B.Arch-VI(R/S)-05-25-4174 Reg. No. | | | | | | | | |

B

B.Arch. Degree VI Semester Regular/Supplementary Examination May 2025

AR 1602 BUILDING MATERIALS AND CONSTRUCTION VI

(2021 Scheme)

Time: 4 Hours Maximum Marks: 100

(Use illustration wherever required. Illustrations carry due marks)

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. (a) Define space structures and explain their key design principles.

(b) Differentiate between single-layer and double-layer grid structures.

(c) What are the primary reasons for using pre-stressed concrete in construction?

(d) Explain the process of post-tensioning in pre-stressed concrete.

(e) List the advantages of precast concrete construction over cast-in-situ methods.

(f) Describe the joinery techniques commonly used in precast concrete systems.

(g) What are the primary functions of temporary structures on a construction site?

(h) Explain the importance of material selection in the construction of temporary structures.

PART B

(4 × 10 = 40)

II. Explain the constructional aspects of spatial grids and double curvature skeletons, highlighting their advantages and disadvantages.

OR

III. Describe the various types of skeleton/grid structures and their applications in different materials.

IV. Discuss the principles of pre-stressing and compare pre-tensioning and post-tensioning methods with examples.

OR

V. Explain different post-tensioning systems like Freyssinet, Magnel Blaton, Gifford-Udal and Lee-McCall, highlighting their applications.

(P.T.O.)

VI. Describe the complete construction process of a fully precast concrete system, from foundation to roof, with design and structural principles.

OR

VII. Explain the constructional details and techniques of connections in precast concrete structures with suitable examples.

VIII. Discuss the design and structural principles involved in constructing temporary structures, considering various materials and joinery techniques.

OR

IX. Explain the constructional aspects and detailing required for designing small temporary structures with common materials.

PART C

$(1 \times 20 = 20)$

X. Draw plan elevation and section of a double-layer spatial grid structure, indicating key structural components and connections.

OR

XI. Prepare a constructional drawing of a small temporary structure (e.g., site office or storage shed), showing key joinery techniques and material specifications.

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B.Arch-VI(R/S)-05-25-4175 Reg. No. | | | | | | | | |

B

B.Arch. Degree VI Semester Regular/Supplementary Examination May 2025

AR 1603 HISTORY OF ARCHITECTURE VI-MODERN AND POST MODERN

(2021 Scheme)

Time: 3 Hours Maximum Marks: 100

Instructions: Illustrations in answers carry due marks.

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. Write short notes on the following:

(a) De Stijl movement.

(b) Contributions of Walter Gropius.

(c) Ecological architecture.

(d) Contributions of Alver Alto.

(e) Post Structuralism.

(f) Zaha Hadid.

(g) Planning of Chandigarh.

(h) Hafeez Contractor.

PART B

(4 × 15 = 60)

II. Discuss the principles of modern architecture using the works of Le Corbusier.

OR

III. Bauhaus school significantly influenced modern architecture through its pioneering contributions. Elaborate.

IV. What were the architectural philosophies of Geoffrey Bawa and Hassan Fathy towards achieving critical regionalism?

OR

V. Briefly discuss the following art movements and their influence in modern architecture. Expressionism, Cubism, Impressionism.

VI. What were the key concepts and visions proposed by Archigram?

OR

VII. Explain the foundational principles of deconstructivism as demonstrated in the architectural works of Frank Owen Gehry and Daniel Libeskind.

VIII. Elaborate on the works and philosophies of:

(i) Allen Stein

(ii) Raj Rewal

(iii) Christopher Beneger.

OR

IX. Discuss the works and ideas of:

(i) Nari Gandhi

(ii) B. V Doshi

(iii) Laurie Baker.

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B.Arch-VI(R/S)-05.25-4176 Reg. No. | | | | | | | | |

A

B.Arch. Degree VI Semester Regular/Supplementary Examination May 2025

AR 1604 THEORY OF STRUCTURES V - STEEL STRUCTURES

(2021 Scheme)

Time: 3 Hours Maximum Marks: 100

Instructions: Codes IS800, Steel tables and calculators are permitted

PART A

(Answer *ALL* questions)

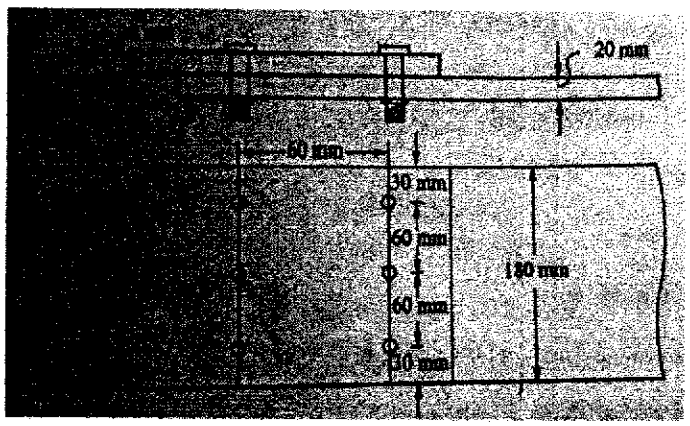
(8 × 5 = 40)

I. (a) Briefly explain types of steel connections.
(b) List and explain the types of bolts.
(c) Explain block shear failure with a neat sketch. Give the design criteria for block shear strength as per IS800.
(d) Write short note about the best shape for compression members. State with reasons.
(e) Write short note on classification of beam sections.
(f) Explain the design considerations of plate girder with a neat sketch.
(g) Give short note on outrigger braced structures.
(h) What is bundled tube structures? Explain.

PART B

(4 × 15 = 60)

II. Find the efficiency of the lap joint shown in figure. Given M20 bolts of grade 4.6 and Fe410 (E250) plates are used.



OR

III. A tie member of a truss consisting of an angle section ISA 70×70×6 mm of Fe410 grade is welded to a 8 mm gusset plate. Design a weld to transmit a load equal to the full strength of member. Assume shop welding.

(P.T.O.)

IV. Design a single angle section for a tension member of a roof truss to carry a factored tensile force of 250 kN. The member is subjected to the possible reversal of stress due to the action of wind. The effective length of the member is 3 m. Use M20 bolts of grade 4.6 for the connection.

OR

V. Determine the design axial capacity of the column ISHB 300 @577 N/m if the length of column is 3 m and its both ends are pinned.

VI. An ISMB 500 section is used as a beam over span of 6 m, with simply supported ends. Determine the maximum factored load that the beam can carry if the ends are restrained against torsion but compression flange is laterally unsupported.

OR

VII. Explain the design procedure of a plate girder step by step.

VIII. Explain about the different roof systems in Industrial Buildings. Give neat sketches.

OR

IX. What are tubular structures? Give notes on different types of tubular structures.

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B.Arch-VI(R/S)-05.25-4177 Reg.No. | | | | | | | | |

B

B.Arch. Degree VI Semester Regular/Supplementary Examination
May 2025

AR 1605 SOCIETY, ARCHITECTURE AND ENVIRONMENT

(2021 Scheme)

(Support your answer with proper illustrations and examples)

Time : 3 Hours Maximum Marks : 100

PART A

(Answer ***ALL*** questions)

(8 × 5 = 40)

I. Write short notes on the following.

(a) Urban community and Rural community.
(b) Family and its characteristics.
(c) Cultural anthropology.
(d) Social class and caste system.
(e) Response of Kerala's traditional architecture to its environment.
(f) Architecture and nature.
(g) Ecology of parks and playgrounds.
(h) Importance of awareness and sensitivity to open spaces in urban design.

PART B

(4 × 15 = 60)

II. Discuss the importance of understanding sociological concepts such as community, social institutions and social networks for architects. Provide examples of how these concepts influence architectural design.

OR

III. Critically examine the differences and similarities among Social Groups, Communities, Associations and Institutions. Discuss how each concept contributes to societal structure and dynamics with examples.

IV. Elaborate the dynamics of social change and their impact on the evolution of built forms. Provide relevant examples.

OR

V. Describe the process of urbanization and its impact on society. How does urbanization affect economic development, social structures and the environment? Support with examples from different regions.

VI. Critically analyze the impact of Kerala's environmental conditions (land, water, air) on its traditional architectural styles and planning.

OR

VII. Define Biophilia Hypothesis. Discuss in detail the design strategies and application of Biophilia Hypothesis in Kerala domestic architecture.

VIII. Identify and examine in detail the three primary challenges in planning new towns. Analyze their implications and provide relevant examples to illustrate each challenge.

OR

IX. Describe in detail the concept of environmental cognition and discuss how urban aesthetics influence people's psychological well-being, providing examples of cities with effective, user-friendly urban designs.

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A

B.Arch. Degree VI Semester Regular/Supplementary Examination May 2025

AR 1606 BUILDING SERVICES-III FIRE SAFETY, HVAC AND BUILDING AUTOMATION

(*2021 Scheme*)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. Write short notes on:

(a) Fire sprinklers and their types.

(b) The role of fire doors in fire protection.

(c) Heat transfer and its significance in architectural building design.

(d) Fourier's Law of Heat Conduction.

(e) Refrigeration cycle.

(f) Components of a basic vapour compression refrigeration system.

(g) The sensors used in modern building automation systems.

(h) The advantages of integrating HVAC systems with fire protection automation.

PART B

(4 × 15 = 60)

II. Compare and contrast wet risers and dry risers.

OR

III. Explain in detail the causes of fire, modes of fire spread in buildings and methods of controlling fire.

IV. Discuss the concept of critical radius of insulation and its practical applications.

OR

V. An exterior roof assembly consists of a 12 cm layer of concrete (thermal conductivity, k = 1.2 W/m·°C) topped with a 5 cm layer of wood (thermal conductivity, k = 0.12 W/m·°C). To enhance thermal performance, a layer of expanded polystyrene insulation (thermal conductivity, k = 0.035 W/m·°C) is proposed. What should be the minimum thickness of the polystyrene layer to reduce the overall heat transfer through the roof by 60%?

VI. Compare and contrast a refrigerator and a heat pump. Discuss their applications in building environmental control.

OR

VII. List the different types of air-conditioning systems and describe how a central air-conditioning system works. Also, explain its main components with the help of a diagram.

VIII. Discuss the design challenges faced while incorporating building automation.

OR

IX. Discuss the concept of Building Automation Systems (BAS).

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