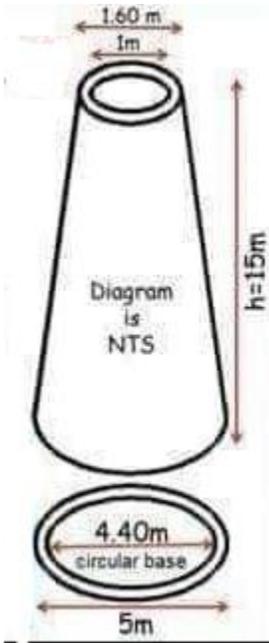
Q64/work out cement, sand and steel quantity for given water tank



Q65/workout cement ,sand steel quantity for given spherical dome .concrete 1:2:4,and steel is %1.5 as # 4 bar also calculate external surface plastering.



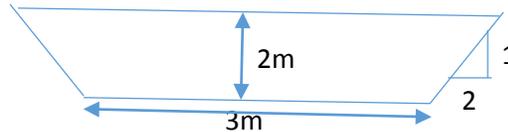
Q66/calculate brick quantity for chimney brick that given below



Q67/what will be the design load for a column (5m)high which is to be filled with concrete.

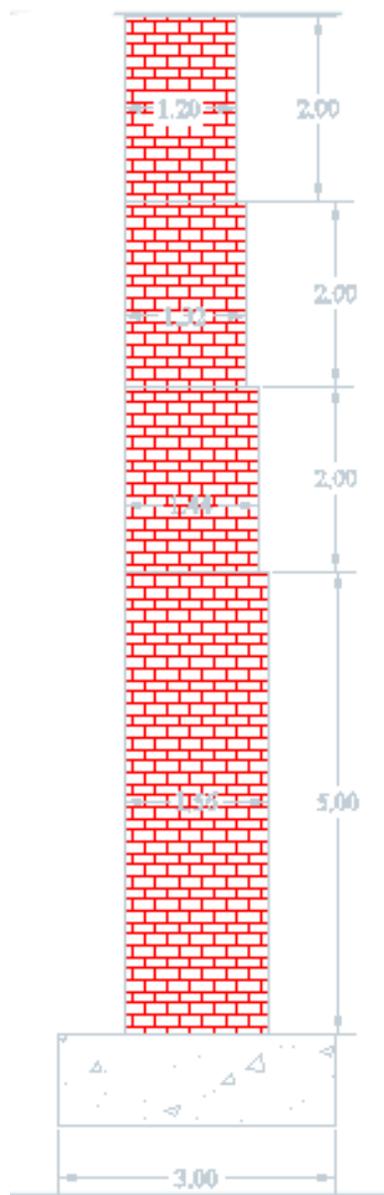
Q68/A 700m length irrigation canal required lining by concrete (1:3:6)910cm thick calculate the cost of the job for the following data :

1. price of cement = \$100/ton
2. price of sand & gravel = \$10/m³
3. 8 workers needed each \$10/ay
4. production = 1195 m²/day

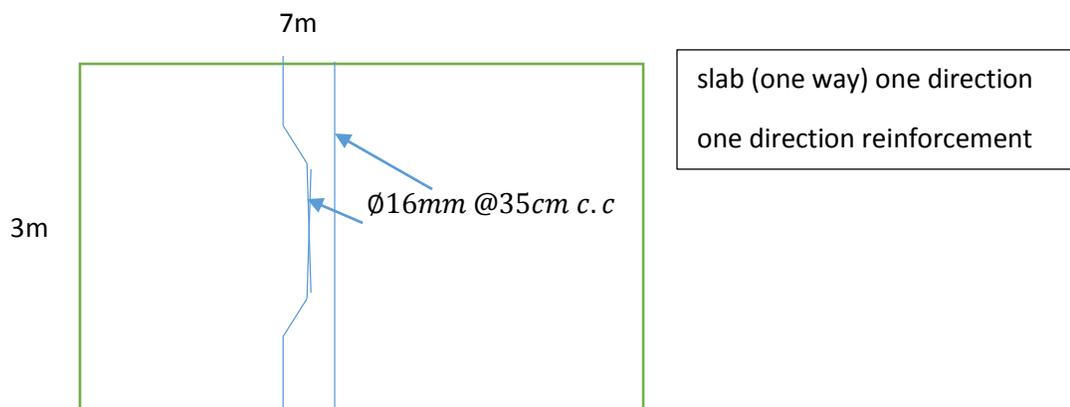


Q69/for the 100m retaining wall shown ,find the following

1. footing concrete
2. brick work



Q70/for the plan shown find the amount of steel in kg (slab thick = 20cm)



Q71/A wheel truck loaded with 2m³ sand of 2000kg/m³ unit weight try to move upward on a slope road of 7% grade and 80kg/ton .R.R it has the following data

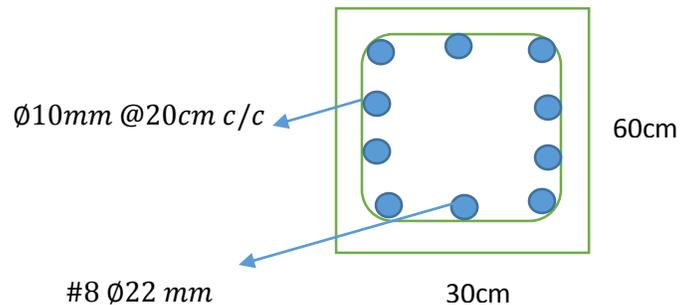
Own weight =20ton Horse power =200hp speed=6km/hr

Can it be loaded by additional load? If yes what will be its amount using eff.=85%

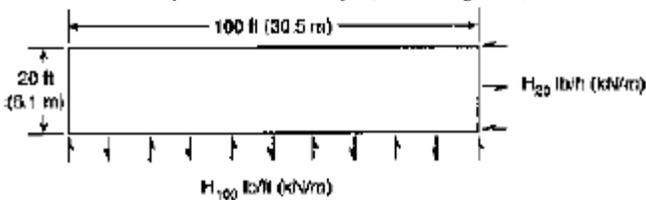
Q72/explain briefly bulb stress theory concerning compactor job (use sketches)

Q73/ its required to give pull of 5450 to move on 6% grade Rolling resistance =36kg/ton find maximum pull available and maximum speed.

Q74/find the amount of steel reinforcement /1m³ of 3m high column as shown below

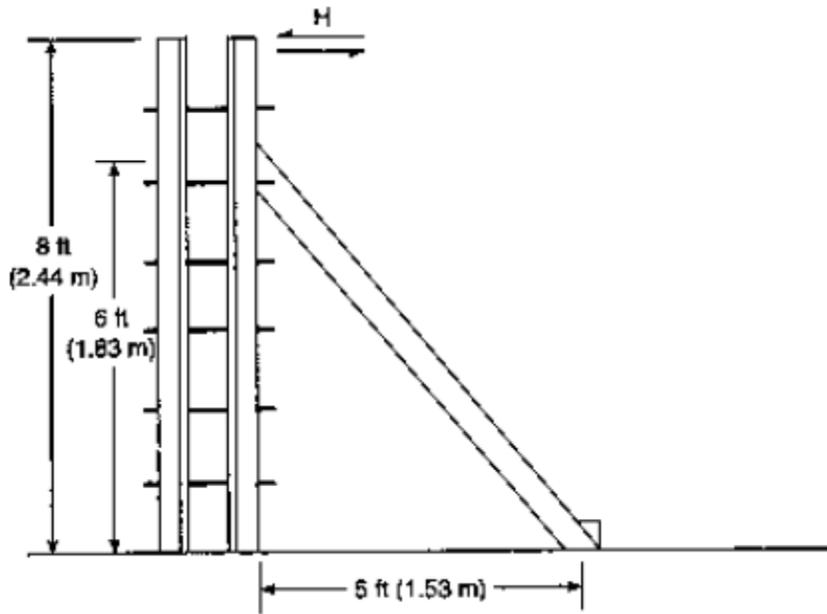


Q74/ Determine the design lateral force for the slab form 6 in. (152 mm) thick, 20 ft (6.1 m) wide, and 100 ft (30.5 m) long shown in Figure 13–5. The slab is to be poured in one pour. Assume concrete density is 150 lb/cu ft (2403 kg/m³) and that the formwork weighs 15 lb/sq ft (0.72 kPa).

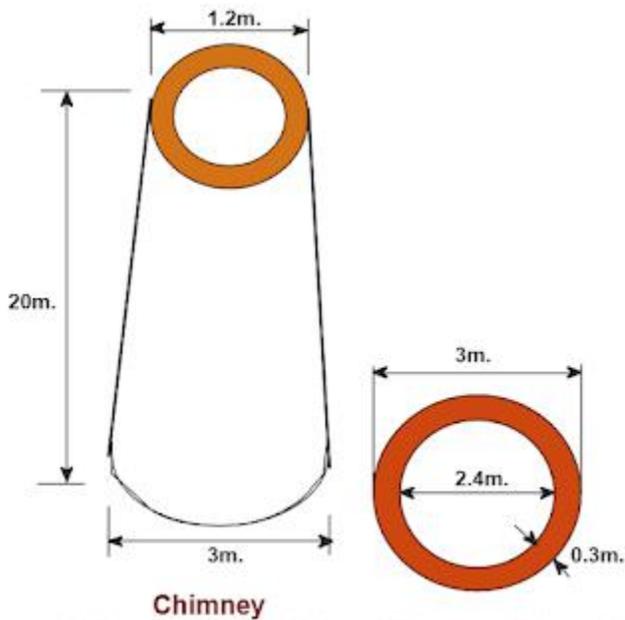


Q75/ Determine the maximum spacing of nominal 2 # 4-in. (50 # 100-mm) lateral braces for the wall form of Example 13–2 placed as shown in Figure 13–4. Assume that local code wind requirements are less stringent than Table 13–3. Allowable stress values for the braces are as follows.

Symbols	Lumber for lateral braces (kPa)
-	-
F_c	5861
F_t	4999
E	9.7×10^6



Q76// calculate volume of brick for chimney brick that given below:



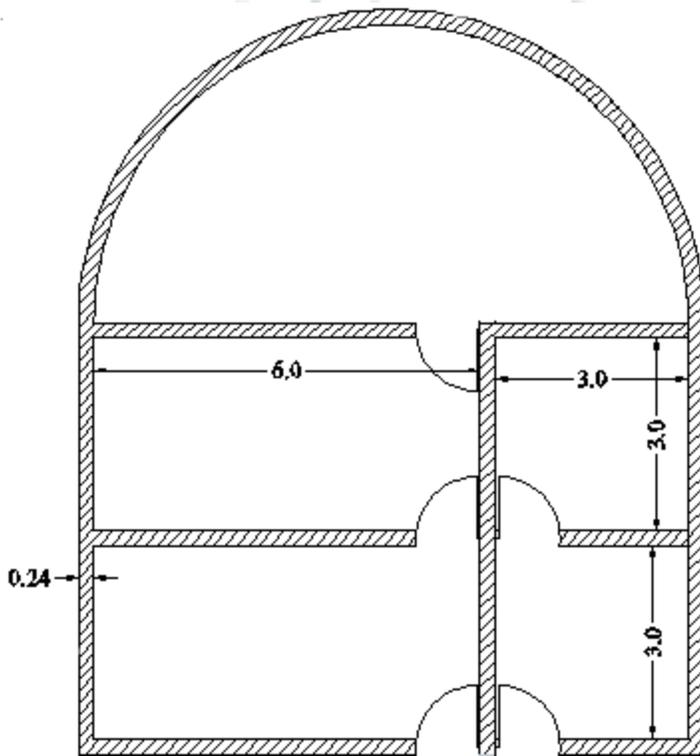
Q77/ for the plan shown find the following:

1. Concrete material for footing (width=94cm, height=25cm),(1:2:4)
2. Volume of excavated soil (height =80cm)

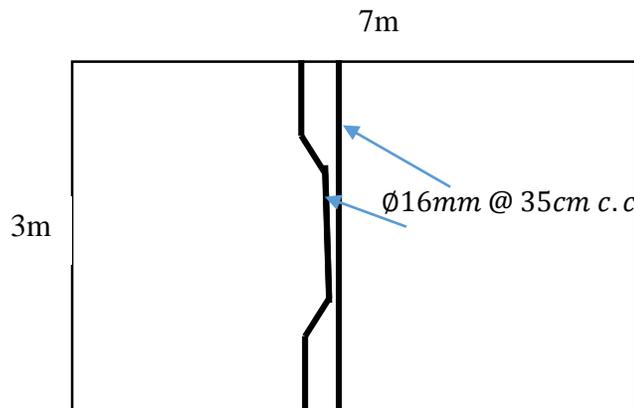
3. No. of cement sack for slab (1:3:6) (thickness =15cm)
4. Brick No. for wall (height=2.9m)
5. Interior plastering (kg gypsum)
6. Exterior plastering mix design (1:3)

All dimensions in meter

5 Door=(1*2.1)m



Q78//for the plan shown find the amount of steel in kg (slab thick. =20 cm)



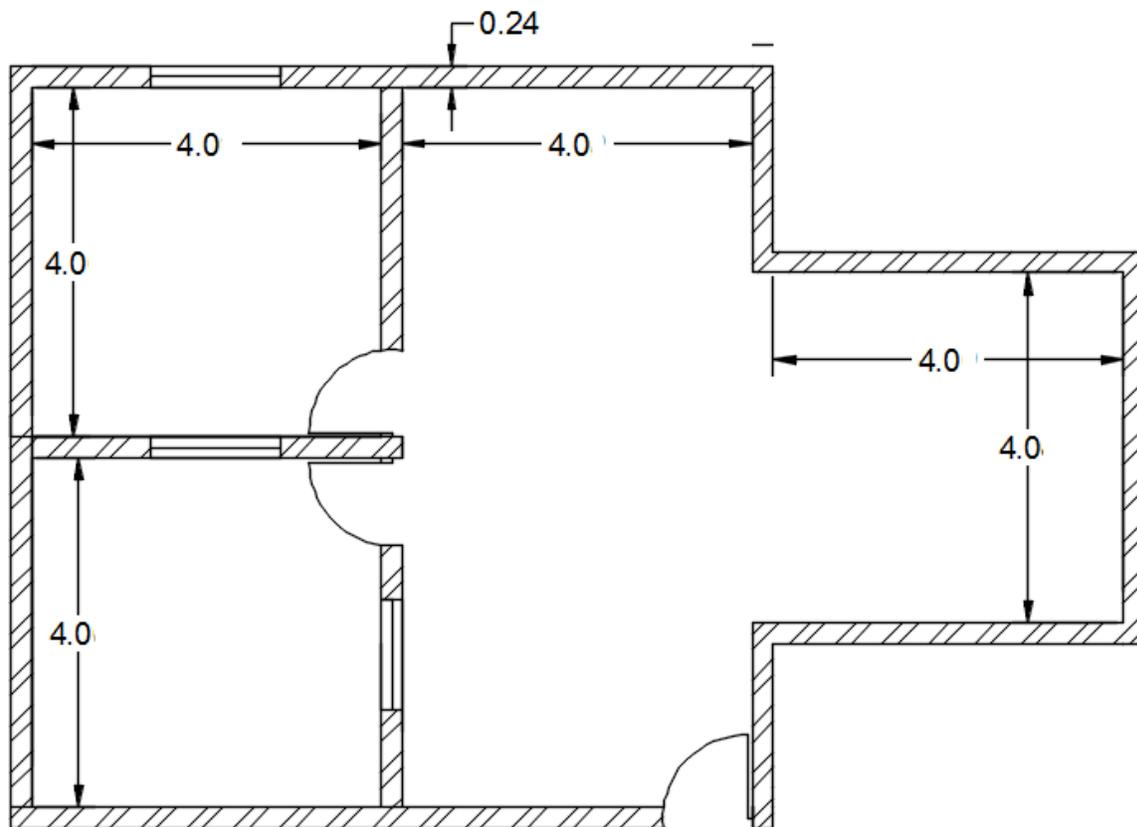
slab (one way)

one direction reinforcement

Q79/

for the plan shown find the following (use long wall short wall method)

1. length of footing (width = 90cm)
2. internal plastering in kg
3. Amount exterior plastering (wall height = 3.0m)(1:3)
4. No of bricks used for wall
5. Volume of concrete slab.



3 Door = 1*2.1

3 window = 1.5*1.5

All dimension in meter

Assume any missing data

Q₈₀/25marks /

find the gradability of **rubber-tired** tractor pulling a **crawler scraper** if the following data were given:

Tractor weight = **20ton** with pull of **10 ton**

Scraper weight = **40ton**

Rolling resistance of tractor = **80 kg /ton**

Rolling resistance of scraper = **95kg/ton**

Q81/

find the amount of steel reinforcement / 1m^3 for (**2 column**) of **3 m** height as shown below. Then find **No. of cement sack** for concrete material (**1:2:4**) for both columns.

