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***B.Arch. Degree V Semester Supplementary Examination
November 2025***

**AR 1502 BUILDING MATERIALS AND CONSTRUCTION - IV
(2014 Scheme)**

Time: 4 Hours

Maximum Marks: 100

**PART A
(Answer ALL questions)**

- I. Write short notes on the following: (8 × 5 = 40)
- Properties, uses and application of distempers.
 - Shellac and Lacquers.
 - Vinyl and Ceramic tiles.
 - Kotah.
 - PVC and Acrylic sheets.
 - Different parts of a king post truss.
 - Horizontal belt conveyors.
 - Hydraulic lift.

- II. Discuss any two purpose of varnish and explain in detail its uses and properties. (2 × 10 = 20)
- OR**
- III. Explain the properties and application of any four types of natural floor finishes.
- IV. What are the advantages and disadvantages of galvanised iron sheets and corrugated aluminium sheets in the construction industry?
- OR**
- V. Explain any two types of elevators. Discuss in detail the planning considerations for elevators and requirements for physically handicapped.

PART B

- VI. Draw to a suitable scale a Queen post roof truss with fixing details for a span of 8.2 m and label the different parts. Show the detailed drawing of its joints (2 × 20 = 40)
- rafter to tie beam
 - queen post to tie beam.
- OR**
- VII. Draw to a suitable scale a steel angular roof truss to span 12 m for a warehouse structure. Use a typical triangular truss form. Show the following details
- to scale plan and elevation of the truss.
 - details of key members.
 - cross section of a typical joint using angle sections and gusset plates. Annotate all key dimensions, member sizes, connections and specifications.

(P.T.O.)

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VIII. Draw in detail the plan and section of a hospital lift suitable for a multi-storey healthcare building having floor-to-floor height of 3.3 meters.

OR

IX. Draw and detail the plan and section of an escalator system for a shopping mall. Assume floor-to-floor height of 4.5 m and escalator angle of 35° .

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**AR 1503 HISTORY OF ARCHITECTURE-IV
(2014 Scheme)**

Time: 3 Hours

Maximum Marks: 100

PART A(Answer *ALL* questions)

(8 × 5 = 40)

- I. (a) Write short note on Fort Aguada.
- (b) Describe the architectural features and significance of the Basilica of Bom Jesus and Se Cathedral in Old Goa as examples of Portuguese influence.
- (c) Explain the features and significance of the Indo-Saracenic style.
- (d) Describe any one example of British Colonial Architecture in India.
- (e) Explain how the industrial revolution influenced architecture, with special reference to the Eiffel Tower.
- (f) Describe post renaissance architecture in Europe.
- (g) Explain the architectural philosophy of Louis Sullivan and his contribution to modern architecture.
- (h) Describe the concept of organic architecture.

PART B

(4 × 15 = 60)

- II. Discuss the origin, styles and evolution of Portuguese Colonial Architecture in India. Explain its major features and overall impact on Indian architectural development with sketches.
- OR**
- III. Discuss the architectural significance of Old Goa, focusing on the Portuguese colonial style and explain about the unique architectural character of the Fontainhas in Goa.
- IV. Describe the evolution and impact of British Colonial Architecture in India, highlighting its major styles and characteristics with sketches.
- OR**
- V. Describe about Edwin Lutyen's Architecture contribution to India with sketches.
- VI. Describe the material, social and cultural impact of industrial revolution in the field of architecture.
- OR**
- VII. Explain about industrial revolution the cause, consequence and impact in architecture along with sketches.
- VIII. Explain about Art Nouveau and Art and crafts movement along with sketches.
- OR**
- IX. Describe the architecture contributions of Antonio Gaudi, Victor Horta and Frank Lloyd Wright.

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AR 1504 ECOLOGY AND ENVIRONMENTAL STUDIES

(2014 Scheme)

Time: 3 Hours

Maximum Marks: 100

PART A
(Answer *ALL* questions)

(8 × 5 = 40)

- I. Write short notes on:
- Troposphere.
 - Biome.
 - Ecophene and Ecotypes.
 - Habitats and their selection.
 - Ten percent law of energy transfer.
 - Food chain.
 - Wetland ecosystem.
 - Freshwater ecosystem.

PART B

(4 × 15 = 60)

- II. Describe the levels of ecological organization. Elaborate on the concept of the Biome
- OR**
- III. What role do environmental studies play in the architecture and construction industry? Explain with examples, how architectural activities affect communities and ecosystems.
- IV. Detail and diagram r and k selection with specific examples of populations that exhibit each selection pattern.
- OR**
- V. Describe the different Population selection strategies. Explain the role of ecological succession in this context, supported by an example.
- VI. Explain in detail the different methods of measuring productivity.
- OR**
- VII. Explain food chains and food webs. Link energy transfer through these pathways with the laws of thermodynamics.
- VIII. Explain the Phosphorus cycle with the help of a diagram. How the human activities in ecosystems affected the Sulphur cycle?
- OR**
- IX. Describe Biogeochemical cycles and their role in the environment. Explain citing the example of one sedimentary cycle.

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**AR 1505 BUILDING SERVICES II-ELECTRICAL DESIGN AND ILLUMINATION
(2014 Scheme)**

Time: 3 Hours

Maximum Marks: 100

**PART A
(Answer ALL questions)**

(8 × 5 = 40)

- I. (a) Differentiate between stand-by power supply and alternate power supply systems.
- (b) What do you understand by balanced and unbalanced loads in a three-phase system?
- (c) Write a short note on the function of a Switch Fuse Unit (SFU) in an electrical panel.
- (d) Explain the role of a transformer in the electrical distribution for a building.
- (e) What are 'rising mains' and why are they essential in high-rise buildings?
- (f) Define the following terms.
- (i) Luminous Flux.
- (ii) Candela.
- (iii) Lux.
- (g) What is the purpose of lightning protection in buildings?
- (h) Briefly explain plate earthing with a simple sketch.

PART B

(4 × 15 = 60)

- II. With neat sketches, explain the star and delta connections for a three-phase electrical system. List the key differences between them.
- OR**
- III. Explain the difference between AC and DC systems. Describe the components and importance of an emergency power supply system in a commercial building.
- IV. Draw a schematic single-line diagram showing the electrical distribution in a typical residential building, indicating the position of the energy meter, main switch, ELCB/RCCB and distribution boards (DBs) for different floors or sections.
- OR**
- V. Explain the working principles and applications of the following protective devices with neat sketches
- (i) Miniature Circuit Breaker (MCB)
- (ii) Moulded Case Circuit Breaker (MCCB)
- (iii) Earth Leakage Circuit Breaker (ELCB).

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VI. Design an illumination scheme for a university classroom of size 8 m × 10 m. Assume suitable data for the type of luminaires, maintenance factor and utilization factor. Calculate the number of lamps required and show their arrangement in a layout plan.

OR

VII. Discuss the different types of luminaires and fittings used in interior lighting. Explain the principles of lighting that should be considered for designing the lighting in a museum.

VIII. Explain the procedure for pipe earthing with a detailed, neat sketch, labelling all the components and specifying standard dimensions.

OR

IX. What are the key electrical safety regulations and considerations to be followed in the design of a high-rise commercial building?

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**AR 1506 ARCHITECTURAL DETAILING
(2014 Scheme)**

Time: 4 Hours

Maximum Marks: 100

Instructions:

- (i) Drawing sheets will be provided.
- (ii) Assume further data, if found necessary

PART A(Answer *ALL* questions)

(8 × 5 = 40)

- I. Write short notes on the following.
- (a) Role of line expression and line weights in working drawings.
 - (b) Components and purpose of a Roof Plan.
 - (c) Cross Referencing and its primary use in a drawing set.
 - (d) Intent and content of a comprehensive Working Drawing set.
 - (e) Key elements to be included in a Site Plan.
 - (f) Concept and importance of a Reflected Ceiling Plan (RCP).
 - (g) Differences between Wall Section and Cross Section in an architectural set.
 - (h) Essential items to be included in a Room Finish Schedule.

PART B

(3 × 20 = 60)

- II. Draw the Central Line Setting Out Plan (Scale 1:50) for the residence shown in Figure 1. Show the column grid, column centers and all dimensions necessary for site execution.
- OR**
- III. Draw the Detailed Section (Scale 1:50) of the residence shown in Figure 1, cutting through the Living Room and Dining, Wash Area, and Toilet. Clearly show the foundation details, wall construction, roof construction, and floor finish layers.
- IV. Prepare a comprehensive Schedule of all the doors and windows shown in Figure 1. Illustrate the joinery details (Plan and Section at an appropriate scale) of the bedroom-1 door.
- OR**
- V. Draw the Interior Elevation (Scale 1:20) of the wall in the Kitchen area of Figure 1 that contains the window. Show all floor finishes, skirting, window details and the material breakup for the wall surface.
- VI. Prepare the Detailed Sanitary and Drainage Layout Plan (Scale 1:50) for the residence shown in Figure 1. Show the connection of all fixtures from Toilet to the main drain line, including the location and symbol for the Gully Trap, Inspection Chamber and connection to a proposed Septic Tank. Indicate pipe sizes and required slope.

OR**(P.T.O.)**

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VII. Prepare a neatly drafted Electrical Layout Plan (Scale 1:50) for the area comprising the Living Room and Dining Area and Sit out in Figure 1. Show the location of the main distribution board, all switches, light points, fan points and power sockets. Include a complete Legend/Key indicating the height of all fixtures from the Finished Floor Level (FFL).

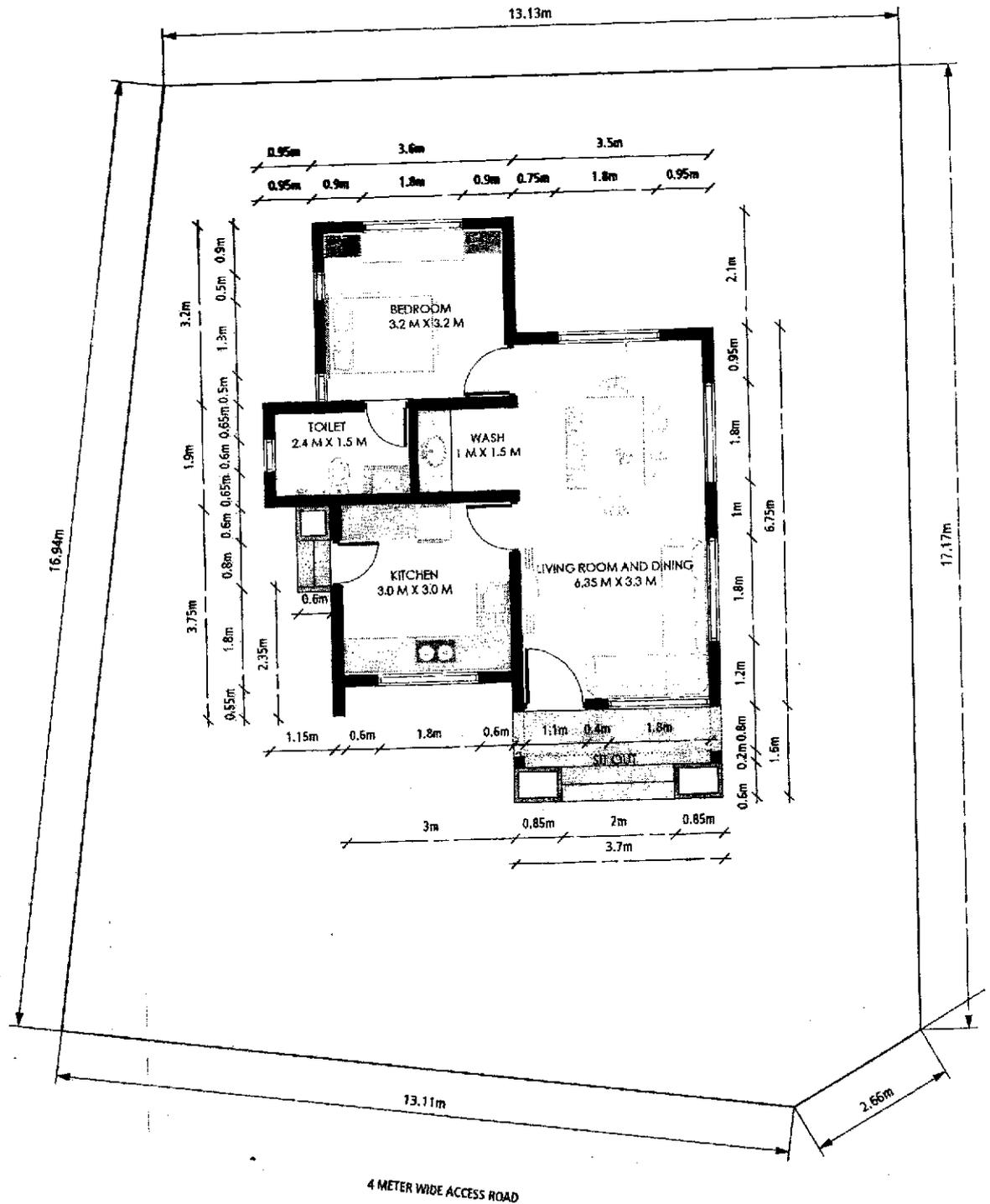


Figure 1

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**AR 1507 STRUCTURAL ANALYSIS - III
(2014 Scheme)**

Time: 3 Hours

Maximum Marks: 100

**PART A
(Answer ALL questions)**

(8 × 5 = 40)

- I. (a) Write the equation of a parabolic arch subjected to a uniform load.
- (b) What are the fundamental differences between two-hinged and three-hinged arches?
- (c) Define a suspension cable.
- (d) What is the effect of support settlement on indeterminate beams?
- (e) Define stiffness and flexibility.
- (f) Define the direct stiffness method.
- (g) What is the distribution factor and carryover in moment distribution method?
- (h) What are the advantages of using software in structural design?

PART B

(3 × 20 = 60)

- II. A three-hinged parabolic arch of span 40 m and central rise 8 m carries:
 - (a) a UDL of 30 kN/m over the entire span
 - (b) a point load of 100 kN at 10 m from the left support.
 Find:
 - (i) horizontal thrust
 - (ii) reactions at supports
 - (iii) draw the bending-moment diagram.
- OR
- III. Derive the expression for the horizontal thrust and bending moment equation for a three-hinged circular arch subjected to a uniformly distributed load. Sketch the diagrams for normal thrust, radial shear and bending moment.
- IV. A suspension cable has a span of 120 m and a dip of 10 m at mid-span. It supports a uniformly distributed load of 15 kN/m over the horizontal span. Find:
 - (i) the horizontal tension
 - (ii) the maximum tension in the cable
 - (iii) the length of the cable.
- OR
- V. Analyze a continuous beam ABC of equal spans 6 m each carrying a UDL of 10 kN/m using the force method. Both ends are simply supported and the beam is continuous over support B. Draw the bending-moment diagram and shear-force diagram.

(P.T.O.)

- VI. Analyze the continuous beam ABC using Stiffness matrix. Span AB = 6 m, BC = 6 m, Beam is fixed at A and simply supported at C, Span AB carries a UDL of 20 kN/m, span BC carries a central point load of 60 kN. Draw the bending-moment diagram.

OR

- VII. Derive the global stiffness matrix for a plane truss member using the direct stiffness method and apply it to analyze a simple two-member truss loaded at the joint.
