

5th Sem. COMMON 2020(W)

Th1- Entrepreneurship and Management & Smart Technology

Full Marks: 80

Time- 3 Hrs

Answer the questions as per the instruction.
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. Write the full form of NABARD.
 - b. Enlist at least four characteristics of an entrepreneur.
 - c. Why should an entrepreneur prepare the project himself?
 - d. Define financial management.
 - e. Distinguish between debit and credit.
 - f. Define market.
 - g. Why does an organization need advertisement?
 - h. Differentiate a manager with a leader.
 - i. Define IoT.
 - j. Define IPR (Intellectual Property Right).

2. Answer **Any Six** Questions 5 x 6
 - a. Differentiate entrepreneur with manager.
 - b. What are the factors to be taken into account to select a technology for an enterprise?
 - c. Write the objectives of financial management.
 - d. Write the different functions of marketing.
 - e. Briefly discuss different types advertising media.
 - f. Briefly explain the functions of HRM.
 - g. Briefly discuss the smart transportation system, the advantages and

- disadvantages related to it.
- h. Explain the Maslow's theory of motivation.

3 Answer any three questions

10x3

- a. Briefly explain different barriers in entrepreneurship.
- b. How do you select a business opportunity? Explain different components (at least five) related to business opportunity.
- c. What is PPR (Preliminary Project Report)? Briefly explain the structure of PPR.
- d. Explain the five functions of management briefly.
- e. Briefly explain the general recruitment process in an organization.
- f. Briefly explain different types of budgets.

5TH SEM /CIVIL/2020(W)NEW

Th2- Structural Design-II

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

IS800:2007, IS 883-1970, SP 20, IS 806-1968,IS 1161-1998 and steel table are allowed in examination.

1. Answer **All** questions 2 x 10
 - a. Define crinkling in tubular Steel compression member.
 - b. Define structural Steel.
 - c. Define gauge distance
 - d. What do you mean by slot weld and plug weld?
 - e. Differentiate between web buckling and web crippling of beams.
 - f. What is effective length of a column?
 - g. Define net sectional area of a tension member.
 - h. What is slenderness ratio of a masonry wall?
 - i. For what type of structure is the tubular Steel sections are suitable?
 - j. What do you mean by mortar and what are the types of mortars?

2. Answer **Any Six** Questions 6 x 5
 - a. Write down the advantages and disadvantages of steel structure.
 - b. Explain block shear failure in tension members.
 - c. Explain different types of butt welds with neat sketch.
 - d. A ground floor masonry wall is 4m clear height up to bottom of roof slab. Height of plinth above foundation footing is equal to 0.8 metre. If the wall thickness is 30 cm, calculate effective height and slenderness ratio for partial restraint on both ends condition.
 - e. Determine the tensile strength of a roof Truss 100×75× 10 mm connected to the gusset plate with 100 mm leg by 5 mm fillet weld with length of weld equal to 200 mm. Take $f_y=250\text{N/mm}^2$.
 - f. Determine the plastic moment capacity of unsymmetrical I section. Given specifications are:

Top flange- 100 mm × 20 mm
Bottom flange- 200 mm × 20 mm
Web- 200 mm × 20 mm

- g What do you mean by slip critical connection? Explain the principle of high strength friction grip bolts. 10
- 3 Find the maximum force that can be transmitted through a double bolted chain lap joint consisting of 6 bolts in two rows at pitch and gauge distances of 40mm. Given that M16 bolts are of grade 4.6 and plates of fe410 are used. The thickness of the plates connected are 10mm and 12 mm. Take end distance and edge distance as 30mm. 10
- 4 A laterally supported beam ISMB 600 @1226 N/m is placed between two supports. Determine the safe uniformly distributed load the beam can carry for an effective span of 8 m. Take $f_y=250\text{N/mm}^2$. Neglect web buckling and web crippling. 10
- 5 Design a column section to carry a working axial load of 400 KN. The column is 4 metre long and effectively held in position and restrained against rotation at both ends. Consider $f_y=250\text{N/mm}^2$. 10
- 6 Write the codal provisions of design consideration for masonry walls under eccentric loading. 10
- 7 A tie member of a roof Truss consists of two ISA 100 75,8 mm. The angles are connected to either side of a 10mm gusset plate and the member is subjected to a working pull of 300 KN. Design the welded connection, assuming connections are made in workshop. 10

**5TH SEM./CIVIL ENGG./ 2020(W) NEW
TH3 RAILWAY & BRIDGE ENGINEERING**

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. What do you mean by crossing?
 - b. Define gauge. Mention different types of gauges.
 - c. What is maximum value of superelevation provided in a track as per railway board?
 - d. List the different types of rail joints
 - e. What do you mean by gradient?
 - f. Differentiate between square & skew alignment
 - g. Write Dicken's & Ryve's formula for the determination of flood discharge.
 - h. What is a culvert?
 - i. What do you mean by coffer dam?
 - j. Define afflux
2. Answer **Any Six** Questions 6 x 5
 - a. Write the advantages of railway
 - b. Mention the function of ballast. Also state the requirement of good ballast.
 - c. List the requirement of an ideal rail joint.
 - d. Write down the requirement & characteristics of an ideal bridge site.
 - e. Explain afflux with Marriman's formula and Molesworth's formula.
 - f. Give a brief description of various types of causeway in use.
 - g. Explain pile driving methods
3. Write the necessity of track maintenance & advantages of maintenance. 10
4. Explain various types of crossing in use on Indian Railways. 10
5. Describe briefly about the selection of gauge. 10
6. Describe the components of a bridge with neat sketch. 10
7. What are the different types of bridge foundation? Describe open foundation and raft foundation with neat sketch. 10

5TH SEM./ CIVIL / 2020(W) NEW
Th4 - Water Supply And Waste Water Engineering

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
- a. Explain the term per capita demand?
 - b. What is the yield of a well?
 - c. Define specific yield?
 - d. What is self cleaning velocity?
 - e. What are the different methods for calculating population growth?
 - f. What is sewage?
 - g. What do you mean by hardness of water?
 - h. Mention different types of traps in sewage system?
 - i. What is screening?
 - j. Define sewage farming.
2. Answer **Any Six** Questions 6 x 5
- a. Explain the type of water demand.
 - b. Explain break point chlorination.
 - c. Differentiate between slow sand filter and rapid sand filter?
 - d. What are the preventive measures to avoid sewage sickness?
 - e. Determine the velocity of flow in a circular sewer of diameter 150cm.Laid on slope of 1 in 500 while running full by using Chezy's formula. The value of C =70.
 - f. Explain manhole with sketch?
 - g. Discuss roof top rain water harvesting with figure.
3. The population of 5 decade from 1930 to 1970 are given below. Find out the population after one, two and three decade beyond the last known decade, by using arithmetic increase method. 10
- | | | | | | |
|------------|-------|-------|-------|-------|-------|
| Year | 1930 | 1940 | 1950 | 1960 | 1970 |
| Polutation | 25000 | 28000 | 34000 | 42000 | 47000 |
4. Sketch and describe in details the working of slow sand filter. 10
5. Describe about the factors affecting per capita demand? 10
6. Describe the process of primary treatment of sewage with help of flow diagram. 10
7. Write down various types of sewer appurtenance. 10

5TH SEM./ CIVIL /2020(W)
Th5 Estimating & Cost Evaluation- II

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
- a. What do you mean by Technical sanction?
 - b. Define special repair with example.
 - c. Define E.M.D.
 - d. Calculate the standard weight of 12mm dia mild steel bar of 3m length.
 - e. Calculate the quantity of stone grit 20mm gauge @ 1.3cum % sqm and binder @210kg % sqm for a road of length 2K.m and metalled width is 4m.
 - f. Find the area of temporary land required for 2km length of a road having formation width 8m, average height of bank is 1.5 m. Side slope is 2(horizontal):1(vertical). Depth of borrow pit is 20 cm.
 - g. Find the quantity of stone pitching along the side slopes of a portion of road from the following data. The depth of bank at two ends being 3m and 4m. Side slope is $1\frac{1}{2} : 1$. Thickness of stone pitching 15 cm. Length of road is 300m.
 - h. Define “Imprest Money”.
 - i. What is “RERA”? Write down the date of establishment of RERA in Odisha.
 - j. Differentiate between isolated & combined footings.
2. Answer **Any Six** Questions 6 x 5
- a. Write down different method of execution of work in P.W.D.
 - b. Calculate the quantity of pointing works involved from **Figure -2**.
 - c. Calculate the quantity of 1st class brickwork in Figure -1.
 - d. What do you mean by Tender? Write a notice inviting tender for any work.
 - e. Write short notes on Muster roll and Acquittance roll.
 - f. Estimate the quantity of fundamental items involved for the construction of a tube well having following data.
Dia of tube well =40mm, depth = 40m . The length of strainer is 3m. The pipe is projected 20 cm above G.L . One ordinary hand pump and four sockets are used.
 - g. What do you mean by building bye-law? Write down the objectives of it.
3. Estimate the cost of earthwork for a portion of road of 1 Km length from the following data. The cost of earthwork is Rs.600/- per cum for banking and Rs. 750/- per cum for cutting. Also draw the longitudinal section and typical section. 10

Formation width of a road is 10 metre and side slope is 2:1 in banking and $1\frac{1}{2}$:1 in cutting. Length of chain is 40m.

| Station | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
|------------------|------|---|------|------|------|------|------|------|------|------|------|
| R L of ground | 52.0 | 51.9 | 51.5 | 51.8 | 51.6 | 51.7 | 52.2 | 52.4 | 52.3 | 52.0 | 51.6 |
| R L of formation | 53.0 | <.....downward gradient of 1 in 200.....> | | | | | | | | | |

4 Estimate the items involved for the construction of a new state highway of WBM 10 road from the following data.

Length of road=200 m

Metalled width= 6m

Thickness of grade 1 metal soling=80mm

Wearing coat of grade –II metal =12cm loose and compacted to 8c.m

Surface to be finished with 2 coats of bitumen as given below.

First finishing coat= 12mm chips @.018m³ and bitumen @1.32kg per m² of road surface.

Second finishing coat=6mm chips @0.010m³ and bitumen @1.36kg per m² of road surface.

Consumption of fuel @ 0.45kg per kg of bitumen.

5 Calculate the quantity of “Earthwork in Excavation” for the construction of a canal 10 fall from the drawing given in **Figure-1**.

6 Prepare a quantity estimate for the following items of works of a slab culvert given 10 in **Figure-2**.

(a)Earthwork in excavation [3]

(b) Cement concrete works in foundation [2]

(c) 1st class brick work in cement mortar [5]

7 Calculate the quantity of reinforcement for a R.C.C slab of size 4m×5m×12c.m 10 thick. 10mm dia rods are placed in short span@20c.m c/c with one side 45° crank with end hooks. 10 mm dia rods are placed in long span @ 25c.m c/c with one side 45° crank with end hooks. 4 nos 10mm dia bars along short span and 4 nos along long span are provided as top bars . Provide clear cover = 25mm and side cover =40 mm.

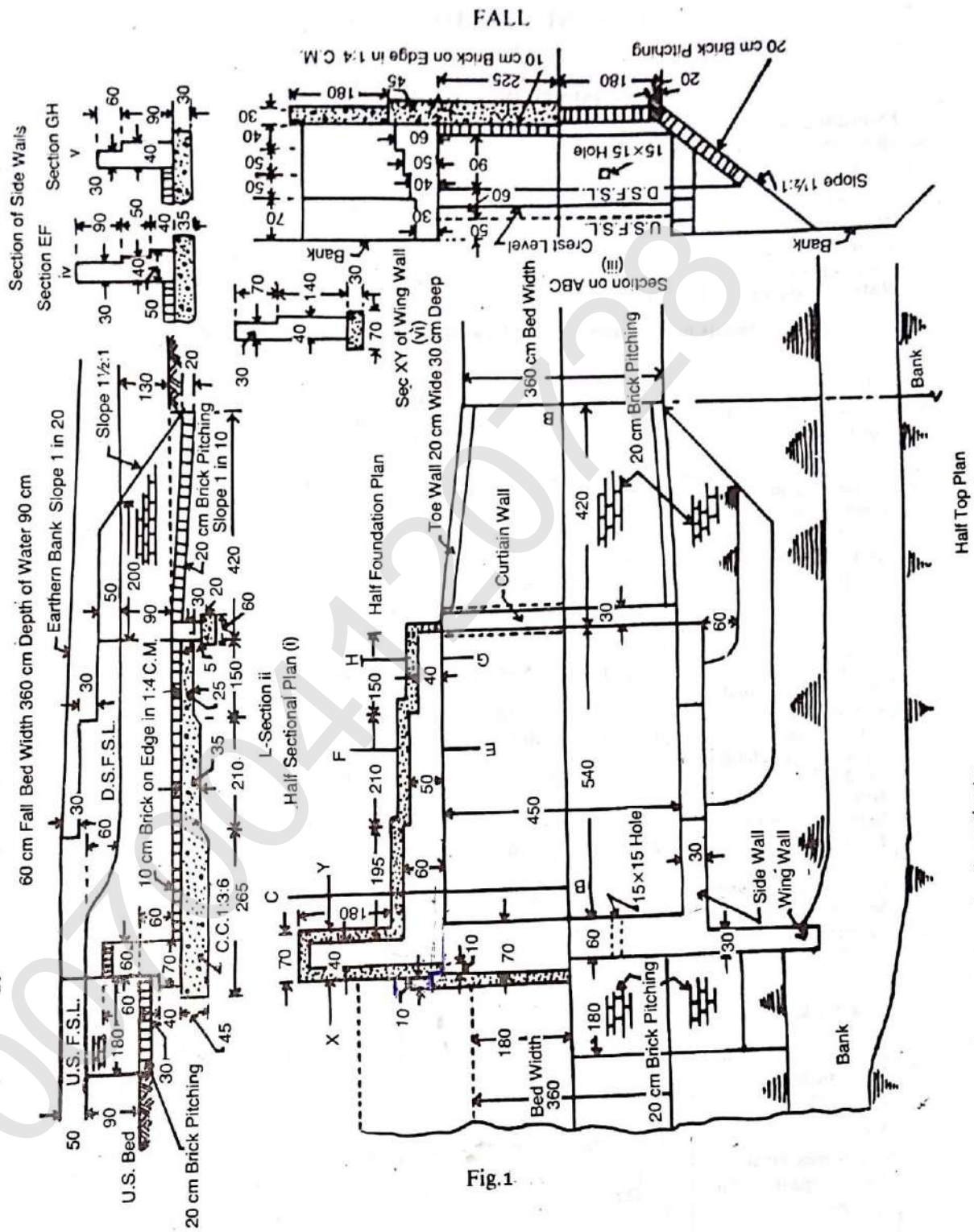
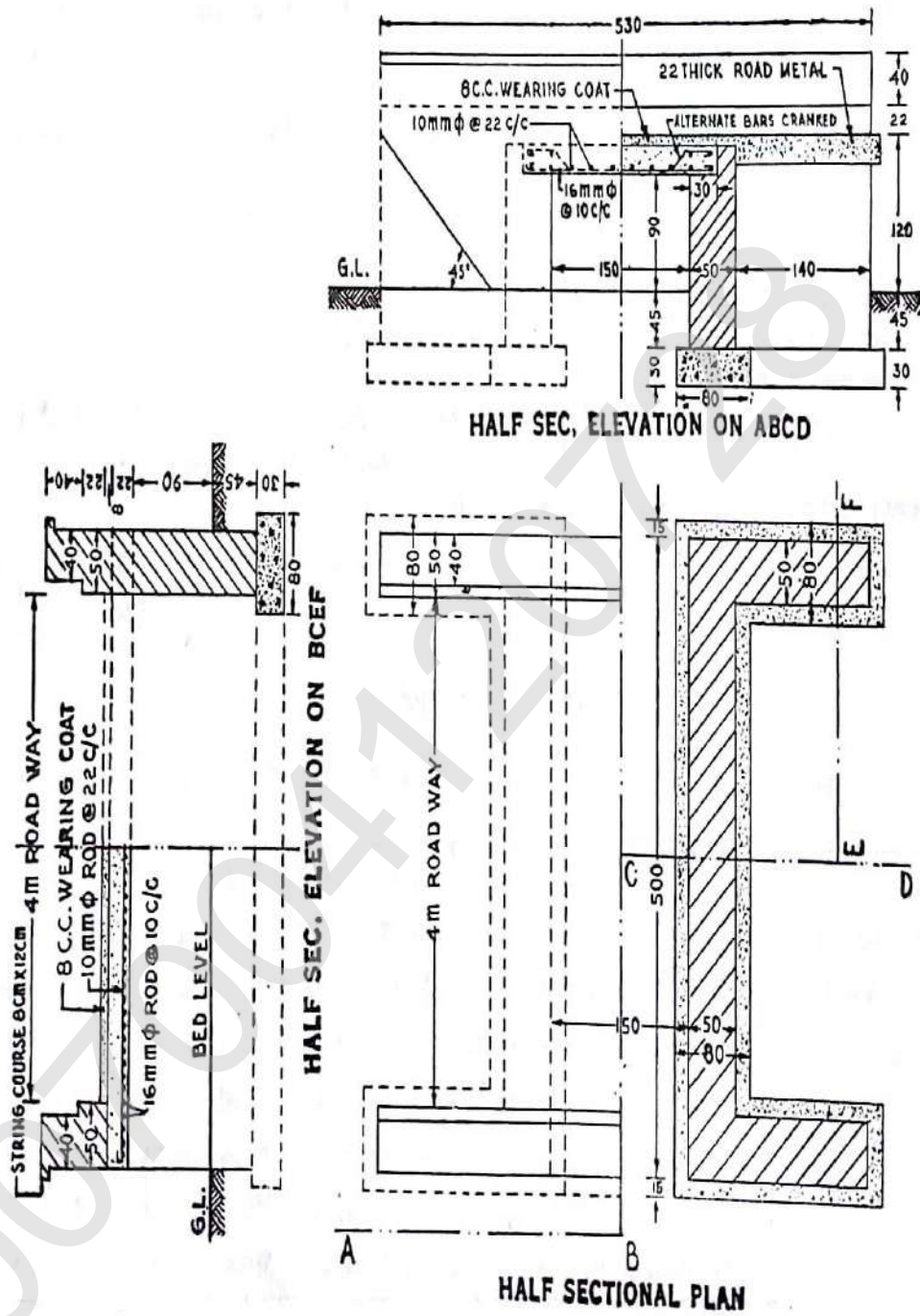


Fig.1

All Dimensions in centimetre



All dimensions in centimetre scale 1:75

FIG. 2

TH-II STRUCTURAL DESIGN-II

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
- a. With a neat sketch give examples of bolted connection with single shear plane and double shear plane.
 - b. Differentiate between limit states of strength and limit state of serviceability.
 - c. What do you mean by crinkling in tubes?
 - d. What is slenderness ratio of a masonry wall?
 - e. What will be the buckling class of ISHB 450@ 925 N/m about Z-Z and Y-Y axis?
 - f. What is the minimum and maximum value of pitch of bolts in a tension member?
 - g. Define Bolt value.
 - h. What are the types of mortar?
 - i. What is the recommended throat thickness for incomplete penetration butt weld welded from one side only?
 - j. What do you mean by HSFG bolts?
2. Answer **Any Six** Questions 5X6
- a. Write down the advantages of welded connection over bolted connection.
 - b. Design a single angle tension member of a roof truss to carry a factored tensile load of 225 KN. The member is subjected to the possible reversal of stresses due to action of wind. The length of member is 3 metre. Use 20mm shop bolts of grade 4.6 for the connection. Assume any other suitable data.
 - c. Explain about buckling class of cross sections in compression member.
 - d. Write short note on design consideration for masonry wall footing.
 - e. Write short note on web buckling and web crippling.
 - f. A tubular Steel column of 4.8m length is hinged at both ends. It has nominal diameter of 225 mm and conforms to yst 25 grade. Determine the safe load carrying capacity of the column.

- g Write the difference between limit state method and working stress method.
- 3 Design a steel column section using channel section only to carry factored axial load of 400 KN. The column is 4 m long and is effectively held in position at both ends but restrained against rotation at one end. Consider $f_y=250$ MPa. Assume any other suitable data. 10
- 4 Determine the load carrying capacity of a brick masonry column at its base for following data. 10
Effective height=3.5 m,
Column section- 400mm \times 400mm
Grade of mortar-m2
Average compressive strength of bricks=7.5 N/mm²
Assume modular bricks and raked joints.
- 5 A laterally supported beam ISMB 600@1202.71 N/m is placed between two supports. Determine the safe uniformly distributed load the beam can carry for an effective span of 8m. Take $f_y=250$ N/mm². Neglect web buckling and web crippling. 10
- 6 Find the maximum force that can be transmitted through a double bolted chain lap joint consisting of 6 bolts in two rows. Given that M16 bolts are 4.6 grade and plates are of Fe410. The thickness of the plates connected are 10 mm and 12 mm. 10
- 7 Design a welded lap joint for two plates of size 120 mm \times 8 mm and 120 mm \times 12mm for maximum efficiency. Assume shop welding and Fe410 grade of Steel. 10

V-SEM./CIVIL ENGG./ 2021(W)
TH-III RAILWAY & BRIDGE ENGG.

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. Differentiate between B.G and M.G.
 - b. Name different types of masonry bridge.
 - c. What do you mean by Creep of rails?
 - d. Differentiate between bridge and culvert.
 - e. What do you mean by crossing?
 - f. What do you mean by coffer Dam?
 - g. Explain equilibrium cant.
 - h. Define waterway and economic span for a bridge.
 - i. Write three functions of sleeper.
 - j. What is free board?

2. Answer **Any Six** Questions 5X6
 - a. Write down the requirement of permanent way.
 - b. What are the characteristics of an ideal bridge site?
 - c. Describe the requirement of ballast in laying of rails.
 - d. State precisely the purpose of providing bearings in bridge. Name the various types of bearings.
 - e. Explain the necessity and procedure of track maintenance.
 - f. Write short notes on shallow foundation.
 - g. Write short notes on advantages of welding rails.

3. Describe briefly the construction procedure in sinking of Wells. 10
4. Discuss the necessity of points and crossing in a railway track. Briefly describe the main components. 10
5. State the advantages of concrete sleepers and what are the functions of ballast? 10
6. What are the requirements of rail joints? Discuss different types of rail joints with the help of neat sketches and give their merits and demerits. 10
7.
 - a. Name the different components of a bridge. 10
 - b. What are the hydraulic data required for particular bridge site selection?

Th4 Water supply & Waste Water Engineering

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. Explain the term per capita demand?
 - b. What should be the PH of portable water?
 - c. What is yield of well?
 - d. What do you mean by cone of depression?
 - e. Define garbage?
 - f. Temporary hardness of water is generally removed by which method?
 - g. What is the function of manhole?
 - h. Define self cleaning velocity?
 - i. What is sewerage?
 - j. What is the function of algae in sewage?

2. Answer **Any Six** Questions 5X6
 - a. Explain the different types of fire demand.
 - b. Differentiate between slow sand filter and rapid sand filter?
 - c. Explain manhole with sketch?
 - d. Write down about the physical characteristic of portable water?
 - e. Write down the difference between water supply pipes and sewer pipes?
 - f. Determine the velocity of flow in a circular sewer of diameter 150cm.Laid on slope of 1 in 500 while running full by using Chezy's formula. The value of $C = 70$.
 - g. Describe different shapes of sewer pipes with figure?

- 3 The population of 5 decade from 1980 to 2020 are given below. Find out the population after one, two and three decade beyond the last known decade, by using arithmetic increase method. 10

| Year | 1980 | 1990 | 2000 | 2010 | 2020 |
|------------|-------|-------|-------|-------|-------|
| Population | 35000 | 38000 | 44000 | 52000 | 57000 |

- 4 Describe about secondary treatment of water? 10
- 5 Write down about physical, chemical and biological characteristic of sewage? 10
- 6 Describe about secondary treatment of sewage? 10
- 7 Write down the different properties about various types of pipes? 10

TH 5 Estimation & Cost Evaluation-II

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1 & 2
 Figures in the right hand margin indicates marks

1 Answer **All** questions 2 x 10

- a. What is a Culvert and when Hume pipe Culvert is preferred?
- b. What is the total length of straight bar hooked at both ends having straight length L and dia D?
- c. What indent and stock?
- d. Classify different types of work?
- e. Define tender and contract.
- f. Define Lead and Lift.
- g. Calculate the additional length of bent up bar for 45° cranked bar?
- h. Calculate the number of main bars required for a slab of 2.1m X 4.8m provided with 16 mm dia bars @ 30cm C/C ?
- i. Enlist different components of hume pipe culvert.
- j. What is final bill and running bill ?

2 Answer **Any Six** Questions 6 x 5

- a. Calculate the quantity of earthwork by prismoidal method for 200 mtr length for a portion of a road in an uniform ground, the heights of banks at the two ends being 1.00m and 1.60m. The formation width is 10 mtr and side slopes 2:1 (Horizontal: Vertical). Assume that there is no transverse slope.
- b. Estimate the following item involved for the fall from fig 2.
i. Earth work in excavation
- c. Estimate the volume of concrete for the footing given in the fig 5 ?
- d. Explain muster roll and measurement book.
- e. Estimate the cost of earthwork for a portion of a road from the following data.
Road width at the formation surface is 8 metre. Side slope 2:1 in banking and 1½:1 in cutting.
Length of the chain is 30 metre.

| | | | | | | | | | | |
|-----------------|-------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| chainage | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| Ground level | 71.20 | 71.25 | 70.90 | 71.25 | 70.80 | 70.45 | 70.20 | 70.35 | 69.10 | 69.45 |
| Formation level | 70.00 | Upward gradient 1 in 200 | | | | | | | | |

Take the rate of earthwork as Rs. 275.00 per cum in banking and Rs. 350.00 per cum in cutting.

- f. Estimate the quantities of items of a tube well from fig No 4 . 5
- g Estimate the following items of a fall from fig 2
 i.Cement Pointing in 1:3 cement mortar.
 ii.Brick pitching.
- 3 Estimate the following items of work of a slab culvert from Fig No 1. 5+5
 i. I class brickwork in 1:4 cement mortar.
 ii. R.C.C Work.
- 4 Prepare a detailed estimate of the following items of a siphon aqueduct from the given figure 6.
 The general specifications :
 cement concrete in foundation shall be 1:3:6 with brick ballast.
 Brickwork shall be of cement mortar 1:4.
 i. Earthwork in excavation in foundation.
 ii. First class brickwork in cement mortar (1:4).
- 5 Estimate the following items involved for septic tank shown in Fig No 3. 3+3+2+2
 i. Earth work in excavation
 ii. I class brick work in 1:4 cement mortar
 iii. 12 mm thick inside plastering.
 iv. R.B work in partition wall.
- 6 Estimate the items involved for construction of a WBM road from the following data: 10
 Length of road =150 m.
 Formation width =10m.
 Metalled width = 8 m.
 Thickness of grade-I metal solving = 90mm.
 Wearing coat of grade-II metal =12 cm thick loose and 8cm thick compacted surface to be finished with 2 coats of bitumen as given below:
 First finishing coat = 12 mm chips @ 0.020 m³ and bitumen @ 1.24 kg per m² of road surface.
 Second finishing coat = 6 mm chips @ 0.02m³ and bitumen @ 1.24 kg per m² of road surface.
 Consumption of fuel @ 0.45 kg per kg of bitumen.
- 7 Write short notes on : 2 ½ x 4
 (a) Regular Establishment
 (b) Aquittance role
 (c) Administrative Approval.
 (d) Tender and contract

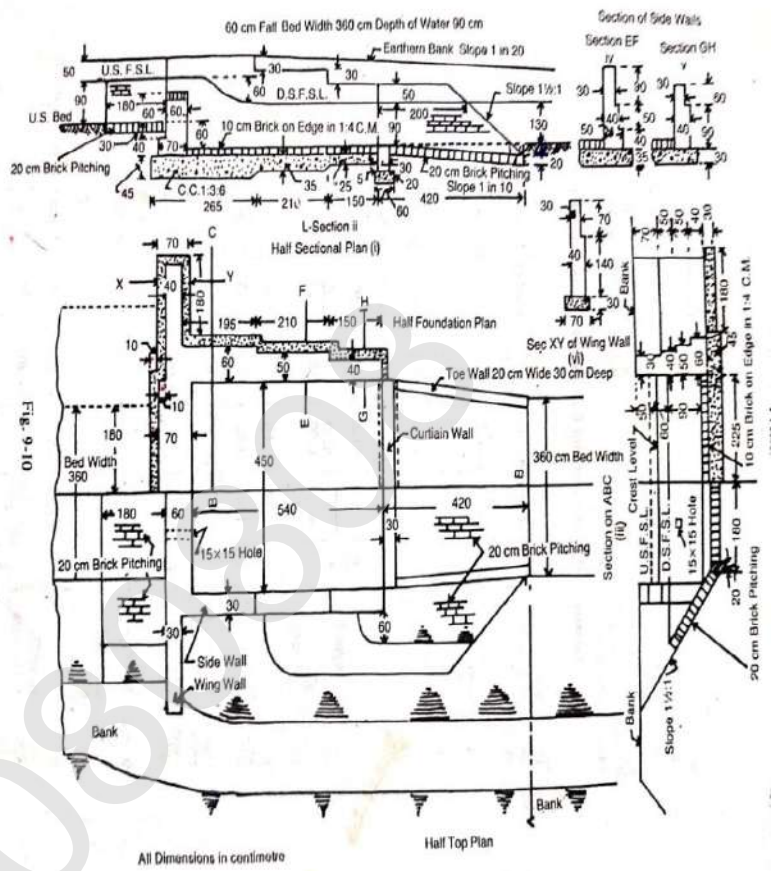
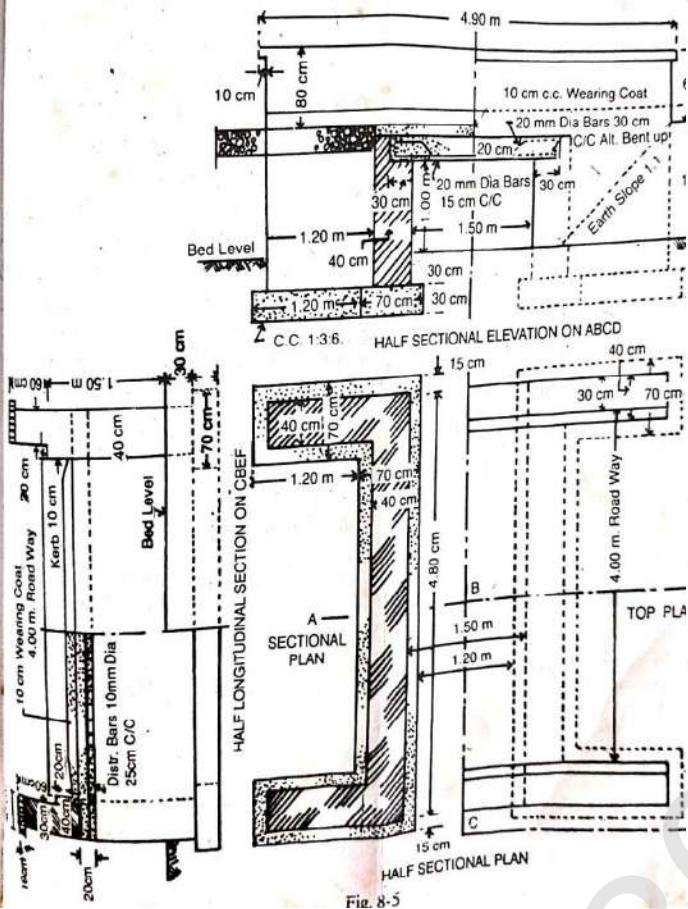


Fig 1

Fig 2

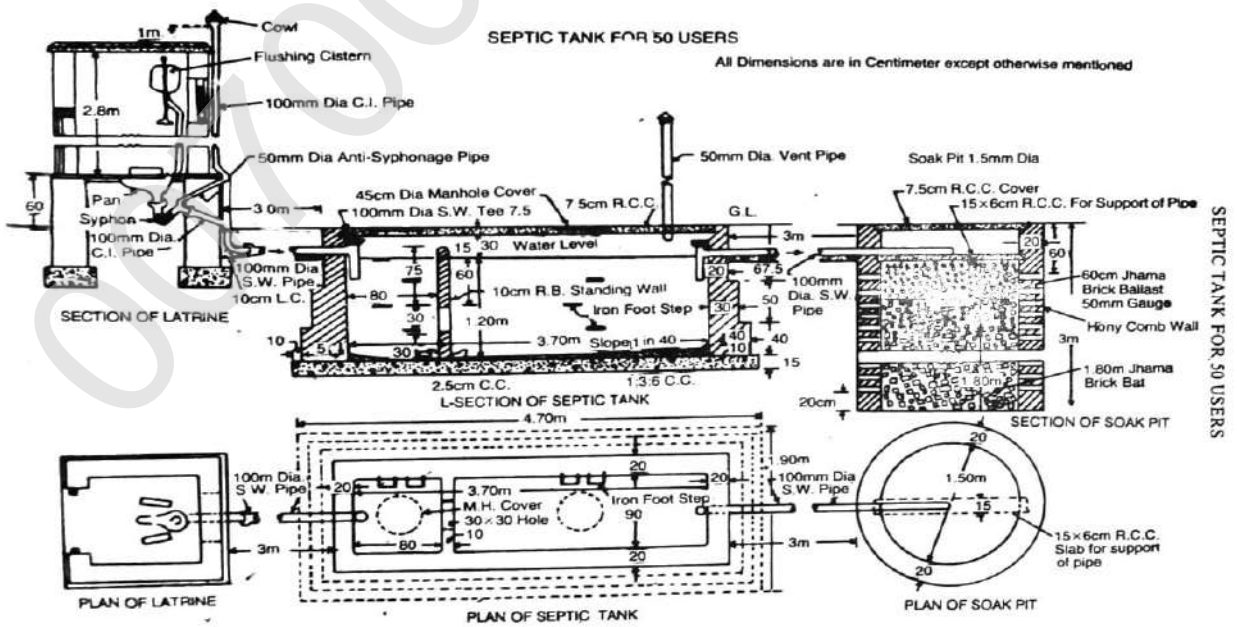
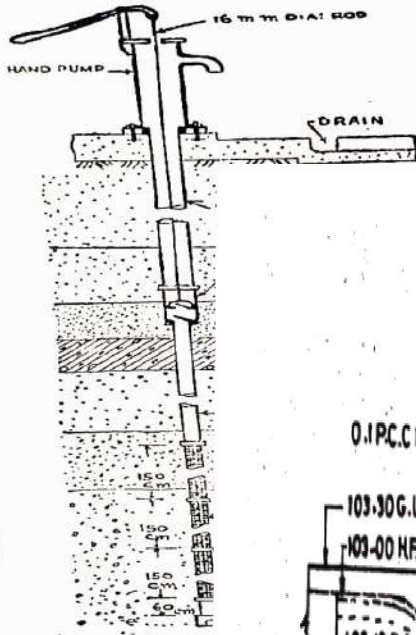
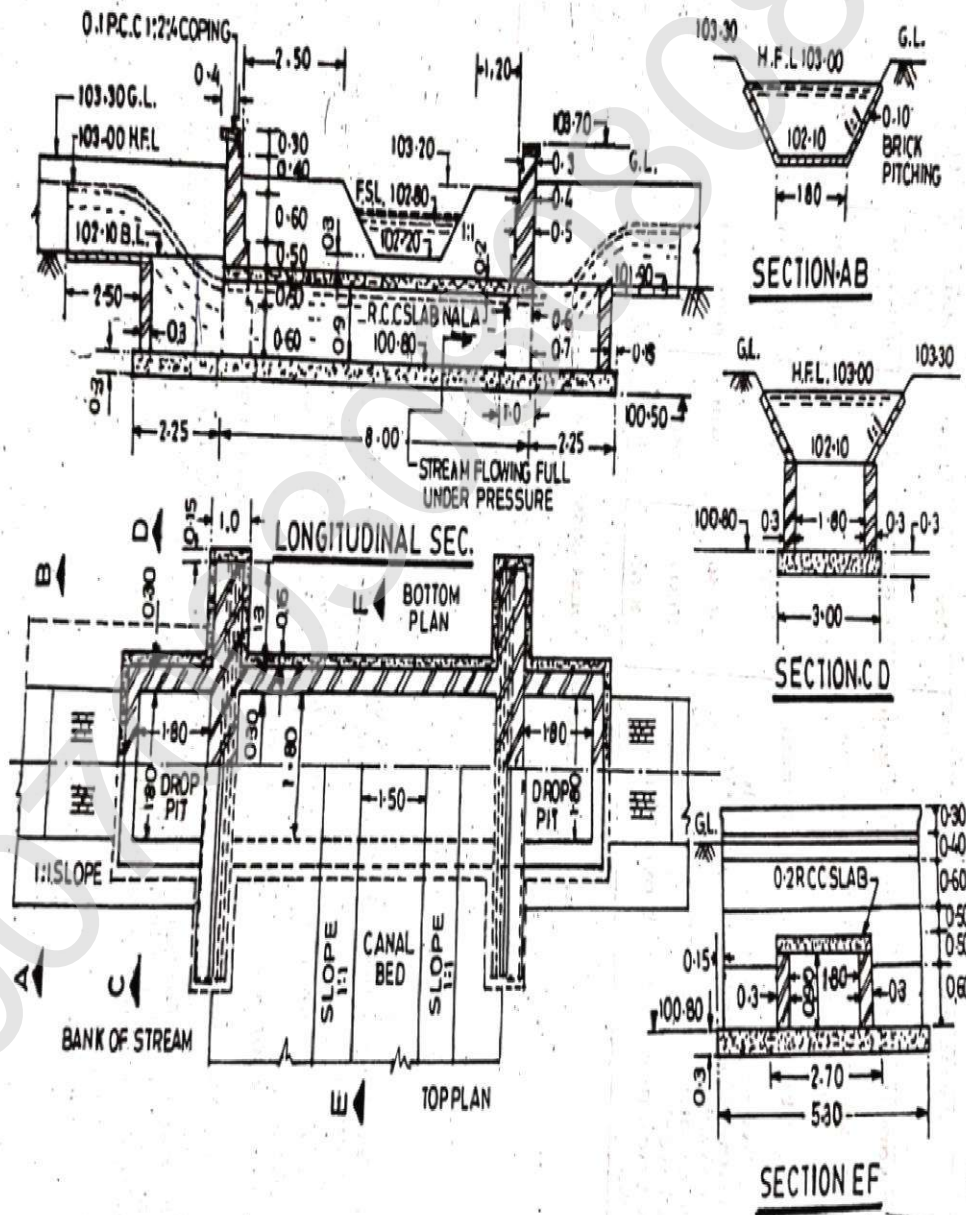


Fig 3



Trapezoidal column footing

(Fig 4)
(Fig 5)



(Fig 6)

Th-1 ENTREPRENEURSHIP AND MANAGEMENT & SMART TECHNOLOGY

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right-hand margin indicates marks.

1. Answer **All** questions 2 x 10
 - a. Name two barriers in entrepreneurship. 2
 - b. Write two advantages of preliminary project report. 2
 - c. Write two techniques /models of inventory management. 2
 - d. How does branding helps manufacturers, retailer and consumers? 2
 - e. Name two symptoms of bad management. 2
 - f. Write two primary responsibilities of Human Resource Department in an industry. 2
 - g. Write two functions of a leader. 2
 - h. Name four personal protective equipment used in industry. 2
 - i. Write two applications of break-even analysis. 2
 - j. Write two applications of smart agriculture. 2
2. Answer **Any Six** Questions 6 x 5
 - a. Compare between an entrepreneur and manager 5
 - b. Write a short note on a successful Indian Entrepreneur. Mention any five quality in him/her. 5
 - c. Explain the role of District Industry Center in promoting enterprises. List any five supports provided by DIC to entrepreneur. 5
 - d. What are the parameters used to decide the plant capacity in a project? 5
 - e. What is TQM? Explain the need of TQM in small enterprises. 5
 - f. Write any five safety provisions in Factory Act,1948? 5
 - g. Explain the techniques of motivation. 5
3.
 - a. What is Technology Business Incubator? Explain with example. 10
 - b. Explain the success story of an Indian start up.
4. Explain the components of Techno economic feasibility report. 10
5. Explain delivery schedule, market need and inventory control in production planning and control. 10
6. Write the Concept of IoT and how does it work. 10
7. Explain the management of working capital 10

5TH SEM/ CIVIL /2022(W)

Th-2 Structural Design-II

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
 - a. What do you mean by efficiency of joint ?
 - b. What is the relation between yield strength and ultimate strength of bolt?
 - c. What is slenderness ratio?
 - d. Define local buckling.
 - e. What is web buckling and web crippling ?
 - f. What is the basic difference between bearing type and HSFG bolts?
 - g. What are the possible failure criteria for tension member?
 - h. Write full form of HFS & ERW ?
 - i. What is radius of gyration?
 - j. What is fillet weld ?

2. Answer **Any Six** Questions 6 x 5
 - a. State all the assumption taken for design of bearing bolts.
 - b. Select a suitable angle section to carry a factored tensile force of 170 KN assuming a single row of M20 bolts and assuming design strength as $F_y=250$ MPa.
 - c. What are the different types of beam sections used in design according to slenderness value?
 - d. What are the types of welds used in steel design explain with neat sketch.
 - e. Determine the plastic moment capacity and plastic section modulus of a symmetrical 'I' section having depth of section as 300mm and width 150mm. Thickness of flange is 14.2 mm and thickness of web is 8.1 mm about z-z axis.
 - f. A butt weld is used to connect two plates of 180mm x 18mm each. Find out the stress developed in the weld if it is subjected to a moment of 13000 KN mm.
 - g. Why tubular sections are preferred over other steel sections?

3. Design a lap joint between two plates each of width 120 mm, if thickness of one plate is 20mm and the other is 11 mm. The joint has to transfer a design load of 240 KN, the plates are of Fe410 grade use bearing type bolts of property class 4.6. 10

4. A tension member consists of a flat 120mm x 8mm is connected to a gusset plate of 12mm thick by 2 numbers of M20 bolts. If steel grade Fe410 and bearing bolts of property class 4.6 are used in field, determine the strength considering all failure criteria . 10

5. Calculate the factored axial load on the column section ISHB 400 @ 806.38 N/M. The height of column is 3.0 m and it is pin ended use steel of Fe410 grade. 10

6. Design a simply supported beam of effective span 1m carrying a factored concentrated load of 360KN at mid span. 10

7. Describe factors affecting the strength of a tubular section. 10

5TH SEM./ CIVIL / 2022(W)

Th-3 Railway & Bridge Engineering

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2.
Figures in the right hand margin indicate marks.

1. Answer **All** questions. 2 x 10
- a. Define railway gauge. Name the types of railway gauge used in Indian Railways.
 - b. Define sleepers. Write down the types of sleepers used in railways.
 - c. Define creep of rails. Mention two causes of creep in rails.
 - d. Name the types of gradients provided in railway track.
 - e. What is the need of points and crossings in railway track? Define check rails.
 - f. Define railway yards and classify them.
 - g. Differentiate between bridge and culvert.
 - h. Define afflux and free board in bridges.
 - i. What is cofferdam? Mention its two uses.
 - j. Define wing walls and classify them.
2. Answer **Any Six** Questions. 6 x 5
- a. Define permanent way. Write down the requirements of ideal permanent way.
 - b. Write down the functions of rails. Briefly explain the types of rail sections used in railway track along with neat sketches.
 - c. Define superelevation. Write down the functions of superelevations in railways.
 - d. Briefly explain the factors responsible for site selection of a railway station.
 - e. Draw the figure showing constituents of a right -hand turn out and label it neatly.
 - f. Write down the site characteristics of an ideal bridge.
 - g. Define caissons .Briefly explain different types of caissons along with their uses.
3. Define ballast. Write down functions and classification of ballast. Also mention the characteristics of good ballast. 10
4. What are the requirements of rail joints ? Discuss different types of rail joints with the help of neat sketches and mention their merits and demerits. 10
5. What are the essentials of track maintenance? Briefly explain the procedure of track maintenance along with its advantages. 10
6. Define piers of bridges and their functions. Draw the cross sectional shapes of piers. Explain different types of piers. 10
7. Define causeway. Explain the necessities and classification of causeways. Mention the conditions to be satisfied for providing causeways. 10

5TH SEM./CIVIL / 2022(W)

Th-4 Water Supply & Waste Water Engineering

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
- a. What is per capita demand ?
 - b. Define sewage and sewer.
 - c. What is yield of a well ?
 - d. What is pre-chlorination and post chlorination ?
 - e. Write the short notes on sluice valve and scour valve.
 - f. What is aquifer and their types?
 - g. Write down the PH value of drinking water.
 - h. Write down Darcy's formula for discharge of water.
 - i. Write down the cause of blue baby disease?
 - j. What is flocculation?
2. Answer **Any Six** Questions 6 x 5
- a. Find the diameter of an open well to give the discharge of 5 lit/sec. The depression head is 5 m and specific yield $2 \text{ m}^3/\text{hr}/\text{m}^2$.
 - b. Describe the biological characteristics of drinking water .
 - c. Write the types of hardness. Write necessity of water softening .
 - d. Describe skimming tank with sketch.
 - e. Write the short notes on 1)Manhole 2)Gully trap.
 - f. Describe the methods of distribution with neat sketch.
 - g. Explain the various methods of sludge disposal.
3. Differentiate between water carriage system and conservancy system of collection of wastes. 10
4. Explain the principle of rapid sand filter. 10
5. The census records of a small town is as follows : 10
- | YEAR | POPULATION |
|------|------------|
| 1940 | 5,400 |
| 1950 | 6,000 |
| 1960 | 8,000 |
| 1970 | 10,000 |
- Calculate the probable population in 1980,1990,2000,2010 by arithmetic increase method.
6. Write the necessity of secondary treatment of sewage. Sketch the flow diagram of secondary treatment & write the function of each unit. 10
7. Describe the different types of pipes as per material? 10

Th-5 Estimation & Cost Evaluation - II

Full Marks: 80

Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

- 1 Answer **All** questions 2 x 10
- a. What is Muster Roll
 - b. Differentiate between store and stock
 - c. What do you mean by piece work agreement.
 - d. What is earnest money.
 - e. What is drainage syphon
 - f. Mention the function of coping and kerb in a culvert.
 - g. Find out weight of a 12 mm dia bar of 1m length.
 - h. Write down the necessity of providing canal fall.
 - i. Define lead and lift.
 - j. What do you mean by Notice Inviting Tender.
- 2 Answer **Any Six** Questions 6 x 5
- a. Calculate the area of the side slopes of portion of a bank for a length of 200 metre. The heights of bank at two ends being 2.50 m and 3.50 m and the ratio of the side slope 2:1. If the side slopes are to be provided with 15 cm thick stone pitching, calculate the cost of pitching at the rate of Rs. 150/- per cum.
 - b. Calculate the quantity of main reinforcement required for a slab of 2.1mX 4.8m size provided with 20 mm dia main bars @ 15 cm C/C. In the slab alternate bars bent at 45° with end hooks.
 - c. Find out the quantity of earthwork in excavation for drainage syphon from figure 1.
 - d. Estimate the quantity of cement concrete work in foundation of a fall from figure 2
 - e. What do you mean by administrative approval and technical sanction.
 - f. An isolated column footing is of size 2.1 m x 2.1 m and of thickness 650 mm. Find out the volume of cement concrete work for the footing.
 - g. Estimate the items involved for construction of a WBM road from the following data:
Length of road =500 m.
Metalled width = 7 m.
Thickness of brick soiling = 7.5 cm.
Wearing coat of grade-II metal =12 cm thick loose and 8cm thick compacted surface to be finished with 2 coats of bitumen as given below:
First finishing coat = 12 mm chips @ 0.018 m³/sqm and bitumen @ 1.2 kg per m² of road surface.
Second finishing coat = 6 mm chips @ 0.009 m³/sqm and bitumen @ 1.2 kg per m² of road surface.
Consumption of fuel @ 0.3 kg per kg of bitumen.

3 Prepare a detailed estimate for earthwork for a portion of a road from the following data

10

Formation width of road is 10m, side slope 2:1 in banking and 1½:1 in cutting

| | | | | | | | | | | | | | |
|--|------------------------------|--------|--------|--------|--------|--------|--------|----------------------------|--------|--------|--------|--------|--------|
| Dis ta nc e in me tre | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
| R.L of GL | 114.5 | 114.75 | 115.25 | 115.20 | 116.10 | 116.85 | 118.00 | 118.25 | 118.10 | 117.80 | 117.75 | 117.90 | 119.50 |
| RL of FL | 115 upward gradient 1 in 200 | | | | | | | Downward gradient 1 in 400 | | | | | |

4 Write short notes on

10

- a. Measurement book
- b. Security money
- c. Temporary advance
- d. **Acquittance Roll**

5 Estimate the following items involved for septic tank shown in Figure 3

2+4+4

- a. Earthwork in excavation
- b. I class brick work in 1:4 cement mortar
- c. 12 mm thick inside plastering.

6 Estimate the following items of work of a slab culvert from Fig No 4.

5+5

- a. 1st class brickwork in 1:4 cement mortar
- b. Cement pointing 1:2

7 a. Estimate the quantity of 1st class brickwork in 1:4 cement mortar of a 60 cm fall from Fig No 2

5+5

- b. Estimate the quantity of cement pointing of a drainage syphon from Fig No 1

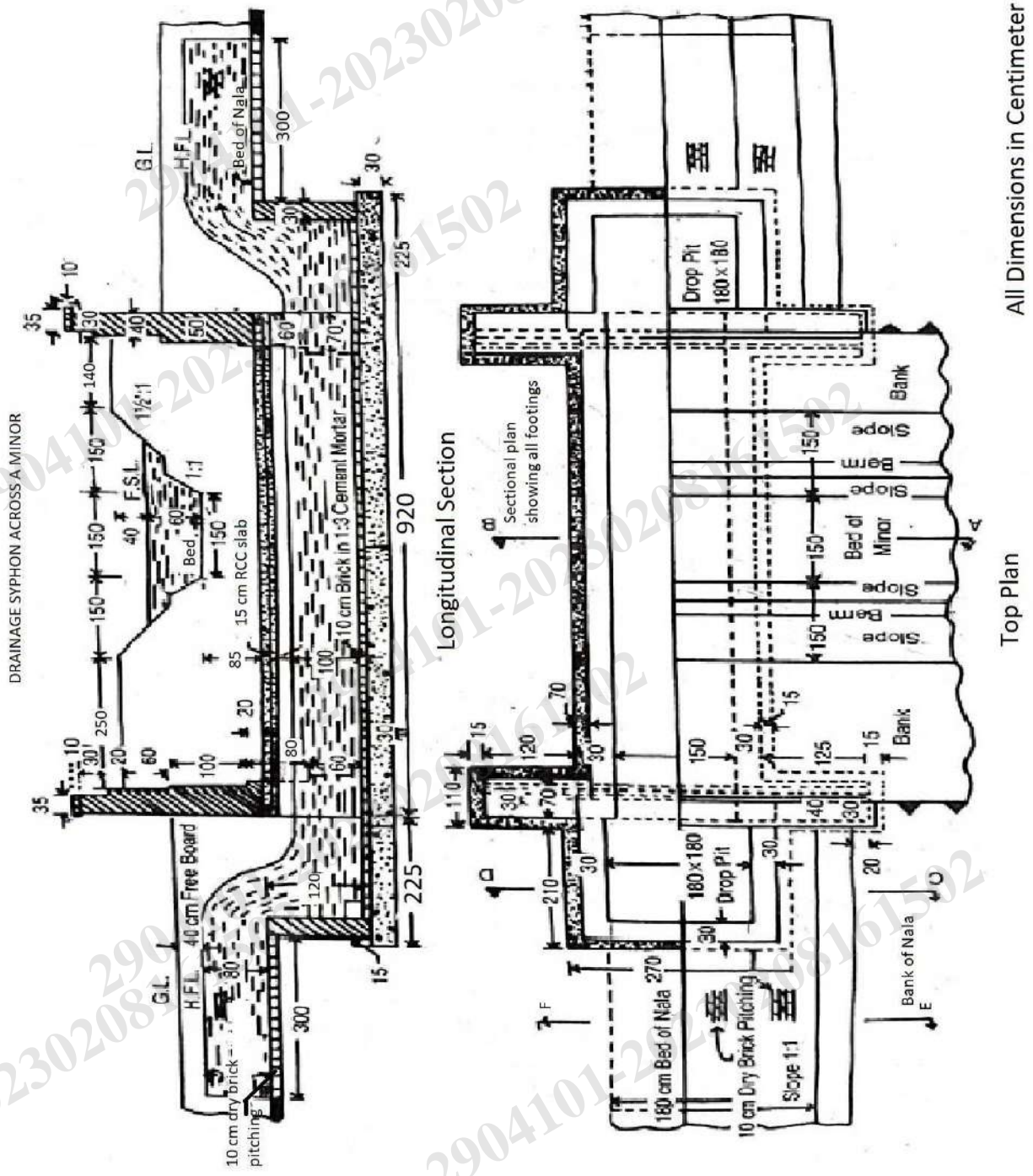


Figure 1

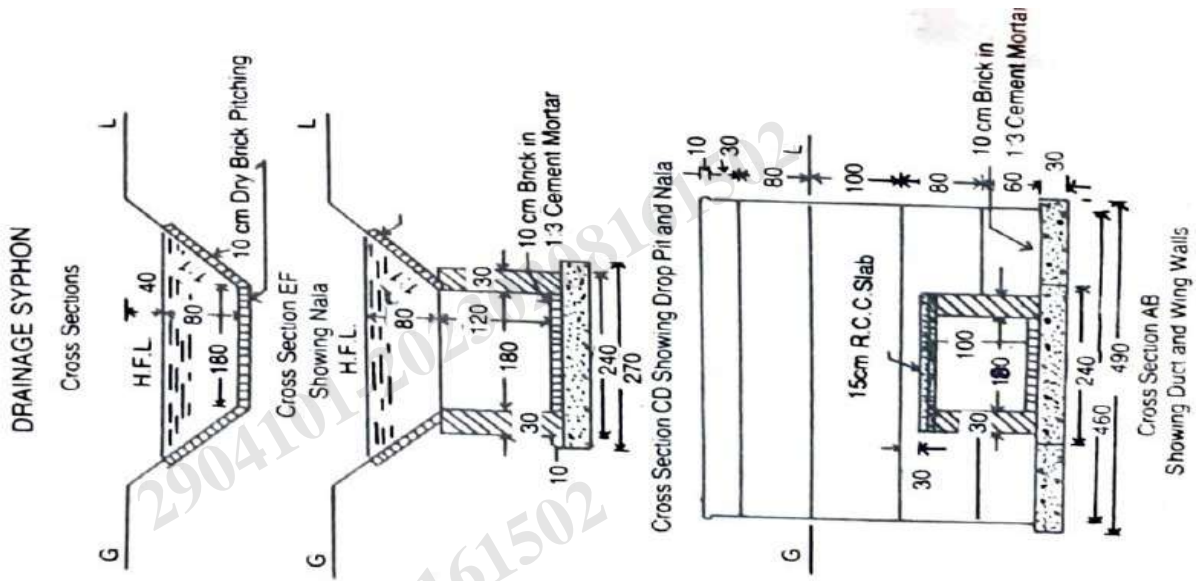


Figure 1

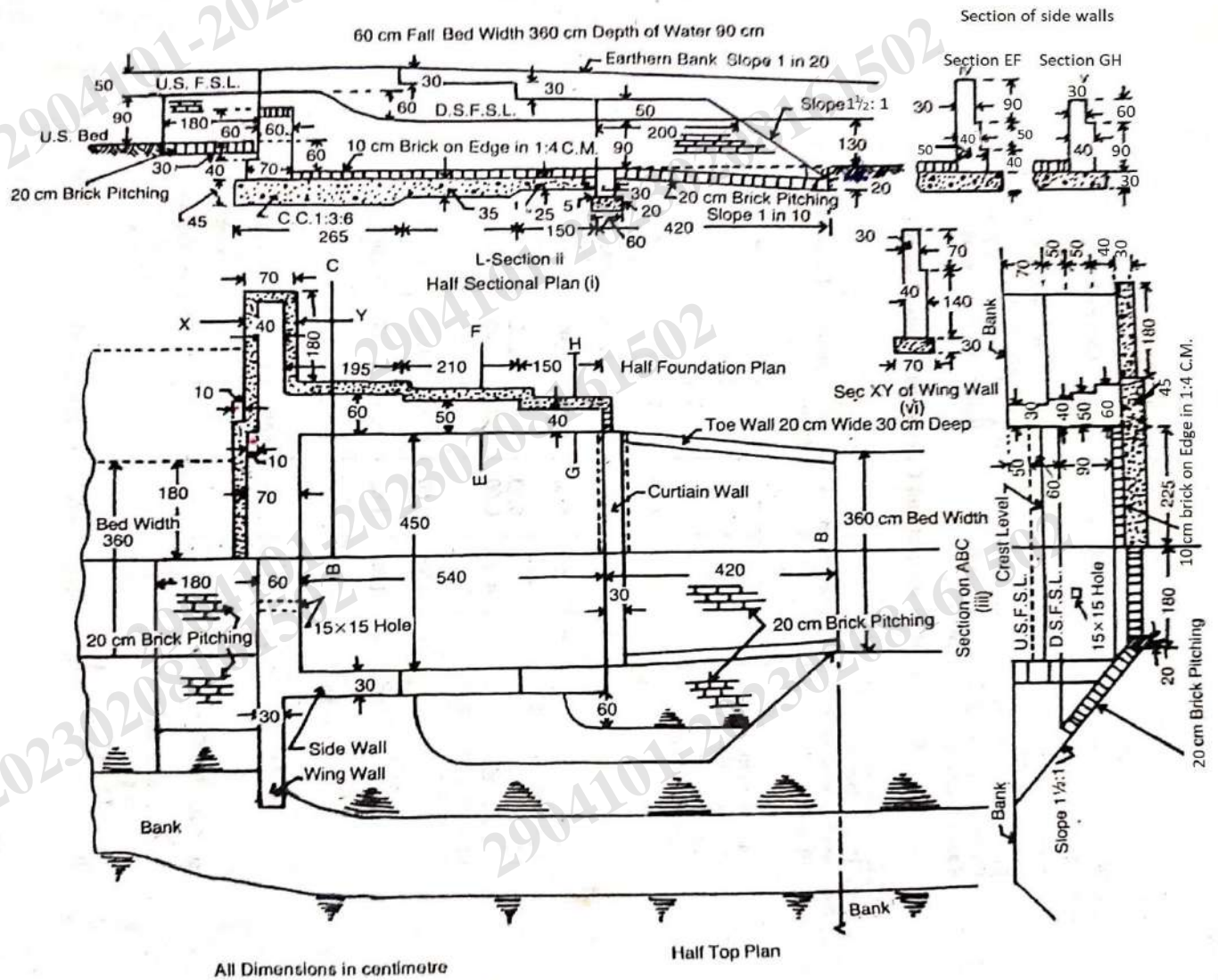


Figure 2

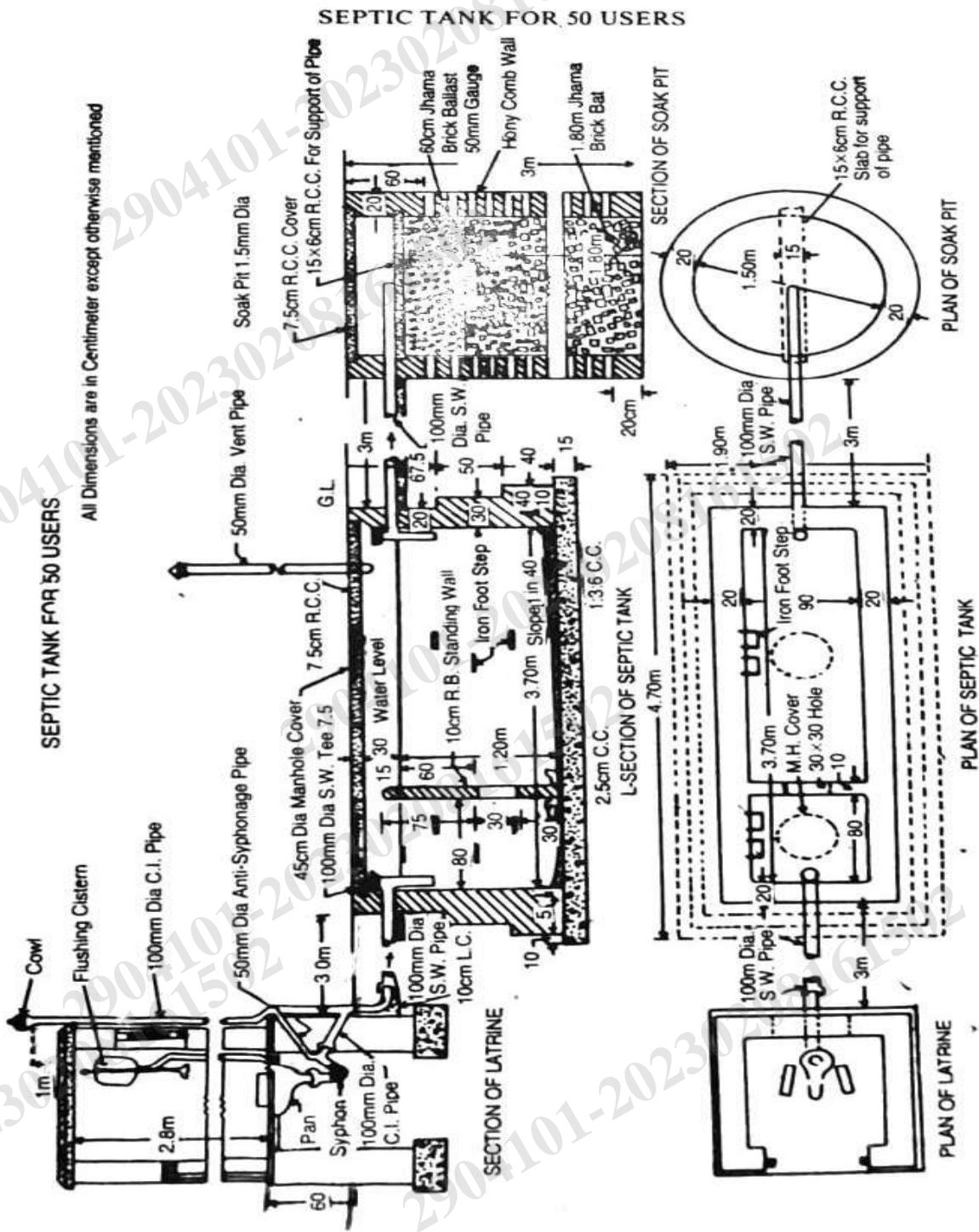


Figure 3

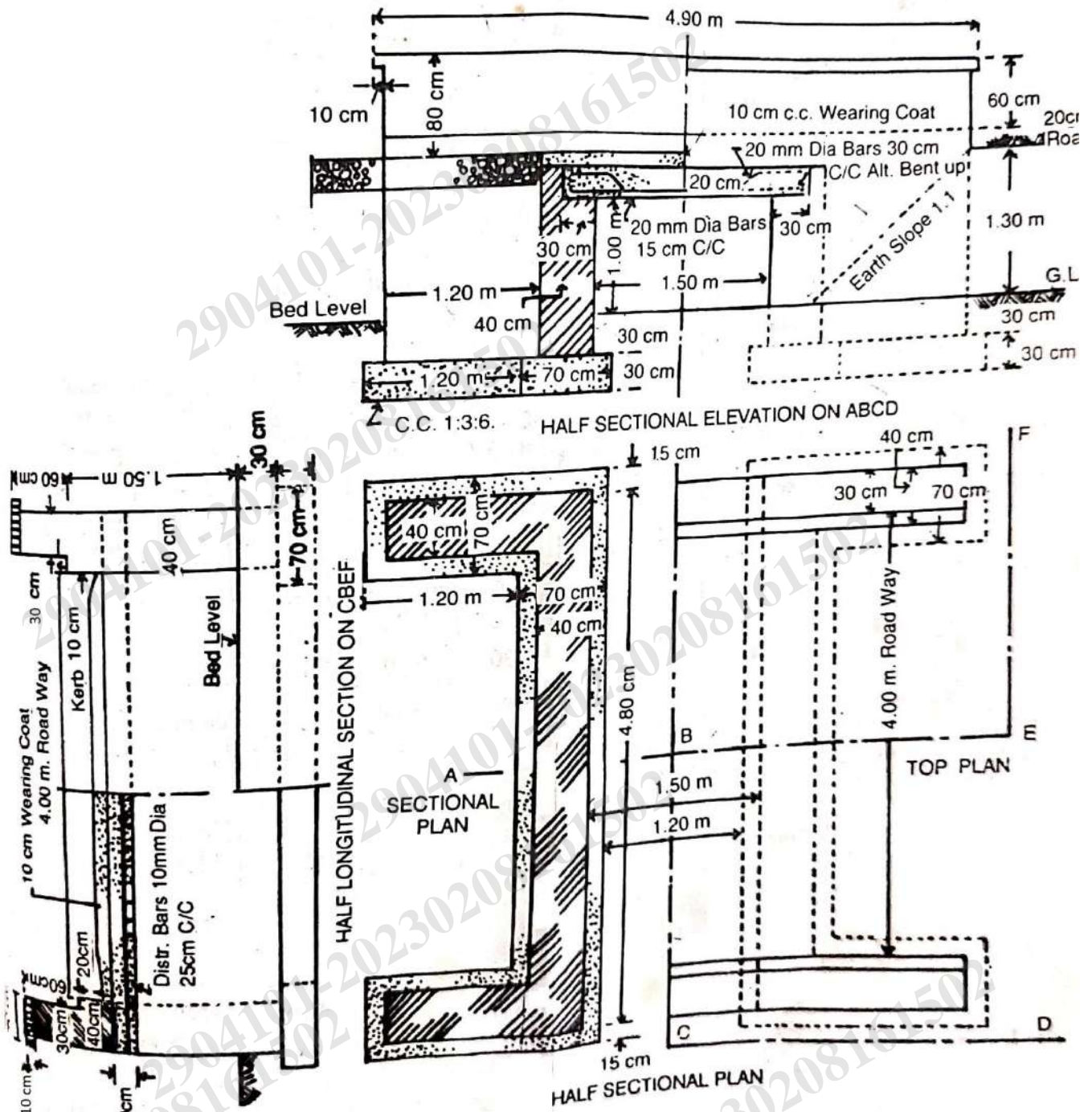


Figure 4