N19-00186

TED (15) – 5014

(REVISION — 2015)

Reg. No. .....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019

QUANTITY SURVEYING - II

[*Time* : 3 hours

(Maximum marks : 100)

[*Note* :— 1. Missing data may be assumed.
2. Sketches are accompanied.
3. Quantities to be worked out in standard format.]

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Write the length of a common rafter in terms of the eave span, when the rise of the roof is ¼ spans.
2. Differentiate between culvert and bridge.
3. What are the two types of specifications for various items of work ?
4. Define the term sinking fund.
5. Define value. (5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Work out the quantity of R.C.C work 1:2:4 in cover slab over the septic tank, shown in figure II.
2. Calculate the quantity of first class brick work in cement mortar 1:4 for the walls of the septic tank shown in figure II.
3. Calculate the quantity of R.C.C work 1:2:4 for stem and base slab for the cantilever retaining wall shown in figure III. Length of retaining wall 30m.
4. Calculate the brickwork in 1:4 cement mortar for abutments and wing walls for the slab culvert of span 1.5m and 4m roadway, shown in figure IV.
5. Write the detailed specification for plastering with cement mortar 1:4.
6. Write the methods of calculating depreciation and explain any two methods.
7. List out the purpose of valuation. (5×6 = 30)

Marks

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

III (a) Workout the quantity of brickwork in c m 1:6 for superstructure for a given building shown in figure I. 8

(b) Workout the quantity of wood work, frames for doors, windows and ventilators for a given building shown in figure I. 7

OR

IV (a) Work out the quantity of plastering inside and outside of walls with c.m 1:5 for a given building shown in figure I. 8

(b) Calculate the quantity of RCC 1:2:4 for roof slab and sunshade in given building shown in figure I. 7

UNIT — II

V (a) Work out the quantity of steel work for using stem, in a given retaining wall shown in figure III. Length of retaining wall 30m. 8

(b) Work out the quantity of steel work for using base slab in a given retaining wall shown in figure III. Length of retaining wall 30m. 7

OR

VI (a) Work out the quantity of earth work in foundation for given slab culvert of span 1.5m and 4m road way, shown in figure IV. 8

(b) Workout the quantity of cement concrete 1:3:6 in foundation for given slab culvert of span 1.5m and 4m roadway shown in figure IV. 7

UNIT — III

VII (a) Prepare a detailed estimate of RCC and steel bars for the R.C.C slab (clear span 3m×6m), 1:2:4 mixes shown in figure V providing hooks for steel bars and side cover 40mm. 8

(b) Prepare bar bending schedule for the above slab in standard format. 7

OR

VIII (a) Write the detailed specification for earth work excavation for foundation. 8

(b) Write the detailed specification for pointing with cement mortar. 7

UNIT — IV

IX Define the terms :

(i) Outgoings (iv) Market value

(ii) Scrap value (v) Book value

(iii) Salvage value (5×3= 15)

OR

X (a) The sinking fund amount of a building is estimated to ₹ 50,000 whose future life is 20 years. Find out the yearly installment of sinking fund, which should be set aside @ 5%. 8

(b) The total cost of a new building is 2,00,000. Workout the depreciated cost of the building after 20 years by straight line method. If the scrap value is ₹ 20,000, Assuming the life of the building is 80 years. 7

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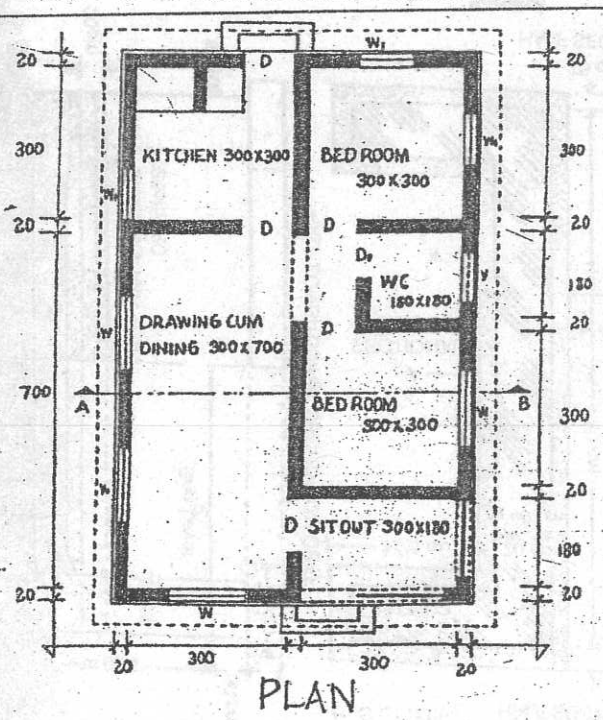


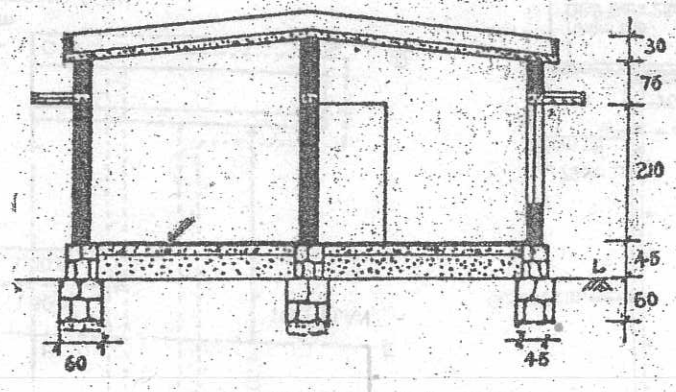
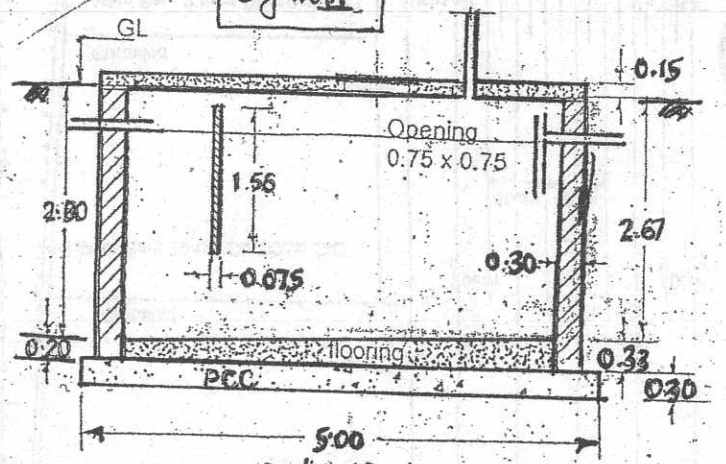


figure I

figure II

CI cover 0.85 x 0.85 x 0.05



SPECIFICATIONS

FOUNDATION - R.R IN CM 1:8 , 60 x 60 C.M.	WINDOWS - W 150 X 150 , FULLY GLAZED.
BASEMENT - R.R IN CM 1:8, 45 x 45 C. M.	W1 100 X 150 "
WALLS - B.W IN CM 1:6 , 20 C.M. THICK.	VENTILATOR - V 100 x 50 "
LINTEL - R.C.C. 1:2:4 , 15 C.M. THICK.	PLASTERING - INSIDE & OUTSIDE WITH CM 1:5.
ROOF - R.C.C 1:2:4 , 10 C.M. THICK.	CEILING 1:3
DOORS - D 100 X 210 , FULLY PANELLED.	FLOORING - C.C. FLOORING WITH 1:4 CM PLASTERING
D1 80 X 210 "	

SCALE : 1: 100 **Dimensions are in CM** **PLINTH AREA : 74.32 m²**

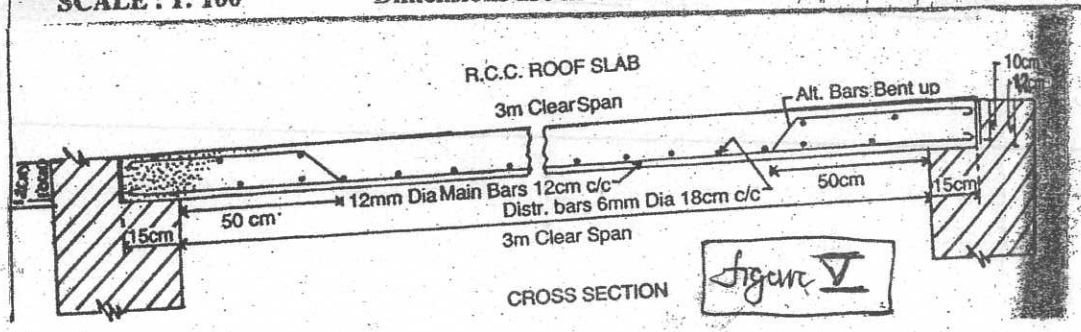
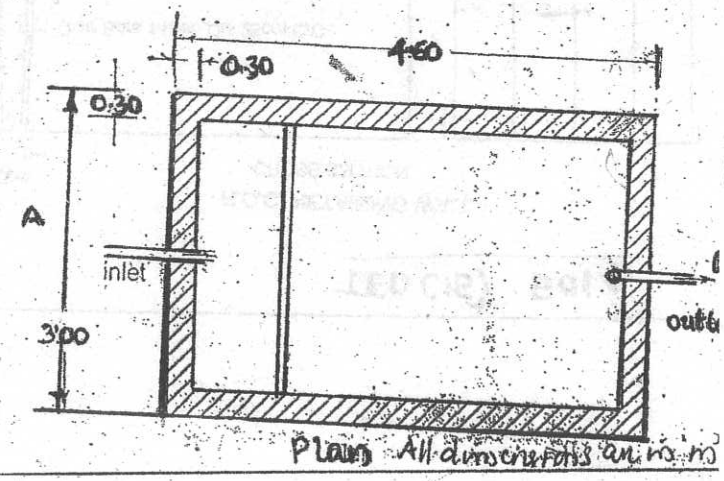


figure V



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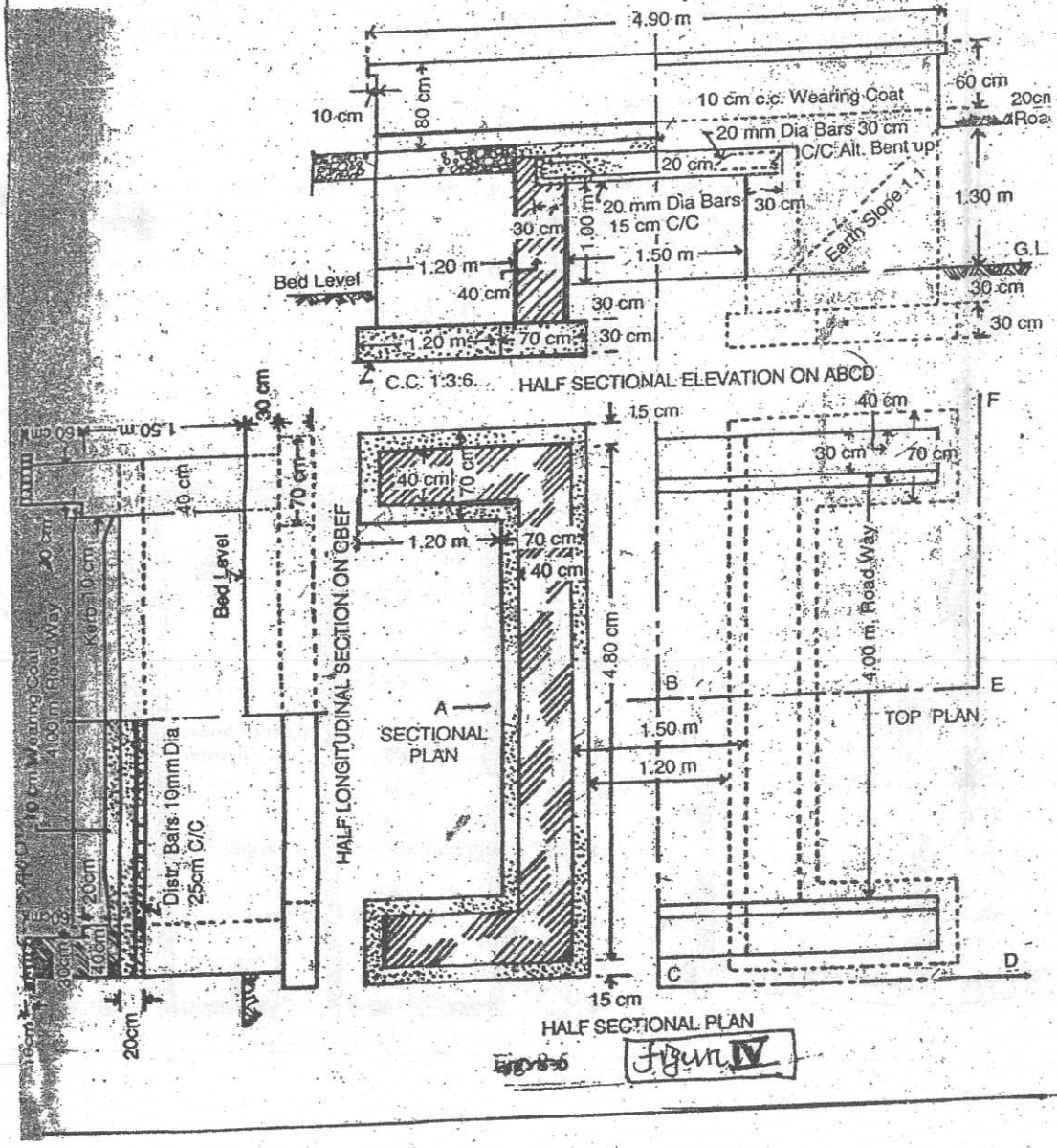

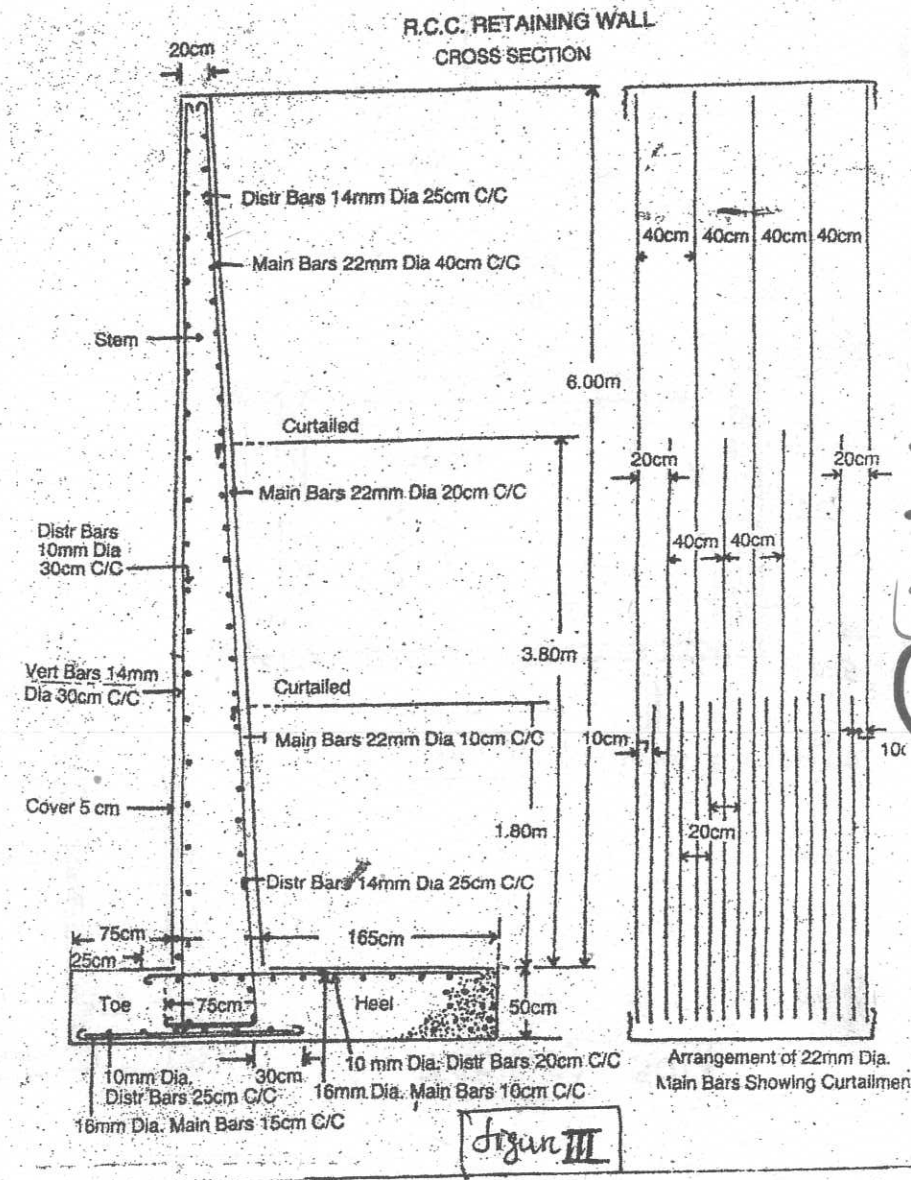

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SCHEME OF VALUATION

Revision 2015 Course Code 5014

Course Title: - Quantity Surveying II.

Qst No	Scoring indicator	Split up Score	Sub Total	Total.
	PART A (Max mark 10)			
I i)	0.56 S, when S is the eave span	2+1	2	
I ii)	When the linear water way is upto 6m, it is a culvert and those with linear water way above 6m, are classified as Bridges.	1+1	2.	
I iii)	a) General / Bnry Specifications and b) Detailed specification	1+1	2.	
I iv)	The fund which is gradually accumulated for the sole purpose of replacement or reconstruction of the building or structure at the end of its useful life.	2	2	
I v)	Value means its worth or utility. Value varies time to time and depends largely on the supply of that particular type of property and the extent of the demand for it.	2	2	10
	PART B. (Max mark 30). Answer any five questions (5x6=30)			
II i)	R.C.C. work for 1:2:4 in Cover Slab. $1 \times 4.60 \times 3.00 \times 0.15 = 2.07 m^3$ Say $2.1 m^3$	2+2+2	6	
	$l \times b \times h$ — 1 - 2. b - 2 Ans 2.			

II ii) Brickmasonry in cement mortar 1:4, for the walls.

Longwalls $2 \times 4.60 \times 0.30 \times 3 = 8.28$ 2

Shortwalls $2 \times 2.40 \times 0.30 \times 3 = 4.32$ 2

$12.6\ m^3$ 2

OR

C/C $= (4.3 + 2.7) 2 \times 0.30 \times 3 = 12.6 m^3$ 6

II iii) R.C.C work 1:2:4 for Cantilever retaining wall

Base slab $1 \times 30.00 \times 3.00 \times 0.50 = 45.00$ 2

Stem $1 \times 30.00 \times \frac{0.6+0.2}{2} \times 6.00 = 72.00$ 2

Total $= 117.00\ m^3$ 2 6.

II iv) Brickwork in 1:4 cement mortar

Abutments $2 \times 4.80 \times 0.40 \times 1.50 = 5.76$ 2

Wingwalls $4 \times 1.20 \times 0.40 \times 1.50 = 2.88$ 2

$8.64 m^3$ 2 6.

II v) Specifications for plastering with cement mortar

The joints of brickwork shall be raked, washed and kept before plastering. Materials should be dry mix Standard specifications. The mortar materials should be dry mixed, first and then water added slowly to get a through mix

The thickness of plastering shall be as specified and applied in one or two coats. First mortal shall be dashed and pressed over the surface

by means of float and trowel.

Plastering shall be started from top and worked downs. The plastered surfaces shall be kept wet for 10days. The surface should be protected from rain, sun, etc. 6x1 6.

II vi) Methods of calculating depreciation

a straight line method.
b. Constant percentage method or Declining balance method
c. Sinking fund method.
d Quantity survey method. 4x1/2=2.

a) Straight line method.

In this method the property is assumed to lose value by a constant amount every year and thus a fixed amount of original cost is written off every year so that at the end of the term when the asset is worn out, only the scrap value remains.

Let C = original cost Sc Scrap value
n = Age of the property in years
D = Annual depreciation by straight line method.

$$\text{Annual depreciation} = \frac{(\text{original cost} - \text{Scrap value})}{\text{Age in years}}$$

$$D = \frac{C - Sc}{n}.$$

b) Constant percentage method or declining balance method.

In this method the property is assumed to lose value annually at a constant percentage of its value. (or book value)

Let p = Percentage rate of annual depreciation for the constant percentage method expressed in decimal.

C = original cost Sc = Scrap value

n = Life of the property in years.

The end of 'n' years value of the property becomes ultimately the scrap value.

$$Sc = C(1-p)^n.$$

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

The above formula does not hold good when the scrap value, Sc is zero.

c) Sinking fund method

In this method the depreciation is assumed to be annual sinking fund plus the interest of the accumulated sinking fund till that year

Annual sinking fund to provide for Rs 1/- in n years $= \frac{i}{(1+i)^n-1} - x.$

Where i = rate of interest expressed in decimal. at which sinking fund account is required to be invested.

ex) An amount of Rs 1/ per annum is 'n' years. $= (1+i)^n-1 = y.$

Rate of depreciation in 'n' years xy.

d) Quantity survey method.

In this method the property is studied in details and extent of physical deterioration worked out in an endeavour to calculate depreciation. 2x2=4 6.

II

vii) Purpose of valuation

1) Purchase for investment or for occupation.
2) Taxfixation.
3) Sale.
4) Rent fixation.
5) Insurance premium. 6) Security of Loans or mortgage value. (7) Compulsory acquisition.
8) Speculation 9) Betterment charges.
10) wealth tax and estate duty
11) Gift-tax (12) Probate (13) Partition.
14) Assessment of income or stamp fees.
15) Capital gains tax. 6x1=6 6. 42

III

UNIT I PART C

a) Brickwork in cm 1:6 for superstructure.

Outter wall	1 x 33.60 x 0.20 x 2.70	= 18.14
Long cross wall	1 x 10.20 x 0.20 x 3.00	= 6.12
Short cross wall	4 x 3.00 x 0.20 x 2.85	= 6.84
Cross wall w/c	1 x 2.00 x 0.20 x 2.85	= 1.14
Parapet outer Sun side	1 x 38.00 x 0.10 x 0.10	= 0.38
Parapet roof	1 x 35.20 x 0.10 x 0.30	= 1.06
Chimney, Side wall	1 x 1.00 x 0.20 x 2.85	= 0.57
Top	1 x 5.20 x 0.20 * 1.20	= 1.25

Steps I footing		$2 \times 1.80 \times 0.60 \times 0.15 = 0.32$
II footing		$2 \times 1.20 \times 0.30 \times 0.15 = 0.32$
	Total	$36.14 m^3$

Deduction for openings

Doors	D	$5 \times 1.00 \times 0.20 \times 2.10 = 2.10$
	D_1	$1 \times 0.80 \times 0.20 \times 2.10 = 0.34$
Windows	W	$4 \times 1.50 \times 0.20 \times 1.50 = 1.80$
	W_1	$3 \times 1.00 \times 0.20 \times 1.50 = 0.90$
Ventilators	V	$1 \times 1.00 \times 0.20 \times 0.50 = 0.10$
Sitout		$1 \times 2.60 \times 0.20 \times 2.10 = 1.09$
		$1 \times 1.40 \times 0.20 \times 2.10 = 0.59$
Lintel outer wall		$1 \times 33.60 \times 0.20 \times 0.15 = 1.01$
Long cross wall		$1 \times 10.20 \times 0.20 \times 0.15 = 0.31$
Short cross wall		$4 \times 3.00 \times 0.20 \times 0.15 = 0.36$
Cross wall w/c		$1 \times 1.80 \times 0.2 \times 0.15 = 0.05$
Beam		$1 \times 5.60 \times 0.2 \times 0.15 = 0.17$
	Total	$8.82 m^3$

Net brick masonry $= 27.32 m^3$ 8 8

III

(b) ~~Supporting and~~ Frame works for doors, windows and vent lators.

Horizontals	D	$5 \times 1.20 \times 0.10 \times 0.08 = 0.05$
	D_1	$1 \times 1.00 \times 0.10 \times 0.08 = 0.01$
	W	$(4 \times 2) \times 1.70 \times 0.10 \times 0.07 = 0.10$
	W_1	$(3 \times 2) \times 1.20 \times 0.10 \times 0.07 = 0.05$

	V	(1x2) x 1.20 X 0.10 x 0.07 = 0.02				
	Verticals D	(5x2) X 2.15 X 0.10 X 0.08 = 0.17				
	D_1	(1x2) x 2.15 X 0.10 X 0.08 = 0.03				
	W	(4x4) X 1.50 X 0.10 X 0.07 = 0.17				
	W_1	(3x3) X 1.50 X 0.10 X 0.07 = 0.09				
	V	(1x3) X 0.50 X 0.10 X 0.07 = 0.01				
		Total	0.70m³	7	7	15
		OR				
IV a)	Plastering inside and outside of walls with CM1:5.					
	Drawing cum Dining room	1 x 20.00 X 2.85 = 57.00				
	Bedroom and kitchen	3 x 12.00 X 2.85 = 102.60				
	Latrin	1 X 7.20 X 2.85 = 20.52				
	Conidor	1 X 4.20 X 2.85 = 11.97				
	Stout	1 x 9.60 X 2.85 = 27.36				
	Chimney Sidewall	1x 2.20 X 2.85 = 6.27				
	Inside	1x 4.40 X 1.20 = 5.28				
	Outside	1 x 6.00 X 1.20 = 7.20				
	Outer face of wall	1 x 34.40 X 2.85 = 98.04				
	parapet Sunshade	1x 38.00 X 0.40 = 15.20				
	Roof	1 x 35.20 X 0.80 = 28.16				
	Steps, top	2 X 1.80 X 0.60 = 2.16				
	Front	2 x 1.80 X 0.30 = 1.08				
	Sides	4 X 0.60 X 0.30 = 10.72				
		Total	388.56m²			

Deductions

Openings at sitout

	2x 2.80 x 2.10 = 11.76	
	2x 1.60 x 2.10 = 6.72	
D	5 x 1.00 x 2.10 = 10.50	
D_1	1 x 0.80 x 2.10 = 1.68	
W	4 x 1.50 x 1.50 = 9.00	
V	1 x 1.00 x 0.50 = 0.50	
Total deductions		$40.16 m^2$

Area of plastering = 383.56 − 40.16

$= 343.40 m^2$ 8 8

IV

(b) R.C.C 1:2:4 for roof slab and Sunshade.

Roof slab 1 x 10.90 x 6.90 x 0.10 = 7.52

$7.52 m^3$

Sunshade 1 x 36.20 x 0.45 x 0.075

$= 1.22 m^3$ 7 7 15

UNIT II

V(a) Steel bars including bending in reinforcement.

for Stem

Right side.

22mm dia bars :-

22mm dia main bars @ 40cm c/c full height 76 x 7.53 = 572.28kg

No = $\frac{30 - \text{covers}}{0.40} + 1 = 76$ Nos

22mm dia main bars upto 3.6m ht @ 40cm c/c. 75 x 5.13 = 384.75kg

No = $\frac{29.90 - 2x0.20}{40} + 1 = 75$ Nos.

22mm dia main bars up to 1.8m ht @ 20cm c/c (remaining bars)

$No = \frac{29.90 - 2 \times 0.10}{.20} + 1 = 150 Nos.$

$150 \times 3.33 = 499.5$

Total of 22mm dia bars.

1456.53m

@ 2.98 kg = 4340.4 kg.

14mm dia bars.

14mm dia distributing bars

right side of stem @ 25cm c/c.

$No = \frac{6.50 - 0.05 - 0.07}{0.25} + 1 = 27 Nos.$

$27 \times 31.52 = 851.04$

14mm dia vertical bars

left side of stem @ 30cm c/c

$No = \frac{30 - 10}{.80} + 1 = 101 Nos.$ $101 \times 6.63 = 669.63m$

Total 1520.67m.

1520.67 @ 1.21 kg = 1840 kg

10mm dia bars.

10mm dia distributing bars.

left side stem @ 30cm c/c.

$No = \frac{6.5 - 0.05 - 0.07}{0.3} + 1 = 22 Nos.$

$22 \times 31.06 = 687.28m$

687.28 @ 0.62 = 426.11 kg

8 8

V

(b) Base slab.

10mm dia distributing bars at bottom (Toe) @ 25 c/c.

$$No = \frac{(0.75+0.6+0.3)-0.05}{0.25} + 1$$

7 x 31.06 = 217.42m

10mm dia distributing bars at top (Heel) @ 20 cm c/c.

$$No = \frac{(1.56+0.60+0.25)}{0.20} + 1$$

= 13 Nos

13 x 31.06 = 403.78.

621.2m.

Total

621.2 @ 0.62 = 385.14 kg

16 mm dia bars

16mm dia main bars at bottom (Toe) @ 15cm c/c.

$$No = \frac{30-0.10}{0.15} + 1 = 200$$

200 x 1.89 = 378 m

16 mm dia main bars at top (Heel) @ 10 cm c/c.

$$No = \frac{30-0.10}{0.10} + 1 = 300 Nos$$

300 x 2.74 = 822

1200m

Total

1200 @ 1.58 = 1896 kg

7 7 15

OR

VI (a) Earth work excavation in foundation

Abutments	$2 \times 5.10 \times 0.70 \times 0.60 = 4.28$			
Wingwalls	$4 \times 1.20 \times 0.70 \times 0.60 = 2.02$			
Total	$6.30 m^3$	4+4	8	

VI (b) Cement concrete 1:3:6 in foundation.

Abutments	$2 \times 5.10 \times 0.70 \times 0.30 = 2.14$			
Wingwalls	$4 \times 1.20 \times 0.70 \times 0.30 = 1.01$			
Total	$3.15 m^3$	$3\frac{1}{2} \times 2$	7	15

VII

UNIT III

a) 1) R.C.C work 1:2:4 excluding steel and its bending but including centering and shuttering and binding steel.

$1 \times 6.30 \times 3.30 \times 0.12 = 2.495$

$2.495 m^3$

2) Steel bars including bending (mild steel) in RCC work.

Main bars 12mm dia @ 0.89 kg/m.

Straight bar 24cm c/c.

$No = \frac{6.30 - 0.08}{0.24} + 1$

$= 27$

Bent up bars $No = 6.30 - 0.08 / 0.24 = 26.$

$27 \times 3.44 = 92.88$

$26 \times 3.52 = 91.52$

$184.40 m$

$184 @ 0.89 = 164.12 kg$

Distribution bars 6mm dia @ 0.22kg/m.

Bottom bars Central portion 18cm c/c.

No = $\frac{2.00}{0.18} + 1 = 12$ $\quad 12 \times 6.33 = 75.96$

Bottom bars two sides $\quad 2 \times 3 \times 6.33 = 37.98$

Top bars two sides $\quad 2 \times 3 \times 6.33 = 37.98$

151.92m

151.92 @ 0.22 = 33.42kg $\quad$ 8 $\quad$ 8

VII (b) Barbending schedule.

Description of bars	Shape of bending dimensions in cm	Length of each m	No	Total length m	Weight kg.
Main straight bars 12mm dia.	322cm	3.44	27	92.88	
Main bent up bars 12mm dia	161 | 200 cm. | 61	3.52	26	91.52 184.40 m	164.12 kg
Bottom distributing bars. 6mm dia.	622	6.33	18	113.94	
Top distributing bars. 6mm dia.	622	6.33	6	37.98. 151.92	33.42 kg

OR

VIII @ The detailed specifications for earth work in excavation for foundation.

Main points:- Excavation methods.
- Finish of trench.
- Funds during excavation.

	- Water in foundations - Trench sides refilling. - Measurement considering lead and lift values - Excavation in saturated soils	8×1	8	
VIII (b)	Main points – Surface finishing including raking of joints. - Standards for materials. - Dry mixing of mortar first and then mixing of water - Application of mortar at joints and finishing. - Curing of pointed surfaces. - Different types of pointing	7×1	7	15
IX	UNIT IV a) Outgoings :- These are the expenses which are required to be incurred to maintain the revenue of the building. Various types of are, Taxes, amount for repairs, management and collection charges, sinking fund, loss of rent, miscellaneous items etc. b) Scrap value :- It is the value of the dismantled materials. For buildings, when the life is over, at ~~its~~ the ends of its utility period, the dismantled materials will fetch a certain amount and is known as Scrap value. For machines it is the value of the metal part. c) Salvage Value :- It is the value at the ends			

of the utility period, without being dismantled It does not include the cost of removal, sale etc. It is the value of the property, as it is in the present condition.

d) Market value :- It is the amount ~~shown in~~ which can be obtained at any particular time, from the open market if the property is put for sale. The market value will differ from time to time, according to the demand and supply. Also it may change from time to time for various reasons such as changes in industry, fashions, means of transport cost of materials and labour etc.

e) Book value :- It is the amount shown in the account book, after allowing necessary depreciations. The book values of a property at a time, is the original cost minus the amount of depreciation up to the previous year. It will be gradually reduced year to year and after the utility period, becomes the scrap value. 5x3 15 15

OR

X a) Coefficient of sinking fund

$$y_c = \frac{i}{(1+i)^n - 1} = \frac{0.05}{(1+0.05)^{20} - 1}$$

$$= 0.0302$$ 4

Yearly instalment of sinking fund

$$y = F \times y_c$$

$$= 50,000 / \times 0.0302$$

$$= \underline{1510/-}$$ 4 8

X(b) Annual depreciation by straight line method.

$$= \frac{\text{Original cost} - \text{Scrap value}}{\text{life is n years.}}$$

$$= \frac{2,00,000/- - 20,000/-}{80}$$

$$= 2250/-$$ 2½.

Depreciation for 20 years $= 20 \times 2250 = 45000/-$ 2½

Depreciated cost of the building after 20 years.

$= 2,00,000/- - 45000/-$

$= 1,55,000/-$ 2 7 15