TED (15) – 6011

(REVISION — 2015)

Reg. No.....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

STRUCTURAL AND IRRIGATION ENGINEERING DRAWING

[*Time* : 3 hours

(Maximum marks : 100)

[*Note* :—1. Use of steel tables are permitted.

2. Missing data if any may be suitably assumed.

3. A2 size drawing sheet to be supplied.

4. Drawings shall be neat and fully dimensioned.

5. Answer one full question from each unit.]

UNIT — I

Marks

I An R.C.C beam is reinforced with 7 Nos. of 16mm diameter bars in which 3 Nos. are in compression zone and 4 Nos. are in tension zone it is provided with 10mm diameter stirrups at 200mm c/c. The size of the beam is 300 × 500 mm and clear span is 5000 mm. The thickness of wall is 300mm.

Draw : (a) Longitudinal sectional elevation. 15

(b) Cross section of the beam at centre and support. 10

OR

II An R.C.C. cantilever beam resting in R.C.C. column of size 0.30 × 0.45 m of reinforcement of 6 nos. of 16 mm diameter bars. The bearing in column is 0.45m. The size of the beam is 0.30 × 0.60 m at fixed end and 0.30 × 0.30m at free end. Main reinforcement 16mm diameter 4 nos. and compression reinforcement 12mm diameter 2 nos. Two legged stirrups 8mm diameter @ 200mm c/c are provided.

Draw : (a) Longitudinal section of the beam. 15

(b) Cross section at free end and fixed end. 10

UNIT — II

III (a) An R.C.C. elevated water tank has following specifications :

Height of tank above ground level to the bottom of water 9.8 m

Inner dimensions of the tank: 4500 × 4500 × 1500 mm

Thickness of side walls and bottom slab 200 mm

Size of column: 400 × 400 mm

Size of beams : 400 × 300mm

Spacing of beams : 3000 mm

Depth of R.C.C. footing below ground level: 1000 mm

Size of footing: 1500 × 1500 mm

Thickness of footing at column face : 450 mm

Thickness of footing at end : 150 mm

Draw : (a) The sectional elevation showing all the details 15

(b) Plan 10

OR

Marks

IV The details of dog legged stair are given below :

Room Size : 5000 × 2200 mm

Height of room: 2900 mm

Wall thickness: 230 mm

R.C.C. Landing slab thickness: 125 mm

R.C.C. Waist slab thickness: 150 mm

Clear width of landing: 1000 mm

Provide necessary tread, rise, footing and reinforcement.

Draw : (a) The longitudinal sectional elevation 15

(b) Plan 10

UNIT — III

V A Battened column has the following details.
Column : ISLC 150 × 30 mm placed back to back keeping a clear distance of 125 mm between the webs. The column is provided with batten system. The sizes of end battens are 180 × 12 mm and intermediate battens are 150 × 12 mm spacing between the consecutive battens 450mm c/c.

Draw : (a) Elevation 15

(b) Plan 10

OR

VI Two steel beams mutually intersects the details given below :

Main beam ISLB 500 @ 750N/m (or 500 × 200 × 10mm)

Secondary beam ISLB 300 @ 372N/m (or 300 × 120 × 8mm)

Cleat (web) angle 2 × ISA 90 × 90 × 8 mm

Flange angle 2 × ISA 100 × 75 × 8 mm

Main beam cover plate 250 × 10mm

16mm diameter rivets provided suitably.

Draw : (a) Connection showing main beam in section. 15

(b) Connection section showing secondary beam in section. 10

UNIT — IV

VII A masonry dam having the following particulars :

Foundation bottom level + 75.00m

Foundation level + 75.00

River bed level + 87.50m

Maximum water level + 138.00m

Full reservoir level + 137.00m

Top level of dam + 139.00

Width of top crest 6.00m, depth of PCC 0.30m

Bottom width of dam 185.36m

Marks

Upstream side

Vertical between levels + 125.00m and 139.40m.

Tapering 1 in 9 between levels + l01.00m and + 125m

Tapering 1 in 6 between levels + 75.00 and + 101.00m

Downstream side

Curved portion between levels + 125.00m and 139.40m

Tapering 1 in 1.4 between levels + l01.00m and + 125.00m

Tapering 1 in 1 between levels + 75.00m and + 101.00m

Irrigation sluice

Low level sluice 2.10 × 4.20m, sill level + 101.00m

Upper level of sluice 3.15 × 4.80m, sill level + 116.00m

Drainage gallery size 1.50 × 2.25m

Drainage gutter 300 × 300mm

The main portion of the dam is built with stone masonry in cement mortar 1:4 and Impervious facing is with cement concrete 1:2:4 thickness 0.30m.

All missing data assume suitably.

Draw the cross section showing all details. 25

OR

VIII A tank sluice with tower head has the following details.

Thickness of foundation 400mm

Full tank level + 37.00m

Maximum water level + 38.00m

Revetment level + 38.50m

Bund top level + 40.00m

Tail channel level + 34.00m

Branch bund top level + 35.00m

Still basin top level + 35.5m

Main bund top width 2.50m

Side slope 1 in 2 on both faces

Tower head well: Masonry wall 0.40m thick diameter 1.20 m

Rectangular barrel 1.00 × 0.60m

Barrel foundation PCC 1:4:8 0.40 m thick

Still basin 2.50 × 4.50 m

Length of bed 25.50m

All missing data assume suitably

Draw : (a) Longitudinal section. 15

(b) Sectional plan through barrel. 10

(9)

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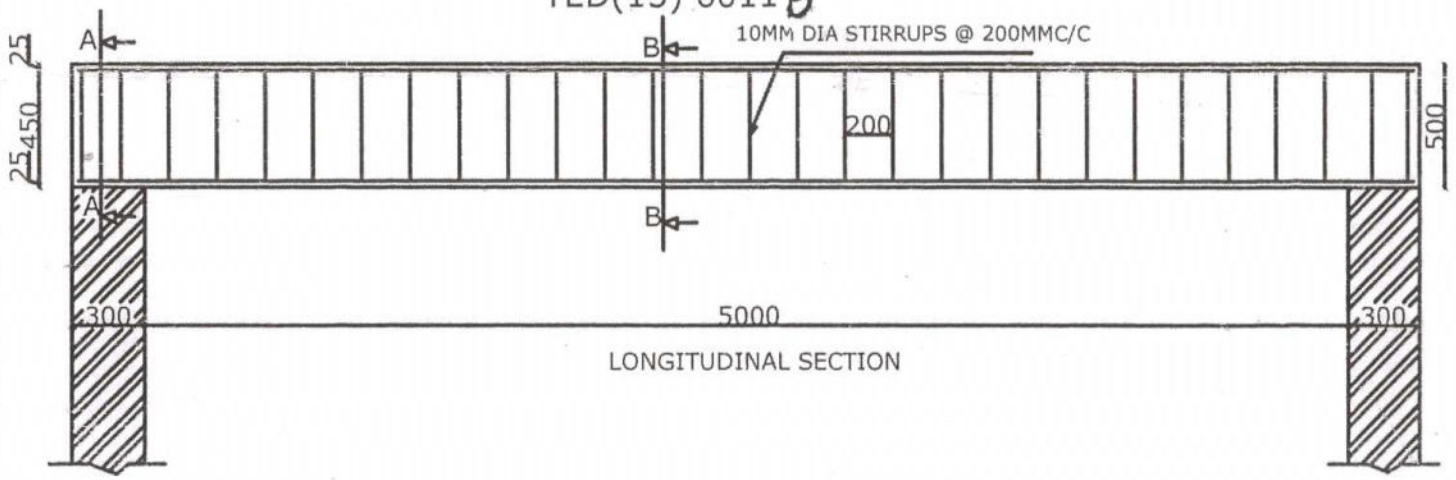
SCHEME OF VALUATION

STRUCTUAL & IRRIGATION ENGINEERING DRAWING

TED(15) 6011 B

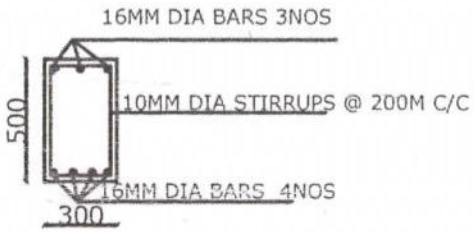
I (a)



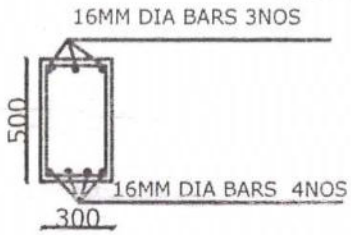
LONGITUDINAL SECTION

CORRECT DRAWING-8
DIMENSIONING-2
NEATNESS-1
REINFORCEMENT DETAILS-4

I (b)



CROSS SECTION AT CENTRE(B-B)



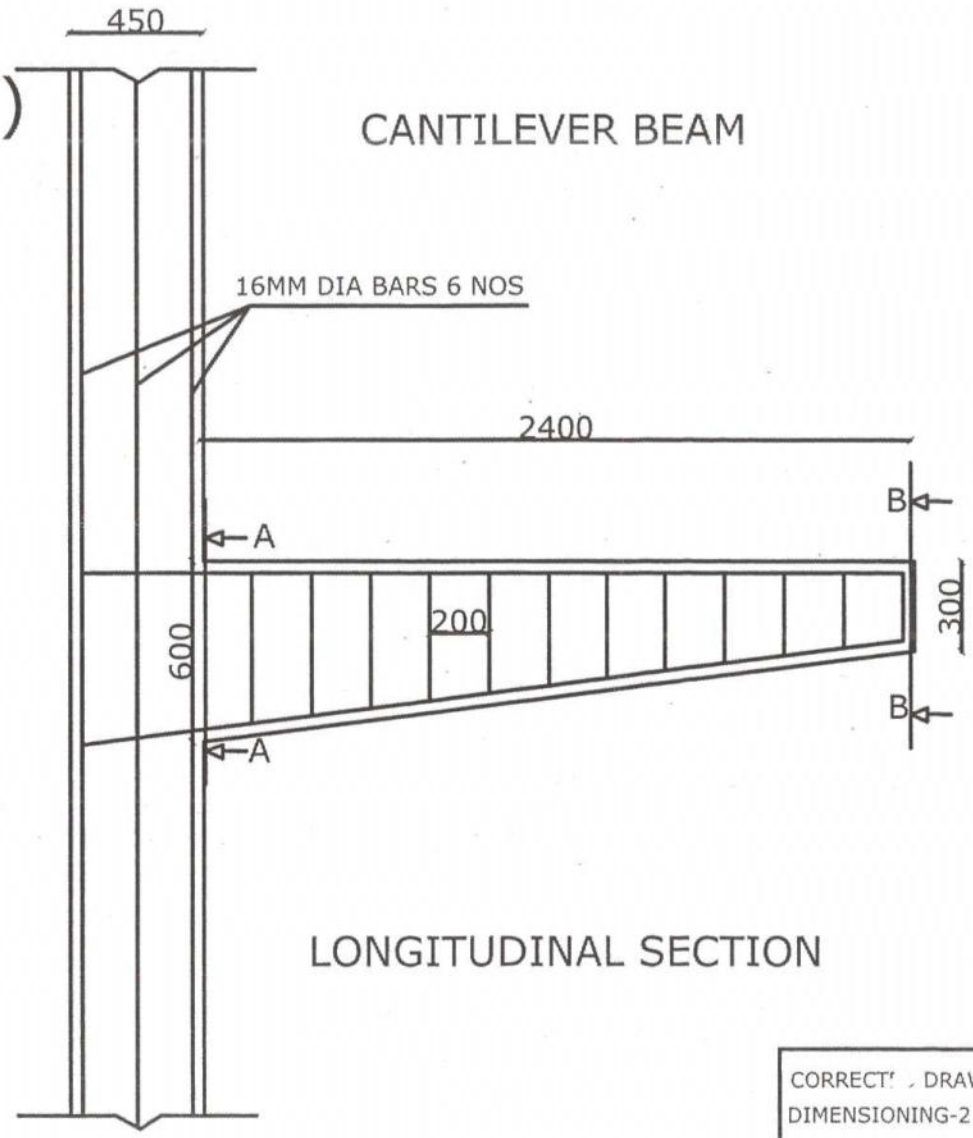
CROSS SECTION AT SUPPORT (A-A)

SIMPLY SUPPORTED DOUBLY REINFORCED BEAM

CORRECT DRAWING-6
DIMENSIONING-1
NEATNESS-1
REINFORCEMENT DETAILS-2

II (a)

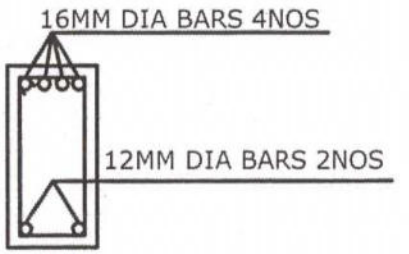
CANTILEVER BEAM



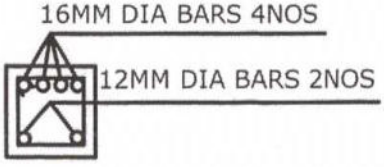
LONGITUDINAL SECTION

CORRECT	DRAWING-8
DIMENSIONING-2	
NEATNESS-1	
REINFORCEMENT DETAILS-4	

II (b)



CROSS SECTION AT SUPPORT(A-A)

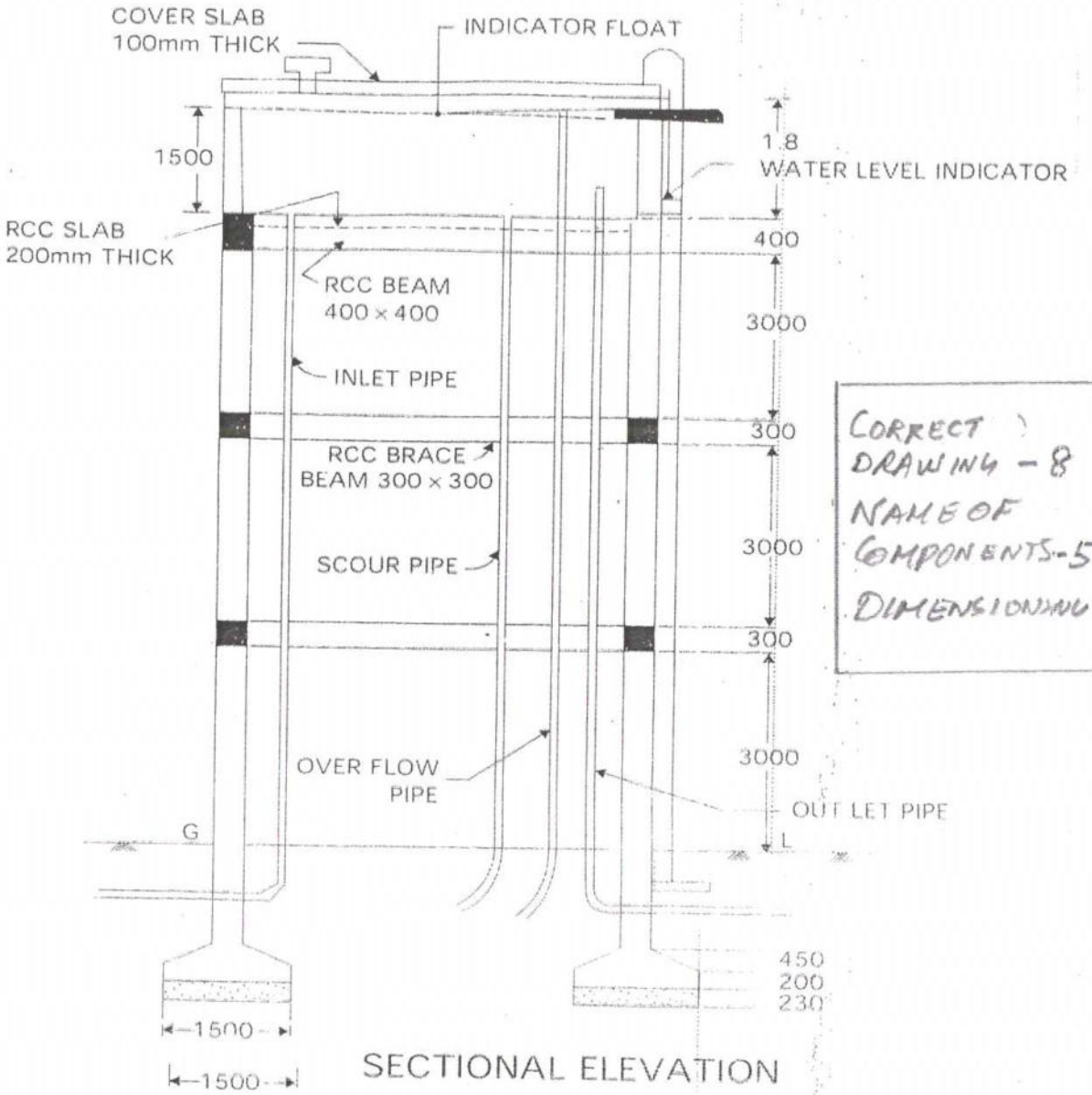


CROSS SECTION AT FREE END (B-B)

CORRECT	DRAWING-6
DIMENSIONING-1	
NEATNESS-1	
REINFORCEMENT DETAILS-2	

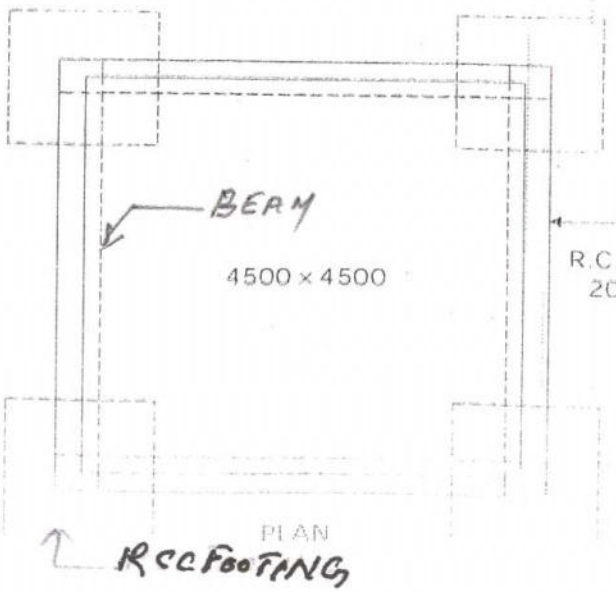
III

R.C.C ELEVATED WATER TANK



SECTIONAL ELEVATION

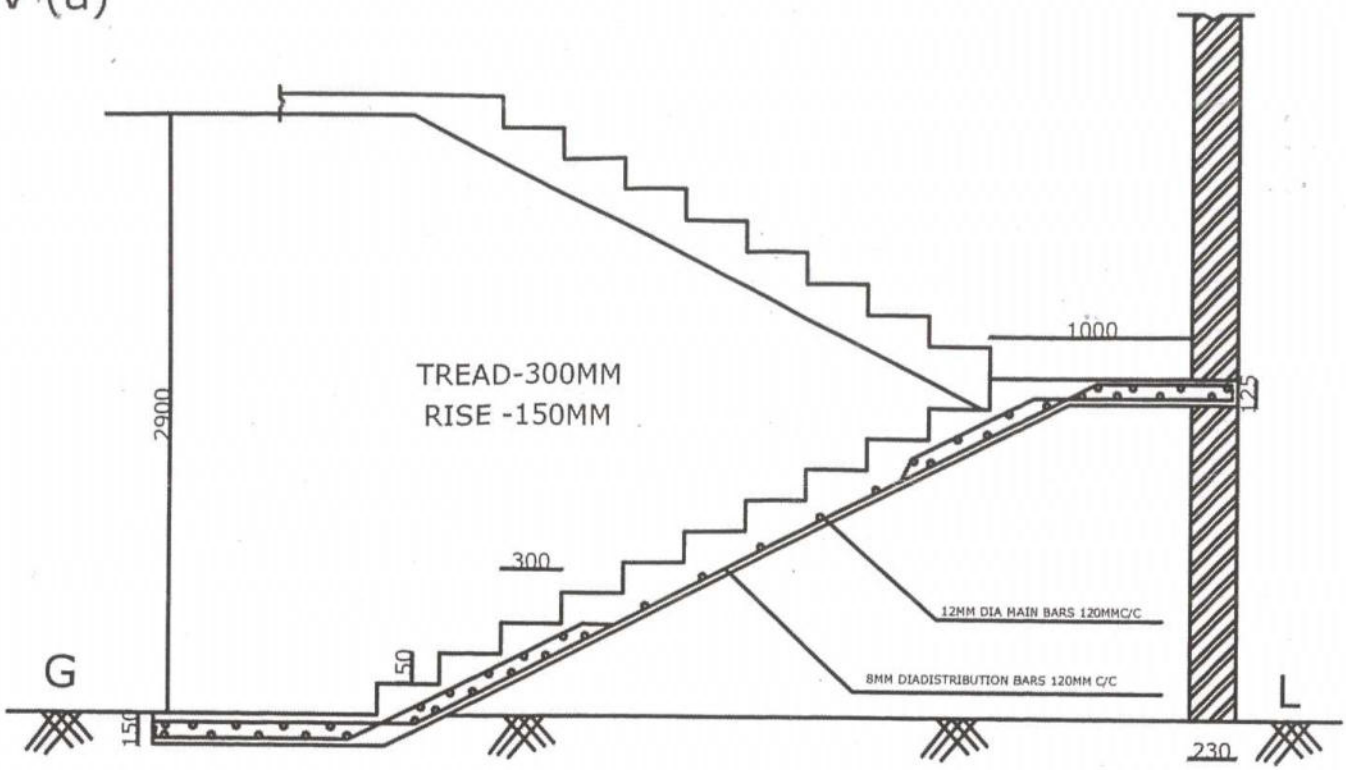
CORRECT
DRAWING - 8
NAME OF
COMPONENTS-5
DIMENSIONING-2



CORRECT:
DRAWING - 8
NAME OF
COMPONENTS 2

DOG LEGGED STAIR CASE

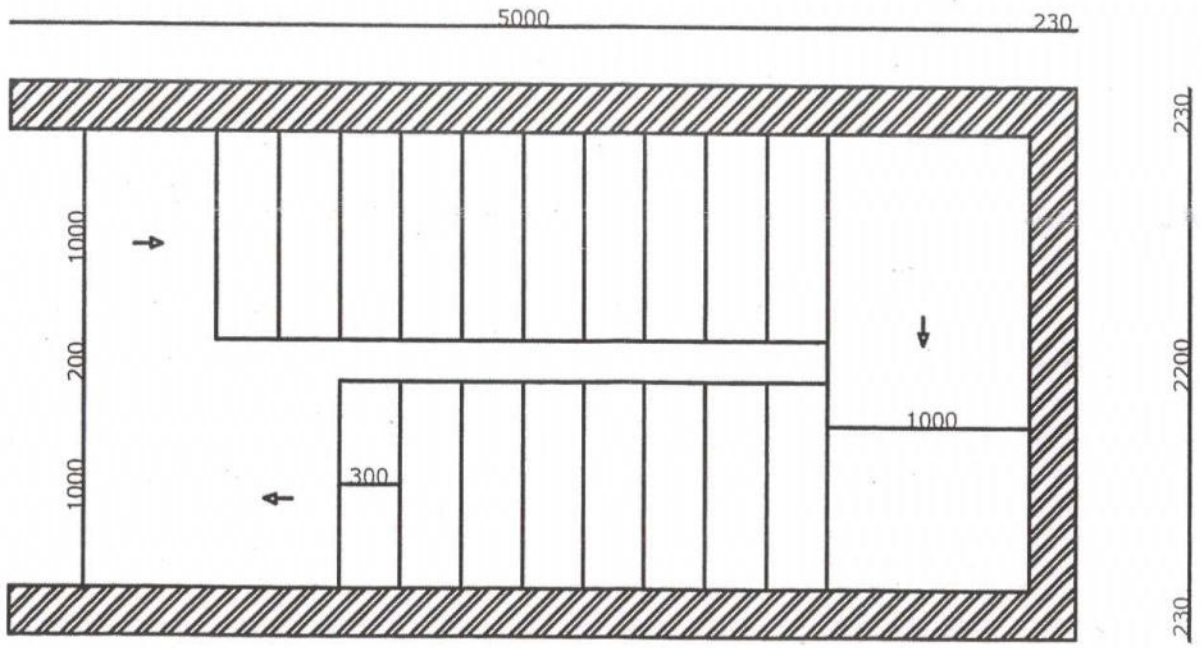
IV (a)



LONGITUDINAL SECTION

CORRECTI	DRAWING-8
DIMENSIONING-2	
NEATNESS-1	
REINFORCEMENT DETAILS-4	

IV (B)



PLAN

CORRECT	DRAWING-6
DIMENSIONING-3	
NEATNESS-1	

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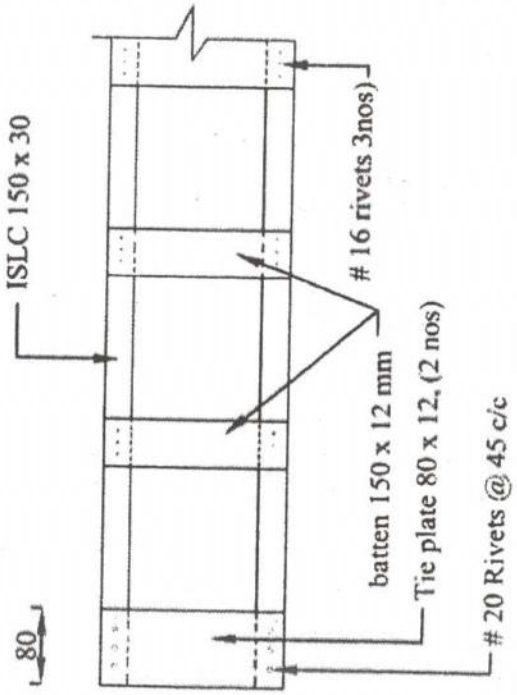
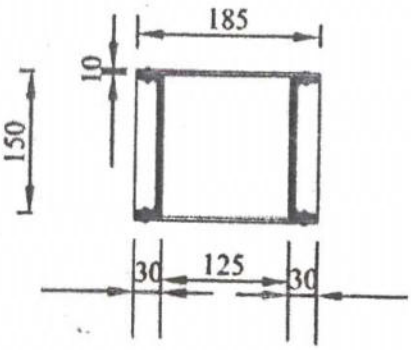
V

a)



b)



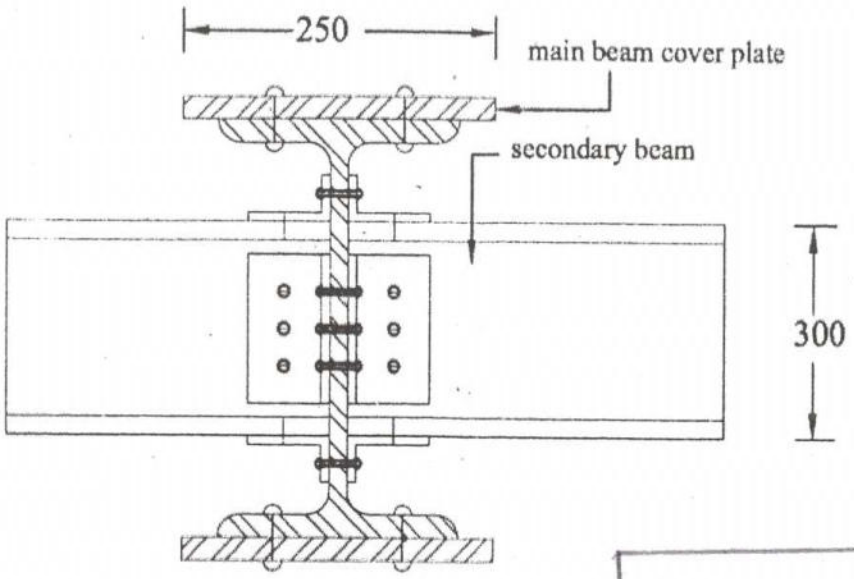
BATTENED STEEL COLUMN

CORRECT DRAWING - 10
NAME OF COMPONENTS - 3
DIMENSIONING - 2

CORRECT DRAWING - 8
DIMENSIONING - 2

VI

a)

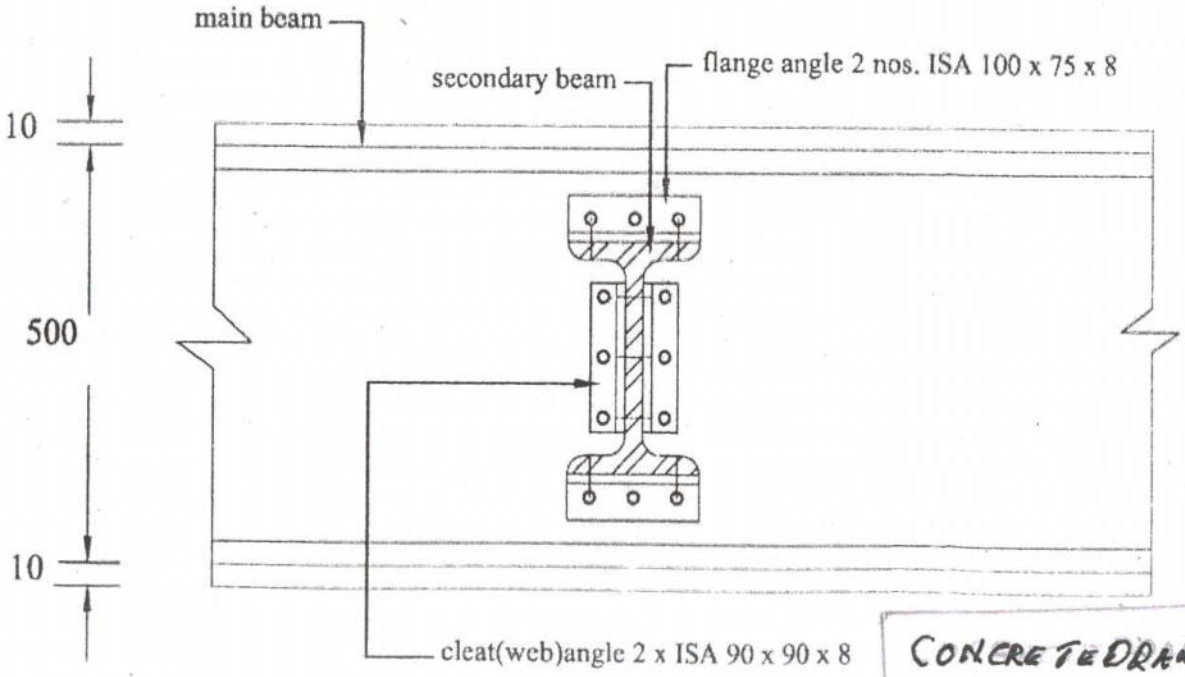


CONNECTION SHOWING

C/S OF MAIN BEAM

CORRECTED
DRAWING - 10
DIMENSIONING - 3
NAME OF COMPONENTS - 2

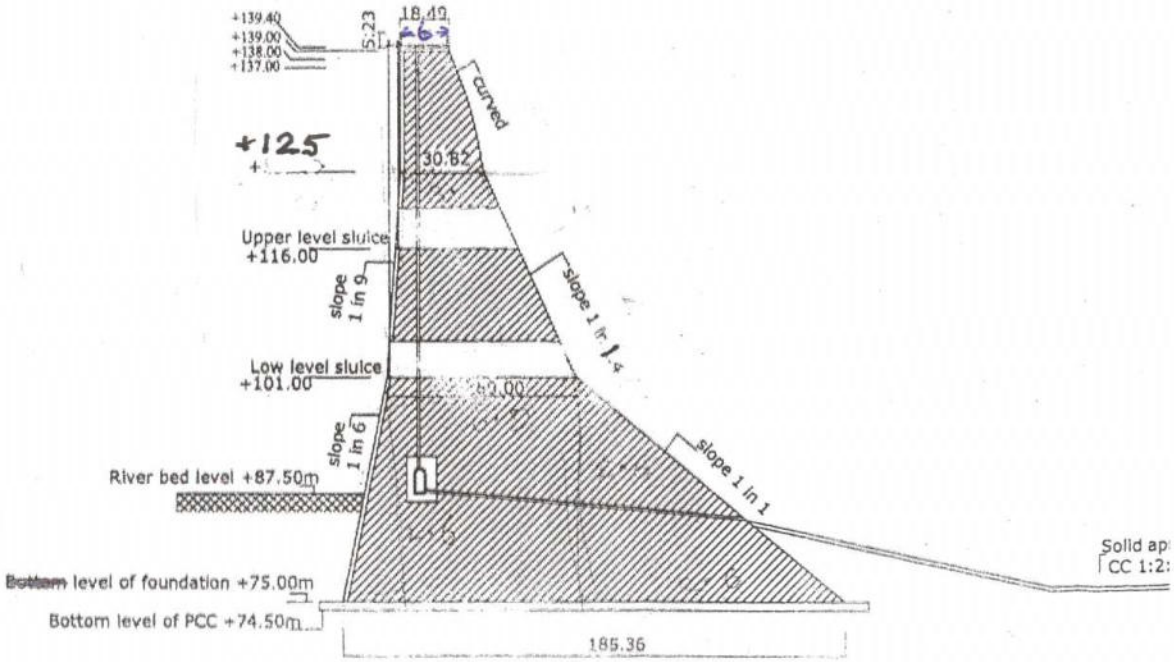
b)



CONNECTION SHOWING **C/S OF SECONDARY BEAM**

CONCRETE DRAWING - 6
NAME OF COMPONENT - 2
DIMENSIONING - 2

VII

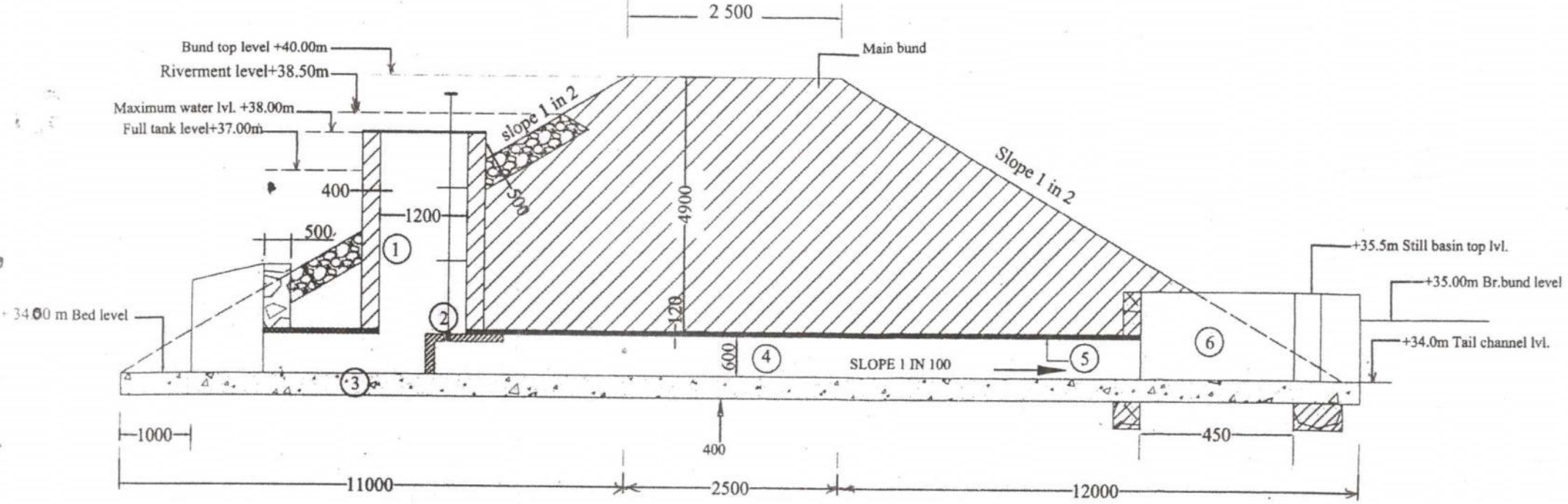


C/S OF TYPICAL MASONRY DAM

CORRECT DRAWING - 1
MARKING OF LEVELS - 5
NAME OF COMPONENTS - 5

VIII

a)



LONGITUDINAL SECTION

CORRECT.
DRAWING -10
MARKING OF LEVELS -2
DIMENSIONING - 3

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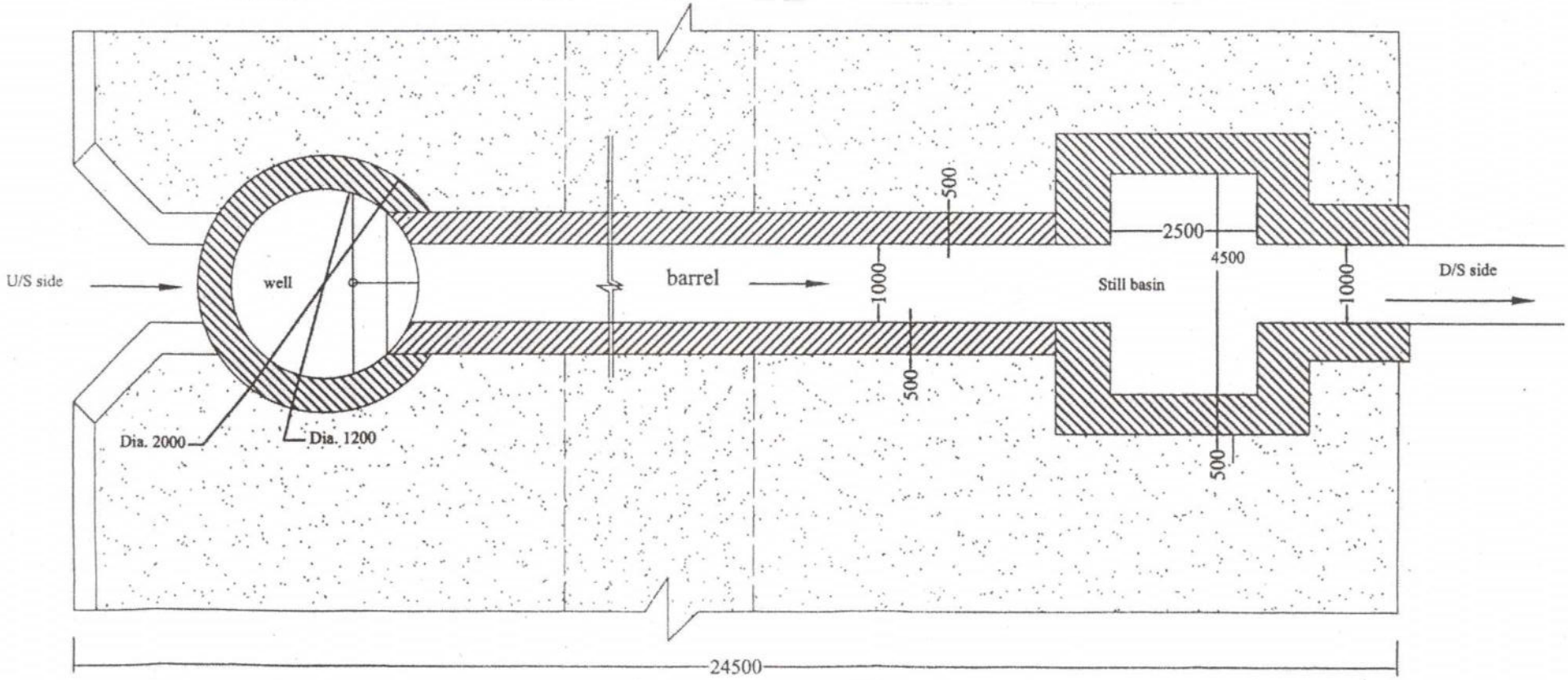

SECTIONAL PLAN THROUGH BARREL

TANK SLUICE WITH TOWER HEAD (Plug controlled)

CORRECT DRAWING-8

DIMENSIONING -2