B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Irrigation Engineering

P. Pages : 2 **MSP/KS/23/2370**

Time : Three Hours * 0 0 2 5 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Diagrams and chemical equations should be given whenever necessary.
11. Illustrate your answers whenever necessary with the help of neat sketches.
12. Use of non programmable calculator is permitted.

1. a) Define Irrigation. What are the types of flow irrigation? Explain any two flow irrigation systems? **6**

b) The CCA for a distributary is 14000 ha. The intensity of irrigation is 40% for Rabi and 15% for Rice. If kor period is 4 weeks for Rabi and 3 weeks for Rice. Determine the outlet discharge. Outlet factor for Rabi and Rice may be assumed as $1800\,ha/m^3/sec$. and $770\,ha/m^3/sec$. what is design discharge at distributary head at 10% conveyance loss? **7**

OR

2. a) Define Duty & Delta? Write down the Relationship between duty & delta? **6**

b) What are the benefits and ill effects of irrigation? **7**

3. a) Write a detail note on 'Storage capacity' of a Reservoir using mass curve? **7**

b) The following table gives the mean monthly runoff of a river. Draw a mass curve and find the capacity of the reservoir for the combined demand for irrigation, power generation reclamation etc. is 5 million cu. m/min. **7**

Month	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Run off 3min	3.5	05	08	12	16	18	12	08	5.5	2.0	2.2	3.0

OR

4. a) Explain Reservoir storage zone and water level with a neat sketch? **7**

b) Write a short notes on **any two**. **7**
i) Factors governing selection of dams
ii) Describe various modes of failure in Gravity Dam.
iii) Sedimentation of reservoir.

5. a) Explain in brief forces acting on a Gravity Dam? **7**

b) A masonry dam (Sp. Gr. = 2.5) with vertical face has top width 4m, bottom width 25 m and height 26 m. FRL 3.5 m below top. Determine the factor of safety against overturning and stresses developed at the toe and heel of the dam? **7**

OR

6. a) Define phreatic line? Explain the procedure for drawing phreatic line. **7**

b) Write a short note on **any two**. **7**
i) Methods of seepage control in an earthen dam.
ii) Explain elementary profile of a gravity dam.
iii) Inspection Galleries.

7. a) Describe the design criteria of ogee spillway? **6**

b) Explain with neat sketch. **7**
i) Divide wall ii) Silt Excluder
iii) Fish ladder.

OR

8. a) Discuss development utility & limitations of Khosla's theory? **6**

b) Explain in brief the design of a weir on permeable foundation using Bligh's creep theory? **7**

9. a) Discuss about the Lacey's regime theory? **6**

b) A canal has bed width 6.5 m and depth 2.0 m, discharge 4.60 cumecs and slope 1 in 5000 manning's N = 0.0225 and CVR = 0.95. Check whether the chosen section satisfy Kennedy's Theory. **7**

OR

10. a) Explain salient features of Kennedy's theory for the design of earthen channels based on the critical velocity concept? **6**

b) Design a channel using Lacey's theory for discharge 20 cumecs, mean diameter of silt particles = 0.30 mm and slide slopes $\frac{1}{2}:1$. Also find the longitudinal slope. **7**

11. Write a note on **any three**. **13**
i) Land Reclamation
ii) Water logging
iii) Tile Drain
iv) Head Regulators.

OR

12. a) Write a short note on Aqueduct and super passage. **6**

b) Explain in detail about canal regulation works? **7**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Advanced Structural Analysis

P. Pages : 3 **MSP/KS/23/2371**

Time : Three Hours * 0 1 9 9 * Max. Marks : 80

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.
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7. Solve Question 11 OR Questions No. 12.
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. Write a computer program for beam on elastic foundation by giving suitable example. **13**

OR

2. Derive the expression for circular beam subjected to uniformly distributed load 'w' in kN/m & supported on symmetrically placed column. Find maximum bending moment & maximum torsional moment **13**

3. Analyze the plane frame as shown in fig. 1. **14**

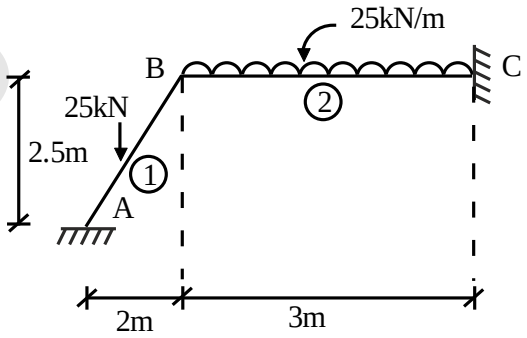

Fig. 1

Load of 25 kN is acting at the centre of AB.

OR

4. Assemble the global stiffness matrix & joint load vector for the plane frame as shown in fig 2. **14**

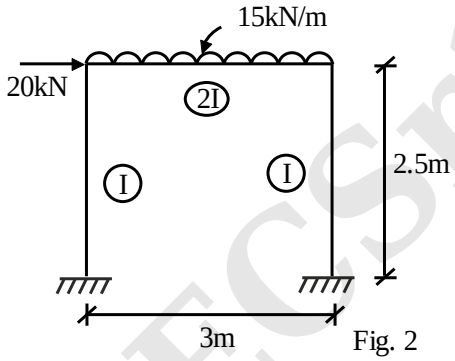

Fig. 2

5. Analyse the plane grid as shown in fig. 3. **14**

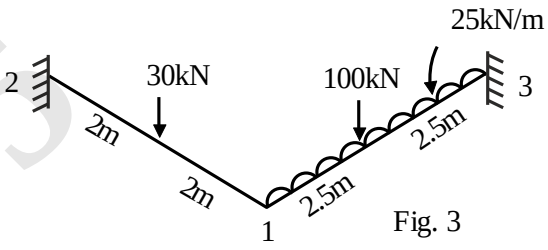

Fig. 3

Take:

$E = 22 \times 10^6 \text{ kN/m}^2$

$G = 8.8 \times 10^6 \text{ kN/m}^2$

$b = 350 \text{ mm}$

$d = 550 \text{ mm}$

$J = Ixx = \frac{db^3}{3}$

OR

6. Find displacement at node 2 of grid structure as shown in fig. 4. Member 1 is loaded with UDI of 25 kN/m and member 2 is loaded with concentrated load 30 kN acting at center take **14**

$E = 2.54 \times 10^7 \text{ kN/m}^2$ $\quad$ C/S of beam $= 250 \text{ mm} \times 600 \text{ mm}$

$G = 8.8 \times 10^6 \text{ kN/m}^2$

$Ixx = db^3/3$

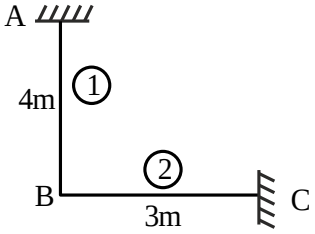

Fig. 4

7. Explain the following terms in details

i) D'Alembert's principle. **3**

ii) Inertia force **3**

iii) Equation of motion **3**

iv) Single degree of freedom system **4**

OR

8. a) What is transmissibility? Derive the equation of transmissibility. **6**

b) Derive the transient and steady state response for undamped single degree of freedom system subjected to harmonic loading. **7**

9.	a)	Explain DUHAMEL's integral in reference to impulsive loading and derive the expression for DLF rectangular load.	**7**
	b)	Draw the first three mode shapes for a beam fixed at one end & free at other end.	**6**

OR

10.	a)	Draw the first three mode shapes for a beam fixed at one end & free at others using Euler Bernoulli equation.	**6**
	b)	Explain approximate method of analysis of impulsive loading.	**7**
11.	a)	What are different IS 1893 code based procedure for seismic analysis? Explain Codal coefficient method in detail.	**7**
	b)	Explain need of earthquake analysis of structure and need of standard code.	**6**

OR

12.	a)	Explain the guideline of earthquake resistance design?	**6**
	b)	Explain in brief about Seismic Zone of India.	**7**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Pre-Stressed Concrete

P. Pages : 3 **MSP/KS/23/2372**

Time : Three Hours * 0 2 0 0 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
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.
11. Use of IS 1343 and IS 3370 is permitted.

1. a) Explain in brief the losses of prestress. **6**

b) A pre-tensioned concrete beam, 150 mm wide and 350 mm deep is prestressed by straight wires carrying an initial force of 250 kN at an eccentricity of 40mm. the modulus of elasticity of steel and concrete are $210\,kN/mm^2$ and $35\,kN/mm^2$ respectively. Estimate the percentage loss of stress in steel due to elastic deformation of concrete if the area of steel wires is $188\,mm^2$. **7**

OR

2. a) Explain the process of transmission of prestressing force in pre-tensioned members. **6**

b) The end block of post tensioned prestressed concrete beam, rectangular in section is 100 mm wide and 200 mm deep. The prestressing force of 150 kN is transmitted to concrete by a distribution plate 100 mm wide and 40 mm deep. Concentrically located at ends. Calculate the position and magnitude of maximum tensile stress on horizontal section through the centre and edge of the anchor plate. Calculate the bursting tension on these horizontal planes. **7**

3. a) What is Kern distance. **3**

b) A post-tensioned prestressed beam of rectangular section 250 mm wide is to be designed for an imposed load of 15 kN/m, uniformly distributed on a span of 10m. The stress in the concrete must not exceed 17 MPa in compression and 1.5 MPa in tension at any time and the loss of prestress may be assumed to be 15% **10**

i) Calculate the minimum possible depth of beams and

ii) For the section provide, calculate the minimum prestressing force and the corresponding eccentricity

OR

4. A prestressed concrete beam having a cross sectional area (A) of $6\times10^4 mm^2$ is simply supported over a span of 10m. It supports a uniformly distributed imposed load of 3kN/m, half of which is non-permanent. The tenden 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 $A_P = 350 mm^2$ have effective prestress of $1290\,N/mm^2$ immediately after transfer. Using the following data, calculate **13**

a) Short term deflection
b) Long term deflection

Take $I_g = 4.5\times10^8 mm^4, E_c = 34 kN/mm^2, E_s = 200\,kN/mm^2$,

Density of concrete $23.6 kN/m^3$, creep coefficient = 2, $\varepsilon_{cs} = 450\times10^{-6}$, Relaxation of steel stress = 12%

5. a) What are the requirements of longitudinal and transverse reinforcement requirements if the prestressed beam is subjected to combined bending, shear and torsional stresses. **7**

b) How do you estimate the ultimate shear strength of prestressed concrete sections with web shear cracks? **7**

OR

6. a) The cross section of a prestrsed concrete beam is rectangular with a width of 350 mm and overall depth of 600 mm. The prestressing force of 200 kN acts at an eccentricity of 180 mm. If the pending and twisting moments at the section are 80 and 20 kN-m respectively, calculate the maximum principle stress in the section. **7**

b) What are the advantages of using precast prestressed units in association with the in-situ concrete. **7**

7. a) Explain the terms: **7**
i) Primary moment ii) Secondary moment iii) Resultant moment

b) A continuous prestressed concrete beam ABC, (AB = BC = 10m) has a uniform rectangular cross – section with a width of 150 mm and depth 450 mm. the cable carrying an effective prestressing force 400 kN is parallel to the axis of the beam and located at 140 mm from the soffit. **7**

i) Determine the secondary and resultant moment at the control support B
ii) If the beam supports an imposed load of 2kN/m, calculate the resultant stresses at top and bottom of the beam at B. Assume density of concrete as $24\,kN/m^3$.
iii) Locate the resultant line of thrust through beam AB.

OR

8. A prestressed concrete portal frame ABCD is fixed at A and D has columns AB = CD = 4m and the beam BC = 12m. **14**
The members have cross section 160 mm wide and 400 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 and C and 100 mm below the centroid at the centre of BC. The prestressing force in all the cables is 200 kN. Calculate the secondary moments developed in A and B using the flexibility coefficients.

9. A cylindrical prestressed concrete water tank of internal diameter 30m is required to store water over a depth of 10m. the permissible compressive stress in concrete at transfer is $15\,N/mm^2$ and minimum compressive stress under working pressure is $1\,N/mm^2$. The ratio loss is 6.75 wires of 5 mm diameter with an initial stress of $1000\,N/mm^2$ and available for circumferential winding and freyssinet cables made up of 12 wires of 8 mm diameter stressed to $1250\,N/mm^2$ are to be used to vertical prestressing. Design the tanks wall assuming the base as fixed. The cube strength of concrete is $40\,N/mm^2$. **13**

OR

10. A prestressed concrete circular cylindrical water tank is required to store 25000 million litres of water. The permissible compressive stress in concrete at transfer should not exceed $13\,N/mm^2$ and the minimum compressive stress under working pressure should not be less than $1\,N/mm^2$. The loss ratio is 0.75. High tensile steel wires of 7 mm diameter with an initial stress of $1000\,N/mm^2$ are available for winding round the tank. freyssinet cables made up of 12 wires of 8 mm diameter stressed to $1250\,N/mm^2$ are available for vertical prestressing. Design the tank walls supported an elastomeric pads. The cube strength of concrete is $40\,N/mm^2$. Assume the coefficient of friction as 0.5. **13**

11. Explain **any three** of the following. **13**

i) Prestressed concrete elements under fatigue loads.
ii) Behaviour of prestressed concrete elements under fire.
iii) Effect of corrosion on prestressed concrete elements.
iv) Explain in brief the behaviour of prestressed concrete elements under dynamic loads.

OR

12. Design a post-tensioned prestressed concrete slab bridge deck for a highway crossing to suit the following data: **13**

clear span = 8m
width of bearing = 300 mm
clear width of road = 7m
foot path = 1.0 m on either side
Thickness of wearing coat = 70m
Live load; IRC class AA tracked vehicle.
Type of structure :- class I type
Materials :- M-30 grade concrete and 7mm diameter.
High tensile wires with and ultimate tensile strength of 1500 MPa housed in cables with 12 wires and anchored by freyssinet anchorages of 150 mm diameter for supplementary reinforcement adopt fe 415 grade. Compressive strength at transfer $f_{cr} = 35\,MPa$,Loss ratio = 0.8.

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Pavement Analysis & Design

P. Pages : 5 **MSP/KS/23/2373**

Time : Three Hours * 0 2 0 1 * Max. Marks : 80

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.
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7. Solve Question 11 OR Questions No. 12.
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) Compare Highway and Airfield Pavements. **6**

b) Find ESWL **7**
i) Wheel Arrangement = Dual
ii) Load on Dual = 5000 kg
iii) Tyre Pressure = $6.5\,kg/cm^2$
iv) Clear Distance of Dual = 12 cm
v) Pavement Thickness = 60 cm.

OR

2. a) Discuss the effects of repeated applications of loads on pavements. Explain equivalent wheel load factors for load repetitions. **7**

b) Explain the different airport traffic areas. **6**

3. a) Explain in detail the stress analysis for single layered flexible pavement. **6**

b) Estimate the group index of subgrade soil from following data and discuss its rating as subgrade. **7**
i) Passing 425 micron = 80.5%
ii) Passing 75 micron = 60%
iii) Liquid Limit = 51%
iv) Plastic Limit = 28.5%

OR

4. a) Estimate the vertical compressive stress at depth = 24 cm and surface deflection for a subgrade with the following data. **7**
i) Wheel load = 3200 kg at $4.5\,kg/cm^2$ T.P.
ii) E of subgrade = $250\,kg/cm^2$
iii) Poissons Ratio = 0.47

b) Calculate the cone bearing value from the following data of North Dakota Cone test (Half Angle of Cone = 7º45') **6**

Load (Kg)	4.5	9.0	18.0	36.0
Cone Penetration (mm)	2.91	4.11	6.01	8.40

5. a) A plate load test conducted with 30 cm dia. Plate on subgrade and also on 20 cm thick base recorded a load of 1800 kg and 5400 kg respectively for 2.5 mm deformation. Design the pavement section for a wheel load of 5200 kg at $5.1 kg/cm^2$ tyre pressure for allowable deformation of 3.5 mm. Assume Poissons ratio of subgrade = 0.48. **7**

b) Explain North Dakota Cone test of flexible pavement design with sketch. **7**

OR

6. The CBR test carried out on a subgrade soil gave following readings. **14**

Penetration (mm)	Load (Kg)	Penetration (mm)	Load (Kg)
0.0	0.0	3.0	56.0
0.5	5.0	4.0	74.0
1.0	12.0	5.0	75.5
1.5	32.0	7.5	92.3
2.0	43.0	10.0	103.4
2.5	48.0	12.5	112.6

The different pavement materials available near the construction site are as follows.
i) Sandy soil of CBR = 12%
ii) Soil – Kankar mix of CBR = 20%
iii) Crusted Gravel of CBR = 80%
Design a flexible pavement if initial traffic is 300 CVD, traffic growth rate is 7.5% and design life of pavement 20 yrs. Minimum bituminous surfacing by 5 cm.

7. a) Write short note on LCN method of Airfield pavement design. **7**

b) Find the spacing of expansion joint and contraction joint for the following data **7**

i) $r = 2300 kg/m^3$ ii) $Sc = 0.85 kg/cm^2$
iii) F = 1.55 iv) d = 2.5 cm
v) T = 35ºC vi) alpha $\alpha = 9.5 \times 10 - 6/^oC$

Also design tie bar joint for the following data lane width = 3.5 m, thickness of concrete pavement, h = 20 cm, $St = 1400 kg/cm^2$, $Sb = 24 kg/cm^2$.

OR

8. a) Estimate the load factor at all regions of runway concrete pavement of 300 mm thickness under ESWL = 12000 kg at $8.5 kg/cm^2$ tyre pressure. Assume grade of concrete M30 and K for subgrade soil = $7.5 kg/cm^2/cm$. **8**

b) Explain P.C.A. method of design of rigid pavement with neat sketches. **6**

9. a) A plate load test with 30 cm dia. plate conducted a subgrade gave following data- **7**

Deformation (mm)	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00
Load on plate (Kg)	200	480	730	1005	1240	1475	1720	1975

Estimate the modulus of subgrade reaction.

b) Explain Marshall's method of Bituminous mix Design. **6**

OR

10. a) Following observation were recorded in a Benkalman Beam deflection investigation for certain section of a state highway. **7**
1.42, 1.34, 1.28, 1.30, 1.61, 1.58, 1.54, 0.96, 1.44, 1.36, 1.54, 1.45 mm. Design a bituminous overlay if maximum allowable deflection is 0.85 mm. Assume layer equivalency factor.

b) Explain plate load test for evaluation of modulus of subgrade reaction and correction to be applied. **6**

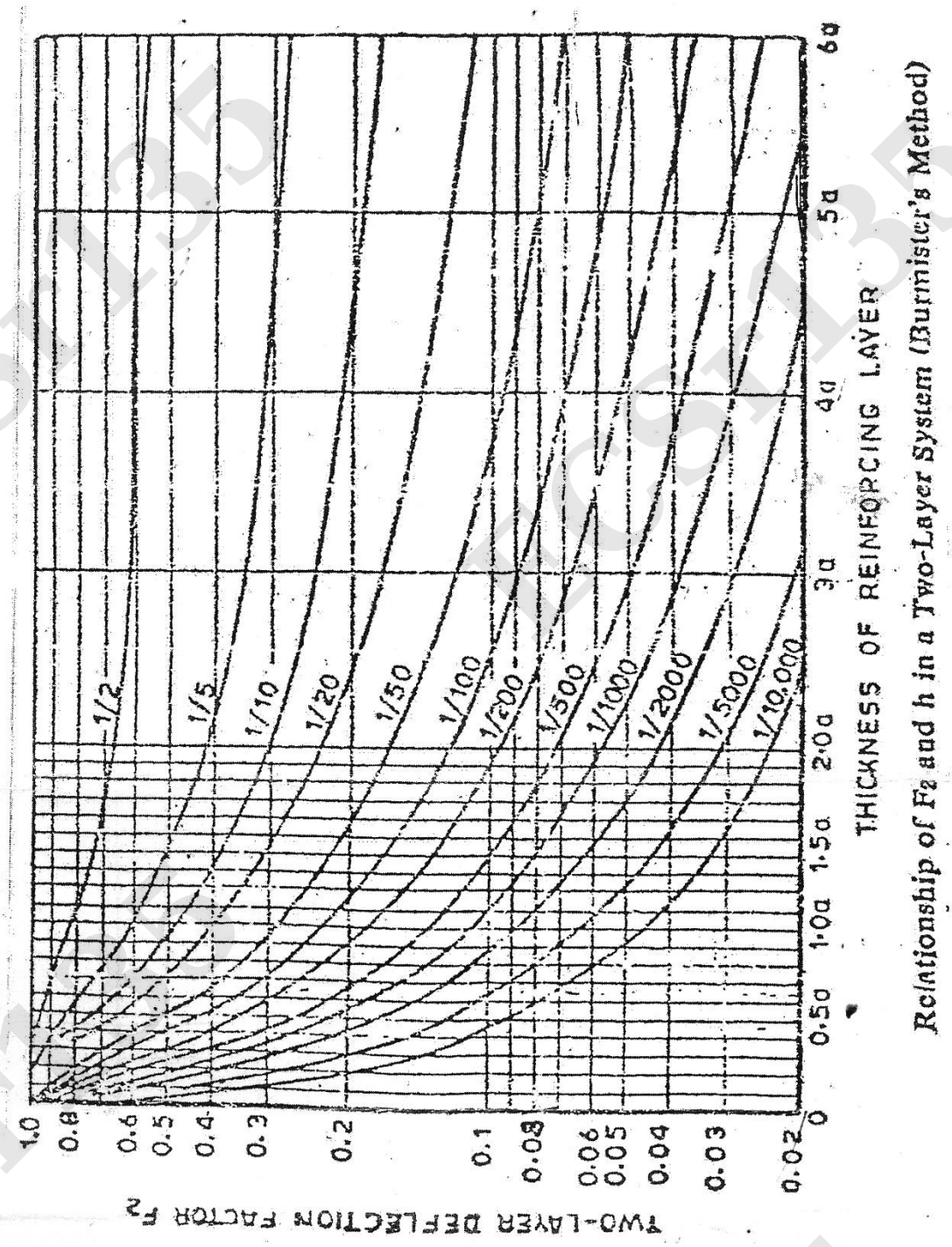
11. a) Explain strengthening of Existing pavements and design of overlap. **7**

b) What are IRC specification for the highway pavements. **6**

OR

12. a) A bullock cart rim is more damaging when compared to pneumatic rubber tyre, explain. **6**

b) Explain maintenance and Rehabilitation of pavements. **7**



Relationship of F_2 and h in a Two-Layer System (Burmister's Method)

Fig. No. 1 for Q. No. 5 (a)

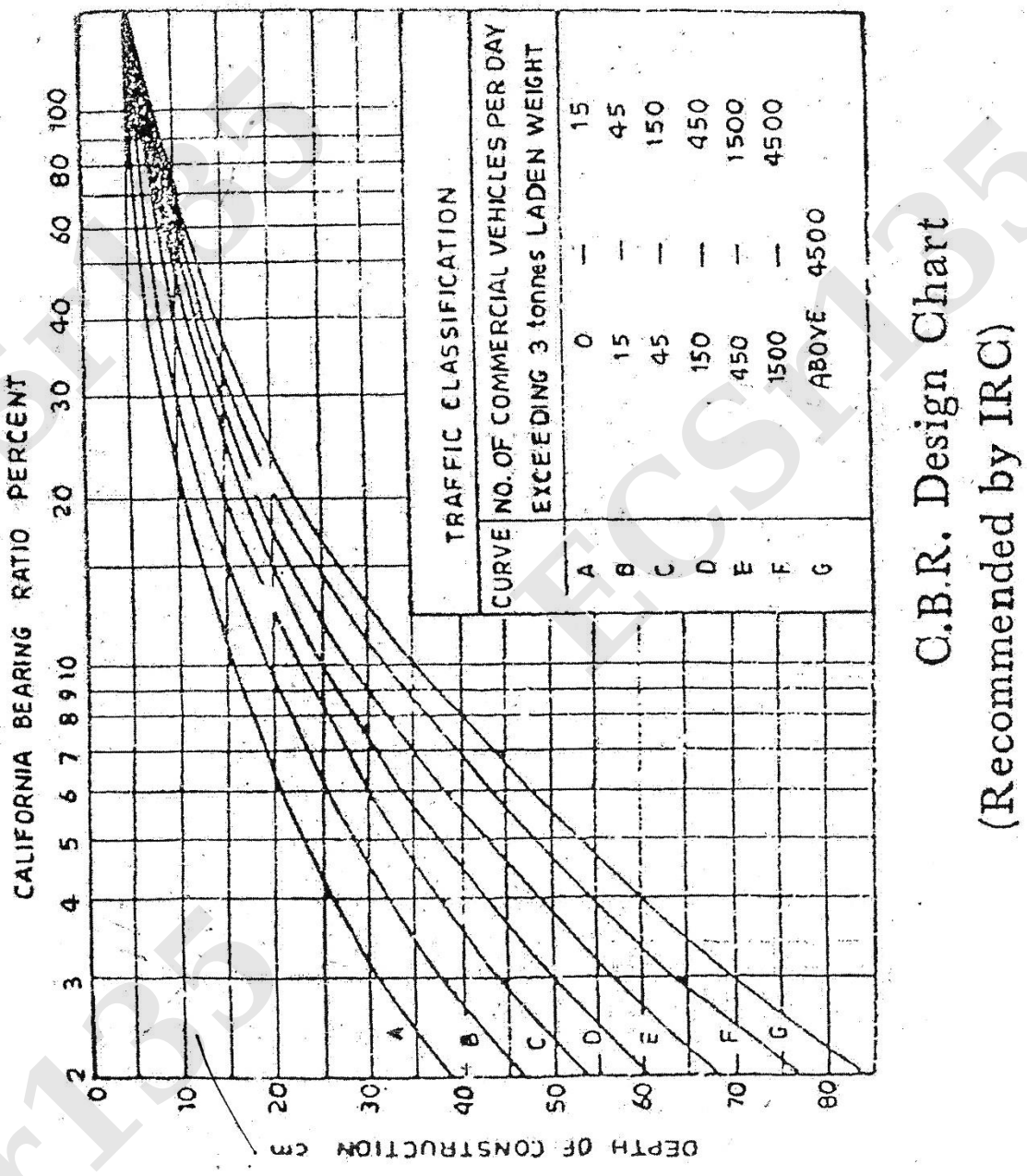


Fig. No. 2 for Q. No. 6

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Watershed Management

P. Pages : 2 **MSP/KS/23/2374**

Time : Three Hours * 0 2 0 2 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) Explain the various methods for determining the consumptive use of crops. **6**

b) Explain land capability and determination of land capability class. **7**

OR

2. a) Explain in details about soil classification and its origin. **6**

b) What is waterlogging? What are the it's remedial measures? **7**

3. a) Explain the terms: **6**
i) Water yield of a catchment ii) Water auditing

b) Describe in details about the physical elements of a watershed. **7**

OR

4. a) Explain soil erosion and it's conservation? **6**

b) Write a note on: **7**
i) Watershed experiments
ii) Representative and experimental basins

5. a) Explain in details about water conservation and its techniques. **7**

b) What are various methods of estimation of peak runoff? **7**

OR

6. a) Explain the elements of water harvesting. **7**

b) What is land capability classification? explain in details. **7**

7.	a)	Explain the various types of soil erosion?	**6**
	b)	Explain the factors affecting soil erosion.	**7**

OR

8.	a)	Explain the following: i) Assessment of erosion ii) Catchment area treatment	**6**
	b)	Describe the process of identification of critical areas.	**7**
9.	a)	Explain watershed surveys in detail.	**7**
	b)	Write a note on people's participation in watershed management.	**7**

OR

10.	a)	Explain watershed project & it's objectives of planning?	**7**
	b)	Describe conservation farming.	**7**
11.	a)	Explain Curve number method for runoff estimation.	**6**
	b)	Explain the physical based runoff models.	**7**

OR

12.	a)	Describe various components of runoff.	**6**
	b)	Write short note on: i) Source area models ii) Quasi-physically based models	**7**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Environmental Management System

P. Pages : 2 **MSP/KS/23/2375**

Time : Three Hours * 0 2 0 3 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What are the benefits of ISO1400? **7**

b) Write a short note on sustainable development in relation to Environment. **6**

OR

2. a) What is Environmental Management System? Describe in brief various requirements of EMS. **7**

b) Explain Eco-labeling and it's importance with examples. **6**

3. a) Define Environmental Audit and give various activities carried out under EA. **7**

b) State various environmental acts and Rules Prevailing in India. Discuss salient features of water Act, 1974. **7**

OR

4. a) What are the functions of CPCB and SPCB? **8**

b) Explain post project monitoring and give it's benefits. **6**

5. a) State Goals objectives and elements of EIA. **6**

b) What is the procedure for environmental clearance in India? Explain with flow chart. **7**

OR

6. a) Enlist the various methodologies of EIA and explain any one in detail. **6**

b) Explain various types of Impacts in brief. **7**

7.	a)	Why the cost-benefit analysis is done for any project? Explain in detail.	**7**
	b)	Describe the role of GIS in base line studies.	**7**

OR

8.	a)	What are the basic steps adopted in risk management programs?	**7**
	b)	Explain risk assessment with reference to any environmental management program.	**7**
9.		Write short note on-	**13**
		i) Energy inventory	
		ii) Supply demand scenario.	
		iii) Energy impact analysis.	

OR

10.	a)	Explain the importance of energy impact analysis.	**6**
	b)	Describe various conventional and alternative energy sources in detail.	**7**
11.	a)	Write short note on energy conservation.	**6**
	b)	Enlist various energy sources & discuss importance of energy impact analysis.	**7**

OR

12.	a)	Discuss energy alternatives that can be adopted to minimize energy impact & pollution on environment.	**7**
	b)	Define the following-	**6**
		i) Supply demand	
		ii) Energy inventory	

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Water Transmission & Distribution System

P. Pages : 2 **MSP/KS/23/2376**

Time : Three Hours * 0 2 0 4 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
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.

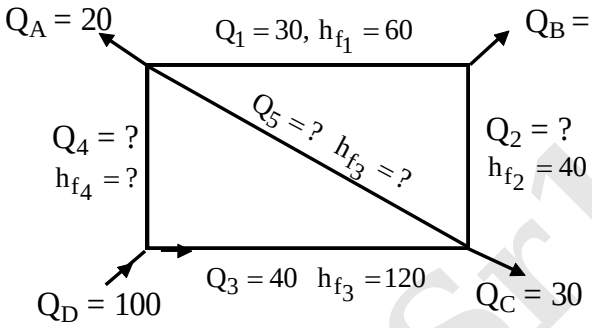
1. a) Derive Darcy-Weisbach formula for calculating loss of head due to friction in a pipe. **7**

b) What is an equivalent pipe? Derive an expression for Dupit's equation. **7**

OR

2. The water levels in the two reservoirs A and B are 104.5m and 100m respectively above the datum. A pipe joins each to a common point D, where pressures is $98.1 kN/m^2$ gauge and height is 83.5m above datum. Another pipe connects D to another tank C. What will be the height of water level in C assuming the same value of 'f' for all pipes take friction coefficients is 0.0075. The diameters of the pipes AD, BD and CD are 300mm, 450mm and 600mm, and respective lengths are 240m, 270m and 300m. **14**

3. Fig. shows a network in which Q and h_f refer to discharges and pressure drops respectively subscripts 1, 2, 3, 4 and 5 designate respective values in pipe lengths AC, BC, CD, DA and AB. Subscripts A, B, C and D designates entering or leaving the Junction points A, B, C and D respectively. By sticking to the values given below find the following discharges Q_3, Q_2, Q_4 and Q_5 and pressure drops h_{f_4} and h_{f_3} and give these computed values at their respective places on a neat sketch of the network along with flow directions. **13**



OR

4. Explain in detail analysis of water distribution network by Newton's Raphson method. **13**

5. a) Differentiate between Node Head and Node flow analysis. **6**

b) Explain Necessity of node flow analysis. **7**

OR

6. A linear network consists of a source node A with constant HCL value of 100m and nodes B, C, D and E with minimum HCL value 90m, 88m, 85m and 82m respectively. The resistance constants for pipes AB, BC, CD and DE are 0.05, 0.12, 0.2 and 0.30 respectively in Hazen William heal loss formula. The required discharges at nodes B, C, D and E in cumees are 2.5, 3.8, 3.5 and 4.0 respectively Carryonl-Nod flow analysis of the network. **13**

7. Discuss about the optimal design of pumping main considering pipe diameter as continuous variable. **13**

OR

8. Discuss about the estimation of minimum required reservoir capacity using graphical method. **13**

9. Design with suitable example single source branching networks using critical path method. **13**

OR

10. Explain in detail the configuration of looped networks using Graph theory principles. **13**

11. Explain : **14**

i) Cost Head loss Ratio method.

ii) CHE methodology for single branching networks.

OR

12. Explain in detail linear programming formulation and solution using simplex method. **14**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Geotechnical Investigation & Ground Improvement Techniques

P. Pages : 2 **MSP/KS/23/2377**

Time : Three Hours * 0 2 0 5 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) Describe the salient features of good sub-soil investigation airport. **6**

b) What are the different types of soil samples. **7**

OR

2. a) Explain seismic refraction method of exploration with the help of neat sketch. **7**

b) Explain different type of samples and their suitability. **6**

3. a) Explain standard penetration test with the help of neat sketches. **6**

b) Explain field vane shear test. **7**

OR

4. Explain plate load test with the help of neat sketch. What are the limitations of this test. **13**

5. a) Explain vane shear test. **7**

b) Explain Rammed & floated stone column. **7**

OR

6. a) Explain Geosynthetic encased stone column. **7**

b) Explain Reinforced earth wall. **7**

7. a) Write short note on geofarm and geocell. **6**

b) Describe various types of geosynthetics used for construction works. **7**

OR

8.	a)	Write short note on geosynthetics & their types.	6
	b)	Write applications of Geofoam and Geocells.	7
9.	a)	Explain concept, design features and types of soil nailing.	6
	b)	Explain with neat sketch the construction procedure of soil nailing.	7

OR

10.	a)	Write down the construction steps of diaphragm wall.	7
	b)	What are the advantages and limitations of deep soil mixing.	6
11.	a)	Explain cement slurry wall.	7
	b)	What are various advantages of Deep soil mixing.	7

OR

12.	a)	Explain construction method and application of diaphragm wall.	7
	b)	Explain the procedure for deep soil mixing.	7

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Advanced Engineering Geology

P. Pages : 2 **MSP/KS/23/2378**

Time : Three Hours * 0 2 0 6 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. What is RQD? Describe the rock quality designation with a suitable diagram and discuss its importance in civil engineering projects. **13**

OR

2. What are various methos of surface and sub-surface investigations? Describe in detail about electrical resistivity method of geophysical investigation. **13**

3. Explain the test required to calculate the water percolation of foundation. **13**

OR

4. What is the specific capacity of well? Discuss the method of determination of specific capacity of a dug well at a field? **13**

5. What is ground water? Describe the method of pumping test conducted for unconfined aquifer. **14**

OR

6. Write notes on the following. **14**

a) Water Budget

b) Transmissivity and Storage capacity

c) Resistivity Test

7. What is importance of Artificial Recharging of Groundwater? Describe the various method of artificial recharging of Groundwater table. **13**

OR

8. Explain the need of groundwater investigation? How remote sensing method are useful in Hydrological investigation. **13**

9. Describe the various factors which are considered during waste disposal site selection for solid and liquid wastes. **13**

OR

10. Discuss the following: **13**

a) Land use and land cover

b) Source of ground water pollution

11. Describe in detail the natural disaster management with emphasis on Earthquakes. **14**

OR

12. Write note on **any three**. **14**

a) Stability of slopes and land slides.

b) Prevention of Rehabilitation.

c) Prediction of landslides.

d) Seismic zones of India.

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Water Power Engineering

P. Pages : 2 **MSP/KS/23/2379**

Time : Three Hours * 0 2 0 7 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) What are the different methods of classifying the hydro electric power plants? **7**

b) Explain General arrangements of a power station. **7**

OR

2. a) What are the principle of underground power station? **7**

b) Explain components of water power project. **7**

3. a) What are the methods of computing the hydrograph? **7**

b) How are the load factor, capacity factor and utilization factor interrelated? **6**

OR

4. When a run-of river plant operates as a peak load station with a weekly load factor of 20%, all it's capacity is firm capacity. What will be the minimum flow in the river so that the station may serve as the base load station? It is given that **13**

Rated installed capacity of generator = 12,000 kw
Operating head = 16m
Plant efficiency = 80%
Estimate the daily load factor of the plant if the stream flow is 18 cumecs.

5. Write short notes on: **13**

i) Level of intake, ii) Trash rack,
iii) Transition, iv) Intake gate

OR

6. a) Define tunnel. Discuss various methods of tunnel linings. **6**

b) What are the forces which should be taken into account in anchor blocks in their stability analysis? **7**

7. What are the basic design criteria of simple surge tank. Describe with neat sketches the behaviour of various types of surge tanks. **13**

OR

8. A power station is fed through a 12,000m long concrete tunnel of 7.0m diameter operating under a gross head of 400m. The discharge through the tunnel is $30 m^3/sec$. A surge tank of 300 sq.m. area has been provided at the end of tunnel calculate. **13**

i) The maximum up-surge in the tank
ii) The maximum down-surge in the tank

Also calculate the factor of safety and ascertain whether this is adequate. Assume friction factor for concrete lining as 0.016.

9. What is the choice of type of turbine? Explain the characteristics of different types of turbines. **13**

OR

10. a) Explain tunnel draft tubes. **6**

b) Explain function and types of Tail race. **7**

11. a) Explain typical arrangements of the upper reservoir. **7**

b) A 100MW reversible pump turbine has to work under a head of 400m. Choose a suitable specific speed and running speed for the machine. **7**

OR

12. Write explanatory notes on **any two.** **14**

i) General layout of - pumped storage schemes.

ii) Economics of pumped storage plants,

iii) Tidal power stations.

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Forensic Civil Engineering

P. Pages : 1 **MSP/KS/23/2380**

Time : Three Hours * 0 2 0 8 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Illustrate your answers whenever necessary with the help of neat sketches.

1. What is forensic investigation? Discuss different tools and techniques used in forensic investigation. **14**

OR

2. What are the forensic engineering techniques in various field of civil engineering. **14**

3. How are the compression & tension members fails by reversal of load? Discuss. **14**

OR

4. State how the failure of post tensional concrete system is investigation. **14**

5. Enumerate and explain various instrumentations in testing of failed structures. **13**

OR

6. Write detailed notes on **any two**. **13**
i) Laser scanning
ii) Radio graphic evaluation
iii) Failure hypothesis.

7. Discuss the selection of theoretical model in back analysis comment on method of analysis adopted. **13**

OR

8. Discuss load testing of shoring system. **13**

9. Discuss in details professional practices & ethics in civil engineering. **13**

OR

10. Discuss quality control in workmanship design & detailing. **13**

11. Discuss the legal issues involved in forensic investigation. **13**

OR

12. Discuss in detail importance of quality control in designing against failure? Discuss selection of material & manpower. **13**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-II : Disaster Response & Management Techniques

P. Pages : 2 **MSP/KS/23/2381**

Time : Three Hours * 0 2 0 9 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain in detail, the causes and remedies for manmade disasters. **6**

b) What is flood? What are the causes of floods in India? Discuss the long term and short term planning for floods. **7**

OR

2. a) Explain in detail the disaster response plan for earthquake. **6**

b) What should be the training emergency response mechanism for dealing with earthquake? **7**

3. Discuss the role of local, State and Central administration for preparing disaster response plan. **13**

OR

4. Why disasters occur? State and explain about the various factors affecting the occurrence of the disaster. **13**

5. a) Explain in detail, awareness and safety program to reduce the risk of disasters. **7**

b) Write a note on cost assessment for disaster management. **7**

6. Discus in details about the rescue and relief arrangements for disaster management. **14**

7. a) What is disaster management? What are the principles of disaster management? **6**

b) Write a detailed note on organizational structure of disaster management. **7**

OR

8. Write a detailed note on: **13**

i) Drought management

ii) Epidemic management

9. Write a detailed note on: **14**

i) Accidents in Coal mines

ii) Crisis in Power sector.

OR

10. a) Explain in detail, Terrorism management in India. **7**

b) What are the control measures for spreading of rumors and panic during and after an Epidemic? **7**

11. Write a detailed note on: **13**

i) Rehabilitation of people after flood

ii) Medical camping during epidemic

OR

12. a) Explain in detail, health management after a disaster. **6**

b) Trauma and stress management. **7**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-III : Advanced Geotechnical Engineering

P. Pages : 2 **MSP/KS/23/2382**

Time : Three Hours * 0 2 1 0 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) Explain parameters of expansive soil. **7**

b) What are the causes of moisture changes in soils? **6**

OR

2. a) Write note on Free Swell Index. **7**

b) What is an Expansive soil and where it is found in India? **6**

3. a) Explain in brief grain morphology? **7**

b) Explain stress-strain behavior of soil? **7**

OR

4. a) What are effects for grain morphology. **7**

b) Discuss various methods for determining Grain morphological parameter (any three). **7**

5. a) What is dewatering? Discuss various purposes of dewatering. **7**

b) Explain a case of flow to a slot from line source. **6**

OR

6. a) What is electro-osmosis? What are the advantages and disadvantages as compared with the conventional drainage system? **7**

b) Write a note on electro-osmosis method for dewatering. **6**

7. a) Discuss Terzaghi's Theory of consolidation, stating the various assumption and their validity? **7**

	b)	Write a short note on 'Schmertmann's method for determination of pre consolidation pressure field consolidation curve.	**6**

OR

8.	a)	Explain settlement due to consolidation.	**7**
	b)	Describe sand drains. How are these designed? Discuss their uses. What is the effect of smear?	**6**
9.	a)	What is Mohr's strength theory for soil? Discuss its important characteristics?	**7**
	b)	Discuss the field conditions when soil is subjected to Dynamic loading (any two).	**7**

OR

10.	a)	What is stress path? Sketch different types of stress path can be obtained in a triaxial test?	**7**
	b)	Write a note on cyclic triaxial test.	**7**
11.	a)	What is liquefaction of sands? How can it be prevented?	**7**
	b)	What is liquefaction potential? Explain any two methods for determination of liquefaction potential.	**6**

OR

12.	a)	Write a note on Evaluation of liquefaction potential?	**7**
	b)	Liquefaction occur in dense sand? Why?	**6**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-III : Advanced Concrete Technology

P. Pages : 2 **MSP/KS/23/2383**

Time : Three Hours * 0 2 1 1 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Diagrams and chemical equations should be given whenever necessary.
11. Illustrate your answers whenever necessary with the help of neat sketches.
12. Use of non programmable calculator is permitted.

1. a) Explain Hydration process of concrete. **6**

b) Explain Hydrated cement paste of blended cement. **7**

OR

2. a) Explain in brief constituents of concrete. **6**

b) Explain transition zone in concrete. **7**

3. a) Explain concrete with different materials for G.G.B.S. **6**

b) Write short note on: **7**
i) Recycled aggregate
ii) Autoclave aerated concrete.

OR

4. a) Write short note on: **6**
i) High performance concrete.
ii) Transportation concrete.

b) Explain in brief different concreting techniques used. **7**

5. a) Differentiate between British and American method of mix design. **7**

b) Explain in brief Design of High. Strength concrete mix design. **7**

OR

6. a) Explain various failure mode of concrete. **7**

b) Explain with neat sketch stress-strain relation & Modulus of elasticity of concrete. **7**

7. a) Write short note on: **7**
i) Shrinkage
ii) Creep of concrete.

b) Describe in brief compressive strength of concrete. **7**

OR

8. a) What do you mean by Fatigue strength of concrete? **7**

b) Explain in brief. **7**
i) Compressive strength
ii) Tensive strength of concrete

9. a) Explain permeability of concrete. **6**

b) Describe classification & causes of cracks in concrete. **7**

OR

10. a) Describe Freezing and thawing of concrete. **6**

b) Explain Alkali-Aggregate Reaction. **7**

11. a) Write short note on **6**
i) Corrosion of Embedded steel in concrete.
ii) Sulphate attack.

b) Explain the concept of Ground penetrating Radar. **7**

OR

12. a) Write short note on stress wave propagation method. **6**

b) Write short note on core test. **7**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-III : Advanced Reinforced Cement Concrete Design

P. Pages : 2 **MSP/KS/23/2384**

Time : Three Hours * 0 2 1 2 * Max. Marks : 80

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. Due credit will be given to neatness and adequate dimensions.
7. Assume suitable data whenever necessary.
8. Illustrate your answers whenever necessary with the help of neat sketches.
9. IS 456 (Revised), IS3370 (Part IV) may be consulted.
10. Use of non programmable calculator is permitted.

1. Decide the dimension of Intz tank of capacity 15.0 Lacs liter of water. Design top dome, top ring beam, cylindrical wall only. Use M25 concrete and Fe 415 steel. Draw the sketch showing all reinforcement details. **20**

OR

2. Design the circular water tank to hold 7,80,000 liters of water. The depth of water in tank is to be 4.8m and joint between floor and wall of tank is to be rigid Use M25 grade of concrete & Fe415 steel. Design the following. **20**

i) Top dome.
ii) Ring Beam
iii) Circular wall
iv) Base slab

Sketch the reinforcement details.

3. Design the R. C. C. bridge deck slab for following details. **20**

i) Carriage way = 7.5m wide (two lane)
ii) Clear span = 5m
iii) Foot path = 1200 mm wide on either side.
iv) Wearing coat = 80 mm
v) Width of bearing = 450 mm
vi) Loading IRC class AA wheel load
vii) Use M20 grade of concrete & Fe 415 grade of steel.
viii) Impact factor for 5m span is 25% and linearly decrease to 10% for 9m span use following table for calculating 'K' for effective width.

B/L	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
K	2.48	2.60	2.64	2.72	2.80	2.84	2.88	2.92	2.96	3.00

Design deck slab & draw R/F details.

OR

4. Design the R.C.C. bridge deck slab for following details. **20**
– Carriage way - 6.5m wide (Two lane)
– Clear span - 5.2n
– Width of kerb - 650 mm
– Width of bearing = 450 min
– Value of K = 2.85
– Loading IRC class AA tracked vehicle
– Use M20 grade concrete & Fe 415 grade steel
– Impact facto for 3m span is 25% and linearly decreasing to 10% for 9m span.
Design deck slab & Draw R/F details.

5. A portal frame with and hinged is to be analysed for following details. **20**
-Spacing of portal frame = 4m
Height of columns from hinge base to = 5.2m center of beam
Distance between column center = 12m
Live load on the roof = 1.5kN/m^2
RCC slab to be provided over portal frame analyse and design portal frame and find design moment and shear force at critical section.

OR

6. A multistory building have two Days has continuous beam with AB = 4.5m, BC = 2.5m. The beam are placed equally at the intervals of 3m. The thickness of the floor slab is 120mm. Live load = 3kN/m^2, floor finish = 0.5kN/m^2, size of the beam $(230\times450)\text{mm}$, size of column is $(230\times500)\text{mm}$ Height of floor = 3.5m, $I_{beam} = I_{column}$. Analyze the intermediate frame & design the beam. Assume column are hinged based. Use M20 grade concrete & Fe 415 grade steel. Draw reinforcement details. **20**

7. Design an intermediate cylindrical shell for an area $(9\times25)\text{m}$ with edge beam spaced at 15m. the central angle is 39º with live load 1.2kN/m^2. Use M20 &Fe415. Sketch R/F details. **20**

OR

8. Design an interior panel of cylindrical shell roof with edge beams covering the plan area of $16\text{m}\times30\text{m}$ (effective) using beam method. The semi central angle is 38º. Assume live load = 2kN/m^2. Use M20 & Fe 415. Sketch the R/F details. Assume suitable size of edge beam. **20**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-III : Advanced Steel Design

P. Pages : 2 **MSP/KS/23/2385**

Time : Three Hours * 0 2 1 3 * Max. Marks : 80

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. Assume suitable data whenever necessary.
7. Illustrate your answers whenever necessary with the help of neat sketches.
8. Use of non programmable calculator is permitted.
9. ISI Hand book for structural steel section, IS800, IS456 and IS875 may be consulted.

1. Design a gantry girder to be used in an industrial building carrying an electric overhead traveling crane, for the following data. **20**

Crane capacity	=220kN
Self weight at the crane girder excluding trolley	=200kN
Self weight of the trolley, electric motor, hook etc	=35kN
Approximate minimum approach of the crane hook to the gantry girder	= 1.40m
Wheel base	= 3m
c/c distance between gantry rails	= 14m
c/c distance between columns (span of geometry girders)	= 8m
Self weight of rail section	= 350 N/m
Yield stress of steel	$=250\,N/mm^2$

OR

2. Design a roof truss for an industrial building given the following data. **20**

Overall length	=48m
Overall width	=16.5m
Width c/c of roof columns	= 16.0m
Height of columns	=11.0m
Roofing material	= asbestos cement sheet
Side covering	= asbestos cement sheet

3. Design a foot bridge of the following particulars. **20**

Type of girder	=N-type truss
Span of girder	= 15m c/c
Spacing of cross girder	= 3m c/c
Clear walking width between main girder	= 5m
Live load	$= 4kN/m^2$
Flooring	= Timber plants on cross girder

Design timber plank, cross girder, rakers, central top chord and bottom chord member.

OR

4. a) Explain the various types of bearing in detail. **5**

b) Design of rocker bearing for a 20m span truss girder railway bridge with the following data the reaction due to dead load, live load and impact load is 1250kN. The vertical reaction due to overturning effect of wind load at each of the girder is 130kN, The lateral load due to wind load effect at each bearing is 75kN. The tractive force and braking force are 981kN and 686kN respectively. **15**

5. Design rectangular steel banker of 10m length & 8m width supported on eight columns (four along each long side) to store coal of bulk density $4.5\,kN/m^3$ & angle of internal friction 30º, height of vertical portion is 4m, Height of hopper portion is 4m. **20**

OR

6. a) Design an open web section for fixed beam of span 6m & subjected to UDL of 30kN/m on entire span. **15**

b) What are the factors to be considered while selection of a bridge site? **5**

7. Design the beam of composite construction of the following requirements. **20**

Flange width provided by slab	=1300mm
Thickness of slab	=100mm
Prefabricated unit shall be a steel beam section span of beam	=15m
Total load on beam	=20kN/m
Use M-20 concrete	

OR

8. a) Explain the composite construction in detail. **7**

b) Enlist the types of welding techniques. Explain in detail. **7**

c) Explain the use of shear commentor in composite section. **6**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-III : Water & Waste Water Treatment

P. Pages : 2 **MSP/KS/23/2386**

Time : Three Hours * 0 2 1 4 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Diagrams and chemical equations should be given whenever necessary.
11. Illustrate your answers whenever necessary with the help of neat sketches.
12. Use of non programmable calculator is permitted.

1. a) What points should be kept in mind while selecting a location of Treatment plant? **6**

b) Design a cascade aerator for a plant design flow of 18MLD. **8**

OR

2. a) Draw a layout of conventional water treatment plant and explain significance of each unit. **8**

b) Explain two film theory of gas transfer. **6**

3. a) Design a flash mixer for design flow of $750\,m^3/hr$. **7**

b) Explain factors affecting coagulation and flocculation. **6**

OR

4. Design a clariflocculator for design flow of $750\,m^3/hr$. **13**

5. a) Distinguish between slow sand filter and Rapid sand filter. **7**

b) Explain in detail disinfection action of chlorine. **6**

OR

6. a) Design a sedimentation Tank for design flow of 20MLD. **7**

b) What are the objective of filteration & Discuss the various factor affecting the filteration process. **6**

7. a) Write down the characteristics of waste water. **6**

b) The BOD of 5 day sewage sample is 100mg/lit at 25ºC Calculate its 3 day BOD at 20ºC Assume BOD rate constant at 25ºC is 0.15/day. **7**

OR

8. a) What is oxygen sag curve instream pollution. Explain with neat sketch. **6**

b) Draw flow sheet of conventional waste water treatment plant & working of each unit. **7**

9. a) What are the various screen used in wastewater treatment plant & explain in brief. **6**

b) Explain working of Grit Chamber. **8**

OR

10. a) Explain in detail skimming Tank. **6**

b) Explain working of PST with neat sketch. **8**

11. a) What is activated sludge process? With the help of neat sketch. Explain it's working. **6**

b) An Avg. operating data of conventional Activated sludge Treatment plant is as follows. **7**

i) Waste water flow = 55000 m^3/day

ii) Volume of aeration Tank = 15000 m^3

iii) Influent B.O.D. = 150 mg/lit

iv) Effluent B.O.D. = 20 mg/lit

v) MLSS = 2800 mg/lit

vi) Waste sludge suspended solid = 10,000 mg/lit

vii) Effluent suspended solid = 30 mg/lit.

viii) $Q = 300\,m^3/day$

Determine-

a) Aeration period (hours)

b) F/M Ratio

c) % efficiency of BOD removal

OR

12. Write a short notes on **any three.** **13**

a) Sludge digester

b) Trickling filter

c) Aerated lagoons

d) Sludge Volume Index (SVI)

e) Sludge Drying Beds

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Elective-III : Applied Remote Sensing & GIS

P. Pages : 2 **MSP/KS/23/2387**

Time : Three Hours * 0 2 1 5 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. What is Remote sensing? Discuss the principle of remote sensing along with various elements necessary to generate an ideal remote sensing system. **13**

OR

2. a) What do you understand by Electro magnetic spectrum? **7**

b) Describe various Radiometers. **6**

3. What are different types of platforms? Describe in details space borne platforms. **14**

OR

4. Write note on following. **14**

a) Satellite launch Vehicles.

b) Analogue and Digital data formats.

c) Remote sensing data products.

5. What is relief displacement in Vertical aerial photograph? Derive an expression for relief displacement, with a suitable sketch. **13**

OR

6. An ATC tower 100m high, appears in a vertical photograph taken at a flight altitude of 5000m above MSL. The distance of the image of the top of the tower is 12.70cm. Determine the displacement of the image of the top of the tower with respect of the image of its bottom. The elevation of the bottom of the ATC tower is 2500m. **13**

7. What do you mean by image interpretation? Describe various elements of image interpretation. **14**

OR

8. Write note on following. **14**

a) Passive and Actie Sensor.

b) Atmospheric window.

c) Multispectral images.

d) Stereoscope.

9. What are Geometric and Radiometric errors? Describe various systematic and non systematic errors generally occur in a raw satellite image. **13**

OR

10. What are digital image classification? Describe the supervised classification with suitable sketches. **13**

11. a) What is GIS? Describe the various components of GIS. **6**

b) Write advantages and disadvantages of Raster and Vector data formats. **7**

OR

12. Discuss the application of remote sensing in highway planning and in urban planning. **13**

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B.E. (Civil Engineering) Eighth Semester (C.B.S.) Summer 2023

Construction Economics & Finance

P. Pages : 2 **MSP/KS/23/2388**

Time : Three Hours * 0 0 2 6 * Max. Marks : 80

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. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain why construction industry is called as key industry of India. **7**

b) Illustrate how infrastructure development promotes economic growth of the country. **6**

OR

2. a) Describe the concept and significance of time value of money. **6**

b) Describe the concept internal rate of return. **7**

3. a) Explain the characteristics of land. **7**

b) Explain the various stages involved in a turnkey construction projects. **6**

OR

4. a) What factors affecting the efficiency of Labour. **6**

b) What is recession? Explain its impact on economy. **7**

5. a) Explain the impact of Inplation on economy. **7**

b) What is monopoly? Describe various features of monopoly. **7**

OR

6. a) Explain the various causes of Inflation? **7**

b) Differentiate between collusive and non collusive oligopoly. **7**

7. a) Describe the various sources of Finance for construction industry. **7**

b) Why foreign direct investment is called as an engine of economic growth for developing nation. **6**

OR

8. a) Explain Venture capital and Angle Funding as non-conventional source of finance. **6**

b) What do you understand by project cash flow? **7**

9. a) Give the specimen of Income statement. **6**

b) Calculate Debt Equity Ratio from the following? **7**

Equity share capital	Rs. 2,00,000
General Reserve	Rs. 1,60,000
Debentures	Rs. 1,50,000
Current liabilities	Rs. 1,00,000
Prepaid expenses	Rs. 10,000

OR

10. a) Discuss the affordable housing schemes by government of India. **6**

b) What are the uses of Ratio Analysis. **7**

11. a) Explain the relevance of capital structure? **7**

b) Explain the importance of cost, control in business. **7**

OR

12. a) What factors determine the need of working capital for construction projects? **7**

b) Describe the concept of Credit Information Bureau of India [CIBIL]. Why is it important? **7**

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