B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Estimating & Costing

P. Pages : 4 **MSP/KS/23/2691**

Time : Three Hours * 0 5 8 1 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.

1. a) Explain with suitable examples. The various methods of Calculating Approximate Estimates. **7**

b) The following table is an extract from the longitudinal section of a road earthwork survey. Calculate the quantity of earthwork from the following data. **7**

i) Formation width: 12m

ii) Side Slopes

a) Banking - 2:1 b) Cutting - 1.5:1

Chainage	0	30	60	90	120	150	180
RL of Ground	99.70	99.80	100.30	100.50	100.80	100.90	100.60
RL of Formation	100.50---------- in 300(+) ------ → ←	in 150(-) ——→					

OR

2. a) Prepare a preliminary estimate of a double storeyed building having carpet area of 1800m2. It may be assumed that 30% of the built up area will be considered for corridors and verandahs and 10% of the area to be occupied by walls Given: **6**

1) Plinth Area Rate: Rs. 1500 per m2
2) Water Suppl and Sanitary works : 5% of building cost
3) Electrical Installation: 12.5% of building cost.
4) Contingencies : 10%

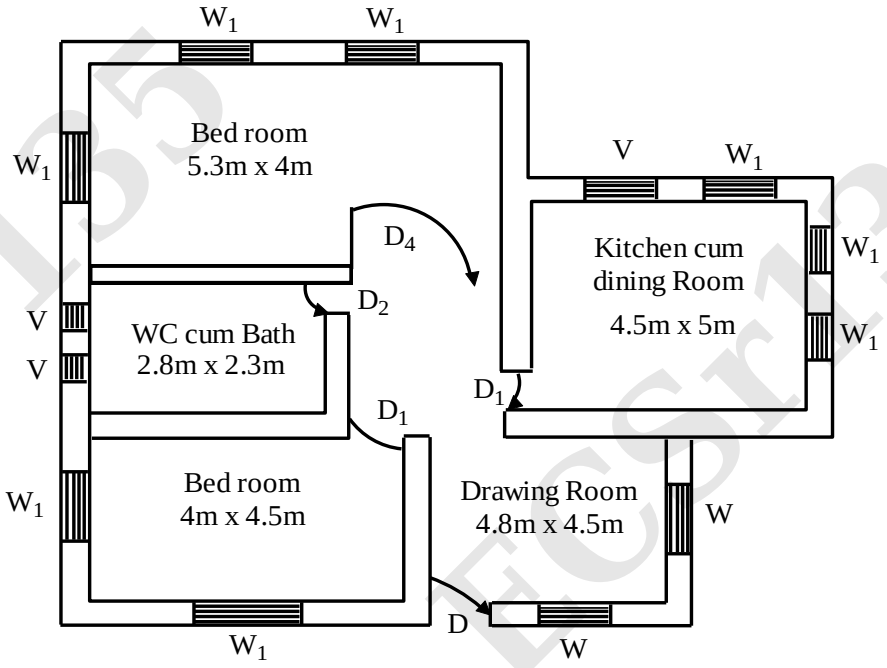
b) From the enclosed drawing (Fig. 1) calculate the quantities of the following items of work in standard tabular form on answer sheet. Prepare centre line diagram and indicate long walls and short wall separately and c/c length of each L/W and S/W and also its numbers (any two) **8**

i) Excavation in foundation

ii) PCC (1:4:8)

iii) UCR Masonry

3. a) Explain in details various contracts. **6**



D $\rightarrow 1.2 \times 2.1$ $W_1 \rightarrow 1.2 \times 1.5$

$D_1 \rightarrow 1 \times 2.1$ $V \rightarrow 0.5 \times 0.5$

$D_2 \rightarrow 0.9 \times 2.1$

$W \rightarrow 1.5 \times 1.5$

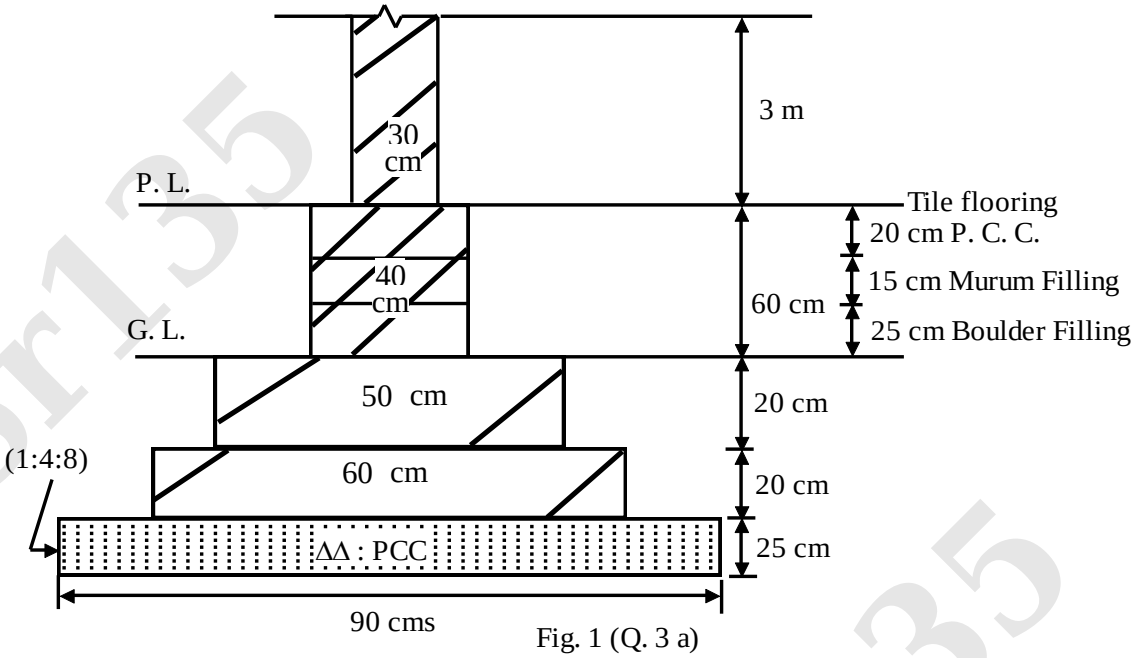


Fig. 1 (Q. 3 a)

b) A RCC slab overall size 3300mm×6800mm×130mm is provided with 16mmϕ as main steel reinforcement bent up alternately and placed @ 140mm c/c. Alternate bars are bent up at 540mm from the outer edge of the slab. Distribution steel bars are of 6mmϕ @180 c/c. Assume cover as 20mm throughout. Calculate the quantities of steel reinforcement in bar bending schedule. **8**
(All steel bars are of mild steel)

OR

4. a) Draft a tender notice for P.W.D. Works. **7**

b) Fig. 2 (Enclosed) shows the details of reinforcement of column and column footing. Assume cover as 25mm throughout in column and column footing both. Prepare an estimate with beat bending schedule and calculate the quantity of steel reinforcement. **7**

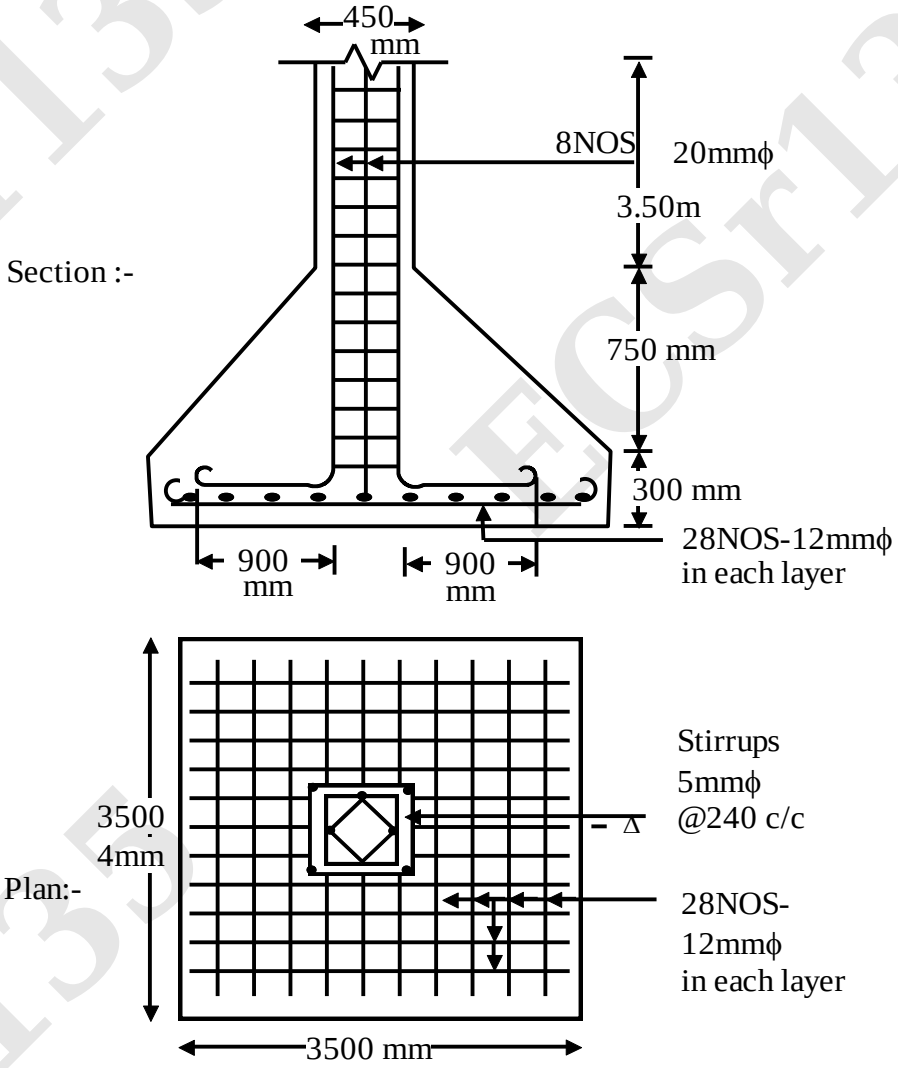


Fig. 2

5. a) What is specification? Explain the various types of specification. **7**

b) Write a short note on 'Direct and Indirect charges'. **7**

OR

6. a) Write a detailed specification of the following **any two.** **8**

i) Earthwork of Excavation in foundation trench.

ii) Laying P.C.C. in foundation trench (Mix 1:4:8)

iii) Second Class Brick Masonry in Superstructure.

b) Write a short note on 'MAS Accounts'. **6**

7. a) Define Rate Analysis. Explain the major and minor factors affecting rate analysis. **6**

b) Calculate the rate per unit item of following items (any two) **8**

i) PCC (1:4:8)

ii) Brick Masonry in Superstructure in C.M. 1:6 (Brick Size 19cm×9cm×9cm)

iii) 20mm thick Cement plaster in C.M. 1:4.

OR

8. a) What do you understand by Task work of a labourer? Explain the factors affecting taskwork. **6**

b) Calculate the rate per unit item of the following **any two.** **8**

i) RCC work (1:2:4) in slab (Assume 1% steel Reinforcement)

ii) Brick Masonry in superstructure in C.M. 1:4 (Brick size 23cm×11cm×7cm)

iii) 10cm thick cement concrete flooring (1:3:6)

9. a) What is valuation? Explain in brief the various purposes of valuation. **7**

b) A person has purchased an old building at the cost of Rs. 90 Lakhs on the basis that the cost of land is Rs. 50 Lakhs and the cost of building structure is Rs. 40 Lakhs. Considering the future life of a building as 20 years. Calculate the amount of sinking fund at 4% interest, when scrap value is 10% of the building structure. **7**

OR

10. a) Enlist the various types of valve. Explain any two. **7**

b) A leasehold property is to produce a net annual income of Rs. 12,000 for the next 20 years. The owner expects a return of 8% on his capital and also sets apart of sinking fund to accumulate at 6% annually to replace the capital. **7**
Determine the capitalized value of the property.

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B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Construction Engineering & Management

P. Pages : 2 **MSP/KS/23/2692**

Time : Three Hours * 0 5 8 2 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Assume suitable data whenever necessary.
8. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Discuss construction is a key industry in India. **7**

b) State the types and factors influencing demand. **7**

OR

2. a) Explain the concept of law of returns with diagrammatic representation. **7**

b) State the role and problems with infrastructure in economic development. **7**

3. a) Define production. Explain the various factors of production with reference to construction industry. **7**

b) What are the concepts of affordable housing schemes by Government of India? **7**

OR

4. a) What is Division of Labour? State the merits of division of Labour. **7**

b) Explain the term. **7**

i) Fixed Cost.

ii) Variable Cost.

iii) Average Cost.

iv) Marginal Cost.

5. a) state the essentials and classification of market. **7**

b) Discuss the measures to control inflation in an economy. **7**

OR

6.	a)	Highlight the merits and demerits of Direct taxes.	**7**
	b)	What is Oligopoly? Explain the characteristics of Oligopolistic Competition.	**7**
7.	a)	Define marketing management. Explain the elements of marketing mix.	**7**
	b)	Explain the channels of distribution in marketing management.	**7**

OR

8.	a)	Explain the objectives and types of advertisement.	**7**
	b)	Write a note on- i) Sales Promotion. ii) Cost plus pricing.	**7**
9.	a)	Explain the contents and format for Balance sheet.	**7**
	b)	Explain the internal and external sources of finance.	**7**

OR

10.	a)	Discuss with format the outline of profit and loss statement.	**7**
	b)	Highlight the nature and scope of financial management.	**7**

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B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Water Resource Engineering

P. Pages : 3 **MSP/KS/23/2693**

Time : Three Hours * 0 5 8 3 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Assume suitable data whenever necessary.
8. Illustrate your answers whenever necessary with the help of neat sketches.
9. Use of non programmable calculator is permitted.

1. a) Define precipitation. Explain in brief the different types of precipitation. **6**

b) The average annual rainfall depths recorded at existing 5 raingauge stations in a drainage basin are 88, 104, 138, 78 & 56 cm. Determine the optimum number of raingauge stations in the basin so as to limit the percentage error within 10%. Also determine the optimum number of raingauages required to be installed in the existing basin. **8**

OR

2. a) Explain synthetic Unit Hydrograph. **6**

b) The ordinates of a 4 hr. UH of a basin of area $300\,km^2$ measured at 1hr. Intervals are 6, 36, 66, 91, 106, 93, 79, 68, 58, 49, 41, 34, 27, 23, 17, 13, 9, 6, 3 & $1.5\,m^3/s$ respectively. Obtain the ordinates of a 12 hr. UH for the basin. **8**

3. a) What are the various methods of irrigation? Explain any one in detail. **6**

b) After how many days will you supply water to soil, in order to ensure efficient irrigation of the given crop if: **8**

i) Field capacity of soil = 27%
ii) Permanent wilting point = 14%
iii) Dry density of soil = $15\,kN/m^3$
iv) Effective depth of rootzone = 75cm
v) Daily consumptive use of water for the given crop = 11 mm

OR

4. a) Explain in brief the following: **6**

i) Relation between duty & delta

ii) Methods of Assessment of irrigation water.

b) The base period, intensity of irrigation & duty of water for various crops under the canal system are given. Determine the reservoir capacity if the culturable command area is 4000 hectares. Canal losses are 25% and reservoir losses are 15% **8**

Crop	Base Period (Days)	Duty at field (hect/cumes)	Intensity of Irrigation
Wheat	120	1800	20%
Sugarcane	360	1700	20%
Cotton	180	1400	10%
Rice	120	800	15%
Vegetable	120	700	15%

5. a) Explain in details the various storage zones of reservoir with a neat sketch. **6**

b) An impounding reservoir had original storage capacity for 738 ha.m. The drainage area of the reservoir is 80 sq.km, from which annual sediment discharges into the reservoir at the rate of 0.1153 ha.m per sq. km of the drainage area. Assume the trap efficiency as 80% Find the annual loss of the reservoir in % per year. **8**

OR

6. a) Explain the seepage control measures in earth Dam. **6**

b) Find the probable life of a reservoir from the following data: **8**

i) Initial reservoir capacity = $30\,\mathrm{M\,m^3}$

ii) Annual flood inflow = $60\,\mathrm{M\,m^3}$

iii) Average annual sediment = 36,00,000 kN inflow

iv) Specific weighting sediment = $12\,\mathrm{kN/m^3}$

v) The useful life of reservoir will terminate when 80% of initial capacity is filed with sediments.

vi)

Capacity Inflow	Trap Efficiency
0.1	87
0.2	93
0.3	95
0.4	95.5
0.5	96
0.6	96.5

7. a) Explain in brief forces acting on a gravity dam. **6**

b) Find maximum shear and compressive stress on D/S face of a 200 m high gravity dam having D/S slope of 0.7H: 1V throughout. The top width of dam is 10 m. Weight of masonry may be takes as 24 kN/sq.m & eccentricity of resultant as 20m. U/S face is vertical. Neglect uplift and tail water depth. **8**

OR

8. a) Write a short note on spillways. **6**

b) A masonry dam (specific gravity = 2.25) with vertical face has top width 4m, bottom width 20m and height 24m. FRL is 3m below top. Determine the factor of safety against overturning and stresses developed at the toe and heel of the dam. **8**

9. a) Explain Lacey's regime theory. **6**

b) A canal has bed width 6m and depth 1.20m, discharge 4.60 cumecs and slope 1 in 5000 manning's N = 0.0225 and CVR = 0.95, Check whether the chosen section satisfies Kennedy's theory. **8**

OR

10. a) What is water logging? Explain the causes of water logging. **6**

b) Design a lined canal of trapezoidal section for a discharge of $150\,m^3/sec$. laid in a bed slope of 1 in 10000. The side slopes are 1V: 1.5H manning's 'N' = 0.016, Assume B/D = 1.5. **8**

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B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Elective-III : Prestressed Concrete

P. Pages : 3 **MSP/KS/23/2694**

Time : Three Hours * 1 1 2 5 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
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6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data whenever necessary.
9. Diagrams and chemical equations should be given whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.
12. IS 1343, IS 3370 Permitted.

1. a) List the various types of loss of prestress in pretensioned and post tensioned members. **6**

b) The end block of post tensioned prestressed concrete beam, rectangular in section is 100 mm wide & 200 mm deep. The prestressing force of 100 kN is transmitted to concrete by a distribution plate, 100 mm wide & 50 mm deep, concentrically located at ends. Calculate the position & magnitude of maximum tensile stress on horizontal section through the centre and edge of the anchor plate also calculate bursting tension on these horizontal planes. **8**

OR

2. a) Explain the process of transmission of prestressing force in pre-tensioned members. **7**

b) Explain End block design as per IS1343 method. **7**

3. A prestressed concrete beam of span 8m having a rectangular section of 150 mm × 300 mm the beam is prestressed by a parabolic cable having an eccentricity of 75 mm below the centroidal axis at the center of span & eccentricity of 25 mm above the centroidal axis at support sections. The initial force in cable is 350 kw. The beam supports three concentrated loads of 10 kw each at intervals of 2m E_C = 38 kN/mm^2. **14**

i) Neglect the losses of prestress, estimate long term deflection due to (Prestress +self weight)

ii) Allowing for 20% loss in prestress estimate long term deflection under (prestress + self weight + live load) assume creep coeff. As 1.8.

OR

4. A prestressed concrete beam having a cross sectional area (A) of 5×10^4 mm^2 is simply supported over a span of 10 m. It supports a uniformly distributed imposed load of 3 kN/m, half of which is non permanent. The tendon follows a trapezoidal profile with an eccentricity of 150 mm within the middle third of the span and varies linearly from the third span points to zero at the supports. The area of tendons 2 A 350 mm P = have effective prestress of 1290 N/mm immediately after transfer. Using the following data, calculate : **14**

a) Short term deflection
b) Long term deflection Take 8 4 2 4 2 2 = , Densityx = = x g S I 4.5 10 mm, Ec 34 kN/mm, A 5 10 mm, E 200 kN/mm = concrete = 3 23.6 kN/m, Creep Coefficient = 2, concrete shrinkage, 6 cs 450 10- x = ε Relaxation of steel stress = 10%.

5. A continuous beam ABC, AB = BC = 12 m has a uniform rectangular section with a width of 150 mm & depth of 300 mm. The cable carrying effective prestressing force of 420 kN parallel to axis of the beam located at 125 mm from the soffit. **14**

a) Determine the secondary & resultant moment at central support B.
b) If the supports and imposed load of 1.5 kN/m, calculate the resultant stresses at top and bottom of beam at B.
c) Locate the resultant line of thrust through beam AB.

OR

6. A precast pretensioned beam of rectangular section has a breadth of 100 mm and 200 mm deep. The beam with an effective span of 5m, is prestressed by tendons with their centroid coinciding with the bottom kern. The initial force in tendons is 150 kN. The loss of prestress may be assumed to be 15%. The beam is incorporated in composite T beam by casting a top flange of breadth 400 mm and thickness 50 mm. If the composite beam supports a live load of 8 kN/m2, calculate the resultant stresses developed in the precast and insitu cast concrete assuming the pre-tensioned beam as unsupported and propped during the casting of slab. Assume the same modulus of elasticity for concrete in precast beam and in situ cast slab. **14**

7. A prestressed concrete portal frame ABCD is fixed at A & D has column AB = CD = 4m and the beam BC = 12 m. The member has cross section 150 mm wide and 300 mm deep throughout. The columns are prestressed by a straight cable with an eccentricity of 50 mm towards the outer sides of the frame at B and C. The beam BC is prestressed by a parabolic cable having an eccentricity of 50 mm above the centroid at B & C and 100 mm below the centroid at the centre of BC. The prestressing force in all cables is 200 kN. Calculate the secondary moments developed in A and B using the flexibility coefficients. **14**

OR

8. A prestressed beam having a rectangular cross section with a width of 120 mm and a depth of 300 mm is continuous over two spans, AB = BC = 8 m. The cable with zero eccentricity at the ends and an eccentricity of 60 mm towards the top fibres of the beam over the central support, carries an effective force of 600 kN. **14**

a) Calculate the secondary moment developed at B.
b) If the beam supports concentrated loads of 20 kN each at mid points of span, evaluate the resultant stress at the central support section B.
c) Locate also position of the pressure line at section.

9. A prestressed concrete circular cylinder tank is required to store 25400 million liters of water. The permissible compressive stresses in concrete at transfer should not exceed 13 MPa and the minimum compressive stress under working pressure not less than 1 MPA. The loss ratio is 0.7. High tensile wires of 7 mm diameter with an initial stress of 1000 n/mm2 are available for winding round the tank. Freyssynet cable of 12mm wires of 8mm diameter which are stressed to 1000 N/mm2 are available for vertical prestressing. The cube strength of concrete is 40 MPs. Design the tank walls supported on elastometric pads. Assume the coefficient of friction as 0.5. **14**

OR

10. A prestressed concrete cylinder pipe is formed by lining a steel cylinder of diameter 700 mm and thickness 2.5mm with a layer of spun concrete 25mm thick. If the pipe is required to withstand a hydraulic pressure of 0.85 MPa without developing any tensile stresses in concrete, calculate **14**

i) The required pitch of 4mm wires, wound round the cylinder at tensile stress of 1000 MPa.
ii) The test pressure to produce a tensile stress of 1.4 MPa in the concrete immediately after the winding, and
iii) The approximate bursting pressure Modular ratio = 6 Tensile strength of wire = m 1700 MPa Yield stress of cylinder = 280 MPA Loss ratio = 0.85.

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B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Elective-III : Urban Transportation Planning

P. Pages : 2 **MSP/KS/23/2695**

Time : Three Hours * 0 5 8 9 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
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6. Solve Question 9 OR Questions No. 10.
7. Assume suitable data whenever necessary.
8. Illustrate your answers whenever necessary with the help of neat sketches.
9. Use of non programmable calculator is permitted.

1. a) How would you define Urban Area? Explain how urban area is related to economic growth of a country. **7**

b) Explain briefly the various types of cities and structure of urban roads. **7**

OR

2. a) How urban design is incorporated for urban roads? Explain briefly. **7**

b) How would you classify urban roads? Explain any one type of urban road. **7**

3. a) Explain classification of transit system with an example. **7**

b) Explain the problems in the urban transportation in the present scenario. **7**

OR

4. a) Write notes on: **7**

i) Transportation demand

ii) Road congestion

b) What are the factors influencing transportation needs? Explain briefly. **7**

5. a) Define travel time ratio and explain in brief traffic volume study. **7**

b) Write a short note on: **7**

i) Urban transportation system.

ii) Sample selection for Origin destination survey.

OR

6. a) Discuss briefly about traffic surveys. **7**

b) Explain in brief the process of urban transportation planning. **7**

7. a) The following data shows average household size and total trips made per day for a particular study area. Develop the trip production equation and also compute coefficient of correlation. **7**

Average household size	Total trips/day
2	4
3	6
4	7
5	8
6	10

b) Write a short note on opportunity models. **7**

OR

8. a) Define model split and explain in brief the factors affecting model split. **7**

b) Draw the flow diagram for model split carried out between trip generation and trip distribution. **7**

9. a) Explain rail transit system in India. **7**

b) Define BRT, GIS and ITS. **7**

OR

10. a) What are the innovative approaches in urban transportation? **7**

b) Explain advantages of track guided bus. **7**

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B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Elective-III : Soil Dynamics

P. Pages : 2 **MSP/KS/23/2696**

Time : Three Hours * 0 5 8 5 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
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6. Solve Question 9 OR Questions No. 10.
7. Assume suitable data whenever necessary.
8. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Write a detailed description of past earthquakes due to soil and ground failures. **7**

b) Enumerate and explain the seismic design considerations for retaining walls during earthquakes. **7**

OR

2. a) Explain the effects of soil properties on seismic response of structures. **7**

b) Explain seismic waves and their characteristics in details. **7**

3. Write an explanatory note on the following: **14**

i) Vibration isolation.

ii) Vibration absorbers.

iii) Vibration measuring instruments.

OR

4. a) Explain the behaviour of soil under dynamic loading. **6**

b) Illustrate and describe the mechanism of wave propagation in an semi-infinite elastic continuum medium. **8**

5. a) How the seismic response of soil measured at low and high strain. **6**

b) Why dynamic soil properties are evaluated? List the various laboratory and field tests for dynamic soil properties? **8**

OR

6. a) Explain stress-strain behaviour of cyclically loaded soils. **6**

	b)	Discuss in details the method of conducting seismic cross hole test with their suitability and limitations.	**8**
7.	a)	Give the salient features of the liquefaction studies made by shake table tests.	**7**
	b)	Explain the basic mechanism of 'liquefaction' and the factors affecting it.	**7**

OR

8.	a)	Write a short note on Liquefaction susceptibility.	**6**
	b)	What is liquefaction potential? Explain any two methods for determination of liquefaction potential.	**8**
9.	a)	Explain in details about the types of machine foundation.	**7**
	b)	What is the data required for carrying out design of impact machines. Write a brief note on it.	**7**

OR

10.	a)	What are the different methods of vibration isolation?	**6**
	b)	Describe different materials used for vibration isolation. Discuss relative merits and demerits.	**8**

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B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Elective-III : Environment Management

P. Pages : 2 **MSP/KS/23/2696A**

Time : Three Hours * 0 5 8 6 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
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5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Illustrate your answers whenever necessary with the help of neat sketches.
9. Use of non programmable calculator is permitted.

1. a) What is Environmental Management? What are the objectives of Environmental Management? **7**

b) Write on goals and components of Environmental Management. **7**

OR

2. a) What is Environmental sustainability and sustainable development? **7**

b) Discuss Environmental values and ethics. **7**

3. a) Discuss EIA case Studies. **6**

b) What is an Environmental Impact Assessment (EIA)? Discuss how it is different from strategic Environmental Assessment (SEA). **8**

OR

4. a) What is the role of EIA in India? Explain benefits of EIA. **8**

b) Write on key elements of EIA. **6**

5. a) Define environmental risk Analysis. Suggest some risk assessment applications for environmental management problems. **6**

b) Briefly explain various steps involved in risk management related to hazard identification. Exposure assessment and risk characterization. **8**

OR

6. a) Write on formulation of strategies of Environmental Management Plan. **7**

b) Explain stages in the prior Environmental Clearance. **7**

7.	a)	What is Environmental Audit? Give Details.	**7**
	b)	Explain EMS Certification.	**7**

OR

8.	a)	Discuss various purposes of Environmental Management Systems. What is ISO 1400 standard for EMS? Give its advantages.	**8**
	b)	Write a short note on international voluntary standards.	**6**
9.	a)	Compare the functions of central pollution control board with the functions of state pollution control boards in the area of Air pollution control.	**8**
	b)	Write a short note on cost-benefit appraisals.	**6**

OR

10.	a)	Discuss various energy alternatives that can be adopted to minimize energy impact and pollution on environment.	**8**
	b)	What is cleaner technology of production.	**6**

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B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Elective-III : Repair Rehabilitation of Civil Engineering Structures

P. Pages : 2 **MSP/KS/23/2697**

Time : Three Hours * 0 5 8 7 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Diagrams and chemical equations should be given whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What are the different Physical processes of deterioration explain any one. **7**

b) What is Carbonation and its effect on strength of concrete and how it can be avoided? **7**

OR

2. a) Explain Sulphate attack on concrete and how it can be prevented. **7**

b) What are the different types of Cracks in concrete and how it can be prevented. **7**

3. a) What is Rebar locator, where it is used and How it works. **7**

b) Explain Pull out test on concrete, its application and advantages. **7**

OR

4. a) Explain Penetration resistance test on concrete and what it indicates. **7**

b) What are the different Methods for corrosion measurement and Explain any one method. **7**

5. a) Define building failure and explain types of failures in Civil engineering structures. **7**

b) What do you mean by Accidental over Loading failures in civil engineering structures. **7**

OR

6. a) Explain damage of the structure due to Fire and methodology for investigation of failures due to fire. **7**

b) What do you mean by Poor Construction practices failures in civil engineering structures and how the failures can be avoided. **7**

7.	a)	What is Admixture, explain different types of admixtures and state its Purpose.	**7**
	b)	What is Glass and Carbon fibre wraps, were it has been used and what is its Purpose.	**7**

OR

8.	a)	Explain Concrete behavior under corrosion and what is Chloride induced corrosion.	**7**
	b)	What is Acoustic emission method and explain Principle of Acoustic Emission Test.	**7**
9.	a)	What is Distress, explain different types of distress.	**7**
	b)	What is Grouting, what should be Properties of grout and States its applications.	**7**

OR

10.	a)	What is Jacketing, explain necessity of Jacketing in concrete structures.	**7**
	b)	How under Water Repair can be carried out in concrete What are the different stages in under water repair work?	**7**

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B.Tech. Sixth Semester (Civil Engineering) (C.B.C.S.) Summer 2023

Elective-III : Water Transmission & Distribution System

P. Pages : 2 **MSP/KS/23/2698**

Time : Three Hours * 0 5 8 8 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Assume suitable data whenever necessary.

1. What do you mean by equivalent pipe? Determine the equivalent diameter for a pipe system as shown in Fig. Q. No. 1 **14**

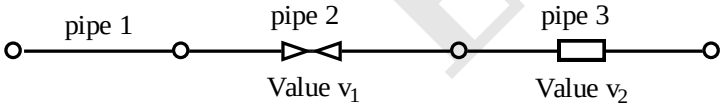


Fig. Q. No. 1

The detail are given below:

Pipe	Length (m)	Dia (mm)	Hw constant
1	200	150	95
2	300	100	90
3	250	120	93

Head loss in valves $hf\ v_1 = \frac{10\,v^2}{zg}$, $hf\ v_2 = \frac{7.5\,v^2}{zg}$ where v = velocity in m/sec through the corresponding pipe.

OR

2. A pump p is connected with two reservoirs A and B as shown in fig. 2. Water level in reservoir A is 93.0 m while in reservoir B is 820 m. The resistance constants for pipe 1, 2 & 3 are 200, 500 and 150 respectively in head loss formula $hf = r\,Q^{1.85}$ in which hf is in m and Q is in m^3/sec. The head discharge characteristics of the pump is H = 17.2 - 49.2 $Q^{1.85}$ in which H = Head developed by the pump in 'm' and Q is discharge in m^3/sec. Determine the discharge in m^3/sec. Determine the discharge in various pipes and HGL value at the junction. Neglect the length of pipe between the pump and sump. The sump water level is 80.0 m. **14**

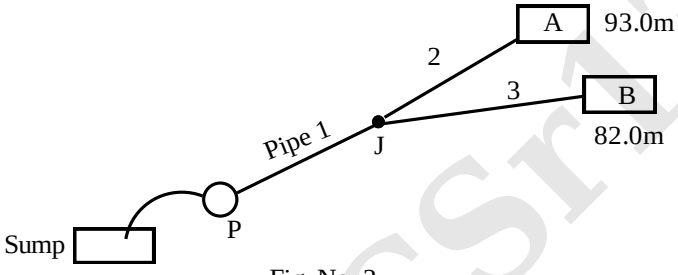


Fig. No. 2

3. a) Explain water distribution system with its requirements and functions. **7**

b) Explain PRV, why is it provided in WDN. How a WDN is to be analysed provided with a PRV? **7**

OR

4. Write short note on **any three**. **14**

i) Sluice valves ii) Pressure Relief valves
iii) Air relief valves iv) Scour valves

5. Analyze the network as shown in fig. Q. No. 3 by using Newton Raphson method using H – equations. The head loss through pipes is given by $hf = rQ^{1.85}$ values of pipe resistance constant are given along the pipes carryout ONE iteration of network analysis. **14**

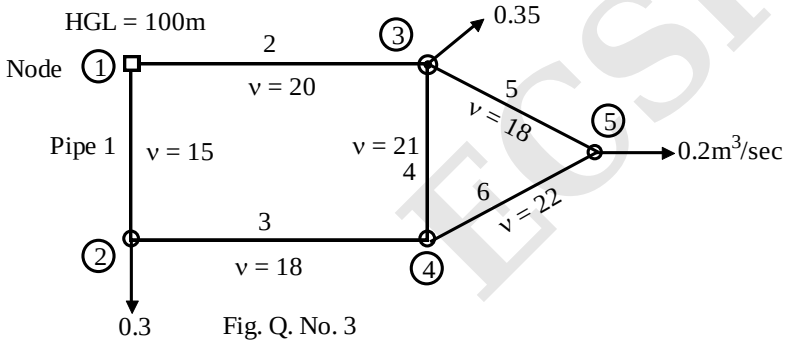


Fig. Q. No. 3

OR

6. The network described in Q No. 3 and shown in fig. Q. No. 3 is to be analysed by linear theory method using Q – equations. Carryout ONE iteration of network analysis. **14**

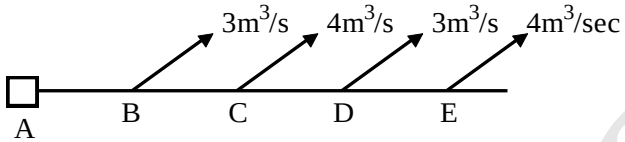
7. a) Explain flow head graphical representation of node flow analysis **5**

b) Classify the nodes according to the flow. **5**

c) Explain static node flow analysis. **4**

OR

8. A serial distribution network consists of source node A and four demand nodes B, C, D, E. The available HGL values at A is 100 m. The level at node B, C, D and E are 90 m, 88 m, 85m and 82 m resp. The resistance content for pipe AB, BC, CD and DE are 0.05, 0.12, 0.2, 0.3 respectively in Hazen Williams pipe Head loss relationship carry out the node flow analysis of the network shown in fig. **14**



9. a) Explain 'Cost Head Loss Ratio criteria method of network optimization. **7**

b) Write short note on Linear programming technique. **7**

OR

10. a) Write various approaches for design of optimal WDN. **7**

b) Write short on introduction to non linear programming. **7**

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