This well-known text-book provides an up-to-date account of the basic knowledge of Building Construction. The subject matter is expressed in a simple language and practical manner. The treatment is clear, methodical as well as interesting and easy to follow.

The entire subject matter is systematically arranged in the chapters like: Introduction; Functional Planning of Buildings; Important Building Components; Site Investigation and Ground Techniques; Foundations; Deep Excavations; Deep Foundations (Pile Foundations); Cofferdams; Caissons; Stone Masonry; Brick Masonry; Structures in Brickwork; Partitions; Scafolding, Shoring and Underpinning; Damp-proofing, Water-proofing and Termite-proofing; Cement Concrete Construction; Arches; Lintels; Stairs; Formwork; Doors, Windows and Ventilators; Carpentry and Joinery; Floors and Flooring; Roofs; Pointing and Plastering; Painting, Varnishing and Distempering etc.; Structural Steelwork; Acoustics; Fire Protection in Buildings; Ventilation and Air-conditioning; Construction Equipments; CPM and PERT.

Part 1 and Part 2 of this book is merged and all the chapters are rearranged to maintain continuity. The chapters Introduction, Functional Planning of Buildings and Important Building Components are totally new and are included as per new syllabus. Also chapter of Site investigation and ground techniques is separated from the chapter of Foundation. In the chapter of Construction Equipments, almost all the types of construction equipments and machineries which are normally used in civil engineering projects have been included. A few new problems on CPM and PERT are also added.

The book in its 32 chapters now contains:

* 860 Self-explanatory and neatly drawn sketches
* 115 Useful tables
* 60 Solved problems
* 575 Questions at the ends of all the chapters.

The book should prove to be extremely useful to the Engineering students preparing for the Degree Examinations of all the Indian Universities, Diploma Examinations conducted by various Boards of Technical Education, Certificate Courses as well as for the A.M.I.E., U.P.S.C., G.A.T.E., I.E.S. and other similar competitive and professional examinations. It is also useful for the preparation of NATA (National Aptitude Test for Architecture), CEPT (Centre for Environmental Planning and Technology), SBST (School of Building Science and Technology), SID (School of Interior Design), AIEEE (Architecture), etc. It should also prove of interest to the practising professionals.
# Chapter 1: Introduction

1-1. General
1-2. Types of buildings
1-2-1. Group A: Residential buildings
1-2-2. Group B: Educational buildings
1-2-3. Group C: Institutional buildings
1-2-4. Group D: Assembly buildings
1-2-5. Group E: Business buildings
1-2-6. Group F: Mercantile buildings
1-2-7. Group G: Industrial buildings
1-2-8. Group H: Storage buildings
1-2-9. Group I: Hazardous buildings
1-3. Structural system of building
1-4. Comparison of load bearing structure with framed structure
1-5. Loads on foundations

# Chapter 2: Functional Planning of Buildings

2-1. General
2-2. Principles of Site Selection
2-3. Site Plan
2-4. Planning regulations and bye-laws
2-5. Principles of planning
2-6. Modern architecture
2-7. Main considerations of architectural design
2-7-1. Bye-laws of the locality
2-7-2. Climate and its effects
2-7-3. Materials and methods of construction
2-7-4. People and their requirements
2-8. Orientation
2-9. Essential factors of planning

# Chapter 3: Important Buildings Components

3-1. General
3-2. Basic functional requirements of a building
3-3. Important building components

# Chapter 4: Site Investigation and Ground Techniques

4-1. General
4-2. Depth of exploration
4-3. Methods of site exploration
4-4. Choice of the method
4-5. Bearing Capacity of soil
4-6. Methods for determining the bearing capacity of soil
4-7. Increasing the bearing capacity of soil

# Chapter 5: Foundations

5-1. General
5-2. Objects of foundations
5-3. Essential requirements of a good foundation
5-4. Shallow foundations
5-5. Design of shallow foundations
5-6. Special foundations
5-7. Eccentric loading on foundation
5-8. Combined footing
5-9. Cantilever footing
5-10. Continuous footing
5-11. Foundations of black cotton soil
5-12. Stepped foundations
5-13. Foundations on reclaimed soil or made-up ground
5-14. Foundations on cavities and old wells
5-15. Foundations near existing adjacent old structures
5-16. Foundations for machines
5-17. Causes of failure of foundations and Preventive measures
5-18. Method of setting out the foundation trenches

# Chapter 6: Deep Excavations

6-1. Definition
6-2. Problems of deep excavations
6-3. Some terms in timbering
6-4. Methods of timbering
6-5. Precautions to be taken during timbering
6-6. Dewatering of the foundation trenches

# Chapter 7: Deep Foundations (Pile Foundations)

7-1. General
7-2. Uses of piles
7-3. Types of piles
7-4. Load bearing piles
7-5. Materials used in construction of load bearing piles
7-6. Cast-iron piles
7-7. Cement concrete piles
7-7-1. Cast-in-situ concrete piles
7-7-2. Pre-cast concrete piles
7-8. Sand piles
7-9. Steel piles
7-10. Timber piles
7-11. Wrought-iron piles
7-12. Non-load bearing piles
7-13. Choice of type of pile
7-14. Composite piles
7-15. Screw piles
7-16. Pile spacing
7-17. Group of piles
7-18. Efficiency of group of piles
7-19. Pile cap and pile shoe
7-20. Load tests on piles
7-21. Pile driving
7-21-1. Pile frames
7-21-2. Pile hammers
7-21-3. Leads
7-21-4. Winches
7-21-5. Miscellaneous
7-22. Pulling of piles
7-23. Loads on piles
7-24. Causes of failures of piles
7-25. Pile driving formulas
7-26. Typical problems using pile driving formulas

# Chapter 8: Cofferdams

8-1. General
8-2. Uses of cofferdams
8-3. Types of cofferdams
8-3-1. Dikes
8-3-2. Single wall cofferdams
8-3-3. Double wall cofferdams
8-3-4. Cellular cofferdams
8-3-5. Rock-filled crib cofferdams
8-3-6. Concrete cofferdams
8-3-7. Suspended cofferdams
8-4. Prevention of leakage in cofferdams
8-5. Puddle for cofferdam
8-6. Factors affecting design of a cofferdam

# Chapter 9: Caissons

9-1. General
9-2. Uses of caissons
9-3. Cofferdam and caisson
9-4. Materials used for the construction of caissons
9-5. Classification of caissons
9-6. Box caissons
9-7. Wells
9-8. Pneumatic caissons
9-9. Construction of a pneumatic caisson
9-10. Pneumatic caisson sickness
9-11. Drilled caissons
9-12. Methods of construction of drilled caisson
9-13. Precautions during construction of drilled caisson
9-14. Loads on caisson
9-15. Floating of caissons
9-16. Cutting edges
9-17. Factors affecting the choice of a cutting edge
9-18. Skin friction
9-19. Sand blowing
9-20. Methods to facilitate the sinking of caissons
9-21. Tilting of caissons
Questions 9

Chapter 10 STONE MASONRY
10-1. Definition
10-2. Materials required for stone masonry
10-3. Some definitions
10-4. Joints in stone masonry
10-5. Classification of stone masonry
10-6. Safe permissible loads on stone masonry
10-7. Tools used in stone masonry
10-8. Dressing of stone surfaces
10-9. Appliances for lifting stones
10-10. Points to be observed while supervising the stonework
Questions 10

Chapter 11 BRICK MASONRY
11-1. General
11-2. Size and weight of bricks
11-3. Some definitions
11-4. Types of brick masonry
11-5. Safe permissible loads on brick masonry
11-6. Tools used in brick masonry
11-7. Bonds in brickwork
11-8. Bonds at connections
11-9. Thickness of walls in brickwork
11-10. Supervision of the brickwork
11-11. Defects in brick masonry
11-12. Cracking in brick masonry walls
11-13. Comparison of brickwork and stonework
11-14. Composite masonry
Questions 11

Chapter 12 STRUCTURES IN BRICKWORK
12-1. General
12-2. Brick Footings
12-3. Piers
12-4. Buttresses
12-5. Retaining walls and breast walls
12-6. Thresholds
12-7. Window sills
12-8. Jambs
12-9. Corbels
12-10. Copings
12-11. Ornamental brickwork
12-12. Circular brickwork
12-13. Fireplaces and flues
12-14. Tall chimneys
12-15. Cavity walls
12-15-1. Reasons of providing a cavity or a hollow space in a wall
12-15-2. Details of construction
12-15-3. Features of a cavity wall
12-16. Reinforced brickwork
Questions 12

Chapter 13 PARTITIONS
13-1. Definition
13-2. Requirements of partition walls

13-3. Types of partitions
13-3-1. Brick partitions
13-3-2. Clay block partitions
13-3-3. Concrete partitions
13-3-4. Glass partitions
13-3-5. Timber partitions
13-3-6. Metal partitions
13-3-7. Plaster slab partitions
13-3-8. Asbestos cement sheet partitions
13-3-9. Wood wool slab partitions
13-3-10. Strawboard partitions
Questions 13

Chapter 14 SCAFFOLDING, SHORING AND UNDERPINNING
14-1. General
14-2. Scaffolding
14-3. Component parts of a scaffolding
14-4. Types of scaffolding
14-5. Points to be attended to in scaffolding
14-6. Shoring
14-7. Types of shoring
14-8. Underpinning
14-9. Points to be attended to before underpinning
14-10. Methods of underpinning
14-10-1. Pit method
14-10-2. Pile method
14-10-3. Miscellaneous methods
Questions 14

Chapter 15 DAMP-PROOFING, WATER-PROOFING AND TERMITE-PROOFING
15-1. General
15-2. Damp-proofing
15-2-1. Causes of dampness
15-2-2. Effects of dampness
15-2-3. Requirements of an ideal material for damp-proofing
15-2-4. Materials used for damp-proofing
15-2-5. General principles of damp-proofing
15-2-6. Methods of damp-proofing
15-3. Water-leakage
15-3-1. Reasons and preventive measures for water leakage
15-3-2. Water-proofing of flat roofs
15-4. Termite-proofing
15-4-1. Types of termites
15-4-2. General principles of termite-proofing
15-4-3. Methods of termite-proofing
15-5. Summary
Questions 15

Chapter 16 CEMENT CONCRETE CONSTRUCTION
16-1. Definition
16-2. Properties of cement concrete
16-3. Materials used in R.C.C. work
16-4. Corrosion of steel in concrete
16-5. Sea water for making concrete
16-6. Proportioning concrete
16-7. Grading of aggregates
16-8. Water-cement ratio
16-9. Workability
16-10. Estimating yield of concrete
16-11. Bulking of sand
16-12. Mixing the materials of concrete
16-13. Transporting and placing of concrete
16-14. Consolidation of concrete
16-15. Curing of concrete
16-16. Coloured concrete
16-17. Lightweight concrete
16-18. No-fines concrete
16-19. Joints in concrete structures
Chapter 16  GUNITING
   16-20. Guniting

Chapter 17  ARCHES
   17-1. General
   17-2. Definition
   17-3. Technical terms
   17-4. Types of arches
   17-4-1. Classification of arches according to shape
   17-4-2. Classification of arches according to number of centres
   17-4-3. Classification of arches according to workmanship
   17-4-4. Classification of arches according to materials of construction
   17-5. Stability of an arch
   17-6. Centering for arches

Chapter 18  LINTELS
   18-1. Definition
   18-2. Materials for lintels

Chapter 19  STAIRS
   19-1. General
   19-2. Technical terms
   19-3. Ramps
   19-4. Types of stairs
   19-5. Moving stairs (Escalators)
   19-6. Stairs of different materials
   19-7. Requirements of a good stair

Chapter 20  FORMWORK
   20-1. General
   20-2. Requirements of formwork
   20-3. Cost of formwork
   20-4. Materials used for preparing formwork
   20-5. Formwork for column footings
   20-6. Formwork for columns
   20-7. Formwork for floors
   20-8. Formwork for walls
   20-9. Formwork for stairs
   20-10. Form linings
   20-11. Slip forms
   20-12. Removal of formwork
   20-13. Centering for big arches
   20-14. Types of centering
   20-15. Formwork for domes
   20-16. Failure of formwork
   20-17. Maintenance of formwork

Chapter 21  DOORS, WINDOWS AND VENTILATORS
   21-1. General
   21-2. Important considerations for doors and windows
   21-3. Technical terms
   21-4. Types of doors
   21-5. Types of windows
   21-6. Ventilators
   21-7. Mosquito-proofing
   21-8. Fixtures and fastenings for doors and windows

Chapter 22  CARPENTRY AND JOINERY
   22-1. Meaning of the terms
   22-2. Technical terms in carpentry
   22-3. Principles governing the construction of joints
   22-4. Classification of joints
   22-4-1. Lengthening joints
   22-4-2. Widening joints
   22-4-3. Angle joints
   22-4-4. Oblique-shouldered joints
   22-4-5. Bearing joints
   22-4-6. Framing joints
   22-4-7. Fastenings
   22-6. Tools used in carpentry

Chapter 23  FLOORS AND FLOORING
   23-1. Definitions
   23-2. Types of floors
   23-2-1. Timber floors
   23-2-2. Composite floors
   23-3. Types of floorings
   23-4. Factors affecting choice of flooring material
   23-5. Materials used for flooring

Chapter 24  ROOFS
   24-1. General
   24-2. Requirements of a good roof
   24-3. Classification of roofs
   24-4. Pitched or sloping roofs
   24-5. Types of pitched roofs
   24-6. Advantages of steel trusses over the timber trusses
   24-7. Roof coverings for pitched roofs
   24-8. Ventilators in pitched roofs
   24-9. Methods to secure pitched roofs against uplift
   24-10. Flat or terraced roofs
   24-11. Curved roofs
   24-12. Drainage of pitched and flat roofs

Chapter 25  POINTING AND PLASTERING
   25-1. General
   25-2. Objects of pointing and plastering
   25-3. Pointing
   25-4. Plastering
   25-5. External finishes
   25-6. Special materials for plastered surfaces
   25-7. Fibrous plaster boards
   25-8. Colour pigments for plaster

Chapter 26  PAINTING, VARNISHING AND DISTEMPERING, ETC.
   26-1. General
   26-2. Painting
   26-2-1. Characteristics of an ideal paint
   26-2-2. Pigment volume concentration number (P.V.C.N.)
   26-2-3. Ingredients of an oil borne paint
   26-2-4. Types of paints
   26-2-5. Notes for guidance in the process of painting
   26-2-6. Painting on different surfaces
   26-2-7. Failure of paint
   26-2-8. Defects in painting
   26-3. Varnishing
   26-3-1. Characteristics of an ideal varnish
   26-3-2. Ingredients of a varnish
   26-3-3. Types of varnishes
   26-3-4. Process of varnishing
   26-4. Distempering
   26-4-1. Properties of distempers
BUILDING CONSTRUCTION
DETAILED CONTENTS

26-4. Ingredients of a distemper
26-4.3. Process of distempering
26-5. Wall paper
26-6. Whitewashing
26-7. Colourwashing
Questions 26

Chapter 27 STRUCTURAL STEELWORK
27-1. General
27-2. Rolled steel shapes
27-3. Built-up sections
27-4. Connections in steelwork
Questions 27

Chapter 28 ACOUSTICS
28-1. General
28-2. Velocity of sound
28-3. Frequency & intensity of sound
28-4. Timbre
28-5. Measurement of sound
28-5.1. Influence of environment
28-5.2. Measurement report
28-6. Sound in enclosures
28-7. Reflection of sound
28-8. Defects due to reflected sound
28-9. Absorption of sound
28-10. Sabin’s equation
28-11. Absorbent materials
28-12. Types of absorbent materials
28-13. Conditions for good acoustics of an auditorium or a hall
28-14. Factors to be considered in the acoustic design of an auditorium
28-15. Defects in an auditorium and their remedies
28-16. Acoustics of studios
28-17. Noise and its effects
28-18. Noise mapping
28-19. Types of noises
28-20. Transmission of noise
28-21. Sound insulation
28-22. Transmission loss
28-23. Acceptable noise levels
28-24. Methods of sound insulation
28-24.1. When source of noise is in the room itself
28-24.2. When noise is air-borne
28-24.3. When noise is structure-borne
Questions 28

Chapter 29 FIRE PROTECTION IN BUILDINGS
29-1. General
29-2. Causes and effects of fire
29-3. Fire hazards
29-4. Fire-load
29-5. Limiting fire spread
29-6. Grading of structural elements and materials
29-7. Characteristics of fire-resisting material
29-8. Fire-resisting properties of common building materials
29-9. General rules for fire-resisting buildings
29-10. Fire protection systems
29-11. Strong-room construction
29-12. General rules for earthquake resistant buildings
29-13. Thermal insulation of buildings
29-14. Thermal insulation of exposed doors and windows
29-15. Thermal insulation of exposed roofs
29-16. Thermal insulation of exposed walls
Questions 29

Chapter 30 VENTILATION AND AIR-CONDITIONING
30-1. Necessity of ventilation
30-2. Factors affecting ventilation
30-3. Requirements of a good ventilating system
30-4. Types of ventilation
30-5. Air-conditioning
30-5.1. Definition of Air-conditioning
30-5-2. Purposes of Air-conditioning
30-5-3. Filters for Air-conditioning
30-5-4. Heating
30-5-5. Cooling
30-5-6. Humidification
30-5-7. Dehumidification
30-5-8. Summer air-conditioning
30-5-9. Winter air-conditioning
30-5-10. Air distribution
30-5-11. Systems of air-conditioning
Questions 30

Chapter 31 CONSTRUCTION EQUIPMENTS
31-1. General
31-2. Classification of equipments
31-3. Selection of equipments
31-4. Standard equipments
31-5. Special equipments
31-6. Owning and operating cost of equipment
31-7. Economic life of construction equipments
31-8. Sources of equipments
31-9. Various types of construction equipments
31-10. Excavating equipments
31-11. Earth compaction equipments
31-12. Hauling equipments
31-13. Hoisting equipments
31-14. Conveying equipments
31-15. Pumping equipments
31-16. Concrete construction equipments
31-17. Drilling equipments
31-18. Road making equipments
Questions 31

Chapter 32 CPM AND PERT
32-1. General
32-2. Network analysis
32-3. Features of network planning
32-4. Rules for network diagram
32-5. Procedure for CPM
32-6. Advantages of CPM
32-7. Uses of CPM
32-8. Application of CPM in project management
32-9. CPM for determining extension of time
32-10. Difficulties in implementation of the CPM
32-11. Project cost
32-12. Cost-time optimization
32-13. Cost slope
32-14. Optimization by crashing
32-15. Updating an arrow diagram
32-16. Time–grid diagram method
32-17. Programme Evaluation and Review Technique (PERT)
32-18. Terminology Used in PERT
32-19. Percentage of probability
32-20. Implementing PERT
32-21. PERT network scheduling
32-22. Slacks of events
32-23. Negative slack & negative float
32-24. Selection of technique
32-25. Bar charts or Gantt charts
32-26. Mile-stone charts
32-27. Resources planning
32-28. Resource allocation
32-29. Resource levelling
Questions 32

BIBLIOGRAPHY

Index