

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK



VII SEMESTER

PCE206 – ADVANCED CONSTRUCTION TECHNIQUES

REGULATIONS - 2023

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UNIT I - SUB STRUCTURE CONSTRUCTION

Construction Methodology - Box jacking - Pipe jacking - Under water construction of diaphragm walls and basement - Tunneling techniques - Piling techniques - Driving well and caisson – sinking cofferdam - cable anchoring and grouting - Driving diaphragm walls, Sheet piles - Laying operations for built up offshore system - Shoring for deep cutting - Large reservoir construction - well points - Dewatering for underground open excavation.

PART A (2 Marks)

Q. No.	QUESTIONS	BT LEVEL	COMPETENCE
1	Define substructure construction.	BT-1	Remember
2	What is meant by construction methodology in substructure works?	BT-1	Remember
3	Define box jacking.	BT-1	Remember
4	State any two advantages of box jacking.	BT-2	Understand
5	What is pipe jacking?	BT-1	Remember
6	Mention two applications of pipe jacking.	BT-1	Remember
7	Define a diaphragm wall.	BT-1	Remember
8	What is the purpose of bentonite slurry in diaphragm wall construction?	BT-2	Understand
9	What are the major steps involved in underwater construction of diaphragm walls?	BT-2	Understand
10	List any two tunneling techniques used in underground construction.	BT-1	Remember
11	What is the function of a Tunnel Boring Machine (TBM)?	BT-2	Understand
12	Define pile foundation.	BT-1	Remember
13	Classify piles based on the method of installation.	BT-1	Remember
14	What is meant by a bored cast-in-situ pile?	BT-1	Remember

15	Define well foundation.	BT-1	Remember
16	Name the different types of caissons.	BT-1	Remember
17	What is a coffer dam? State its purpose.	BT-2	Understand
18	Mention any two types of cofferdams.	BT-1	Remember
19	Define cable anchoring.	BT-1	Remember
20	What is grouting? Mention its objectives.	BT-2	Understand
21	What are sheet piles?	BT-1	Remember
22	List any two methods of driving sheet piles.	BT-1	Remember
23	Define shoring and state its necessity in deep excavations.	BT-2	Understand
24	What is a well point system? Where is it used?	BT-2	Understand
25	What is dewatering? Mention any two methods of dewatering.	BT-2	Understand
PART B (16 Marks)			
1	Explain the construction methodology adopted in substructure works with a neat flow chart.	BT-2	Understand
2	Describe the box jacking technique with neat sketches and discuss its advantages and applications.	BT-2	Understand
3	Explain the procedure involved in pipe jacking and compare it with conventional open-cut excavation methods.	BT-4	Analyze
4	Discuss the underwater construction of diaphragm walls and basements, highlighting the role of bentonite slurry and tremie concreting.	BT-2	Understand
5	Explain various tunneling techniques such as cut-and-cover, shield tunneling, TBM, and drill-and-blast methods with their applications.	BT-2	Understand
6	Describe different piling techniques and explain the construction procedure of bored cast-in-situ piles with neat sketches.	BT-2	Understand
7	Explain the construction, sinking, and completion of well foundations used in bridge engineering.	BT-2	Understand
8	Discuss the types of caissons and explain their construction methods with suitable sketches.	BT-2	Understand
9	Explain the construction and sinking of cofferdams. Discuss the various types and their applications.	BT-2	Understand
10	Elaborate on cable anchoring techniques and discuss the	BT-3	Apply

	importance of grouting in underground construction works.		
11	Explain the construction procedure of diaphragm walls and discuss their advantages in deep excavations.	BT-2	Understand
12	Describe the methods of driving sheet piles and explain their applications in retaining and waterfront structures.	BT-2	Understand
13	Explain the laying of operations involved in built-up offshore systems and discuss the challenges encountered during offshore construction.	BT-3	Apply
14	Discuss various shoring methods adopted for deep cutting and compare their suitability for different soil conditions.	BT-4	Analyze
15	Explain the stages involved in the construction of large reservoirs and discuss the associated engineering challenges.	BT-2	Understand
16	Describe the well point system for groundwater control and explain its components and applications.	BT-2	Understand
17	Explain various dewatering techniques used for underground open excavations and discuss their advantages and limitations.	BT-4	Analyze
18	Evaluate the selection criteria for choosing suitable substructure construction techniques based on soil conditions, groundwater level, and project requirements.	BT-5	Evaluate

UNIT II - SUPER STRUCTURE CONSTRUCTION FOR BUILDINGS

Vacuum dewatering of concrete flooring – Concrete paving technology – Techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections – Erection techniques of tall structures, large span structures – launching techniques for heavy decks – in-situ prestressing in high rise structures, Post tensioning of slab- aerial transporting – Handling and erecting lightweight components on tall structures.

PART A (2 Marks)

Q. No.	QUESTIONS	BT LEVEL	COMPETENCE
1	Define vacuum dewatering of concrete flooring.	BT-1	Remember
2	State the principle of vacuum dewatering.	BT-1	Remember
3	Mention two advantages of vacuum dewatered concrete floors.	BT-2	Understand
4	What is meant by concrete paving technology?	BT-1	Remember
5	List any two types of concrete paving equipment.	BT-1	Remember

6	What are the requirements of good concrete pavement?	BT-2	Understand
7	Define continuous concrete operation.	BT-1	Remember
8	Why is continuous concrete important in tall buildings?	BT-2	Understand
9	What is slip form construction?	BT-1	Remember
10	What is jump form construction?	BT-1	Remember
11	State any two challenges in concreting tall structures.	BT-2	Understand
12	Define tall structures.	BT-1	Remember
13	What is meant by large span structures?	BT-1	Remember
14	Mention any two erection techniques used for tall structures.	BT-1	Remember
15	Define launching heavy decks.	BT-1	Remember
16	What is incremental launching method?	BT-1	Remember
17	Distinguish between pre-tensioning and post-tensioning.	BT-2	Understand
18	Define in-situ prestressing.	BT-1	Remember
19	What is post-tensioning of slabs?	BT-1	Remember
20	State the advantages of post-tensioned slabs.	BT-2	Understand
21	What is aerial transporting in construction?	BT-1	Remember
22	Name any two aerial transportation equipment used in construction.	BT-1	Remember
23	What are lightweight components in tall structures?	BT-1	Remember
24	Mention two methods of handling lightweight components at great heights.	BT-2	Understand
25	List any two safety measures adopted during erection of tall structures.	BT-2	Understand

PART B (16 Marks)

1	Explain the principle, procedure, equipment, advantages and applications of vacuum dewatering concrete flooring.	BT-2	Understand
2	Discuss concrete paving technology and explain the various equipment used in concrete pavement construction.	BT-2	Understand
3	Explain the construction procedure of concrete pavements with neat sketches.	BT-2	Understand
4	Describe the techniques adopted for continuous concrete operations in tall buildings of varying shapes and sections.	BT-3	Apply
5	Explain slip form and jump form construction techniques used in	BT-2	Understand

	high-rise buildings.		
6	Discuss the challenges encountered in concreting operations of tall buildings and suggest suitable solutions.	BT-4	Analyse
7	Explain various erection techniques used for tall structures with suitable examples.	BT-2	Understand
8	Discuss different erection methods adopted for large span structures and compare their suitability.	BT-4	Analyse
9	Explain the launch techniques used for heavy bridge decks with neat sketches.	BT-2	Understand
10	Describe the incremental launching method and its advantages in bridge construction.	BT-3	Apply
11	Explain the procedure of in-situ prestressing in high-rise structures with neat sketches.	BT-2	Understand
12	Discuss the principles and construction sequence of post-tensioning of slabs.	BT-2	Understand
13	Compare pre-tensioning and post-tensioning systems used in construction.	BT-4	Analyse
14	Explain aerial transporting systems used in construction projects and discuss their advantages and limitations.	BT-2	Understand
15	Describe various methods for handling and erecting lightweight components in tall structures.	BT-3	Apply
16	Analyze the factors influencing the selection of erection techniques for tall and large span structures.	BT-4	Analyse
17	Evaluate the suitability of different construction technologies for high-rise buildings based on project requirements.	BT-5	Evaluate
18	Propose an integrated construction methodology for a high-rise building involving continuous concreting, prestressing, and aerial transportation systems.	BT-6	create

UNIT III - CONSTRUCTION OF SPECIAL STRUCTURES

Erection of lattice towers - Rigging of transmission line structures – Construction sequence in cooling towers, Silos, chimney, skyscrapers - Bow string bridges, Cable stayed bridges – Launching and pushing of box decks – Construction of jetties and break water structures – Construction sequence and methods in domes – Support structure for heavy equipment and machinery in heavy industries – Erection of articulated structures and space decks.

PART A (2 Marks)			
Q. No.	QUESTIONS	BT LEVEL	COMPETENCE
1	Define lattice tower.	BTL 1	Remember
2	List the components of a transmission line tower.	BTL 1	Remember
3	What is meant by rigging?	BTL 1	Remember
4	State the purpose of guy wires in tower erection.	BTL 1	Remember
5	What are the common methods of erecting lattice towers?	BTL 1	Remember
6	Define cooling tower.	BTL 1	Remember
7	Mention the types of cooling towers used in industries.	BTL 1	Remember
8	What is a silo? State its function.	BTL 1	Remember
9	What are the advantages of slip-form construction in silos?	BTL 2	Understand
10	Define chimney and mention its purpose.	BTL 1	Remember
11	What is meant by jump-form construction?	BTL 1	Remember
12	List any four challenges in skyscraper construction.	BTL 1	Remember
13	Define Bow String Bridge.	BTL 1	Remember
14	What is a Cable Stayed Bridge?	BTL 1	Remember
15	Name the major components of a cable stayed bridge.	BTL 1	Remember
16	What is incremental launching of bridge decks?	BTL 2	Understand
17	Define box deck.	BTL 1	Remember
18	What is a jetty?	BTL 1	Remember
19	Define breakwater structure.	BTL 1	Remember
20	Mention two methods of dome construction.	BTL 1	Remember
21	What are space deck structures?	BTL 1	Remember
22	Define articulated structure.	BTL 1	Remember
23	State the purpose of support structures for heavy machinery.	BTL 2	Understand
24	What are the factors influencing erection of heavy equipment?	BTL 2	Understand
25	List the advantages of space frame structures.	BTL 2	Understand
PART B (16 Marks)			
1	Explain in detail the erection methods of lattice towers used in transmission line projects with neat sketches.	BTL 2	Understand
2	Describe the rigging techniques adopted for transmission line	BTL 3	Apply

	structures and discuss the safety precautions to be followed during erection.		
3	Explain the complete construction sequence of a cooling tower and discuss the equipment used.	BTL 2	Understand
4	Discuss the methods of construction of silos with emphasis on slip-form and jump-form techniques.	BTL 3	Apply
5	Explain the construction sequence of reinforced concrete chimneys and discuss the challenges involved in tall chimney construction.	BTL 2	Understand
6	Describe the construction methodology of skyscrapers, including foundation systems, vertical transportation, and structural framing.	BTL 3	Apply
7	Explain the construction sequence and erection procedure of Bow String Bridges with suitable illustrations.	BTL 2	Understand
8	Discuss the components, erection procedures, and construction techniques adopted for Cable Stayed Bridges.	BTL 3	Apply
9	Explain the incremental launching method for bridge deck construction and discuss its advantages and limitations.	BTL 3	Apply
10	Describe the launching and pushing techniques adopted for box deck bridges.	BTL 2	Understand
11	Explain the construction sequence of jetties and discuss the equipment used in marine construction works.	BTL 3	Apply
12	Describe the construction methods adopted for breakwater structures and explain the factors affecting their stability.	BTL 3	Apply
13	Discuss the various methods of dome construction and explain the erection sequence with neat sketches.	BTL 2	Understand
14	Explain the design considerations and erection procedures of support structures for heavy industrial equipment and machinery.	BTL 4	Analyse
15	Describe the erection techniques adopted for articulated structures and discuss their applications in modern construction.	BTL 3	Apply
16	Explain the construction and erection methodology of space deck structures and highlight their advantages in large-span buildings.	BTL 3	Apply
17	Compare Bow String Bridges and Cable Stayed Bridges with respect to structural behavior, construction methodology, and	BTL 4	Analyse

	applications.		
18	Discuss the planning, equipment selection, quality control measures, and safety requirements involved in the erection of large-span and heavy structural systems.	BTL 5	Evaluate

UNIT IV - REHABILITATION AND STRENGTHENING TECHNIQUES

Seismic retrofitting - Strengthening of beams - Strengthening of columns - Strengthening of slab - Strengthening of masonry wall, Protection methods of structures, Mud jacking and grouting for foundation – Micro piling and underpinning for strengthening floor and shallow profile - Sub grade water proofing, Soil Stabilization techniques.

PART A (2 Marks)

Q. No.	QUESTIONS	BT LEVEL	COMPETENCE
1	Define rehabilitation of structures.	BTL 1	Remember
2	What is meant by structural strengthening?	BTL 1	Remember
3	Define seismic retrofitting.	BTL 1	Remember
4	State the objectives of seismic retrofitting.	BTL 2	Understand
5	List any four seismic retrofitting techniques.	BTL 1	Remember
6	What are the common causes of beam deterioration?	BTL 1	Remember
7	Mention any two methods of strengthening RC beams.	BTL 1	Remember
8	What is jacketing of columns?	BTL 1	Remember
9	State the advantages of steel jacketing for columns.	BTL 2	Understand
10	Define FRP wrapping.	BTL 1	Remember
11	List the methods used for slab strengthening.	BTL 1	Remember
12	What is ferrocement overlay?	BTL 1	Remember
13	Mention any two causes of masonry wall failure.	BTL 1	Remember
14	What is crack stitching in masonry walls?	BTL 2	Understand
15	Define structural protection.	BTL 1	Remember
16	What are cathodic protection methods?	BTL 1	Remember
17	Define mud jacking.	BTL 1	Remember
18	State the applications of mud jacking.	BTL 2	Understand
19	What is grouting?	BTL 1	Remember
20	Define micropile.	BTL 1	Remember

21	What is underpinning?	BTL 1	Remember
22	Mention the objectives of underpinning.	BTL 2	
23	Define subgrade waterproofing.	BTL 1	Remember
24	What is soil stabilization?	BTL 1	Remember
25	List any four soil stabilization techniques.	BTL 1	Remember
PART B (16 Marks)			
1	Explain the need, objectives, and techniques of seismic retrofitting of existing buildings.	BTL 2	Understand
2	Discuss various seismic retrofitting methods adopted for reinforced concrete structures with neat sketches.	BTL 3	Apply
3	Explain different methods used for strengthening reinforced concrete beams and discuss their applications.	BTL 3	Apply
4	Describe the various techniques used for strengthening reinforced concrete columns, including jacketing and FRP wrapping.	BTL 3	Apply
5	Explain the procedures involved in strengthening slabs using overlays, external reinforcement, and FRP systems.	BTL 2	Understand
6	Discuss the causes of masonry wall deterioration and explain various strengthening techniques adopted for masonry structures.	BTL 3	Apply
7	Explain the protection methods employed to improve the durability and service life of concrete structures.	BTL 2	Understand
8	Discuss corrosion protection techniques such as coatings, inhibitors, and cathodic protection for reinforced concrete structures.	BTL 3	Apply
9	Explain the principle, procedure, advantages, and limitations of mud jacking used for foundation rehabilitation.	BTL 2	Understand
10	Discuss different grouting techniques used in foundation strengthening and ground improvement works.	BTL 3	Apply
11	Explain the construction procedure and applications of micropiles in foundation strengthening.	BTL 2	Understand
12	Describe the methods of underpinning and discuss their suitability for various foundation conditions.	BTL 3	Apply
13	Explain the techniques adopted for strengthening shallow foundations using micropiles and underpinning methods.	BTL 4	Analyse
14	Discuss the materials and methods used in subgrade waterproofing of underground structures.	BTL 3	Apply
15	Explain various soil stabilization techniques and their applications in improving soil properties.	BTL 2	Understand

16	Compare mechanical, chemical, and geosynthetic methods of soil stabilization with suitable examples.	BTL 4	Analyse
17	Discuss the assessment, rehabilitation, and strengthening strategies for earthquake-damaged buildings.	BTL 5	Evaluate
18	Explain the selection criteria for strengthening techniques in beams, columns, slabs, foundations, and masonry walls.	BTL 5	Evaluate

UNIT V - DEMOLITION

Demolition Techniques, Demolition by Machines, Demolition by Explosives, Advanced techniques using Robotic Machines, Demolition Sequence, Dismantling Techniques, Safety precaution in Demolition and Dismantling.

PART A (2 Marks)

Q. No.	QUESTIONS	BT LEVEL	COMPETENCE
1	Define demolition.	BTL 1	Remember
2	What are the objectives of demolition?	BTL 1	Remember
3	List the factors to be considered before demolition.	BTL 1	Remember
4	What is controlled demolition?	BTL 1	Remember
5	Define dismantling.	BTL 1	Remember
6	Differentiate demolition and dismantling.	BTL 2	Understand
7	What are the common demolition methods?	BTL 1	Remember
8	Name any four machines used for demolition.	BTL 1	Remember
9	What is high-reach demolition equipment?	BTL 1	Remember
10	Define wrecking ball demolition.	BTL 1	Remember
11	What is hydraulic crushing?	BTL 1	Remember
12	State the advantages of mechanical demolition.	BTL 2	Understand
13	What is explosive demolition?	BTL 1	Remember
14	Define implosion technique.	BTL 1	Remember
15	Mention the advantages of explosive demolition.	BTL 2	Understand
16	What are robotic demolition machines?	BTL 1	Remember
17	State the advantages of robotic demolition.	BTL 2	Understand
18	What is selective demolition?	BTL 1	Remember
19	Define demolition sequence.	BTL 1	Remember
20	What is meant by deconstruction?	BTL 1	Remember

21	Mention the steps involved in dismantling structures.	BTL 1	Remember
22	What are the hazards associated with demolition work?	BTL 2	Understand
23	List any four safety precautions during demolition.	BTL 1	Remember
24	What is dust suppression in demolition?	BTL 1	Remember
25	Why is structural assessment necessary before demolition?	BTL 2	Understand
PART B (16 Marks)			
1	Explain the various demolition techniques adopted for buildings and civil engineering structures.	BTL 2	Understand
2	Discuss the factors influencing the selection of demolition methods for different types of structures.	BTL 3	Apply
3	Explain the demolition process using mechanical equipment such as excavators, crushers, and wrecking balls.	BTL 2	Understand
4	Describe the demolition by machines and discuss their advantages and limitations.	BTL 3	Apply
5	Explain the principle, planning, and execution of demolition by explosives with neat sketches.	BTL 2	Understand
6	Discuss the implosion technique used in explosive demolition and explain its applications.	BTL 3	Apply
7	Explain the use of robotic demolition machines in modern demolition projects and discuss their advantages.	BTL 2	Understand
8	Compare conventional demolition methods with advanced robotic demolition techniques.	BTL 4	Analyse
9	Describe the demolition sequence adopted for multi-storeyed buildings.	BTL 3	Apply
10	Explain the procedures involved in dismantling steel structures and reinforced concrete structures.	BTL 3	Apply
11	Discuss the planning and execution of selective dismantling and deconstruction techniques.	BTL 4	Analyse
12	Explain the safety requirements and risk assessment procedures to be followed during demolition works.	BTL 3	Apply
13	Discuss the environmental issues associated with demolition and methods for controlling dust, noise, and vibration.	BTL 4	Analyse
14	Explain the precautions to be taken while carrying out demolition in congested urban areas.	BTL 3	Apply
15	Compare demolition by explosives and demolition by machines with respect to cost, time, safety, and suitability.	BTL 4	Analyse
16	Explain the sequence of demolition and dismantling of high-rise	BTL 3	Apply

	buildings and industrial structures.		
17	Discuss modern technologies and innovations used in demolition engineering.	BTL 5	Evaluate
18	Explain the planning, safety management, waste handling, and environmental protection measures involved in demolition projects.	BTL 5	Evaluate