PA-10270

[5930]-101

F.Y. B.Arch.

BUILDING CONSTRUCTION AND MATERIALS - I

(2019 Pattern) (Semester - I) (1201902)

Time : 2½ Hours]　　　　　　　　　　　　　　　　　　*[Max. Marks : 70*

Instructions to the candidates :

　　1)　All questions are compulsory.

　　2)　Neat diagrams must be drawn wherever necessary.

　　3)　Figures to the right indicate full marks.

　　4)　Assume suitable data if necessary.

　　5)　Answer all questions from Section-I on Drawing sheets and from Section-II in Answer Book only.

SECTION - I

Q1) Draw any one of the following :　　　　　　　　　　　　　　　　**[20]**

Draw details of 350 mm thick random rubble masonry compound wall as follows :

a)　Draw a plan and elevation of a stopped compound wall of height 1800mm at scale 1: 10.

b)　Cross section from foundation to coping at scale 1: l0 assuming hard strata depth as 1200 mm

All the necessary annotations and dimensions have to be given for the plan and section of the stone foundation.

OR

Draw the following for the stopped end of 1½ brick thick English bond with mortar thickness.

a)　Plan of alternate courses at scale 1:10

b)　Elevation of minimum six courses at scale 1:10

P.T.O.

Q2) Draw neat labeled sketches Only (any three) : **[15]**

  a)   Draw any five elements of the building

  b)   Draw any five bamboo joineries.

  c)   Draw any five types of pointing with nomenclature.

  d)   Draw any three types of coping.

  e)   Draw any five equipment used in masonry work.

SECTION - II

Q3) Answer any two of the following : **[20]**

  a)   What is strip foundation? Explain plinth formation with a sketch.

  b)   What are the good qualities of bricks and stone as a masonry unit?

  c)   What are the advantages and limitations of concrete blocks?

  d)   Explain the process of plastering. What are the different types of plasters?

Q4) Write short notes on any 3 of the following : **[15]**

  a)   Explain with sketches different types of lintels.

  b)   Explain mortar. Mention qualities and functions of good mortar.

  c)   Explain any two defects that occur in Plaster.

  d)   What are the advantages of bamboo?

  e)   What is quick setting cement and its mention its application.

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SEAT No. :

[Total No. of Pages : 3

F.Y. B.Arch.
THEORY OF STRUCTURES - I
(2019 Pattern) (Semester - I) (1201904) (Back log)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:
1) *Q.No.1 & 5 are compulsory. Solve any 2 from the other 3 in each section.*
2) *Figures to the right indicate full marks.*
3) *Assume suitable data, if required mention the assumption.*
4) *Use of Non- programmable scientific calculator is allowed.*

SECTION-I

Q1) Compulsory.   **[13]**

   a)   Explain Lami's theorem with sketches.   **[4]**

   b)   Determine resultant in magnitude & direction of the forces shown below.
                                                                                              [9]
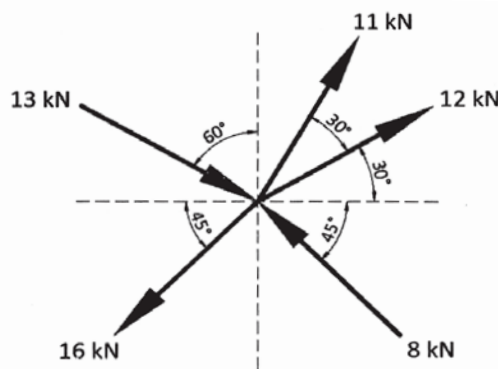
Q2) a)   Explain dead load & live load. How is load in framed structure transferred to the foundation?   **[4]**

   b)   Determine the combined self wt. UDL of a RCC beam 230×450 in cross section, supporting a 230 thk bk. wall, 2.90 m, high above it. Take densities of RCC and brick as 25 kN/m³ & 19 kN/m³. respectively.   **[3]**

   c)   Determine resultant in magnitude & position from A, of the forces shown below.   **[4]**
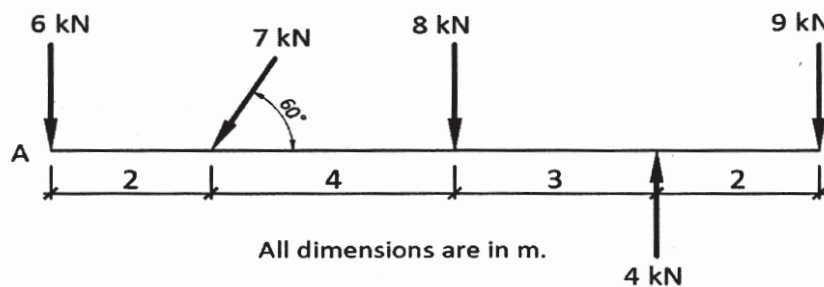
Q3) a) Explain Hooke's law & Poisson's ratio. **[4]**

b) Write the loaded rod of cross section 60×60mm., shown below, determine the reaction at the fixed end and stresses in each part of the rod. **[7]**
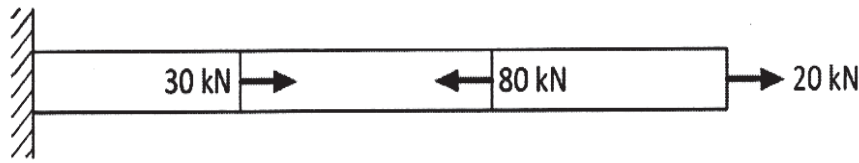

Q4) a) Explain with sketches, any 2 techniques of earthquake resistance of load bearing structures. **[4]**

b) A RCC column, 300 × 600 in cross section is subjected to a compressive load of 900 kN and is reinforced with 8nos. of 20 dia steel bars. Determine the load taken by each material. Take E value of concrete and steel as $0.15 × 10^5$ N/mm² and $2×10^5$N/mm² respectively. **[7]**

SECTION-II

Q5) Compulsory. **[13]**

Draw SFD & BMD of the beam show below. Show the point of contra-shear. Calculate BMmax.

All dimensions are in m.
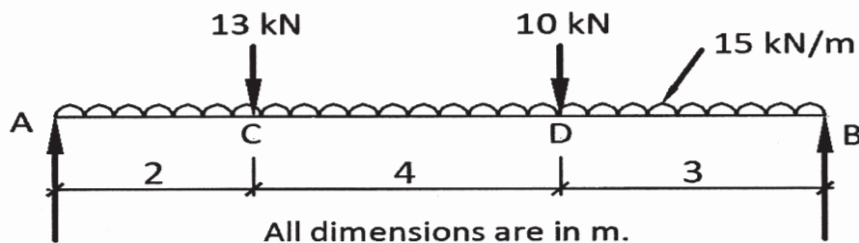
Q6) a) Using sketches, show the centroid co-ordinates of a right-angled triangle and a semi-circle. Also write formula for MI values of a rectangular and a circular section. **[4]**

b) Determine MI about both centroidal axes of the section shown below. **[7]**
Note: All dimensions are in mm.
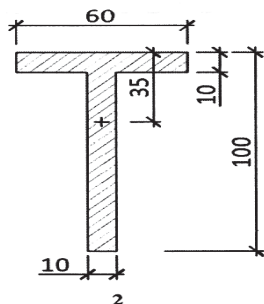
Q7) a) Explain with sketches, reactions offered by a fixed and hinged support.**[4]**

b) Determine support reactions for the beam shown below. **[7]**
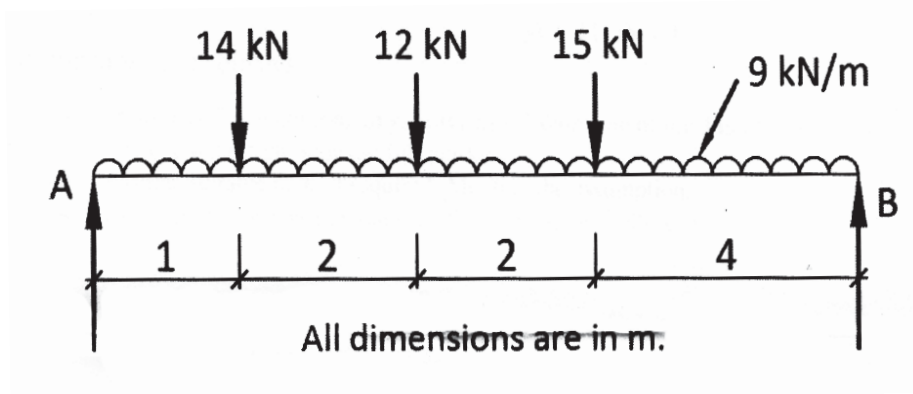
Q8) a) Draw SFD & BMD of a typical simply supported beam with UDL over entire span. Mention & show the location of max. magnitudes of both, with units. **[4]**

b) Draw SFD & BMD of the beam shown below. Show the point of contra-shear. **[7]**

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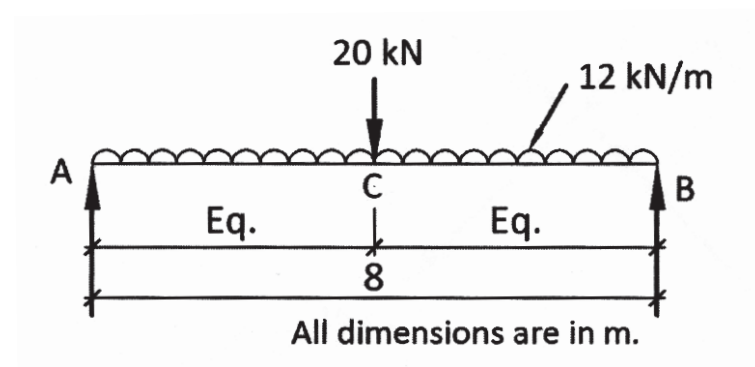
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F.Y. B. Arch.

BUILDING CONSTRUCTION AND MATERIALS - II

(2019 Pattern) (Semester - II) (1201910)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :

1) *All questions are compulsory.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data if necessary.*
5) *Answer all questions from Section-I on Drawing Sheets and from Section-II in Answer Book only.*

SECTION - I

Q1) Draw *any one* of the following :   **[20]**

Provide a Glazed and Paneled door for room with 230 mm thick brick masonry having the opening size of 1000 mm. Consider lintel to be 2100 mm.

a) Draw plan section and elevation on the scale of 1:10

b) Draw one joinery details between style and lock rail.

OR

A room of size 7000 mm × 12000 mm needs a King post roof truss roofing. Draw a key plan at 1:100 scale, elevation at 1:20 scale and details of king post truss at ridge and eaves at 1:10 scale.

Q2) Draw neat and labeled Sketches ONLY (*Any three*) :   **[15]**

a) Joinery between joist and wall plate in timber floors.

b) Sketch any five types of timber joinery.

c) Any two types of joints found in floor boards.

P.T.O.

d) Sketch section showing three consecutive treads and risers in timber staircase with nomenclature.

e) Any 5 tools used in timber construction.

SECTION - II

Q3) Answer *any two* of the following : **[20]**

a) What is purpose of reinforcing masonry construction? Explain with sketch any two types of reinforced masonry.

b) Explain with sketches types of staircases. Sketch detail showing fixing of baluster to tread.

c) Explain with sketches three earthquake resistant measures for load bearing structures.

d) Explain laying of sheet roofing with sketch showing eaves and ridge detail.

Q4) Write short notes on *any three* of the following : **[15]**

a) What is an earthquake? Explain with sketch focus and epicenter.

b) Write short note on seasoning of timber.

c) Explain with sketches masonry vaults and domes.

d) What are timber derivatives? List any 4 timber derivatives.

e) Explain any three defects in timber with sketches.

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F.Y. B.Arch.

THEORY OF STRUCTURES - II

(2019 Pattern) (Semester - II) (1201912)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Q. no. 1 & 5 are compulsory. Solve any 2 from the other 3 in each section.*
2) *Figures to the right indidcate full marks.*
3) *Assume suitable data, if required. Mention the assumption.*
4) *Use of Non-programmable scientific calculator is allowed.*

SECTION - I

Q1) a)   Explain any 4 assumptions of Theory is simple bending.   **[4]**

b)   A simply supported beam 230×400 in cross section is subjected to a load of 24 kN/m over the entire span of 4.5 m. It also is subjected to a central point load of 20 kN. Determine,   **[7]**

   i)   Max. bending stress in compression and tension.

   ii)   Bending stress at a layer 50 mm above the neutral axis.

c)   Explain the concept of Moment of resistance of a beam.   **[2]**

Q2) Draw SFD & BMD of the beam shown below. Show the points of contra-shear & contra-flexure.   **[11]**
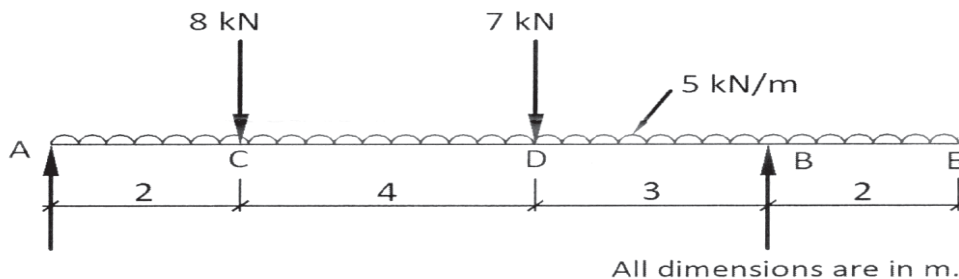
Q3) a)   Draw conceptual shear stress diagrams of a typical T & I section. With Max. magnitude location.   **[4]**

b)   A simply supported beam 230×500 in cross section, is subjected to a load of 22 kN/m over the entire span of 6m. and a central point load of 25 kN. Determine Max. shear stress and draw the shear stress diagram. **[7]**

Q4) a) Explain with sketches, perfect, deficient & redundant frame. **[4]**

b) W.r.t. the frame shown below, determine forces in magnitude & type in the members AC, AF, CF & FG. Tabulate the end results. **[7]**

All dimensions are in m.
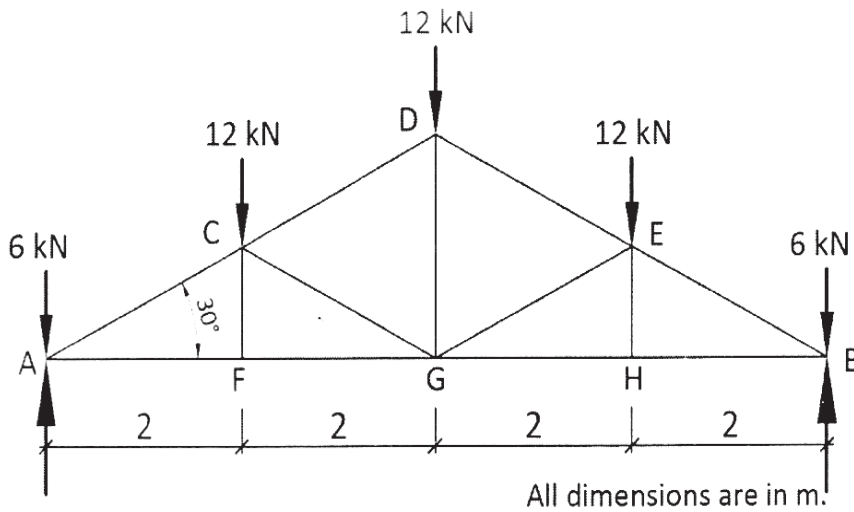
OR

W.r.t. the frame shown below, determine forces in magnitude & type in the members EJ, EF, HE & HJ. Tabulate the end results. **[7]**

All dimensions are in m.
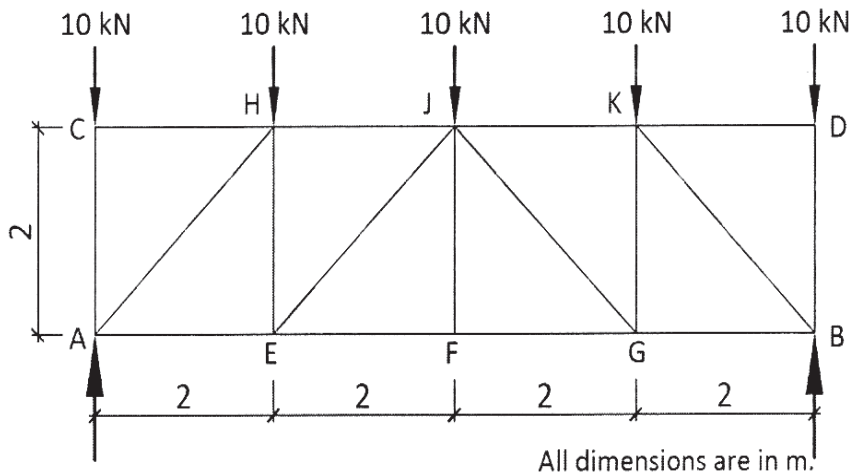
SECTION - II

Q5) a) Explain any 4 assumptions of Euler's theory. **[4]**

OR

Explain with sketches, the end conditions of a column with their respective effective heights. **[4]**

b) A column 300×450 in cross section is 3.60 m high, and fixed at both ends. Determine Crippling load of the column. Take E value as 0.2×10^5 N/mm². **[7]**

c) Explain long & short columns with their failure patterns. **[2]**

Q6) a) For a typical simply supported beam with central point load, show the deflection curve and write the formulae for max. slope and deflection.**[4]**

b) A simply supported beam 230×600 in cross section, is subjected to a load of 30 kN/m over the entire span of 7 m., and a central point load of 35 kN. Determine max. deflection only. Take E value as 0.15×10^5 N/mm². **[7]**

Q7) Determine stresses at the corners of the column subjected to an eccentric load of 800 kN, as shown below. Sketch the stress diagram. **[11]**
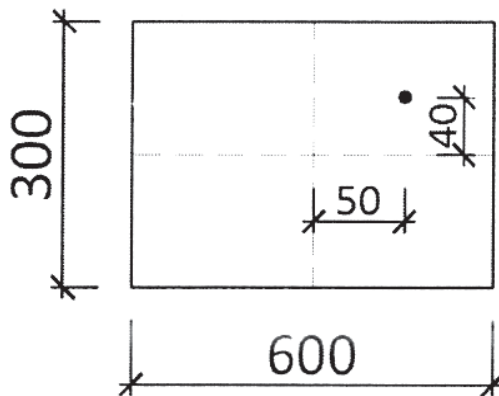
Q8) a) Explain with sketches the concept of Middle third rule of a rectangular column. **[4]**

b) A hollow steel column with outer diameter 300 mm & thickness 20 mm is 7 m high, with one end fixed and the other hinged. Check whether the column is safe to take a load of 3650 kN, if the E value & crushing stress for steel are 2×10^5 N/mm² and 320 N/mm² respectively. **[7]**

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Third Year B. Architecture
BUILDING TECHNOLOGY AND MATERIALS - VI
(3201547) (2015 Pattern) (Semester - VI)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates :

    1) All questions are compulsory.

    2) Answer to Section I and Section II should be written in two separate answer sheets.

    3) Neat diagrams must be drawn wherever necessary.

    4) Figures to the right indicate full marks.

    5) Assume suitable data if necessary.

SECTION - I

Q1) A shop of size 12.0 M × 22.5M × 3.5M is to be constructed using steel truss and station column.

DraftSteel Truss suitable for 12.00 M. span. Show rafters, main tie, and diagonal ties consist of double angles placed back-to-back between which 10 mm gussets are fixed.   **[20]**

    a) Draw Elevation of truss.

    b) Truss resting on Steel Stanchion.

    c) Ridge detail.

OR

Using Modular coordination system for a watchman's cabin of size 1.5 M × 1.5 M.

Draw the following :

    a) Framing plan of cabin .   `**[10]**

    b) Section of cabin.   **[5]**

    c) Detail of slab. (Any slab system developed by CBRI).   **[5]**

P.T.O.

Q2) **Answer the following (ANY THREE) :** [15]

   a) Draw a labelled sketch of the gravity retaining wall.

   b) Differentiate between the buttress and counterfort retaining walls.

   c) State the terminology for retaining walls with help of a sketch.

   d) Draw sketch of internal tanking to basement.

   e) Sketch and describe drain cavity systems in basements.

SECTION - II

Q3) **Answer the following (ANY SEVEN) :** [35]

   a) List any two types of glass and their application in building industry.

   b) Role of floor and roof diaphragm in earthquake resistance.

   c) List five advantages and disadvantages of plastics.

   d) Describe the use of metals and metal alloys in the building industry.

   e) Why are short columns more damage during earthquakes?

   f) Differentiate between natural and synthetic rubber?

   g) State the characteristics of a good sealant.

   h) What is base isolation?

   i) State properties of good metal.

   j) What is adhesive and sealants? Illustrate its application in building.

   k) Role of shear walls in earthquake-resistant structures.

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Fourth Year B.Arch.

PROFESSIONAL PRACTICE - II

(2015 Pattern) (Semester - VIII) (Theory) (4201564)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates :

1) Answers to the two Sections I and II must be written on separate answer books.

2) Answers to Question No. 1 from Section - I and Question No. 5 from Section - II are compulsory.

3) Attempt any two out of the remaining questions in each section.

4) Figures to the right indicate full marks.

SECTION - I

Q1) Define Tender. Enlist the types of tenders. Explain any two types of tenders with advantages and disadvantages.   **[15]**

OR

What is the importance of Construction Management? What are the fundamentals of Construction Management?

Q2) Explain in short what do we mean by General Conditions of Contract and Special Conditions of Contract? Write Special Conditions of Contract. **[10]**

Q3) Write short notes (Any 2) :   **[2 × 5 = 10]**

   a) Liquidated Damages.

   b) Security Damages.

   c) Termination of Contract.

   d) Clerk of work.

P.T.O.

Q4) What is the purpose to prepare the tender notice? What are the elements to be mentioned in tender notice. **[10]**

SECTION - II

Q5) Define valuation. Write the purposes of valuation. What are the factors affecting the valuation of land? Explain the methods used for valuation of land. **[15]**

OR

Define Contract. Explain in brief-Contract documents. Explain any 2 types of Contract with advantages and disadvantages.

Q6) Compare the following (Any 2) : **[2 × 5 = 10]**

    a)   Cost, Price and Value.

    b)   Freehold and Leasehold value.

    c)   Construction Management and Project Management.

    d)   Item rate tender and cost plus percentage tender.

Q7) Define Arbitration. Write powers of arbitrator. Explain the various types of arbitration. **[10]**

Q8) Write short notes (Any 2) : **[2 × 5 = 10]**

    a)   Importance and Significance of NBC.

    b)   Mobilisation Fund.

    c)   Depreciation.

    d)   Defect liability period.

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Fourth Year B.Arch.

QUANTITY SURVEYING AND ESTIMATING - II

(2015 Pattern) (Semester - VIII) (4201567)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates :

1)   All questions are compulsory.

2)   Answers to the two sections must be written in separate books.

3)   Neat sketches must be drawn wherever necessary.

4)   Figures to right indicate full marks.

5)   Assume suitable data wherever necessary.

SECTION - I

Q1) Calculate the quantities for items with the help of accompanying sketch **(any four) :**   **[20]**

a)   Principle rafter of all trusses.

b)   G.I. sheet for roofing.

c)   Ridge cap.

d)   M.S. tie member for all trusses.

e)   Rain water gutter.

f)   All struts in single truss.

Q2) What is direct cost and indirect cost?   **[5]**

Q3) What is indent of material? Explain.   **[5]**

Q4) Write units for the following **(any five) :**   **[5]**

a)   G.I. Pipe.

b)   Wash basin.

c)   W.C. pan.

d)   Gully trap.

e)   Rainwater pipe.

f)   Stop tap.

g)   Inspection chamber.

SECTION - II

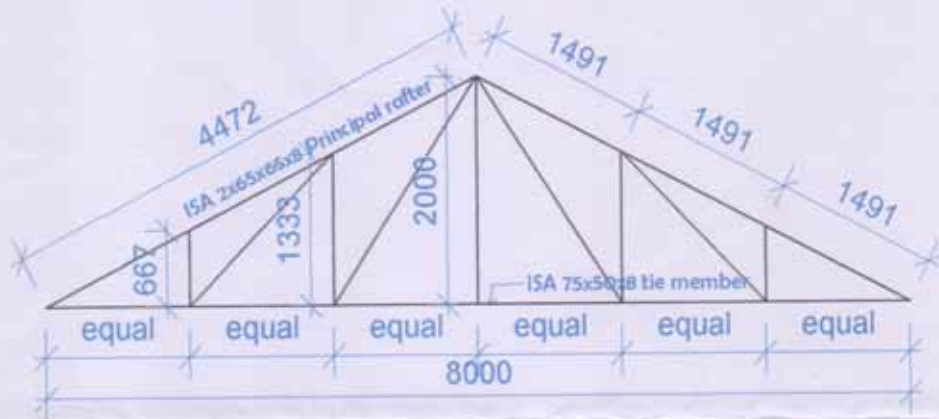*Q5)* What is rate analysis? Explain its importance and factors affecting the same.

[5]

Q6) Calculate rate analysis for any three items listed below **(any three) :** [15]

    a)   Vitrified tile flooring 35mm thick sub base in CM 1 : 5 with cement slurry.

    b)   Sand faced double coat plaster 18-20 mm thick for wall in CM 1 : 4.

    c)   P.C.C. at foundation base in concrete mix 1 : 2 : 4.

    d)   Kota stone flooring (Hand dressed/machine cut) on 50 mm thick sub base in CM 1 : 5 with Cement Pastebacking.

Q7) Calculate the indent of materials for items listed below : [15]

    a)   Ashlar stone masonary 1 : 6 for 40 cu.m.

    b)   Kota flooring in cement mortar 1 : 6 for 100 sq.m.

    c)   Concrete for P.C.C. in 1 : 4 : 8 for 40 sq.m.

    d)   Brick masonary 115 mm thick in 1 : 6 for 50 sq.m.

Material rates	Labour rates
Cement : Rs. 350/bag	Plastering : Rs. 300/sq.m.
Sand : Rs. 2,800/cu.m.	R.C.C. for beam : Rs. 3,000/cu.m.
Aggregate (metal) : Rs. 900/cu.m.	D.P.C. : Rs. 50/sq.m.
Sealant compounded : Rs. 50/kg	White wash : Rs. 20/sq.m.
Burnt bricks : Rs. 10/piece	UCR masonary : Rs. 550/cu.m.
Rubble : Rs. 700/cu.m.	Burnt brick masonary : Rs. 900/cu.m.
Colour cement : Rs. 70/kg	

4472

ISA 2x65x65x8 Principal rafter

1491

1491

1491

667

1333

2008

ISA 75x50x8 tie member

equal equal equal equal equal equal

8000

All struts: ISA 2X50X50X6

Weight per running metre for members:

1. 75x50x8: 7.50 kg/m
2. 65x65x8: 9.76 kg/m
3. 50x50x6: 7.40 kg/m

20000

4000 4000 4000 4000 4000

8000
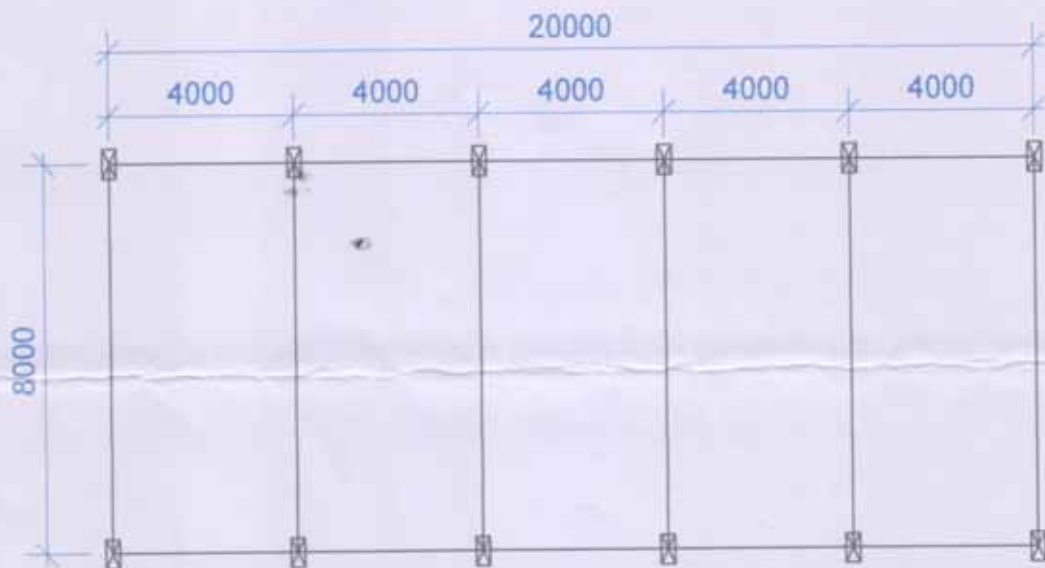
Schematic plan of factory shed

SECTION I- Question 1

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SEAT No. :

[**Total No. of Pages : 2**

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Fourth Year B.Arch. (Semester - VIII)
SPECIFICATION WRITING - II
(2015 Pattern) (4201568)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) *All questions are compulsory.*
2) *Answers to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Assume suitable data, if necessary.*

SECTION - I

Q1) Elaborate on the role and importance of checklist in the construction process.

[10]

OR

Prepare a checklist for P. C. C. 1:4:8 below footing.

Q2) Prepare a checklist for External plaster work. **[10]**

OR

Prepare a checklist for R. C. C. Column.

Q3) **Write brief specifications for (Any Three) :** **[3 × 5 = 15]**

a) Earthing system

b) Fixing of European water closet

c) Acoustical wall panels

d) Septic tank

e) HVAC Duct

P.T.O.

SECTION - II

Q4) **Write short notes on (Any Three) :**   [3 × 5 = 15]

    a)   Building trades

    b)   Cement based water proofing

    c)   Elevators

    d)   Escalator

    e)   Concrete curbs for roads

Q5) **Explain the following (Any Two) :**   [2 × 5 = 10]

    a)   Bitumen based waterproofing.

    b)   Various types of pavements used in landscaping.

    c)   Toilet for disabled people.

    d)   Scope of Masons as a building trade.

Q6) **Write names of manufacturer for the materials (Any ten) :**   [10]

    a)   Elevators

    b)   Escalators

    c)   Cement based Water proofing compounds

    d)   Light fixture

    e)   UPVC pipes

    f)   Wash basin

    g)   Air conditioning systems

    h)   G I pipes

    i)   Cement

    j)   Mild steel

    k)   Vitrified tiles

    1)   Electrical fittings

    m)   Sanitary fittings

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Fourth Year B.Arch.
SPECIFICATION WRITING - I
(2015 Pattern) (Semester - VII) (4201560)

Time : 3 Hours]   *[Max. Marks : 70*
Instructions to the candidates:
    1)   *All questions are compulsory.*
    2)   *Figures to the right hand side indicate marks.*
    3)   *Answers to two sections to be written in two different answer books.*

SECTION - I

Q1) Discuss the relationship between working drawings and specification writing. Explain with example. **[10]**

OR

Discuss the importance of specification writing in contract document.

Explain the principles of specification writing.

Q2) Write material specifications for cement and ms reinforcement. **[10]**

Explain the arrangements for storage of cement and mild steel reinforcement.

OR

Elaborate on the Open, Closed and Restricted types of specification.

Q3) Write brief specifications for (Any Three) **[3 × 5 = 15]**

    a)   230mm thick Rubble soling below footing

    b)   P.C.C. 1:4:8 at plinth level

    c)   Un-coursed rubble masonry in foundation

    d)   230 thk Burnt brick masonry in super structure

    e)   External plaster work for ground floor

SECTION - II

Q4) Write short notes on (Any Three)   [3 × 5 = 15]

    a)   Use of manufacturers guide

    b)   Methods of demolition

    c)   Types of formwork

    d)   Lead and Lift

    e)   Safety nets and Helmets on site

    f)   Box type water proofing

Q5) Explain the following (Any Two)   [2 × 5 = 10]

    a)   Ready mix concrete

    b)   Scaffolding

    c)   Formwork for column

    d)   Brickbat coba

Q6) Write names of manufacturer for the materials (Any ten)   [10]

    a)   Air conditioner

    b)   Water storage tank

    c)   Cement

    d)   Vitrified tiles

    e)   Plywood

    f)   Laminate

    g)   Metal roofing sheets

    h)   Aluminium window sections

    i)   Glass

    j)   Autoclaved Aerated concrete blocks

    k)   UPVC windows

    l)   LED lights

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S.Y. B.Arch. (Semester - IV)
BUILDING CONSTRUCTION AND MATERIALS - IV
(2019 Pattern) (2201927)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :
    1)   *All questions are compulsory.*
    2)   *Answers to the two sections should be written in separate answer books.*
    3)   *Neat diagrams must be drawn wherever necessary.*
    4)   *Figures to the right indicate full marks.*
    5)   *Assume suitable data if necessary.*

SECTION - I

Q1) A Dog legged RCC staircase of Flight width 1000mm is to be designed for a residence from the ground floor to the first floor. The inside clear space of the stair well is 3700mm × 2300mm with main landing to the stair on the shorter side. Design the stair by deciding the appropriate riser and tread and draw the details of follows **[20]**

   a)   Plan of full staircase indicating the complete structural support framing with location of supporting columns and beams marked and showing all relevant dimensions and annotations. Scale 1:10.

   b)   Section through **ANY ONE** flight indicating all reinforcement details and showing all relevant dimensions and annotations Scale 1:10.

<p align="center">OR</p>

A double Shutter sliding door is to be provided for a Store room of Size 3000mm × 3000mm. The required size of the opening is 1800mm wide × 2200mm High with flush door shutter located inside the room. Design the door and Draw: **[20]**

   a)   Part Plan of the room indicating the Opening location and configuration of shutters in Fully CLOSED position. Location of shutters in OPEN position shall be indicated in dashed lines. All relevant dimensions and annotations to be shown. Scale 1:10

   b)   Inside elevation of wall housing the opening indicating the CLOSED position of shutters with proposed sliding mechanism and OPEN position of shutters indicated in Dashed lines. All relevant dimensions and annotations to be given. Scale 1:10.

   c)   Detail section of Sliding Mechanism and its fixing to the wall, giving all relevant annotations and terminology Scale 1:2.

P.T.O.

Q2) Answer **ANY THREE** Questions of the following : **[15]**

a) Sketch neat Plans and elevations of any two types of Arrangement of escalator for a vertical transport system for **G+2** floors.

b) Sketch a Neat Labelled PLAN of a Traction type elevator showing all elements and their terminology.

c) Sketch a neat labelled section through a Typical Bay window.

d) A Full-length Balcony is to be provided to a room of 3000×4000 mm on the 3000 mm side. Sketch a neat plan for the same indicating any one method in which the support framing and construction can be done.

e) Draw a neat sectional detail sketch of any one type of Damp Proof course at PLINTH Level.

SECTION - II

Q3) Answer **ANY TWO** of the following : **[20]**

a) Write a short note on Ferro Crete construction with sketches showing basic construction method and enlist its advantages and disadvantages.

b) Enlist any Five types of GLASS giving a brief description of each.

c) Write in brief about the working of Traction type and Hydraulic elevators comparing the advantages and disadvantages of each.

Q4) Answer **ANY THREE** of the following : **[15]**

a) Write any three Advantages and any two disadvantages of using ready mix concrete.

b) List three types of Lightweight concrete giving One use of each type in buildings.

c) Write any five requirements / Properties that a good damp Proofing / Water proofing material must have.

d) List any Three types of Plastic used in Building industry giving their uses.

e) List and draw Sketches of **ANY TWO** types of door operation mechanisms that are commonly used for traction elevators.

▽ ▽ ▽ ▽

[5930]-62
S.Y. B.Arch.
THEORY OF STRUCTURES - IV
(2019 Pattern) (Semester - IV) (2201929)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

  1) *Question No 1 and 5 are compulsory in each Section. Any two out of Q 2, 3, 4 in section I and Any two out of Q 6, 7, 8 in section II need to be attempted.*

  2) *The Plan given at the end of question paper is for Q.1 and has to be attached with the answer sheet after marking answers on it.*

  3) *Figures to the right indicate full marks.*

  4) *Assume suitable data where necessary only.*

  5) *Use M 25 Grade concrete and Fe 500 grade steel.*

  6) *Every R.C.C Design should be accompanied by relevant Schedule and Reinforcement Sketch.*

  7) *Use of non-programmable Calculators and Standard Steel Tables of Plastic Design Allowed.*

SECTION - I

Q1) The plan of a Load Bearing Structure as shown in Figure 1 is attached at the end of question paper. It has some basic flaws in transfer of load to the walls. **Correct any four flaws** in the plan and attach the plan with answer paper, indicating the corrections, such that its a feasible Load Bearing Structure. (Any 4 flaws). **[9]**

Q2) Design a Doglegged staircase for the following data: Building is a Hospital building, Width of Flight = Width of Landing = 1750, Riser is 150 mm and 12 Trends in each Flight of 300 each, The Flight is supported on 230 wide Beams on the inner edges of the Landing. Consider Live Load = 5 kN/m^2 and Floor Finish = 1.25 kN/m^2 **Write your answers in the Form of a Schedule. Do not draw Reinforcement Sketch**. **[13]**

P.T.O.

Q3) A room of residential building having clear dimensions 7.5 m × 3.6 m has a balcony of 1.5 m × 7.5 m with 1.5 m clear overhang. Design R.C.C. overhanging slab for the same if beams supporting overhang slab have 230 mm width. Consider Live Load = 3kN/m² and Floor Finish = 1.25 kN/m². Use 10 mm diameter bars as main steel, clear cover of 20 mm. Draw RCC sketch only. **Draw reinforcement details for the same. No need to make a Schedule**. **[13]**

Q4) Answer **any 3** of the following : **[13]**

a) Write Short Notes on Under-Reinforced Sections & Over-Reinforced Sections.

b) Draw the reinforcement detailing of a 3 Equal Span Continuous Slab.

c) Why is shear reinforcement provided in a beam? Write down the I.S.456. Provisions for Design of Shear Reinforcement in R.C.C. Beams.

d) Draw sketches to explain Folded Plate staircase

SECTION - II

Q5) Design rectangular RCC Cantilever Beam of clear overhang length 1.8 m. These Beams are subjected to working loads of 12 kN/m. If the beams are fixed to 230 mm wall support at one end. Add self weight and Design the beams for Flexure using 16 mm dia bars. Do Not Design for Shear. Consider width of beam 230 mm. **[9]**

Q6) A roof of a hall size 12.8m × 7.5m consists of 140mm thick R.C.C slab supported on Steel girder spaced at 3.20m centre to centre spanned across the width of 7.5m. Design the Steel Beam using ISMB considering Live Load of 5 kN/m² and Finishing load = 1.25kN/m². Consider 230mm Concrete Column Supports. **[13]**

Q7) Design a Stanchion for the following conditions. Load = 450kN. One end is fixed The other end hinged. The Stanchion is of height 5.5m along ZZ and YY Directions. Use ISHB section. **[13]**

Q8) Answer **any three** of the following : [13]

a) What are various types of steel sections used for structural components?

b) Draw and explain A Typical Factory Building in Plan and Section. Clearly show the various Structural Components.

c) List the explain the advantages of Steel Structures

d) Define and explain Plastic Neutral Axis & Slenderness Ratio

Classification of Sections into Plastic , Compact, Semi Compact Sections

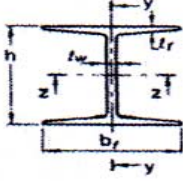*Table 1. Limits on Width to Thickness Ratio of Plate Elements*

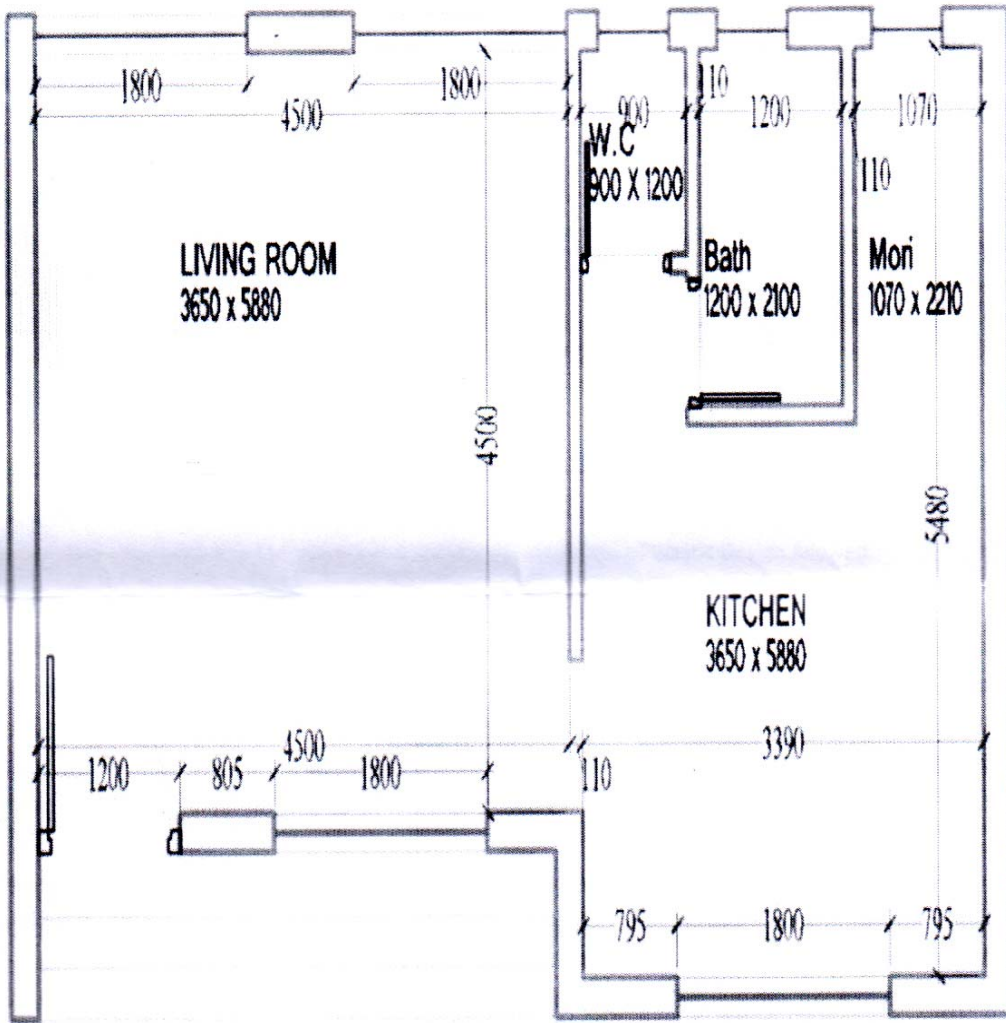| Compression element			Ratio	Class of Section		
				Plastic (β_1)	Compact (β_2)	Semi-compact (β_3)
Outstanding element of compression flange		Rolled section	b/t_f	9.4ε	10.5ε	15.7ε
		Welded section	b/t_f	8.4ε	9.4ε	13.6ε
		Compression due to bending	b/t_f	29.3ε	33.5ε	42ε
Internal element of compression flange		Axial compression	b/t_f	Not applicable		
Web of an I- H-or box section ^{c}	Neutral axis at mid-depth		d/t_w	84ε	105ε	126ε
	Generally	If r_1 is negative:	d/t_w	$\dfrac{84\varepsilon}{1+r_1}$ but $\leq 42\varepsilon$	$\dfrac{105.0\varepsilon}{1+r_1}$	$\dfrac{126.0\varepsilon}{1+2\,r_2}$ but $\leq 42\varepsilon$
		If r_1 is positive :	d/t_w		$\dfrac{105.0\varepsilon}{1+1.5r_1}$ but $\leq 42\varepsilon$	
	Axial compression		d/t_w	Not applicable		

Note 1: Section having elements which exceeds semi-compact limits are to be taken as slender cross sections

Note2: $\varepsilon = (250/f_y)^{1/2}$

Note 3: Check webs for shear buckling in accordance when d/t > 67 ε. Where, b is the width of the element may be taken as clear distance between lateral supports or between lateral support and free edge, as appropriate, t is the thickness of element, d is the depth of the web, D mean diameter of the element.

Note 4: Different elements of a cross-section can be in different classes. In such cases the section is classified based on the least favorable classification.

Note 5: The stress ratio r_1 and r_2 are defined as

$r_1 = \dfrac{actual\,average\,axial\,compressive\,stress}{design\,compressive\,stress\,of\,web\,alone}$, $r_2 = \dfrac{actual\,average\,axial\,compressive\,stress}{design\,compressive\,stress\,of\,overall\,section}$

End Conditions and effective lengths for Stanchions

a. Both Ends Fixed Le= 0.65L
b. One End Fixed other end Hinged Le = 0.8L
c. Both Ends Hinged = 1.0L
d. One End Fixed One End Free Le=2L

IS 800 : 2007

Table 10 Buckling Class of Cross-Sections
(Clause 7.1.2.2)

Cross-Section	Limits	Buckling About Axis	Buckling Class
(1)	(2)	(3)	(4)
Rolled I-Sections	$h/b_f > 1.2$: $t_f \leq 40$ mm	z-z y-y	a b
	$40 < mm < t_f \leq 100$ mm	z-z y-y	b c
	$h/b_f \leq 1.2$: $t_f \leq 100$ mm	z-z y-y	b c
	$t_f > 100$ mm	z-z y-y	d d
Built-up Member		Any	c

LIVING ROOM
3650 x 5880

W.C
900 X 1200

Bath
1200 x 2100

Mon
1070 x 2210

KITCHEN
3650 x 5880

1800 4500 1800 900 10 1200 1070

110

4500

5480

1200 805 4500 1800 110 3390

795 1800 795

□□□

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S.Y. B.Architecture
BUILDING SERVICES - II
(2019 Pattern) (2201932) (Semester - IV)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

1) All questions are compulsory

2) Answer to Section I and Section II should be written in two separate answer sheets.

3) Neat diagrams must be drawn Wherever necessary.

4) Figures to the right indicate full marks

5) Assume suitable data if necessary.

SECTION - I

Q1) Explain Direct and Indirect lighting and give at least two examples of application of each in different spaces. **[20]**

OR

An office area measures 16 m × 8 m × 2.7 m high. it is to be illuminated to an average value of 500 lux. 600mm × 600mm recessed luminaries, each containing 4 lamps are used. Each lamp has an output of 1400 luminance. UF is 0.5 and MF is 0.75. Consider SHR 1.5:1.

a) Calculate number of luminaries required.

b) Sketch the layout of the scheme indicating the spacing between the luminaries.

Q2) Write short notes with sketches with label wherever necessary (Any Three)**[15]**

a) Vermi composting for a residential building

b) Public address system (benefits & disadvantages)

c) EPABX System

d) Task Lighting & Mood lighting

e) Fluorescent lamp

f) Transformers

P.T.O.

SECTION - II

Q3) Write short notes with sketches with label wherever necessary (AnyThree)**[15]**

    a) Lightening conductor

    b) Meter boards and Distribution boards

    c) Fire detection

    d) Circuit breakers (purpose and application)

    e) Feeder pillar and bus bar

    f) Earthing and earthing pit

Q4) Answer the following (Any Four)   **[20]**

    a) Explain what is single phase and three phase supply with sketch.

    b) Write short note on "External reflected component (ERC)"

    c) Explain with neat sketches "Components of Daylight factor"

    d) Explain Refuse chute with neat sketches

    e) Write short note on "Concealed wiring system"

    f) Explain any two methods of garbage disposal methods at town level

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[5930]-64

S.Y. B.Arch.

BUILDING CONSTRUCTION AND MATERIALS - III
(2019 Pattern) (Semester - III) (2201918 [P])

Time : 2½ Hours]   *[Max. Marks : 70*
Instructions to the candidates:
1) *All questions are compulsory.*
2) *Answers to the two sections should be written in separate answer books.*
3) *Answer to section - I to be drawn on drawing sheet only.*
4) *Answer to section - II to be written on answer sheet only.*
5) *Neat diagrams must be drawn wherever necessary.*
6) *Figures to the right indicate full marks.*
7) *Assume suitable data if necessary.*

SECTION - I

Q1) An office of size 3m × 3m × 4.5m height needs to be constructed in RCC frame structure. It has flat roof and plinth level of 450mm from the ground level. Draw following details to the scale of 1:10. **[20]**

(All column sizes 0.3m × 0.45m)

a) Draw detailed reinforcement of S1 & sectional plan of XX′ & YY′.

b) Draw detailed section of footing and plinth beam ZZ′.

OR
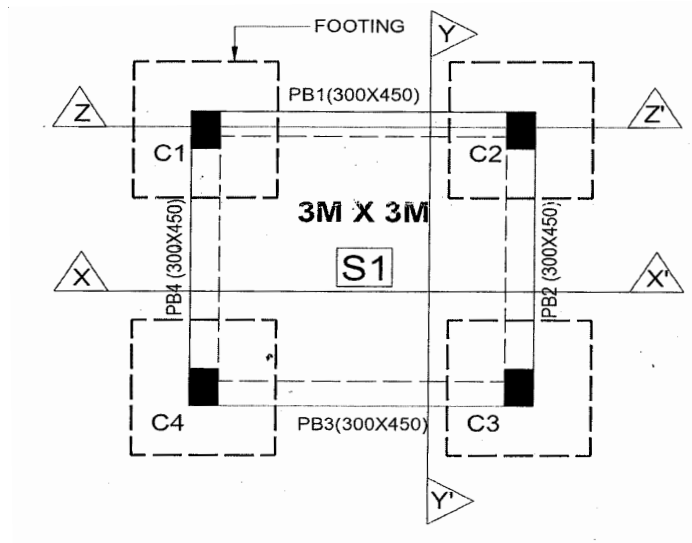
Q1) A room of size 4.5m × 3m × 4.5m height with an attached toilet of 3m × 2.5m × 4.5m height which needs to be constructed in RCC. (All column sizes 0.3m × 0.45m) **[20]**

a) Draw detailed reinforcement drawing of slab S1 & S2

b) Draw two sections XX′ & YY′ showing reinforcement.

c) Draw an isometric view through of any one slab.
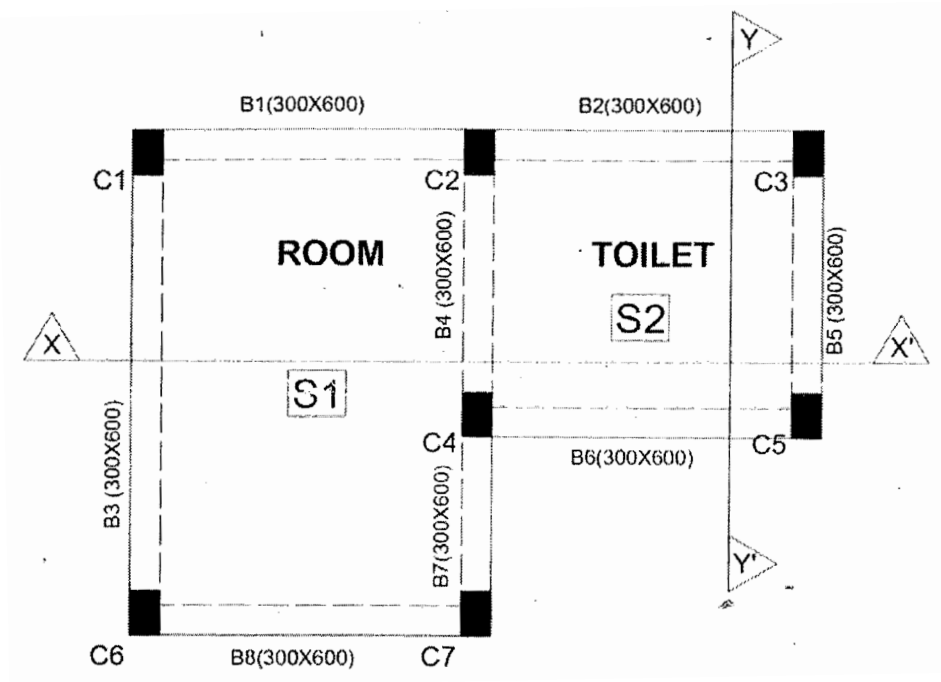
Q2) Draw Sketches for following : (any Three) **[15]**

a) Explain in detail site investigation and the concept to carry out the investigation. (bulb of pressure)

b) Explain with detail sketches any one type of non-timber window.

c) Explain with sketches the requirement of lintel.

d) Explain with proper sketches Earthquake resistant features in RCC construction.

SECTION - II

Q3) Answer the following: (any Two) **[20]**

a) What are the different types of shallow foundation, explain any 2 in detail?

b) What do you understand by Plinth beam explain with appropriate sketches?

c) What do you understand by concrete mixes explain any 5 types of concrete grade?

Q4) Write short notes: (any three) **[15]**

a) Why do we need formwork & what are the different materials used to make formwork.

b) Explain Precast Concrete construction.

c) What is water cement ratio?

d) Explain the process of curing of concrete.

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[5930]-65

S.Y. B.Architecture
THEORY OF STRUCTURES - III
(2019 Pattern) (Semester - III) (2201920)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

　　1)　　*Question No. 1 and 5 are compulsory in each Section. Any two out of Q 2, 3, 4 in section I and any two out of Q 6, 7, 8 in section II have to be solved.*

　　2)　　*Figures to the right indicate full marks.*

　　3)　　*Assume suitable data where necessary only.*

　　4)　　*Use M 25 Grade concrete and Fe 500 grade steel.*

　　5)　　*Use of non-programmable Calculators and Standard Steel Tables of Plastic Design Allowed.*

SECTION - I

Q1) A room of institutional building having clear size 6.85m × 3.3m has to be covered with RCC simply supported slab resting on two beams having 230 mm width and 6.85 m length. Consider Live Load = 4 kN/m^2 and Floor Finish = 1.25kN/m^2. Use 10 mm diameter bars as main steel, 8 mm diameter as distribution (secondary) steel. Write the answer in the form of schedule. Do not draw RCC details.   **[11]**

Q2) For a fixed beam AB having 11m length, udl of 9 kN/m, point load of 20kN is acting at 4 m from support A, Find support reactions and draw shear force and bending moment diagram.   **[12]**

Q3) A rectangular simply supported RCC beam having clear length of 5 m and resting on 300 mm thick brick wall has to be designed. The beam is supporting slab load of 7 kN/m an wall load of 14 kN/m. Calculate the self weight of beam and design the beam for all the loads mentioned. For flexure use 20 mm dia bars and for shear use 8 mm dia 2 legged stirrups. Width of beam is 230 mm.   **[12]**

Table 19 Design Shear Strength of Concrete, τ_c, N/mm²

(Clauses 40.2.1, 40.2.2, 40.3, 40.4, 40.5.3, 41.3.2, 41.3.3 and 41.4.3)

$100\dfrac{A_s}{bd}$	Concrete Grade				
	M 15	M 20	M 25	M 30	M 35
(1)	(2)	(3)	(4)	(5)	(6)
≤ 0.15	0.28	0.28	0.29	0.29	0.29
0.25	0.35	0.36	0.36	0.37	0.37
0.50	0.46	0.48	0.49	0.50	0.50
0.75	0.54	0.56	0.57	0.59	0.59
1.00	0.60	0.62	0.64	0.66	0.67
1.25	0.64	0.67	0.70	0.71	0.73
1.50	0.68	0.72	0.74	0.76	0.78
1.75	0.71	0.75	0.78	0.80	0.82
2.00	0.71	0.79	0.82	0.84	0.86

Q4) Answer **any 3** of the following : **[12]**

a) State comparison of fixed beams and simply supported beam with respect to its bending behaviour, maximum deflection and static indeterminancy.

b) Write a short note on seismic load on structures.

c) Write a short note on Working Stress Method of design of structures.

d) Write a short note on advantages of timber as structural material.

SECTION - II

Q5) For a short axially loaded RCC column subjected to working load of 950kN having one dimension 350mm, find the dimensions of column cross-section. Consider 1% steel. Find spacing of links. Write answer in the form of schedule and draw a sketch of reinforcement details. **[11]**

Q6) A room having size 4.8m × 2 m with simply supported timber joists having 2 m clear length, placed at 1.2m c/c has timber flooring of 50 mm thick. Consider 2kN/m^2 live load. Design intermediate timber joist with Working Stress Method, where depth of joist d = 3 times width b. Use Indian oak for joist and flooring. Indian Oak has permissible bending stress 12.16 N/mm^2, Modulus of elasticity 12.26 × 10^3 N/m^3, density 8.48 kN/m^3, Permissible shear stress 1.67 N/m^2. and permissible deflection is L/150.
[12]

Q7) For a room having size 3.8 m × 3.2 m, RCC simply supported slab has to be designed using limit state method. Consider load including self weight, live load and floor finish as 7kN/m^2. Use 8 mm dia steel bars and 20 mm cover. No need for schedule or sketch. Slab is resting on 230 mm wide beams at four edges. **[12]**

Q8) Answer **any three** of the following : **[12]**

a) Explain the term water cement ratio and it's importance.

b) What is clear cover? State minimum nominal clear cover for slab, beam, column and footing.

c) What is grade of concrete and grade of steel?

d) Write a short note on Compaction of concrete and it's importance.

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[5930]-66

Second Year B. Architecture
BUILDING SERVICES - I
(2201923) (2019 Pattern) (Semester - III)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :

1) *All questions are compulsory.*
2) *Answer to Section I and Section II should be written in two separate answer sheets.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Assume suitable data if necessary.*

SECTION - I

Q1) Design water tanks for residential building for 100 persons. Calculate water capacity and draw section of Under Ground and Overhead water tank. **[20]**

OR

Explain working of septic tank with neat labelled plan and section in reference to its salient parts.

Q2) **Answer the following with necessary sketches (ANY THREE) :** **[15]**

a) Intercepting trap with chamber.

b) Solar water heating system.

c) Gravity system of water supply.

d) Roof top rain water harvesting system.

e) Single stack system showing all components in vertical drainage system.

P.T.O.

SECTION - II

Q3) **Answer the following (ANY Two) :** [20]

    a) Explain any two types of pumps with sketches.

    b) What is ferrule? Explain with necessary sketches connection from municipal water mains to any house.

    c) Draw and explain any two types of traps used in drainage system.

Q4) **Answer the following with necessary sketches (ANY Three) :** [15]

    a) Working of Flushing cistern.

    b) Inspection chamber.

    c) Biogas plant.

    d) Ventilation of drains.

    e) Divided water tank system for high rise building.

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[5930]-67

T.Y. B. Arch.

THEORY OF STRUCTURES - VI

(2019 Pattern) (Semester - VI) (3201947)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Q No. 1 and Q No. 5 are compulsory. Out of the remaining three solve any two in each Section.*

2) *Figures to the right indicate full marks.*

3) *Assume suitable data where necessary only.*

4) *Use M25 grade concrete and Fe500 grade steel L.S.M of Design in R.C.C Problems.*

5) *For Structural Steel use Steel Fe410 (E250) whose fy = 250N/mm². Use L.S.M. of Design.*

6) *Every R.C.C Design should be accompanied by relevant schedule and Reinforcement Sketch.*

7) *Use of non-programmable Calculators allowed.*

8) *Use of Approved Standard Steel Tables in LSM and Wind Load Tables allowed.*

SECTION-I

Q1) Make the Framing Plan for the Given Ground Floor and First Floor. *Framing Plan to be shown on Ground Floor Plan Only.* **[15]**

Show Columns only on Ground Floor, Size could be be 230mm×450mm.

Show all Beams. Restrict Depth of Beams to 600mm. Indicate depth on plan and the Span to Depth Ratio considered for type of beam.

Show Spans of all Slabs and Indicate Depth considered, Span to Depth Ratio. Slab depths to be restricted to 125mm. You need not show the beams and spans of Staircase Slab.

No Columns to be provided within the Main Halls.

Window Positions are indicative only and could be changed to adjust for Column Positions.

P.T.O.

Q2) A R.C.C. Cantilever Retaining wall is detailed as below. **[10]**

    a)   Top width of stem - 250mm Width of base - 3200mm S.B.C of soil - 240 kN/m^2.

    b)   Bottom width of stem - 520mm Thickness of base - 500mm Density of soil - 18 kN/m^3.

    c)   Height of stem - 5300mm Toe projection - 750mm Coefficient of friction - 0.6

    d)   Density of Concrete - 25 kN/m^3 Angle of repose - 28º.

Check the stability of wall wrt Overturning and sliding.

Q3) a)   Distances to be observed for Plate Tearing Failure in a Bolted Connection.

                                                                        [3]

    b)   Design a Purlin for the following Data: **[7]**

        i)   Spacing of Trusses = 4.25m, Span of Truss = 15m and Height of Truss = 2.5m.

        ii)   Roof Covering = G.I. Sheets.

        iii) Spacing of Purlins = 1.35m.

        iv) Neglect Wind Load.

Angle Section	Zezz in mm^3	Angle Section	Zezz in mm^3	Angle Section	Zezz in mm^3
ISA 75×50×6	6700	ISA 100×65×6	14200	ISA 125×95×6	23100
ISA 75×50×8	8000	ISA 100×65×8	18700	ISA 125×95×8	30600
ISA 75×50×10	10400	ISA 100×65×10	23100	ISA 125×95×10	37800
ISA 75×50×12	12700			ISA 125×95×12	44800
ISA 80×50×6	7500	ISA 100×75×6	14400	ISA 150×75×8	41700
ISA 80×50×8	9000	ISA 100×75×8	19100	ISA150×75×9	51600
ISA 80×50×10	11700	ISA 100 ×75×10	23600	ISA 150×75×10	61200
ISA 80×50×12	14400	ISA 100×75×12	27900		
ISA 90×60×6	11500	ISA 125×75×6	22200	ISA 150×115×8	44200
ISA 90×60×8	15100	ISA 125×75×8	29400	ISA150×115×10	54900
ISA 90×60×10	18600	ISA 125×75×10	36300	ISA 150×115×12	65300
ISA 90×60×12	22000			ISA150×115×15	80400

Q4) Write short notes with relevant sketches on any Two of the following.   **[10]**

   a)   Reinforcement Detailing in a Circular Water Tank with a Rigid Joint at the Base.

   b)   Advantages of Welded Connection.

   c)   Some Parameters that will influence Column Positions in a R.C.C. Building.

   d)   Design the Reinforcement of the Stem in Question No.2.

SECTION-II

Q5) A Factory Building is to be Built over a Plinth Area of 15m×33m.   **[15]**

   a)   Decide at what centre to centre distance you will place the Stanchions to support Roof Trusses. Accordingly Draw a Key Plan Showing Stanchions, Bracing System Used and Position of Bracing System.

   b)   Use a Fink Truss. Draw the Signle Line Elevation of the Truss Showing important Dimensions. Show Purlins and Purlin Spacing. Calculate the Live Load based on the angle of the Truss. Suggest an Unequal Angle Purlin (You may use Thumb Rules for the same).

   c)   Suggest Angle Sections for Top Chord Members and Struts and Slings.

   d)   Explain the Joint of the Truss and Stanchion as to a Sliding End and a hinged or fixed end.

Q6) Design a Compond Stanchion consisting of 2 no ISMC palced front to front with a Battened lateral system to take a load of 1200kN. Height of the Stanchion is 8m, with both ends fixed in both directions. (Hint: Assume Stress = 200N/mm²). Assume End Battens of Size 200mm × 8 mm and Intermediate Battens 150mm × 8mm wide. Draw Sketch.   **[10]**

Q7) Attempt Any Two. [10]

   a)   Write a short note on structural action of Barrel Vaults.

   b)   Write a short note on any structural system used in a High Rise Building.

   c)   Write a short note on structural action of RCC domes.

OR

Design a Tension Member to take a service load of 150kN. It is to be bolted with 20mm Bolts. Design the Bolted Connection. Use $\beta = 1.08$. [10]

Q8) Calculate Design equivalent static wind forces on an R.C.C. Multistorey building having size $11m \times 22m \times 31m$ located in Pune in a flat land Average storey height is 3.2m and frames are spaced at 5.5m c/c in both directions. The building is oriented with smaller dimension facing the wind.

$v_b = 39m/s$, $k_1 = 1$, $k_3 = 1$, $k_4 = 1$, $k_d = 0.9$, $k_a = 0.9$, $k_c = 0.95$, cf = 1.35. k_2 as per following table. $k_2 = 0.91, 0.97, 1.01, 1.06$ at height of 10m, 15m, 20m, 30m. Calculate the Design Nodal Wind load on all floors above the fifth floor. Explain k_3 = Topography Factor. [10]

GROUND FLOOR PLAN

Parking Space
9690 x 9230

Hall
15920 x 9000

Cabin
3000 x 4430

Toi
1650 x 1200

Toi
1650 x 1500

Toi
1650 x 1500

300 x 10 = 3000

1350

1350

300

1350

Up

9230

230

9000

9000

15920

9690

230

3000

230

3000

230

230

4430

1200

1500

1650

9000

230

150

150

150

150

[5930]-67

5

FIRST FLOOR PLAN

Hall
9460 × 9000

Hall
15920 × 9000

Cabin
3000 × 4430

Toi
1650 × 1200

Toi
1650 × 1500

Toi
1650 × 1500

Up

300 × 10 = 3000

✿   ✿   ✿
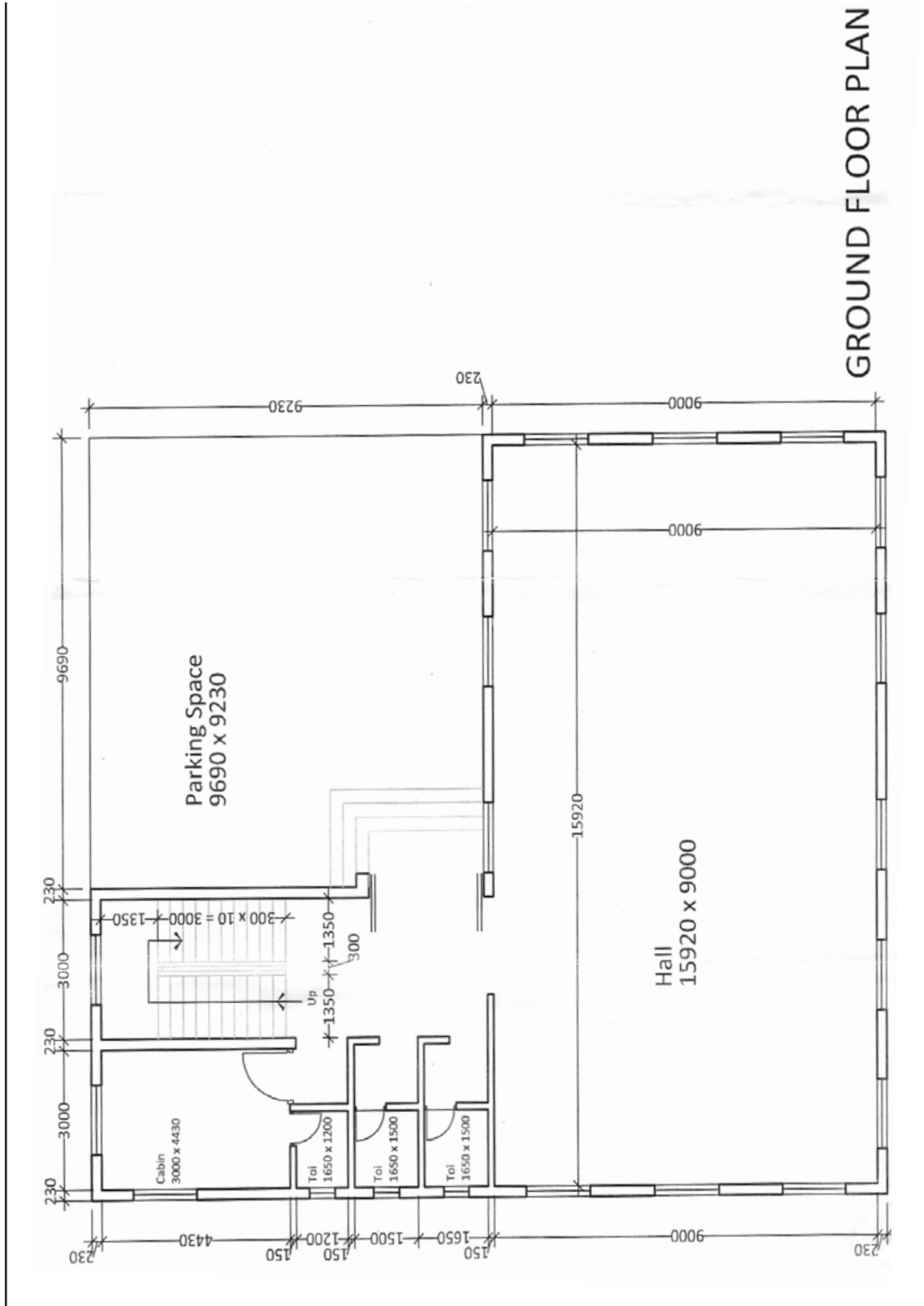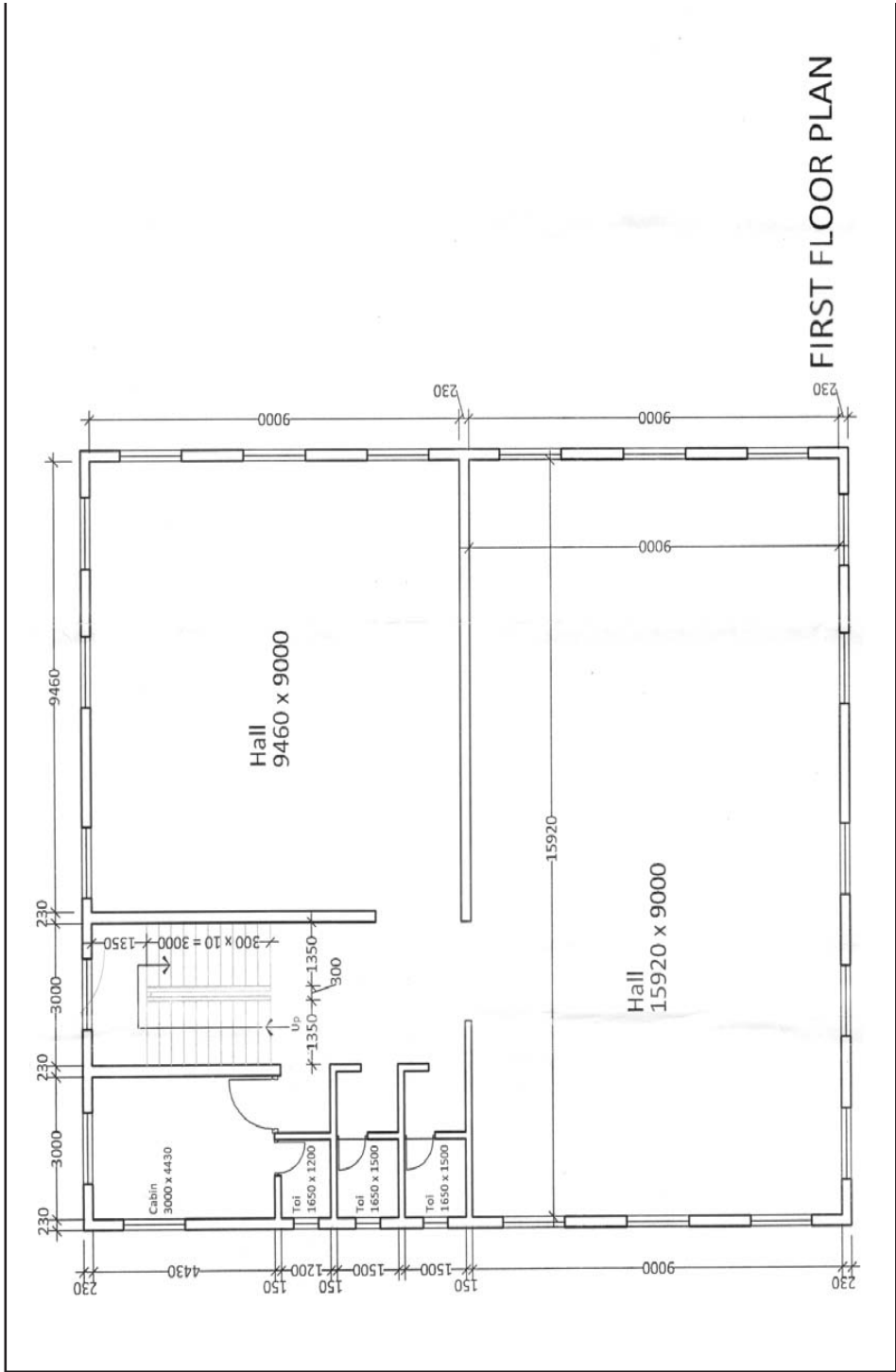
[5930]-68

T. Y. B. Arch.

BUILDING SERVICES - IV

(2019 Pattern) (Semester - VI) (3201950(P))

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) Answer all sections.

2) Figures to the right indicate full marks.

SECTION - I

Q1) Explain Boundary conditions. Explain with the help of sketches behaviour of sound with different boundary considerations. **[15]**

OR

Q1) <u>State</u>   Sabine formula to calculate reverberation time and describe the terms involved.

<u>Calculate</u> the reverberation time for a Seminar Hall measuring ($12m \times 6m \times 4m$ H) having capacity of 40 persons. <u>Solve</u> following cases referring to the data given below and give your conclusions based on the optimum RT for Seminar Hall.

Case - I : All windows open, doors closed and no occupancy.

Case - II : All windows and doors closed with full occupancy.

Assume : a) Laminated flush doors - ($1.2m \times 2.4m$) - 2 Nos. Absorption coefficient - 0.15.

b) Aluminium Glazed window ($1.5m \times 1.5m$) - 4 Nos. Absorption coefficient - 0.10.

c) Ceiling and walls plastered - Absorption coefficient - 0.03.

d) Vinyl flooring - Absorption coef. - 0.03.

e) Upholstered seats - 40 Nos. - Absorption coef. - 0.77

f) Persons seated - Absorption coef. - 0.40

[15]

P.T.O.

Q2) Write short note on any four of the following :   **[20]**

   a)   Discuss Echo and Future Echo.

   b)   Acoustical shadow.

   c)   Methods of cutting off structure Borne Noise.

   d)   Relationship between Frequency, Wavelength, Velocity of sound.

   e)   Reverberation time.

   f)   Marking of sound.

SECTION - II

Q3) State different types of fixed five fighting systems used in a multi-storied building. Explain with the help of sketches the suitable system for an electrical panel room in a building.   **[15]**

OR

Q3) Explain passive fire safety strategies for high rise buildings. What is fire detection? Explain methods of detecting fire at an early stage.   **[15]**

Q4) Write notes on any four :   **[20]**

   a)   Photo-electric type smoke detector.

   b)   Fire escape staircase.

   c)   Output and Input devices used in Fire Alarm systems.

   d)   Dry type of fire extinguisher.

   e)   Types of sprinklers and their working.

   f)   Fire pump room and its functioning.

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PA-810

[5930]-69
T.Y.B. Arch.
ARCHITECTURAL DESIGN-V
(Semester-VI) (3201945) (2019 Pattern)

Time : 12 Hours]   *[Max. Marks : 100*
(First day : 6 Hours)
(Second day : 6 Hours)
Instructions to the candidates:
  1) *Do not write anything on question paper except seat no.*
  2) *Your design will be valued as a whole.*
  3) *Assume suitable data, if necessary.*
  4) *The candidate must submit layout plan to 1:200 scale and schematic floor plan and section to 1:100 scale at the end of the first day. These sketches will not be returned to the candidate's subsequent day. Candidate should avoid serious and abrupt deviations from the sketches (Planning scheme and concept) submitted on the first day.*
  5) *The drawings should be self-explanatory with requisite graphics, nomenclature, dimensions, levels and structural concept clarity.*

ART GALLERY AT PUNE

PREAMBLE:

A piece of land is reserved in Pune for commercial purpose. It has been decided that it is necessary to provide an Art gallery in this area to exhibit the rich tradition and culture of Pune through exhibits of paintings, models, etc. The building should look aesthetically beautiful and the character visualized should be appropriate for an Art gallery.

DESIGN PARAMETERS:

1) Plot area 3000 sq.m. (60m×50m)

2) 15m wide main road situated on the East side (Refer to the attached site plan)

3) Front setback=6M

4) Side setbacks=4.5M

5) FSI : 01

6) Ground coverage=50%

DESIGN PROGRAMME:

A. Administration Unit

Sr. No.	Requirements	Area in sq.m.
1	Entrance Foyer, Reception desk, Ticket area, Waiting Area	40sq.m.
2	Administrative office for 4 staff	30sq.m.
3	Separate toilets facilities for ladies and gents	Adequate no. and areas of each

B. Exhibition area

Sr. No.	Requirements	No. of Persons	Quantity	Area in sq. m.
1	Exhibition hall 1	20 People	01 Hall	80sq.m.
2	Exhibition hall 2	20 People	01 Hall	80sq.m.
3	Exhibition hall 3	20 People	01 Hall	50sq.m.
4	Exhibition hall 4	20 People	01 Hall	50sq.m.
5	Cafe	20 People	01 Room	50sq.m.
6	Kitchen	6 People	01 Room	20sq.m.
7	Souvenior and gift shop	10 People	01 Room	30sq.m.
8	Loading and unloading area	Adequate no. and Adequate areas of each		
9	Parking facilities i) Cars ii) Two wheelers	Adequate no.		

C. NOTES:

i)   Assume additional circulation area and any other required details suitably.

ii)   Minor changes in requirements are permissible as per design ideas.

DRAWING REQUIREMENTS - DAY ONE: **Scale**

i)   Single line Site layout   1:200

ii) Single line floor plans with at least one schematic section.   1:100

FINAL DRAWING REQUIREMENTS: **Scale**

i)   Site plan showing building, parking space, setback's

     distance, pathways and landscaping etc.   1:200

ii) Well-developed Floor plan with schedule of openings

     and furniture layouts.   1:100

iii) Two sections through staircase or from toilet unit   1:100

iv) Building elevations minimum two   1:100

v)   Sketch view.

SITE PLAN:

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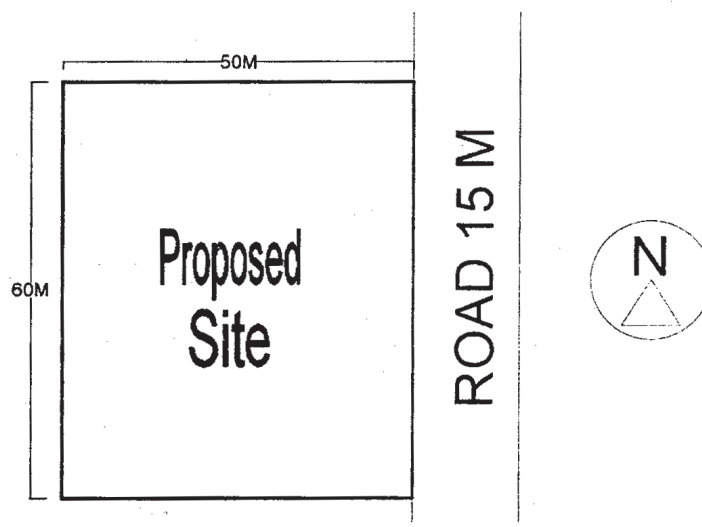
[5930]-70
T.Y. B.Arch.
BUILDING CONSTRUCTION AND MATERIALS - V
(2019 Pattern) (Semester - V) (3201936)

Time : 2½ Hours]   *[Max. Marks : 70*
Instructions to the candidates :
  1)   *All questions are compulsory.*
  2)   *Neat diagrams must be drawn wherever necessary.*
  3)   *Figures to the right indicate full marks.*
  4)   *Assume suitable data if necessary.*
  5)   *Answer all questions from Section-I on Drawing Sheets and from Section-II in Answer Book only.*

SECTION - I

Q1) Provide a demountable partition using proprietary or non-proprietary systems using non- timber materials to divide the area equally between an air-conditioned recording room and open reception along the shorter side. Size of hall is 8 m × 5 m.   **[20]**

  a)   Plan, Elevation and Section of a partition at 1:20 Scale

  b)   Any two joinery detail used in the construction of this door at a suitable enlarged scale.

<div align="center">OR</div>

Draw plan, section of wardrobe for a female user made up of wooden derivatives.

  a)   Draw plan and Section to scale of 1:10.

  b)   Draw any two joinery detail to scale 1:5.

Q2) **Explain with sketches (Any three) :**   **[15]**

  a)   Detail in plan & section of fixing plywood to TW frame of bed.

  b)   Any two alternatives of joinery in plywood with proper nomenclature and dimensions.

c) Any two alternatives of joinery in TW members with proper nomenclature and dimensions.

d) Fixing of down light & indirect light in suspended ceiling with proper nomenclature.

e) Detail in plan & section of fixing paneling to wall.

SECTION - II

Q3) **Answer any seven of the following with necessary sketches if required.**
[35]

a) Different types of Boards used in interior furniture work.

b) Explain about paints & varnishes.

c) Explain Hardware required for application to interior and furniture elements with their names.

d) Defects in timber with their names.

e) Concept of shallow and deep foundations different soil conditions.

f) Explain internal tanking and external tanking in basement construction.

g) Explain Retaining wall and types of it.

h) Explain terminology, proportions and construction details of retaining wall.

i) Explain types of slabs in Reinforced cement concrete floor construction systems.

j) Explain pre-stressed slabs.

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[5930]-71

T.Y. B.Arch.
THEORY OF STRUCTURES - V
# (2019 Pattern) (Semester - V) (3201938)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :

1) *Question 1 and 5 are compulsory and remaining any two questions from each section.*

2) *The Plan given Below applies to questions in Both Sections.*

3) *Figures to the right indicate full marks.*

4) *Assume suitable data where necessary only.*

5) *Use M 25 Grade concrete and Fe 500 grade steel.*

6) *Every R.C.C Design should be accompanied by relevant Schedule and Reinforcement Sketch.*

7) *Use of non-programmable Calculators and Standard Steel Tables of Plastic Design Allowed.*
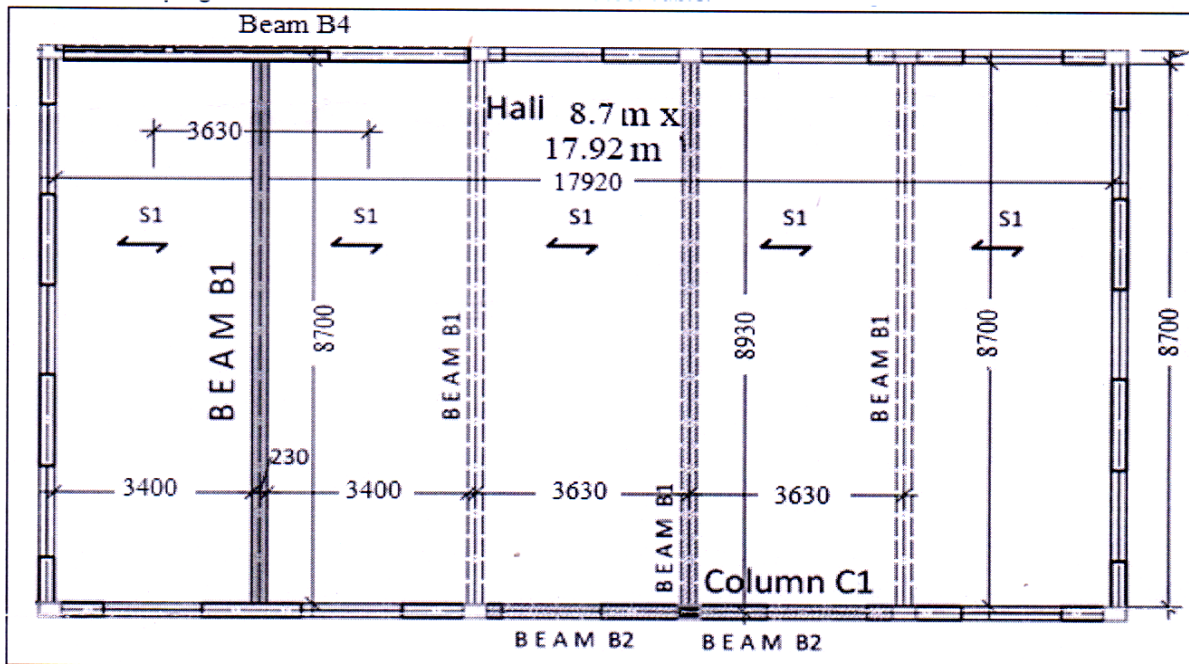
SECTION - I

Q1) Find the Load acting on column C1 per floo. Assume Load on B1 to be 36 kN/ m and Effective Span = 8.93m and Load on B2 to be 33 kN/m and Effective Span = 3.63 m. Calculate Load on every Floor considering Ground floor + 5

P.T.O.

Floors. Design Column of 230mm width on third Floor using 1.5 %steel and M25 Grade Concrete. Keep the Size same and Design Column on First Floor. Make Schedule and Draw Sketch of reinforcement of both the columns. **[13]**

% Steel	M25	M30	M35
l.	13.25Ag	15.23Ag	17.21Ag
1.5	14.875Ag	16.845Ag	18.815Ag
2	16.5Ag	18.46Ag	20.42Ag
2.5	18.125Ag	20.075Ag	22.025Ag
3	19.75Ag	21.69Ag	23.63Ag

Q2) a) Design a simply supported RCC beam B1 as a T Beam for Effective span 8.93m. Calculate load (Do NOT consider assumed load of Q 1), Calculate over all depth with span to depth ratio L/do = 15. Assume Slab Depth = 120mm of Slab S1. Take Live Load as 3kN/m². Design for Flexure only. Assume N.A Position within Flange. **[8]**

b) Discuss the Situation Leading to Restriction of Depth on a Beam. **[3]**

Q3) a) Design Beam B4 as a Doubly Reinforced Beam of Clear Span 7.03 m to carry an u.d.l of 40 kN/m. Restrict the Overall depth to 500 mm. Design for flexure only. Consider 2 rows of 20 mm bars in Tension. **[8]**

b) Necessary conditions which allow RCC beams to be considered flanged beams. **[3]**

Q4) a) Write short notes on any two of the following drawing sketches wherever necessary : **[8]**

  i) Necessity of combined footing.

  ii) Effective width of flange for T and L RCC beams - formulae and terms involved in it.

  iii) Flat Slab - Advantages and disadvantages

  iv) Structural actions in a coffered slab and its applications

b) Sketch various types of raft foundation construction. **[3]**

SECTION - II

Q5) Beam B1 of Effective span 8.93 m is to be replaced by ISMB 450 with $Z_p = 1553347 mm^3$. Calculate the load (Do NOT consider the load in Q 1) it can carry if welded with Flange Plates of 170 mm × 12 mm on each side. Check for Shear Strength. How is adding of flange plates at top and bottom of a steel I girder advantageous? **[13]**

OR

a) Calculate the Load taken by ISHB 450 @ 859N/m of Area 1111435.4 mm² if it is welded with Flange. Plates of 270mm × 20 mm on each side. Governing axis is Y axis with lyy of Bare Section = 1878000 mm⁴. Length = 5000mm with Hinges at both ends. **[8]**

b) Write a Short Note on Castellated Girder - construction, advantages, disadvantages. **[5]**

Q6) a) An U.C.R Masonry wall is to be provided to retain Earth on its Vertical Face. **[8]**

Density of Retained Earth = 16 kN/m³, Density of Masonary = 21 kN/m³

Top Width of Wall = 1.2 m, Take Bottom Width of wall = 3.4 m

Height of Wall = 5.1 m = h

Angle of Repose = 27°, Coefficient of Friction μ = 0.6, S.B.C of Soil = 230kN/m²

Check the stability of the wall with respect to Overturning and Sliding

b) What is active earth pressure? Explain. **[3]**

Q7) a) List the Advantages of Pre-Stressed Constructions over conventional R.C.C. Construction. **[3]**

b) A Pre-stressed beam of size 300 mm × 700 mm is used as Beam B1 It carries an udl of 34 kN/m over its entire span of 9 m inclusive of its self-weight. It is pre-stressed by tendons supplying 1500 kN force which are placed at 80 mm below the neutral axis. Calculate the extreme fiber stresses at mid span section. **[8]**

Q8) Design the Isolated Pad Footing of a Column 230 mm × 600 mm to carry a load of Service Load of 1600 kN in a Soil of S.B.C. 250 kN/m^2. Assume 0.25% Steel and Design Shear Stress as 0.36 N/mm^2 for the assumed % of Steel. Do not Design or Check for Double Shear. **[11]**

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[5930]-72

T.Y. B. Arch.
BUILDING SERVICES - III
(2019 Pattern) (Semester - V) (3201941 (P))

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:
   1) Answer Q1 or Q2, Q3 or Q4.
   2) Figures to the right indicate full marks.
   3) Neat diagrams must be drawn wherever necessary.
   4) Use of algorithmic tables slide rule, Mollier charts, and electronic pocket Calculator and steam table is allowed.
   5) Assume suitable data, if necessary and clearly state.

SECTION-I

Q1) Explain Evaporative cooling system. Which different passive techniques can be used to cool dam spaces inside a building? Explain indetail direct evaporative cooling system. **[15]**

OR

State types of Mechanical Ventilation Systems Calculate, the number of exhast fans required for ventilating a basement shop located at Northwest caorner of building, measuring (10m×6m×3mH). Select the best fit option from the fans available for comfortable ventilation of the shop and draw a schematic diagram indicatives fan installation.

Fan data	-	Fan size		Capacity
		305 mm	-	1900cu.m/hr
		380 mm	-	4000 cu.m/hr
		457 mm	-	6800cu.m/hr

Q2) Write short ntoes on any four of the following. **[20]**
   a) Indirect-direct evaporative cooling system.
   b) Stack effect technique of ventilation.
   c) Kitchen exhaust system.
   d) Working of centrifugal fan.
   e) Psychrometric chart and its parameters.
   f) Sustainable cooling techniques.

Q3) Explain with a schematic diagram refrigesation system cycle with functions of components used in it. Skecth and explain in detail the working of central DX plant to condition a large space. **[15]**

<center>OR</center>

What is A.H.U.? Draw and explain the working of A.H.U. Explain which of the Air- canditioning systems needs A.H.U. and give the strategic location to install it in a building. **[20]**

Q4) Write short notes on any <u>four</u> of the following.
   a) Viscous type filters.
   b) Shell and tube type of geat exchangers.
   c) Split AC system.
   d) Types of ducts used in Airconditioning.
   e) Air cirulation system in Central Aireconditioning.
   f) Working of Cooling Tower.

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SEAT No. : ☐

[5930]-73
Fourth Year B.Arch. (Semester - VII)
QUANTITY SURVEYING & SPECIFICATION WRITING - I
(2019 Pattern) (4201958)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :
1) *All questions are compulsory.*
2) *Answers to the two sections should be written in separate answer books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Use of lograithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
6) *Assume suitable data, if necessary.*

SECTION - I

Q1) **Write short notes on the following (*Any Three*) :** [3 × 5 = 15]
   a)   Essential qualities of an estimator.
   b)   Schedule of Quantities.
   c)   Essential data for an estimate.
   d)   Two types of estimates.
   e)   Measurement sheet and Abstract sheet.

Q2) **Answer the following in detail (*Any One*) :** [1 × 10 = 10]

   a)   Definition, Need and Importance of specification writing.

                              OR

   b)   Types and classification of Specifications.

Q3) **Workout Quantities of the following items from the Fig.-1 attached (*Any Two*) :** [2 × 5 = 10]

   a)   Excavation for foundation

   b)   PCC below the foundation

   c)   Random Rubble Masonry in foundation

   d)   Brick masonry

P.T.O.

Q4) **Workout Quantities of the following items from the Fig.-2 attached**
   (*Any Three*) :   **[3 × 5 = 15]**

   a)   RCC footings

   b)   RCC columns up to plinth level

   c)   RCC slab

   d)   External masonry walls

   e)   Internal plaster for walls of Hall and Lobby

   f)   Flooring in Hall and Lobby

Q5) **Answer the following (*Any Three*) :**   **[3 × 5 = 15]**

   a)   What is the importance of standard mode of measurements?

   b)   What is the classification of Strata as per IS-1200.

   c)   Write brief specification for 'Excavation in soft soil'.

   d)   What is lift and lead with reference to excavation.

   e)   Write specifications for 'Sand'.

Q6) **Write the mode of measurement for the following (*Any Five*) : [5 × 1 = 5]**

   a)   Excavation for foundation

   b)   600mm thick UCR masonry in foundation

   c)   RCC plinth beams

   d)   RCC column in super structure

   e)   Dado above kitchen platform

   f)   Aluminium sliding windows
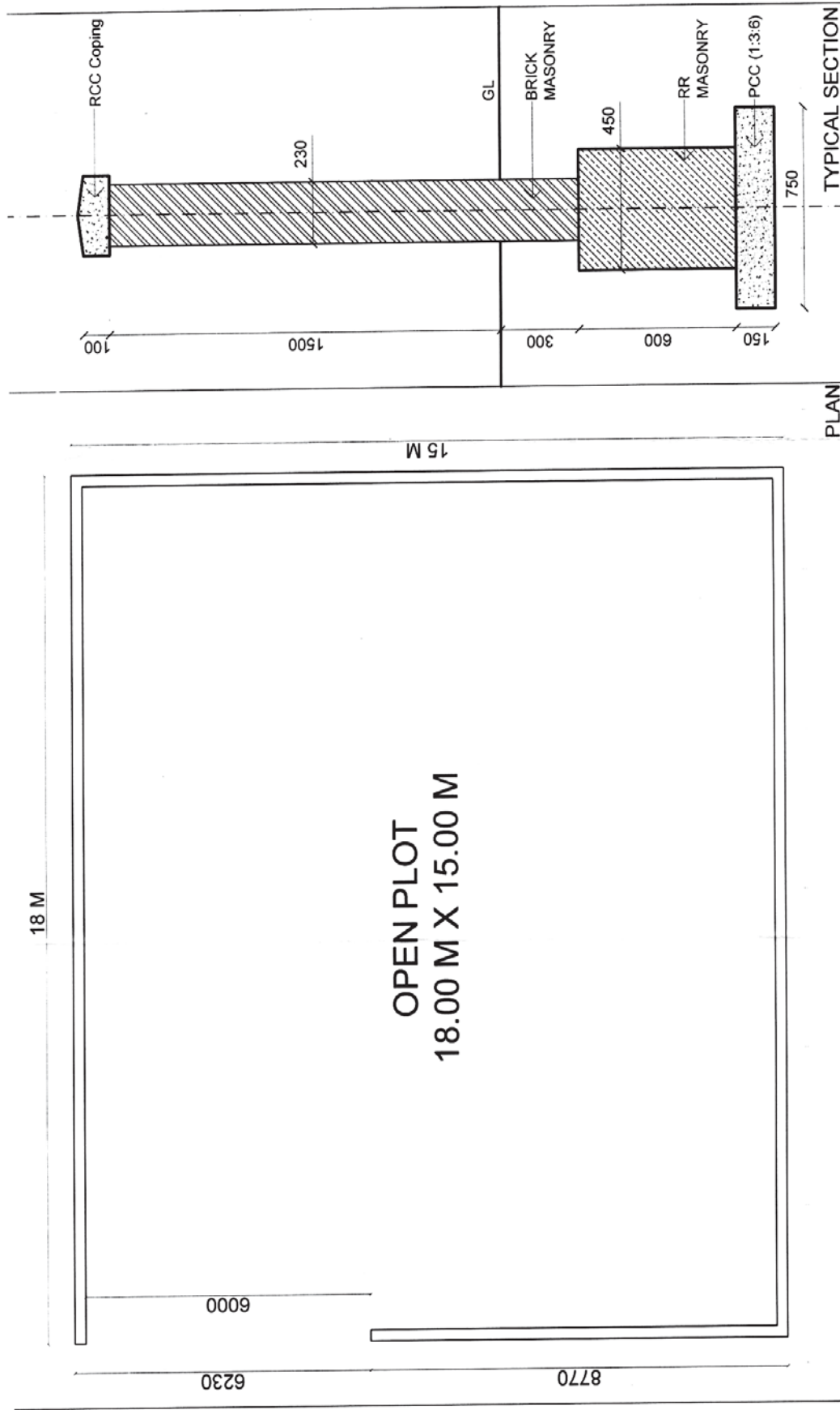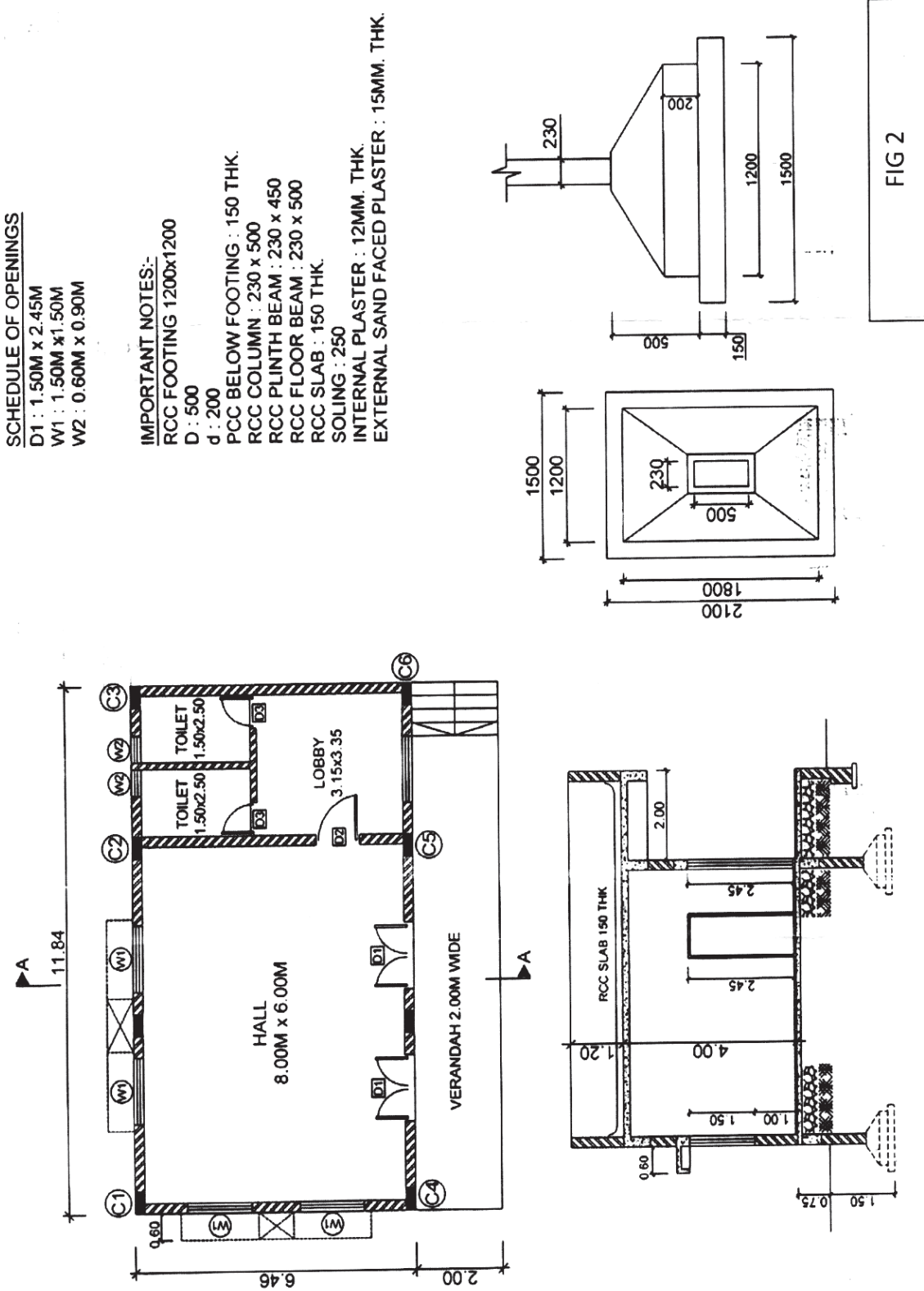
   g)   Overhead water tank

   h)   Wash hand basin

TYPICAL SECTION

FIG 1

RCC Coping

BRICK MASONRY

RR MASONRY

PCC (1:3:6)

GL

230

450

750

100

1500

300

600

150

PLAN

15 M

18 M

OPEN PLOT
18.00 M X 15.00 M

6000

6230

8770

SCHEDULE OF OPENINGS

D1 : 1.50M x 2.45M
W1 : 1.50M x1.50M
W2 : 0.60M x 0.90M

IMPORTANT NOTES:-

RCC FOOTING 1200x1200
D : 500
d : 200
PCC BELOW FOOTING : 150 THK.
RCC COLUMN : 230 x 500
RCC PLINTH BEAM : 230 x 450
RCC FLOOR BEAM : 230 x 500
RCC SLAB : 150 THK.
SOLING : 250
INTERNAL PLASTER : 12MM. THK.
EXTERNAL SAND FACED PLASTER : 15MM. THK.

FIG 2

HALL
8.00M x 6.00M

TOILET
1.50x2.50

TOILET
1.50x2.50

LOBBY
3.15x3.35

VERANDAH 2.00M WIDE

RCC SLAB 150 THK

[5930]-74

Fourth Year B. Architecture
PROFESSIONAL PRACTICE
(2019 Pattern) (Semester - VII) (4201959)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) *Answer to the two Sections are to be Written in Separate Answer Books.*
2) *Q.No. 1 is Compulsory. Question in Section I and Q.No. 5 is compulsory Question in Section II.*
3) *Answer any Two Questions out of Q.Nos. 2,3 & 4 in Section-I AND any Two Questions out of Q.No. 6,7 & 8 in Section -II.*
4) *Figures to the right indicate full marks.*

SECTION - I

Q1) When can the Council of Architecture REMOVE an Architect from the official Register?

A Client has approached you for A Bunglow Project. When going through his papers you see that he has got designs done from another Architect. What is your course of Action? **[11]**

Q2) Write Short Notes on ANY THREE of the following : **[12]**

a) Advantages of an Architectural Competition to the Promoter.

b) Single Stage and Two Stage Competitions.

c) Project Competition and Ideas Competition.

d) Advantages of participation in an Architectural Competitions.

Q3) Answer ANY THREE of the following questions :   **[12]**

   a) Write a Short Note on importance of Team Work in Architecture.

   b) Write a Short Note on Changing Nature of the Profession of Architecture.

   c) Explain Reasons why you consider Architecture as a Profession and not a Business.

   d) Explain the Differences between Proprietorship and Partnership.

Q4) Explain with reference to an Architects Office :   **[12]**

   a) Various Departments of an Architects Office.

   b) What do you think of an Open Office Layout.

   c) Explain the need of an Engineering Department and its activities in an Architects office.

SECTION - II

Q5) List the Various Stages of Services offered by a Architect to his Client, and the percentage of the total Professional Fee charged at every stage. Total Fees are 5.00%.   **[11]**

Q6) Write Short Notes on ANY THREE of the following :   **[12]**

   a) Savings Account and Current Account.

   b) Income Tax and Professional Tax.

   c) Different Types of Insurance Policies.

   d) Income Tax Exemptions and Deductions.

Q7) Answer ANY THREE of the following questions :   **[12]**

   a) Define Valuation and the Explain any three Purposes of Valuation.

   b) Write a Short note on Free Hold and Lease Hold Properties.

[5930]-74   2

c) Any two methods of Land and Building Valuation.

d) Different types of Arbitration.

Q8) Explain ANY THREE of the Following :　　　　　　　　　　　　　**[12]**

a) Benefits of Membership of a Professional Association/Organisation.

b) Major Objectives of the Indian Institute of Architects.

c) Name the Associations/Organisations an Architect with an Graduate Degree can join.

d) Why is it important for Architects to be sensitive and active in Civic issues of the City?

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