SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

I SEMESTER

1917105-PREFABRICATED STRUCTURES

M.E STRUCTURAL ENGINEERING

Regulation – 2019

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SEMESTER: 01st REGULATION-2019 YEAR: M.E /I

UNIT-1 DESIGN PRINCIPLES

General Principles of Fabrication- General Civil Engineering requirements, specific requirements for planning and layout of prefabrication plant, IS Code specifications. Modular co-ordination, standardization, Disuniting of Prefabricates, production, transportation, erection, stages of loading and code provisions, safety factors, material properties, Deflection control, Lateral load resistance, Location and types of shear walls.

PART-A (2MARKS)

Q.No	Questions	BT Level	Competence
1.	Define Prefabrication.	BT-1	Remember
2.	Explain the production process in prefabricated structures.	BT-1	Remember
3.	Define modular co-ordination and also list out the uses.	BT-1	Remember
4.	Outline the handling stress in Prefabricated Construction.	BT-1	Remember
5.	List the disadvantages of prefabricated structures.	BT-1	Remember
6.	List the types of prefabricated construction systems.	BT-1	Remember
7.	Articulate the major considerations in prefabrication.	BT-2	Understand
8.	What is joint flexibility?	BT-2	Understand
9.	Compare the site prefabrication and plant prefabrication.	BT-2	Understand
10.	Summarize the advantages of prefabricated structures.	BT-2	Understand
11.	List the IS code books used in prefabricated structures.	BT-2	Remember
12.	What are the different methods used in erection of prefabrication Structures?	BT-3	Apply
13.	Construct the process of standardization in prefabrication.	BT-3	Apply
14.	Construct the types of shear wall.	BT-3	Apply
15.	Compute the behavior of structural components for prefabrication.	BT-3	Apply
16.	Classify characterization of the standardization and modular co-ordination.	BT-4	Analyse
17.	What are the steps to be followed in erection of prefabricated structures?	BT-4	Analyse
18.	Explain the disuniting of prefabricated structures.	BT-4	Analyse
19.	Figure out the tolerance.	BT-4	Analyse

20.	Estimate any two transportation methods used for prefabricated Structures.	BT-5	Evaluate
21.	Explain the importance of Off-site fabrication.	BT-5	Evaluate
22.	Interpret the material properties in prefabrication.	BT-5	Evaluate
23.	Discuss deflection controls in prefabricated structures.	BT-6	Create
24.	Elaborate about Shear wall and give recommendation on suitable location to provide a shear wall.	BT-6	Create
25.	Summarize the limitations of shear wall.	BT-6	Create

PART-B (13 MARKS)

Q.No	Questions	BT Level	Competence
1.	How will you eliminate handling stresses while hoisting precast Members? Explain in detail.	BT-1	Remember
2.	List out the general specific requirements for planning and layout of Prefabrication plant and explain in detail.	BT-1	Remember
3.	What are the different types of structural systems used in prefabricated Structures? Explain.	BT-1	Remember
4.	Discuss, how the material selection impacts the design efficiency of a Precast element.	BT-2	Understand
5.	Summarize the merits and demerits of Prefabricated constructions over monolithic methods of constructions in detail.	BT-2	Understand
6.	Explain the following : i) Modularco-ordination. (3 Marks) ii) Standardization. (3 Marks) iii) Disuniting of structures. (3 Marks) iv) Transportation and erection. (4 Marks)	BT-2	Understand
7.	i) Explain the forces induced during the transportation of precast elements. (7 Marks) ii) Explain in detail about precaution to be taken during transportation process. (6 Marks)	BT-2	Understand
8.	i) Examine the significance of providing tolerances in precast buildings. (7 Marks) ii) Examine in detail about the different types of tolerances adopted in precastconstruction. (6 Marks)	BT-3	Apply
9.	Construct the concept of production techniques.	BT-3	Apply
10.	Figure out the IS codal provision used for prefabricated structures and discuss in detail.	BT-4	Analyse
11.	Discuss the process of production, transportation and erection principles of prefabrication.	BT-4	Analyse
12.	Explain in details about. i) Importance of prefabrication (7 Marks) ii) Advantages and disadvantages of prefabrication (6 Marks)	BT-4	Analyse
13.	i) Evaluate the necessity of providing shear wall in the precast structures? (7 Marks) ii) State and explain the types of shear wall. (6 Marks)	BT-5	Evaluate

14.	Examine, the concept of deflection control and lateral load resistance of prefabricated structures?	BT-6	Create

PART-C (15 MARKS)

Q.No	Questions	BT Level	Competence
1.	Explain in detail with sketches the prefabrication system and their relative merits and field of application	BT-1	Remember
2.	List the various equipments used in the erection of prefabricated system and explain any two in detail.	BT-2	Understand
3.	Write case study on the need for prefabrication with an example	BT-4	Analyse
4.	Why shear wall provided at exterior corners and justify the reasons why it performs better than core shear walls.	BT-5	Evaluate

UNIT II -REINFORCED CONCRETE

Prefabricated structures - Long wall and cross-wall large panel buildings, one way and two way prefabricated slabs, Framed buildings with partial and curtain walls -Connections – Beam to column, column to column and column to foundation.

PART-A (2MARKS)

Q.No	Questions	BT Level	Competence
1.	What are the prefabricated structural units?	BT-1	Remember
2.	What are the benefits of using reinforced concrete windows?	BT-1	Remember
3.	What are the materials used for connection?	BT-1	Remember
4.	Define curtain wall and partial wall.	BT-1	Remember
5.	List the types of connections used in prefabricated structures.	BT-1	Remember
6.	Define joint flexibility and joint deformation.	BT-1	Remember
7.	Summarize the limitations of prefabricated structures.	BT-2	Understand
8.	Compare expansion and contraction joints.	BT-2	Understand
9.	Compare rigid joint and hinged joint with reference to prefabricated construction.	BT-2	Understand
10.	Explain one way and two way precast slabs.	BT-2	Understand
11.	Distinguish long wall and cross wall in large panel building.	BT-2	Understand
12.	How would you apply the torsion effects on prefabricated slabs?	BT-3	Apply
13.	Sketch beam to column connection with salient features.	BT-3	Apply
14.	Sketch column to column connection with salient features.	BT-3	Apply
15.	Show lateral load resisting elements in a building.	BT-3	Apply
16.	Compare the framed wall system and load bearing wall system.	BT-4	Analyse
17.	Examine concepts involved in the analysis of framed buildings.	BT-4	Analyse

18.	How prefabricated structural components are classified?	BT-4	Analyse
19.	Compare the primary and secondary connections.	BT-4	Analyse
20.	List out the types of joints and connections.	BT-5	Evaluate
21.	Recommend the merits and demerits of expansion joints.	BT-5	Evaluate
22.	Interpret the various connections in buildings	BT-5	Evaluate
23.	Discuss column to foundation connection.	BT-6	Create
24.	Draw the details about framed connection.	BT-6	Create
25.	Summarize the essential requirements of joints in precast construction.	BT-6	Create

PART-B (13 MARKS)

Q.No	Questions	BT Level	Competence
1.	What are the requirements of ideal structural joints? List different joint of structures.	BT-1	Remember
2.	List the methods of joining of one way slab and two way prefabricated slabs in prefabricated constructions with neat sketches In detail.	BT-1	Remember
3.	Describe the methods joining of beam to column and column to column in prefabricated constructions with neat sketches?	BT-1	Remember
4.	Discuss about the expansion joints and also list out the merits and demerits.	BT-2	Understand
5.	Compare the framed buildings with partial and curtain walls.	BT-2	Understand
6. .	Write the importance of joints in precast structures and compare with cast- in-situ structures.	BT-2	Understand
7.	Explain with neat sketches, the difference in structural behaviour of beam column joint in a prefabricated construction and conventional RC construction.	BT-2	Understand
8.	Explain framed buildings with partial and curtain walls.	BT-3	Apply
9.	Explain the joint techniques and materials used for expansion joints in detail?	BT-3	Apply
10.	Prepare a brief report on different types of wall and slab systems.	BT-4	Analyse
11.	Explain in detail about large panel construction with neat sketches.	BT-4	Analyse
12.	Describe the manufacturing Process of wall panels.	BT-4	Analyse
13.	Explain with the aid of neat sketches, any two different types connections in prefabricated structures.	BT-5	Evaluate
14.	Discuss the factors to be considered for manufacturing of RCC wall panels.	BT-6	Create

PART-C (15 MARKS)

Q.No	Questions	BT Level	Competence
1.	Write about manufacturing of roof slabs. Also explain the Precautions taken during the process.	BT-1	Remember

2.	Elaborate the recommendations for the detailing in the precast element in respect of the connections and erection of Structural slab and wall system.	BT-2	Understand
3.	Explain the manufacturing process of roof and floor slabs with neat flow chart.	BT-4	Analyse
4.	Classify the structure of building based on the load distribution and briefly explain the different types of such prefabricated building.	BT-5	Evaluate

UNIT III - FLOORS, STAIRS AND ROOFS

Types of floor slabs, analysis and design example of cored and panel types and two-way systems,staircase slab design, types of roof slabs and insulation requirements, Description of joints, their behaviour and reinforcement requirements, Deflection control for short term and long term loads,Ultimate strength calculations in shear and flexure.

PART-A (2MARKS)

Q.No	Questions	BT Level	Competence
1.	List out the types of prefabricated floor slabs.	BT-1	Remember
2.	Write the importance of dimensional tolerance.	BT-1	Remember
3.	Define large panel systems.	BT-1	Remember
4.	Define wall panel systems.	BT-1	Remember
5.	Write the formula for shear strength of floor slabs.	BT-1	Remember
6.	What is the importance of joints in precast structures when compared to cast insitu structures?	BT-1	Remember
7.	Compare rigid joint and hinged joint with reference to Prefabricated construction.	BT-2	Understand
8.	How does the material used in construction affect the design of floor Slabs?	BT-2	Understand
9.	Write the maximum allowable deflection limit for roof slabs under short term loads.	BT-2	Understand
10.	Discuss about the dimensional tolerances.	BT-2	Understand
11.	Figure out the short term load.	BT-2	Understand
12.	List out the prefabricated structural components.	BT-3	Apply
13.	What are RCC planks and joists?	BT-3	Apply
14.	Compare the merits and demerits of precast roofing system	BT-3	Apply
15.	Write about the long term load.	BT-3	Apply
16.	Compare the joint deformation and joint flexibility	BT-4	Analyse
17.	Discuss about the lift slab construction.	BT-4	Analyse
18.	Figure out the staircase system.	BT-4	Analyse
19.	What is deflection control?	BT-4	Analyse
20.	Prepare the general design requirements of cored and panel systems.	BT-5	Evaluate

21.	What are the types of precast floor and roof slab system?	BT-5	Evaluate
22.	Prioritize the basic factors to be considered in the provision of waist slab.	BT-5	Evaluate
23.	Sketch the reinforcement details in precast roof slab, floor slab and stair case slab.	BT-6	Create
24.	Summarize the general insulation requirements of roofing and floor slab system.	BT-6	Create
25.	Write about the failure of joints.	BT-6	Create

PART-B (13 MARKS)

Q.No	Questions	BT Level	Competence
1.	List the factors that govern the design of expansion joints in Precast structures, Explain.	BT-1	Remember
2.	What are the features of cored and panel types and two-way systems in prefabricated constructions, Explain.	BT-1	Remember
3.	What is the requirement of ideal structural joints? Explain different joints of structures.	BT-1	Remember
4.	Write the design procedure for cored and panel types of floor slabs.	BT-1	Remember
5.	Explain the types of joints in precast construction. Also explain its behaviour.	BT-2	Understand
6.	Explain the methods of construction of roof and floor slabs.	BT-2	Understand
7.	Explain in detail about the precast structural components like i) Roof slab ii) Stair case waistslab	BT-2	Understand
8.	Explain short notes on i) Precast RC channel roofing (7 Marks) ii) Precast hollow slab roofing (6 Marks)	BT-2	Understand
9.	List the steps for analysis and design of hollow core slab with appropriate sketches.	BT-3	Apply
10.	Exemplify in detail the ultimate strength calculation in shear and flexure for slab.	BT-3	Apply
11.	Discuss about i) Precast RC panel roofing system (4 Marks) ii) Prefabricated brick panel roofing system (4 Marks) iii) Precast curved brick arch panel roofing (5 Marks)	BT-4	Analyse
12.	Write the importance of joints in precast structures when compared to cast in situ structures.	BT-4	Analyse
13.	List the types of joints in precast construction also explain its behavior.	BT-5	Evaluate
14.	Elaborate the manufacturing process of roof slabs and also explain the precautions taken during the process.	BT-6	Create

PART-C (15 MARKS)

Q.No	Questions	BT Level	Competence
1.	Write the case study on two-way system and one way system in prefabricated structures.	BT-1	Remember
2.	Explain in detail about design of precast stair case slab.	BT-4	Analyse
3.	What are the main factors to be considered in on site fabrication of roof slab and floor slab?	BT-5	Evaluate
4.	Sketch the reinforcement details about one way and two way system in precast structural element and elaborate with the comparison of both systems.	BT-6	Create

UNIT IV- WALLS

Types of wall panels, Blocks and large panels, Curtain, Partition and load bearing walls, load transfer from floor to wall panels, vertical loads, Eccentricity and stability of wall panels, Design Curves, types of wall joints, their behaviour and design, Leak prevention, joint sealants, sandwich wall panels, approximate design of shearwalls.

PART-A (2MARKS)

Q.No	Questions	BT Level	Competence
1.	State the types of wall joints.	BT-1	Remember
2.	Write the difference between partition and load bearing walls	BT-1	Remember
3.	List out the importance of providing shear wall in high building.	BT-1	Remember
4.	List the types of sealants of a single storey industrial shed.	BT-1	Remember
5.	Define sandwich wall panels.	BT-1	Remember
6.	Write briefly about types of wall panels.	BT-1	Remember
7.	Demonstrate the role of shear wall as an earthquake resistant member.	BT-2	Understand
8.	What are the types of sealants used in critical case?	BT-2	Understand
9.	Differentiate the blocks and large panel construction.	BT-2	Understand
10.	Difference between open-drained joint and face sealed joint.	BT-2	Understand
11.	Describe in detail about large panel construction.	BT-2	Understand
12.	Identify the limitations of load bearing walls.	BT-3	Apply
13.	Sketch and detail about shear wall construction.	BT-3	Apply
14.	Sketch and detail about load transfer in wall panels.	BT-3	Apply
15.	How can you classify precast large panel?	BT-3	Apply
16.	How do you examine design curves?	BT-4	Analyse
17.	List the methods used for forming vertical joints.	BT-4	Analyse

18.	Compare in detail about load bearing and non-load bearing wall System.	BT-4	Analyse
19.	What do you understand in the concept of construction of wall panel in highrise building?	BT-4	Analyse
20.	How can you assess leak prevention?	BT-5	Evaluate
21.	Prepare the details about architectural design of wall panels.	BT-5	Evaluate
22.	What are the factors associated with curtain walls?	BT-5	Evaluate
23.	How can you elaborate vertical loads?	BT-6	Create
24.	Summarize the design importance of shear wall construction.	BT-6	Create
25.	What are the factors associated with curtain walls?	BT-6	Create

PART-B (13 MARKS)

Q.No	Questions	BT Level	Competence
1.	Discuss the applications of the following (i) Sandwich wall panels (4 Marks) (ii) Blocks and large panels (5 Marks) (iii) Joint sealant (4 Marks)	BT-1	Remember
2.	List out types of wall panels and elaborate any two in detail.	BT-1	Remember
3.	Write the importance structural design of load bearing wall panels and curtain wall.	BT-1	Remember
4.	Write in detail about connections and joints for wall panels	BT-1	Remember
5.	Discuss the manufacturing process of wall panels.	BT-2	Understand
6.	i) Discuss the different types of joint sealants used in precast building. (7 Marks) ii) Write in detail about advantages and disadvantages of the sealants. (6 Marks)	BT-2	Understand
7.	Specify the general consideration for external wall construction.	BT-2	Understand
8.	Describe in details the pattern of load transfer from floor to wall panels.	BT-2	Understand
9.	Illustrate in details about large panel structure with neat sketches for exterior and interior wall panel construction.	BT-3	Apply
10.	Explain the type of wall joints with neat skectches	BT-3	Apply
11.	What do you understanding the concept of i) Cross wall system (4 Marks) ii) Longitudinal wall system (5 Marks) iii) Two-way system (4 Marks)	BT-4	Analyse
12.	Explain the different types of wall panels and blocks.	BT-4	Analyse
13.	Prepare the steps involved in the design of shear walls.	BT-5	Evaluate
14.	Summarize the reports on manufacture, transport and erection of wall panels.	BT-6	Create

PART-C (15 MARKS)

Q.No	Questions	BT Level	Competence
1.	What are the major criteria which should be considered for the stability ofprecast wall panels?	BT-1	Remember
2.	List out the different types of joint sealants used in precast structural element also write a case study related to the joint failures.	BT-1	Remember
3.	Explain in detail about the pattern of load transfer from floor to wall panel in i) Axially load transfer (6Marks) ii) Eccentrically load transfer (7 Marks)	BT-4	Analyse
4.	Explain in detail about the design of curves in wall panels with neat sketch and any case study to validate your justification.	BT-4	Analyse

UNIT V - INDUSTRIAL BUILDINGS AND SHELLROOFS

Components of single-storey industrial sheds with crane gantry systems, R.C. Roof Trusses, Roof Panels, corbels and columns, wind bracing design. Cylindrical, Folded plate and hyper- prefabricated shells, Erection and jointing, joint design, hand book based design.

PART-A (2MARKS)

Q.No	Questions	BT Level	Competence
1.	Define Hyper Prefabricated shell.	BT-1	Remember
2.	State the importance of corbels in prefabricated buildings.	BT-1	Remember
3.	List out the components of single-storey industrial shed.	BT-1	Remember
4.	What are the importance of providing precast purlin and battens?	BT-1	Remember
5.	List the uses of cylindrical prefabricated planks.	BT-1	Remember
6.	Write the advantages of cylindrical shells?	BT-1	Remember
7.	Illustrate crane gantry system in precast structural element.	BT-2	Understand
8.	Illustrate the uses of corbels.	BT-2	Understand
9.	Explain roof trusses and roof panels.	BT-2	Understand
10.	Discuss about the shear connectors.	BT-2	Understand
11.	Describe roof trusses and roof panels.	BT-2	Understand
12.	Construct the limitations of roof panels.	BT-3	Apply
13.	Write the necessary information for the efficient design and construction of doubly curved shell unit.	BT-3	Apply
14.	Examine the instability failure modes for prefabricated concrete shell structures.	BT-3	Apply
15.	How can you classify crane gantry system?	BT-3	Apply
16.	Examine the factors influences in wind bracing design.	BT-4	Analyse

17.	Explain about modular grid.	BT-4	Analyse
18.	Mention the design codes for precast units.	BT-4	Analyse
19.	What do you understand by accelerated hardening?	BT-4	Analyse
20.	What are the types of precast cylindrical shell and folded plate?	BT-5	Evaluate
21.	What are the types of prefabrication system as per IS code?	BT-5	Evaluate
22.	Assess the types of folded plates.	BT-5	Evaluate
23.	Draw the wind brace diagram used in precast structures.	BT-6	Create
24.	Summarize the components of a single storey industrial shed.	BT-6	Create
25.	Elaborate the erection process.	BT-6	Create

PART-B (13 MARKS)

Q.No	Questions	BT Level	Competence
1.	Write in detail about installation of prefabricated elements.	BT-1	Remember
2.	What are the design requirements of precast truss?	BT-1	Remember
3.	Explain the steps involved in the method of erection and jointing of single storey industrial shed with crane gantry systems.	BT-1	Remember
4.	Explain the problems in design of joint flexibility, Discuss with regard to various locations.	BT-1	Remember
5.	Briefly explain the applications of the following: (i) RC roof truss (4 Marks) (ii) Wind bracing (5 Marks) (iii) Folded plates (4 Marks)	BT-2	Understand
6.	Discuss in detail about design of corbel in prefabricated columns.	BT-2	Understand
7.	Briefly explain the various equipments used in the erection of prefabricated industrial building.	BT-2	Understand
8.	Illustrate with a neat sketch an industrial shed with arrangement of crane girders and roof trusses.	BT-3	Apply
9.	Write the types of precast industrial components and What are the factors should be considered in connection of precast industrial structures?	BT-3	Apply
10.	Explain with sketches the different types of trusses used in industrial building.	BT-4	Analyse
11.	Explain in details about i) Holes for dowels and dowel bars (4 Marks) ii) Bond (5 Marks) iii) Bolted connection (4 Marks)	BT-4	Analyse
12.	What are the general design requirements of erecting and jointing in hyper prefabricated shells?	BT-5	Evaluate
13.	Discuss about behavior of columns in prefabricated structures.	BT-5	Evaluate
14.	Summarize in details about i) Reinforcement anchorages (4 Marks) ii) Threaded and non-threaded inserts (5 Marks) iii) Chamfers (4 Marks)	BT-6	Create

PART-C (15 MARKS)

Q.No	Questions	BT Level	Competence
1.	Summarize the detailed report on components of single-storey industrial sheds with crane gantry system.	BT-4	Analyse
2.	Explain in detail about case study report on wind bracing design.	BT-4	Analyse
3.	Explain the design requirements of erection and installation Prefabricated elements.	BT-2	Understand
4.	Compare design procedures in detail for R.C roof trusses and roof panels.	BT-2	Understand