

Course: B. Tech.

Branch: Civil

Semester: VII

Subject Code & Name: BTCVC701 & Design of Reinforced & Prestressed Concrete Structures

Max Marks: 60

Date: 01/ 07/ 2024

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.
5. IS 456:2000 is allowed to be used during design.

	(Level/CO)	Marks
Q.1 Solve Any Two of the following.		12
A) What are the assumptions made in the theory of torsion?	CO1	6
B) A rectangular reinforced concrete beam of size 250mm x 500mm is reinforced with 4 bars of 20mm diameter distributed at the corners with a cover of 50mm depthwise and 25mm widthwise. Further 8mm diameter 2 legged stirrups are provided at 100mm center to center. Find the torsional strength of the section. Fe415 HYSD bars are used and the transverse shear is 80kN. Concrete grade M20. Length of beam is 6 m.	CO1	6
C) What is compatibility torsion? Give an example. Define Equilibrium Torsion (or) Primary torsion?	CO1	6
Q.2 Solve Any Two of the following.		12
A) Define Short column and long column. State the criteria of minimum eccentricity to considered for column design?	CO2	6
B) Design a short R.C.C column to carry an axial load of 1600kN. It is 4m long, effectively held in position and restrained against rotation at both ends. Use M20 concrete and Fe415 steel.	CO2	6
C) Design the reinforcement in a circular column of diameter 400mm with helical reinforcement of 8mm diameter to support a factored load of 1200kN. The column has an unsupported length of 3m and is braced against side sway. Adopt M20 grade of concrete and Fe415 steel.	CO2	6
Q.3 Solve Any Two of the following.		12
A) Explain the advantages of prestress concrete.	CO3	6
B) Elaborate Fressinet system of post tensioning.	CO3	6
C) Elaborate Magnel-Blaton system of post tensioning.	CO3	6

Q.4 Solve Any Two of the following.		12
A) Explain the various losses of prestress.	CO4	6
B) A prestressed concrete beam 250mm wide and 350 mm deep is prestressed by 12 wires of 6mm diameter located at an eccentricity of 40 mm and carrying a initial stress of 1500 N/mm^2 . The span of the beam is 8m. Calculate the percentage of losses in wires if it is pretensioned, $E_s = 210 \text{ KPa}$ and $E_c = 35 \text{ Kpa}$, relaxation of steel stress = 5% of the initial stress, total shrinkage strain is 200×10^{-6} .	CO4	6
C) A rectangular concrete beam 250 mm wide and 550 mm deep is prestressed by means of 4 numbers 12 mm diameter high tensile bars located at 200 mm from the soffit of the beam. If the effective stress in the wire is 700 N/mm^2 , what is the maximum bending moment that can be applied at the soffit of the beam for no tension to be developed in the section.	CO4	6
Q. 5 Solve Any Two of the following.		12
A) Explain the purpose of end blocks in prestressed concrete structures	CO4	6
B) Discuss the necessity of conducting structural audits for load-bearing wall type buildings.	CO4	6
C) Explain the consequences of neglecting structural audits in aging buildings. Provide examples of potential risks.	CO4	6

*****End*****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE Supplementary Summer Examination – 2024 Course: B. Tech. Branch: Civil Semester: VII Subject Code & Name: BTCVC701_Y20 & Design of Concrete Structures - II Max Marks: 60 Date: 01/ 07/ 2024 Duration: 3 Hr. Instructions to the Students: 1. All the questions are compulsory. 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question. 3. Use of non-programmable scientific calculators is allowed. 4. Assume suitable data wherever necessary and mention it clearly. 5. IS 456:2000 is allowed to be used during design.			
		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		12
A)	Give the detailed step and the specifications required to be followed in the design of a beam subjected to torsion.	CO1	6
B)	A rectangular reinforced concrete beam of size 300mm x 400mm is reinforced with 4 bars of 16 mm diameter distributed at the corners with a cover of 25 mm. Further 8mm diameter 2 legged stirrups are provided at 150mm center to center. Find the torsional strength of the section. Fe415 HYSD bars are used and the transverse shear is 70kN. Concrete grade M25. Length of beam is 5 m.	CO1	6
C)	What are the assumptions made in the theory of torsion?	CO1	6
Q.2	Solve Any Two of the following.		12
A)	Explain design of short column for axial load.	CO2	6
B)	What are the purposes of lateral ties in a column? Differentiate between long and short columns.	CO2	6
C)	Design a square column to carry an axial load of 1000 kN. Use M 20 concrete and Fe 415 steel. Draw a longitudinal section and a cross section showing the reinforcement. Length of column is 3 m. Consider Hinged at both ends.	CO2	6
Q. 3	Solve Any Two of the following.		12
A)	Differentiate between pre-tensioning and post-tensioning.	CO3	6
B)	Explain the different types of prestressing of concrete.	CO3	6
C)	Explain Hoyer system of prestressing.	CO3	6
Q.4	Solve Any Two of the following.		12
A)	A Prestressed concrete pile 300mmx300mm and is provided with 40 wires of 3mm diameter distributed uniformly over the section, Initially the wires are	CO4	6

	tensioned in the bed with total pull of 200 kN. Determine the final stress in the section and the percentage loss of stress in wires .Relaxation loss of stress in steel=4.5% of initial stress . $E_c=35\text{kN/mm}^2$, $E_s = 210\text{kN/mm}^2$,Creep coefficient 1.6;Shrinkage strain= 3×10^{-4} . Assume suitable data if required.		
B)	A rectangular concrete beam 300 mm wide and 600 mm deep is prestressed by means of 5 numbers 12 mm diameter high tensile bars located at 220 mm from the soffit of the beam. If the effective stress in the wire is 800 N/mm^2 , what is the maximum bending moment that can be applied at the soffit of the beam for no tension to be developed in the section.	CO4	6
C)	Explain the reasons for using high strength materials in prestressed concrete	CO4	6
Q. 5	Solve Any Two of the following.		12
A)	How do anchorage zones influence the design of end blocks in prestressed concrete members?	CO4	6
B)	Describe the methodology for conducting a structural audit on a steel-framed structure.	CO4	6
C)	What are the primary objectives of a structural audit for RCC (Reinforced Cement Concrete) buildings?	CO4	6

*****END*****

Supplementary Summer Examination – 2024

Course: B. Tech.

Branch: Civil Engineering

Semester: VII

Subject Code & Name: Infrastructure Engineering (BTCVC702)

Max Marks: 60

Date: 03/07/2024

Duration: 3 Hr

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Define rail. Explain requirements of good rails.	CO 1	6
B) Define Gauge. Explain its types.	CO 1	6
C) Illustrate: fixtures and fastening with its types.	CO 1	6
Q.2 Solve Any Two of the following.		12
A) Explain Stations and Yards with its purpose.	CO 2	6
B) Illustrate: Options of Mass Rapid Transit Systems (MRTS).	CO 2	6
C) Define Junction. Explain types of Junctions.	CO 2	6
Q. 3 Solve Any Two of the following.		12
A) Define Harbour. Explain components of Harbour.	CO 3	6
B) Write a short on Inland Water Transport in India.	CO 3	6
C) Explain classification of Ports and Harbors.	CO 3	6
Q.4 Solve Any Two of the following.		12
A) Explain necessity of Airport Lighting.	CO 4	6
B) Define Hangers. Explain its types.	CO 4	6
C) Define Airport. Explain Site selection criteria for Airport	CO 4	6
Q. 5 Solve Any Two of the following.		12
A) Explain methods of tunneling in soft Rock.	CO 5	6
B) Explain necessity of Ventilation and Lighting in tunneling operation.	CO 5	6
C) Illustrate: Shape and Size of Tunnel Shafts.	CO 5	6

*** End ***

Course: B. Tech.

Branch: Civil Engineering

Semester: VII

Subject Code & Name: Infrastructure Engineering (BTCVC702_Y20)

Max Marks: 60

Date: 03/07/2024

Duration: 3 Hr

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Explain types of fixtures and fastenings.	CO 1	6
B) Write a short note on: Design of tracks- Horizontal Alignment, Vertical Alignment.	CO 1	6
C) Explain in detail Permanent Way.	CO 1	6
Q.2 Solve Any Two of the following.		12
A) Write a short note on Construction and Maintenance of Track.	CO 2	6
B) Illustrate types of Signalling and Interlocking in Railway Engineering.	CO 2	6
C) What is Turnout? Explain its components.	CO 2	6
Q. 3 Solve Any Two of the following.		12
A) What is Tunnel Lining? Explain its importance.	CO 3	6
B) Explain methods of Tunnelling in Hard Rock.	CO 3	6
C) Explain difference between dock and harbour.	CO 4	6
Q.4 Solve Any Two of the following.		12
A) Define: a) Spillways b) Tides c) Waves d) Swash e) Currents f) Wharf	CO 4	6
B) State advantages and dis-advantages of water transportation.	CO 5	6
C) Write a short note on Bridge Foundations: Types, Components, reasons for failure.	CO 5	6
Q. 5 Solve Any Two of the following.		12
A) Define: a) Bridge bearings b) Afflux c) Piers d) Dock e) Tides f) Winds	CO 5	6
B) Define Airport. State factors affecting on site selection for Airport.	CO 6	6
C) Write a short note on Airport Drainage & Airport Lighting.	CO 6	6

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Summer Examination – 2024

Course: B. Tech.

Branch: Civil Engineering

Semester: VII

Subject Code & Name: BTCVC703 Construction Techniques

Max Marks: 60

Date: 05/07/2024

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Write down different types of rippers? State the applications and limitations of Rippers	CO1	6
B) Enlist the various types of Rollers and explain any one.	CO1	6
C) Write down working and application of power shovel with neat labelled diagram.	CO1	6
Q.2 Solve Any Two of the following.		12
A) Enlist various methods of dewatering. Explain different method of dewatering in excavation.	CO2	6
B) Describe drilling and blasting for hard rock excavation.	CO2	6
C) Define jack hammers. Explain the working of jack hammer.	CO2	6
Q. 3 Solve Any Two of the following.		12
A) Define shotcrete. Explain the method of shotcrete. Write down advantages of grouting method.	CO3	6
B) Describe the process of underwater concreting with neat labelled diagram	CO3	6
C) Explain the working of ready-mix concrete plant with their components. Draw a neat labelled diagram.	CO2	6
Q.4 Solve Any Two of the following.		12
A) What do you mean by Hoisting Equipment? Explain tower crane with suitable diagram.	CO4	6
B) Write down various uses of dredging. Explain with neat labelled diagram: Cutter head dredger	CO4	6

C) Write down advantages and disadvantages of pre-fabrication. **CO4** **6**

Q. 5 Solve Any Two of the following. **12**

A) Write down application of Diaphragm wall. Explain the method of construction of Diaphragm wall. **CO3** **6**

B) Explain the operation involved in hot mix plan with neat sketch. **CO4** **6**

C) What do you mean by term Disaster? Write down its types. Write a short note on Disaster Management. **CO4** **6**

***** End *****

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Course: B. Tech.

Branch: Civil Engineering

Semester: VII

Subject Code & Name: BTCVC703_Y20 Water Resources Engineering

Max Marks: 60

Date: 05/07/2024

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Define irrigation. Explain types of irrigation system.	CO1	06
B) The command area of the channel is 4000 hectares. The intensity of irrigation of crop is 70%. The crop requires 60 cm of water in 15 days, when the effective rainfall is recorded as 15 cm during that period. Find: a) the duty at the head of the field b) the duty at the head of channel c) the head discharge at the head of channel Assume total losses as 15%	CO1	06
C) Define the following: a. Wilting point b. Crop rotation c. Kor watering d. Base Period e. Field capacity f. Culturable command area	CO1	06
Q.2 Solve Any Two of the following.		12
A) Define Arch dam. Describe various types of arch dam with suitable diagram.	CO2	06
B) Explain the various levels in reservoir with suitable diagram.	CO2	06
C) What are the different modes of failure of gravity/ earthen dam?	CO2	06
Q. 3 Solve Any Two of the following.		12
A) Compare Lacey's and Kennedy's silt theory.	CO3	06
B) Define spillway. Why are spillways provided in dams? Enlist various types of spillways and explain any one with neat labelled diagram	CO3	06
C) Explain cross drainage works in detail.	CO3	06
Q.4 Solve Any Two of the following.		12
A) What are the different types of rain gauges? Describe with neat sketches.	CO2	06

- B)** The catchment area has six rain gauge stations having recorded rainfall as follows-

CO2 06

Station	A	B	C	D	E	F
Rainfall	82.6	102.9	180.3	110.3	98.8	136.7

For 10% permissible error, calculate:

- Average value of precipitation or Mean value of precipitation
 - Standard Deviation
 - Coefficient of variation
 - Number of optimum rain gauges
- C)** Explain the types of tube wells with neat sketches.

CO1 06

Q. 5 Solve Any Two of the following.

12

- A)** Define waterlogging. Write down the effects of waterlogging.
- B)** Illustrate the process of reclamation of land effected by water logging.
- C)** Define the term 'Rain water Harvesting'. Explain groundwater recharge techniques

CO3 06

CO3 06

CO3 06

***** End *****

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Supplementary Summer Examination – 2024

Course: B. Tech.

Branch: Civil Engineering

Semester: VII

Subject Name: Professional Practices

Subject Code: BTCVC704

Max Marks: 60

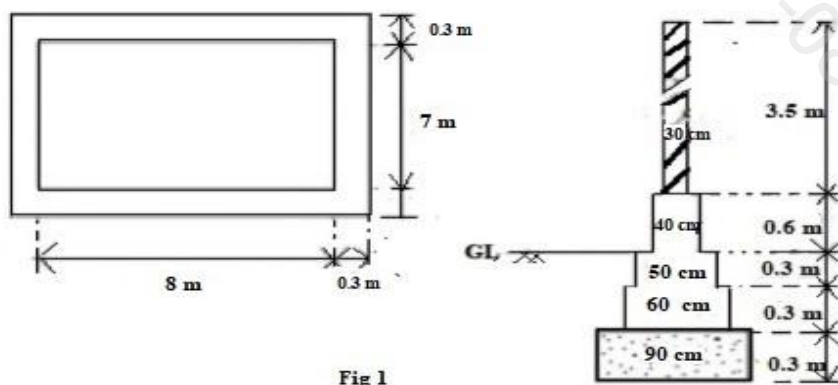
Date: 08/07/2024

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Explain the significance of accurate estimation in construction projects. How does it impact project planning and execution?	CO1	6
B) Define specifications in the context of civil engineering projects and discuss their general purpose.	CO1	6
C) Fig 1. Shows the plan of superstructure wall (0.3 m) of a single room building of 8m x 7m, and sections represent the cross-sections of the walls with foundation. Estimate (Long wall and short wall method) the quantities of 1. Earthwork in excavation in foundation.(2 Marks). 2. Concrete in foundation.(2 Marks). 3. Brickwork in superstructure.(2 Marks).	CO1	6



Q.2 Solve Any Two of the following.		12
A) Define rate analysis in the context of civil engineering and explain its significance in project cost estimation.	CO2	6

B)	Find out the materials required for the 20 Cu.m RCC work (1:1.5:3) excluding Steel.	CO2	6
C)	Discuss the factors that contribute to price escalation in civil engineering projects over time.	CO2	6
Q. 3	Solve Any Two of the following.		12
A)	Define a tender in the context of civil engineering projects and outline its primary purpose.	CO3	6
B)	Describe the key components typically included in a tender document for a civil engineering project.	CO3	6
C)	Explain the concept of project financing in B.O.T projects and how it differs from traditional procurement methods.	CO3	6
Q.4	Solve Any Two of the following.		12
A)	Explain the essentials of contracts briefly.	CO3	6
B)	Explain the methods employed by the Public Works Department (P.W.D) for planning and executing civil engineering projects.	CO3	6
C)	Explain the types of disputes commonly referred to arbitration in civil engineering projects and how they are resolved.	CO3	6
Q. 5	Solve Any Two of the following.		12
A)	What is valuation? Discuss its purpose. (2+4) Marks	CO4	6
B)	Describe the primary duties and responsibilities of a valuer when assessing civil engineering projects.	CO4	6
C)	A building having construction cost of Rs:15,000,00 has been constructed on a 150 m ² freehold land in metro city. The rate of land in the neighbourhood is Rs 3000/m ² . The outstanding such as sinking fund and taxes collectively is Rs:30000/annum.	CO4	6
	1. Determine the net rent of the property considering 6% cost of construction and 4% of the cost of land. (4 Marks)		
	2. Determine gross rent of the property after considering the outgoing (annually and monthly). (2 Marks)		

*** End ***

Supplementary Summer Examination – 2024

Course: B. Tech.

Branch: Civil Engineering

Semester: VII

Subject Name: Professional Practices

Subject Code: BTCVC704_Y20

Max Marks: 60

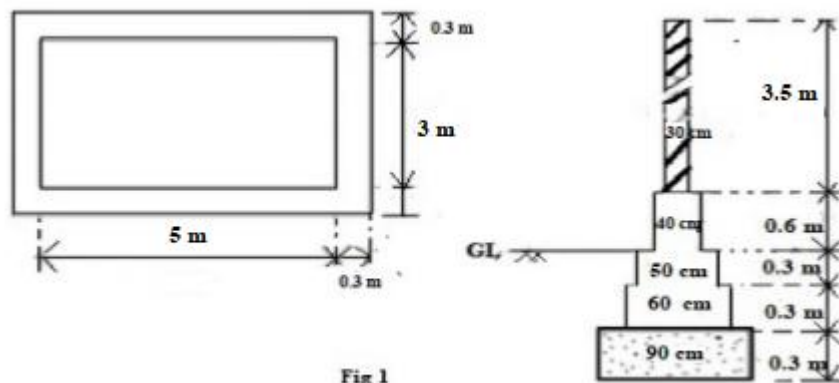
Date: 08/07/2024

Duration: 3 Hr.

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Briefly define estimating in the context of construction and engineering projects. Explain how estimating helps in preparing a detailed and accurate budget.	CO1	6
B) Explain the concepts of administrative approval and technical sanction in the context of project estimation. Why are these approvals necessary before commencing a construction project?	CO1	6
C) Fig 1. Shows the plan of superstructure wall (0.3 m) of a single room building of 5m x 3m, and sections represent the cross-sections of the walls with foundation. Estimate (Long wall and short wall method) the quantities of 1. Earthwork in excavation in foundation.(2 Marks). 2. Concrete in foundation.(2 Marks). 3. Brickwork in superstructure.(2 Marks).	CO1	6



Q.2 Solve Any Two of the following.		12
A) Explain the basic purpose behind specifications and define them into relation to civil engineering projects.	CO1	6
B) Explain the concepts of prime cost, provisional sums, and provisional quantities in the context of construction project estimation.	CO2	6
C) In the context of civil engineering, define rate analysis and discuss its importance for project cost estimation.	CO2	6
Q. 3 Solve Any Two of the following.		12
A) Discuss the factors that contribute to price escalation in civil engineering projects over time.	CO2	6
B) Explain the concept of the Standard Schedule of Rates (SSR) in construction project estimation. Discuss how the SSR helps in controlling project costs by providing a benchmark for estimating.	CO2	6
C) Find out the materials required for the 10 Cu.m RCC work (1:2:4) excluding Steel.	CO1	6
Q.4 Solve Any Two of the following.		12
A) What is Tendering? Describe the key components involved in the preparation of tender papers for a construction project.	CO3	6
B) Describe the main goals of Build-Operate-Transfer (B.O.T.) in the context of civil engineering projects.	CO3	6
C) Explain the roles and responsibilities of key positions within the Public Works Department (PWD).	CO3	6
Q. 5 Solve Any Two of the following.		12
A) Define valuation in the context of civil engineering projects and explain its significance.	CO1	6
B) What are the factors which affect the valuation of a property?	CO1	6
C) A building having construction cost of Rs:10,000,00 has been constructed on a 150 m ² freehold land in metro city. The rate of land in the neighbourhood is Rs 1800/ m ² . The outstanding such as sinking	CO1	6

fund and taxes collectively is Rs:25200/annum.

1. Determine the net rent of the property considering 6% cost of construction and 4% of the cost of land.

Determine gross rent of the property after considering the outgoing (annually and monthly).

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Summer Examination – 2024

Course: B. Tech.

Branch : Civil Engineering

Semester : VII

Subject Name: Applied Hydrology & Flood Control

Subject Code : BTCVE705G

Max Marks: 60

Date: 10/07/2024

Duration: 3 Hr.

Instructions to the Students:

- 1. All the questions are compulsory.*
- 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.*
- 3. Use of non-programmable scientific calculators is allowed.*
- 4. Assume suitable data wherever necessary and mention it clearly.*

	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Define a hyetograph and outline its primary purpose in hydrology and engineering.	CO4	6
B) What is a mass rainfall curve, and discuss the factors influencing the shape and characteristics of a mass rainfall curve.	CO4	6
C) Using the data given below, estimate the average precipitation using Thiessen Polygon method.	CO4	6

Stations	Area (Km ²)	Precipitation (mm)
A	65	98
B	38	115
C	80	125
D	45	140
E	78	150
F	97	130
G	45	120
H	40	125
I	88	99
J	9	80

Q.2 Solve Any Two of the following. **12**

- A) Define runoff and explain how land cover and soil properties influence runoff rates. **CO4** **6**
- B) Explain the key components of a hydrograph and discuss their significance in understanding the response of a river to rainfall events. Use diagrams where necessary to support your answer. **CO4** **6**
- C) Explain the uses and limitations of unit hydrographs in hydrological analysis. **CO4** **6**

Q.3 Solve Any Two of the following. **12**

- A) Explain the different types of floods. Discuss any two factors influencing the occurrence of floods. **(4+2) Marks** **CO1** **6**
- B) Explain the concept of flood frequency analysis and its significance in hydrological studies. **CO1** **6**
- C) Discuss the challenges associated with estimating floods in mountainous regions compared to flat terrains. Highlight the key factors that contribute to these challenges. **(3+3) Marks** **CO2** **6**

Q.4 Solve Any Two of the following. **12**

- A) Explain the concept of flood routing in hydrology and its importance in flood management. **CO2** **6**
- B) I. Explain the Muskingum method for flood routing. **(4 marks)** **CO2** **6**
II. For routing of flood in a given channel using the Muskingum method, two of the routing coefficients are estimated as $C_0 = -0.30$ and $C_1 = 0.50$. Determine the value of the third coefficient C_2 **(2 marks)**.
- C) The data for 2 hr unit hydrograph are given in the table below. **CO2** **6**

0	2	4	6	8	10	12	14	16	18	20
0	4	10	30	35	20	18.45	10	6	5.45	0

Draw a S-hydrograph for 4 hr unit duration and find constant discharge.

Assume catchment area is 100 sq.km.

Q. 5	Solve Any Two of the following.		12
A)	Analyze the role of land use planning and management in flood control and mitigation. Discuss how land use practices such as urbanization, deforestation, and agricultural expansion contribute to increased flood risks.	CO1	6
B)	Explain how remote sensing data can aid in identifying vulnerable areas, assessing flood damage, and planning emergency response and recovery efforts.	CO2	6
C)	Evaluate the benefits of integrating floodplain zoning and mitigation procedures in reducing flood risks and promoting sustainable development in flood-prone regions.	CO2	6

***** End *****