

Total No. of Questions : 4]

SEAT No. :

PD-5145

[Total No. of Pages : 2

[6407]-1901

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 L-junction for (one) 1 brick thick English bond with mortar thickness.

- a) Plans of alternate courses at scale 1:10
- b) Elevation of six courses at scale 1:10

OR

Draw detail of a 450 mm thick square rubble masonry compound wall as follows-

- a) Draw plan and elevation of compound wall of 1500 mm height at 1:10 scale
- b) Cross section of wall with foundation at 1:10 scale

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

P.T.O.

Q2) Draw neat labelled sketches ONLY (any three) : [15]

- a) Draw any three types of special bricks with nomenclature.
- b) Draw any three stone dressing types with nomenclature.
- c) Load transfer in arches.
- d) Draw any three tools used in brick work.
- e) Draw any three types of arches.

SECTION - II

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

- a) Draw section of various building elements from foundation to roof and explain in one line the following terms- lintel, sill, plinth, DPC and parapet.
- b) Method of pointing. Difference between plastering and pointing.
- c) Draw elevation of Semicircular arch with necessary nomenclature. Explain in one line following terminologies associated with arches- springing line, keystone, span, voussoir, soffit.
- d) Explain process of manufacturing of bricks with necessary sketches.

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

- a) Requirements of good plaster.
- b) Bamboo as a construction material.
- c) Stabilized mud earth blocks.
- d) Advantages of Concrete blocks.
- e) Difference in load bearing and non load bearing construction.



[6407]-1902
First Year B.Arch.
THEORY OF STRUCTURES - I
(2019 Pattern) (Semester - I) (1201904)

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 calculator is allowed.

SECTION - I

Q1) Compulsory

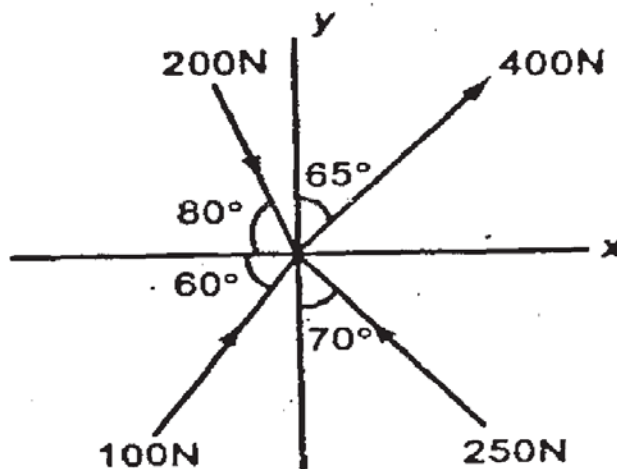
[13]

a) Define following terms

[3]

- i) Moment
- ii) Couple
- iii) Resultant of force system

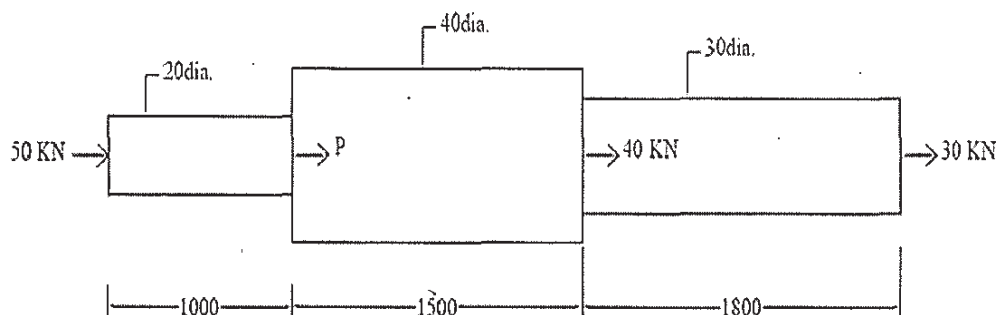
b) Find the resultant of following force system in magnitude and direction.
Find the point of application of resultant. **[10]**



P.T.O.

- Q2) a)** Explain the Advantages of Load Bearing Structures. [2]
- b) Explain Safe Bearing Capacity (SBC). [2]
- c) A 350mm thick brick wall is to be provided with a P.C.C. Strip bed of about 0.6m. The load of the Super Structure is 140KN. Assume 10% Load of Sub Structure and determines the width of foundation for a SBC of 250 KN/m² using 230 × 110 × 75 sized bricks. [7]

- Q3) a)** A Steel bar of square sections as shown is subjected to axial load along its length and it is in equilibrium. If $E = 2 \times 10^5 \text{ N/mm}^2$ [7]
- i) Find P in magnitude for equilibrium
- ii) Find stresses in each part of the bar.

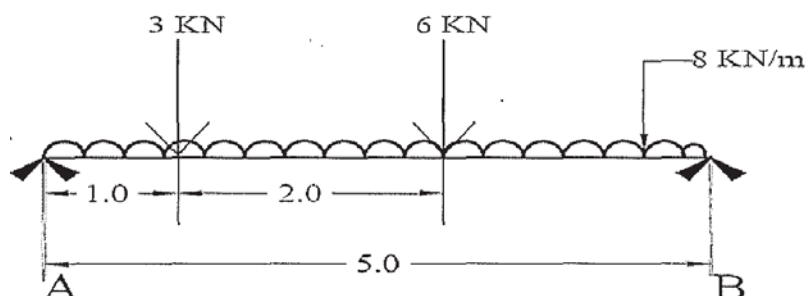


- b) Define following terms: Young's Modulus and Poisson's Ratio. [4]
- Q4) a)** Define with examples in Architectural Materials the concepts of Elasticity, Plasticity and Brittleness. [3]
- b) Explain the Method of Load Transfer in Load Bearing Structures. [3]
- c) Two wires AB & BC support a load of 60N. The wire is fixed to roof at pt. 'A' and to the wall at pt. 'C' angle AB with roof is 35° and angle of CB with wall is 65°, calculate Tension in AB & BC. [5]

SECTION - II

Q5) a) Draw SFD and BMD for the given beam figure. **[11]**

- i) Findings reactions
- ii) Shear force diagram with point of contrashear
- iii) Bending moment diagram
- iv) Maximum bending moment



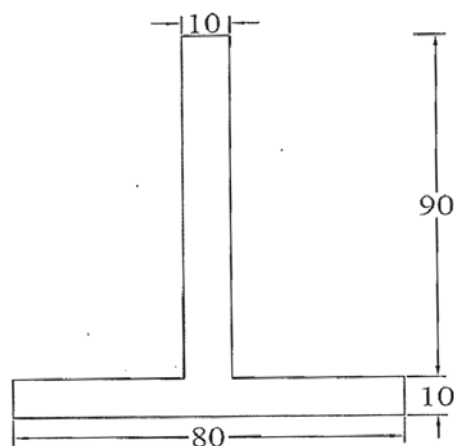
b) Define S.F at a point on a Beam and Define S.F.D. **[2]**

Q6) a) Draw the following beams and Explain weather statically determinate or indeterminate w.r.t. to reactions they offer. **[4]**

- i) A fixed beam
 - ii) An Overhanging Beam.
- b) A Simple supported beam in R.C.C of size 300×600 of clear span 5.8m is supported on 300mm thick columns on each side. The beam carries a wall of 1500mm high and 230mm thick wall on its entire span. Calculate Support reactions. **[7]**

Q7) a) List the Differences between Centre of Gravity and Centroid. **[4]**

- b) Find C.G of the following shape and M.I about XX Centroidal Axis. All dimensions are in mm. **[7]**



- Q8)** a) State the Theorem of Parallel Axis w.r.t M.I and explain with a sketch its application. [4]
- b) Explain the following : [4]
- i) Radius of gyration
 - ii) Define Support and explain a Pinned Support with Slcetches.
- c) Draw a Cantilever Beam of span 1 and full u.d.l w and draw its S.F.D and B.M.D showing important values. [3]



Total No. of Questions : 4]

SEAT No. :

PD-5147

[Total No. of Pages : 2

[6407]-1903

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 side indicate full marks.*
- 4) *Assume suitable data, if necessary.*
- 5) *Answer same questions from section-I on drawing sheet and from section - II in answer book only.*

SECTION - I

Q1) Draw any one of the following :

[20]

A room of size 7M × 12M needs king post truss roofing.

- a) Draw a key plan at 1 : 100 scale
- b) Draw Elevation of queen post at 1 : 200 Scale
- c) Any one joinery detail at 1 : 10 scale

OR

A hospital room having door of size 0.9M × 2.1M, with wall thickness 0.23M. Provide glass panel on top and teak wood panel at the bottom.

- a) Draw Plan, Section and Elevation at scale 1 : 10
- b) Draw any one joinery detail used in door construction at suitable scale.

Q2) Draw neat and labeled sketches (Any Three) :

[15]

- a) Sketch any five tools used in carpentry.
- b) Draw neat labeled Elevation of truss partition.
- c) Draw neat labeled section of queen post truss roof.
- d) Draw a neat and labeled schematic section of timber staircase.
- e) Draw neat sketches of any five Defects in timber.

P.T.O.

SECTION - II

Q3) Answer Any Two of the following : **[20]**

- a) Explain with neat sketches Construction of Reinforced brick walls and Construction of Reinforced brick columns.
- b) What is Seasoning of timber? Explain with neat sketches methods of seasoning.
- c) What are couple roof and couple close roof explain with neat sketches.
- d) Explain with neat sketches teak wood flooring.

Q4) Answer Any Three of the following : **[15]**

- a) What is Earthquake? Define with neat sketch epicenter, focus and fault line.
- b) Difference between soft wood and hard wood.
- c) Explain conversion of timber and any one type with neat sketch.
- d) Explain with neat sketch lean to roof.
- e) Write short note on Plywood.



[6407]-1904
First Year B.Arch.
THEORY OF STRUCTURES - II
(2019 Pattern) (Semester - II) (1201912)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

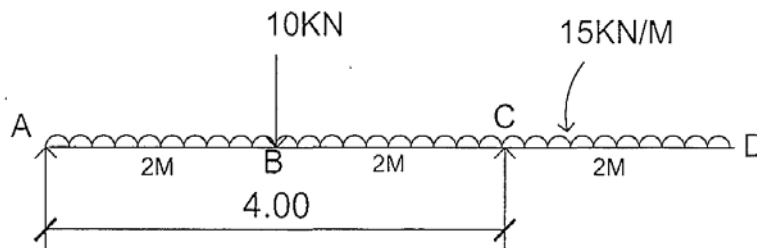
- 1) Q. No.1 & 5 are compulsory. Solve any 2 from the other 3 in each section.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data, if required mention the assumption.
- 4) Use of non-programmable calculator is allowed.

SECTION - I

Q1) Compulsory :

- a) A rectangular beam of size 125 mm wide & 375 mm deep is used over a simply supported span of 5.0 meter. It carries u.d.l. of 4.0 KN/m over entire span along with central point load of 5.0 KN. [7]
 - i) Calculate the maximum tensile and compressive bending stress.
 - ii) Draw Bending stress diagram across cross section
- b) Define the following terms : [4]
 - i) Section Modulus
 - ii) Moment of Resistance

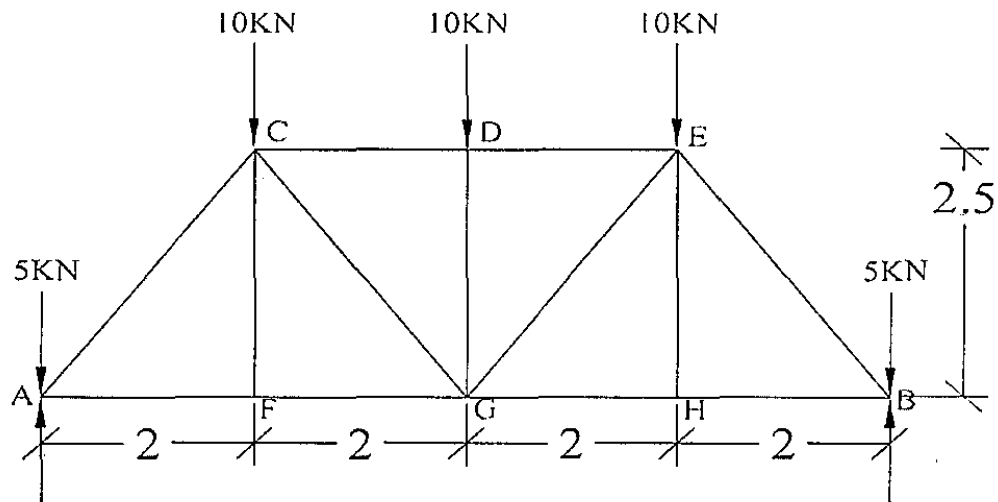
- Q2) a)** Draw SFD & BMD for a given beam as shown in fig. Show the point of contra-shear [8]



- b) Define point of Contra Flexure and Point of Zero Shear. [4]

P.T.O.

- Q3) a)** Calculate the forces in member AC, AF, CF & CD. Present your answer in the form of table. [8]



- b) Explain the Perfect, deficient and redundant frame. [4]

- Q4) a)** A rectangular beam of section 200×400 mm having simply supported span of 6.0 meter. It carries u.d.l. of 10 kN/m over entire span. Find shear stress at necessary points. Draw shear stress distribution diagram. [8]

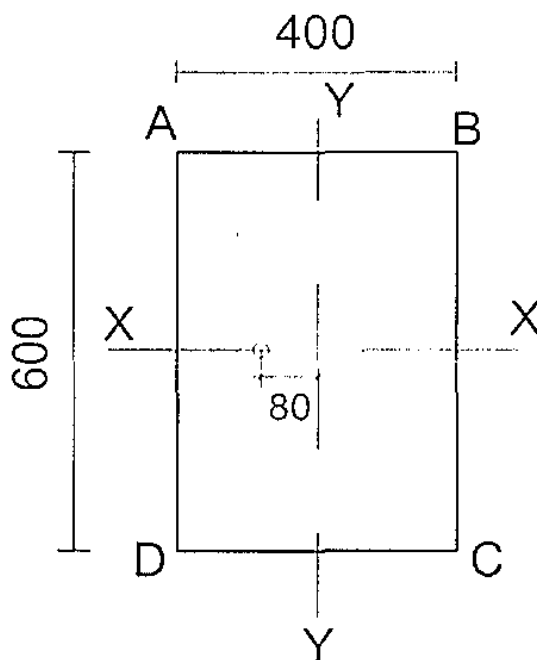
- b) Sketch proportionally, typical shear stress diagram for L & T section with max. value. [4]

SECTION - II

Q5) Compulsory :

- a) A steel column fixed at one end and hinged at other end has $I_{xx} = 39210.8 \times 10^4 \text{ mm}^4$ and $I_{yy} = 2985.1 \times 10^4 \text{ mm}^4$. The column carries safe load of 500 kN with factor of safety as 2.5. Calculate max. height using Euler's theory. Take $E = 2 \times 10^5 \text{ N/mm}^2$. [7]
- b) Explain slenderness ratio. [2]
- c) State and sketch symbolically effective length for a column whose one end is fixed and other free. [2]

- Q6) a)** A simply supported beam of cross section 250×600 mm carrying u.d.l. of 20 KN/m over entire span of 5.0 meter. Calculate max. deflection only. Take $E = 1.5 \times 10^4$ N/mm² [8]
- b)** Draw a Cantilever Beam with a full u.d.l. Show the deflection curve, point of max deflection and point of maximum slope and write down the formulae for the same. [4]
- Q7) a)** For a masonry pier of cross-section 400×600 mm carrying compressive load of 1000 KN with eccentricity w.r.t. Y-Y axis as shown. Find resultant stresses at four corners A, B, C & D. Draw the stress envelope and sketch the tensile zone if any. [8]



- b)** Explain with sketch the middle third rule. [4]
- Q8) a)** A hollow square column of cross-section 500×500 mm with 20 mm thickness. Height of the column is 5.0 meter with one end fixed and other hinged. Find the failure load if crushing stress is 320 N/mm². If $E = 2 \times 10^5$ N/mm². [8]
- b)** Explain limitations of Euler's theory. [4]



[6407]-1905

B.Arch.

BUILDING CONSTRUCTION & MATERIALS - III (2019 Pattern) (Semester - III) (2201918(P))

Time : 2½ Hours]

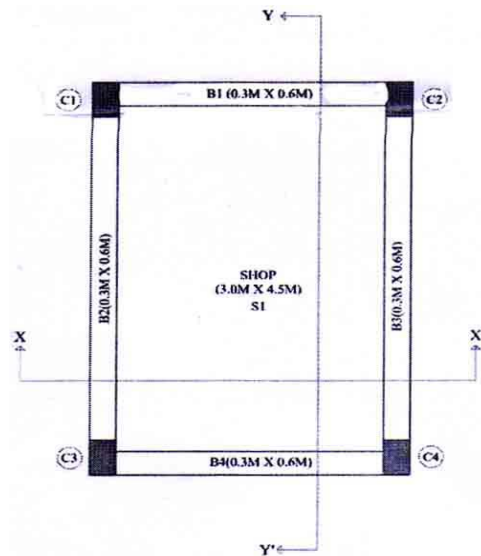
[Max. Marks : 70

Instructions to the candidates :

- 1) All questions are compulsory.
- 2) Answer to section I must be on the drawing sheets only.
- 3) Answers to section II must be written in the answer sheet only.
- 4) Neat diagrams/sketches must be drawn where ever necessary.
- 5) Figures to the right indicate full marks.
- 6) Assume suitable data if necessary.

SECTION - I

Q1) A shop of size 3M × 4.5M × 4.5M height needs to be constructed in RCC frame structure. It has flat roof from the ground level. Draw following details to the scale of 1:10. (All column sizes 0.30M X 0.45M) . RCC slab thickness is 130 mm



- a) Propose appropriate slab and draw detail reinforcement drawing of the slab SI. [7]
- b) Draw sections X-X' and Y-Y' showing reinforcement of the slab and Beam [8]
- c) Draw an isometric view of column and beam Junction showing Reinforcement details. [5]

P.T.O.

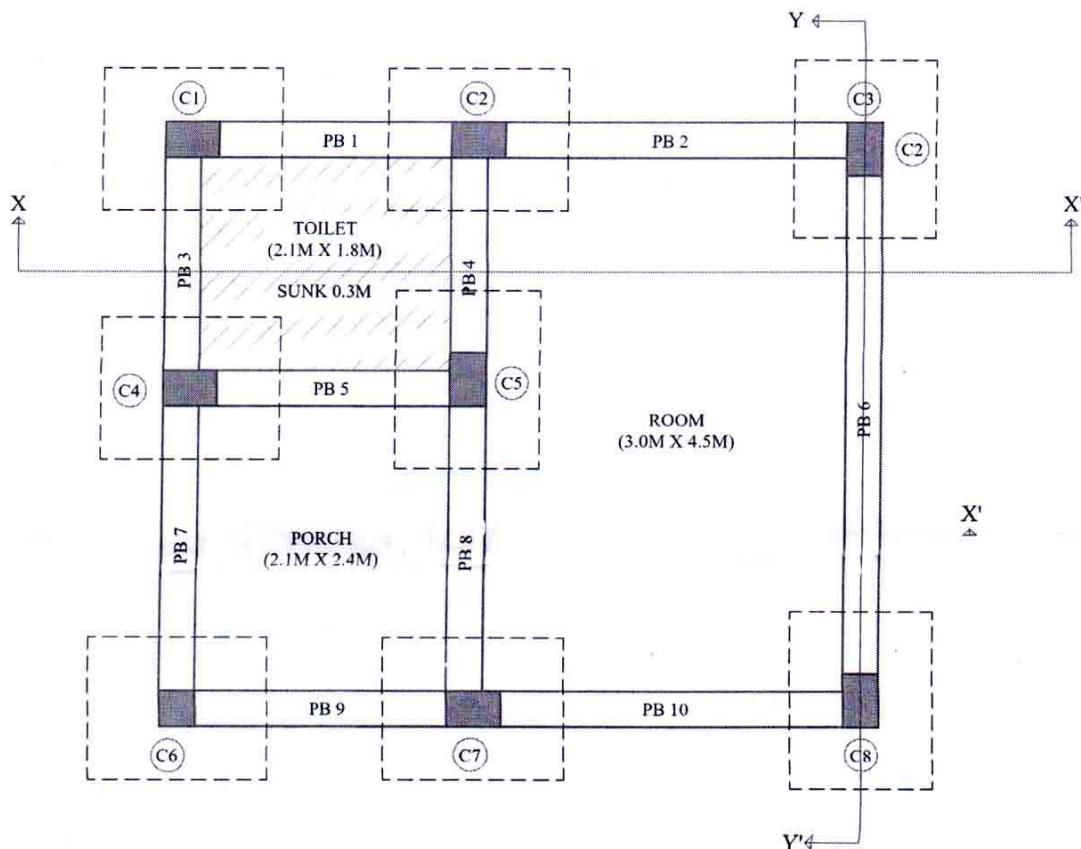
OR

A room of a size $3\text{M} \times 4.5\text{M} \times 3.5\text{M}$ height with an attached toilet of a size $2.1\text{M} \times 1.8\text{M} \times 3.5\text{M}$ height is having a porch in RCC frame structure. The plinth level is at 0.60M from the Existing ground level. Soil conditions suggest Shallow foundations for the structure

Draw following details

(All column sizes $0.30\text{M} \times 0.45\text{M}$) (Plinth beam sizes $0.30\text{M} \times 0.45\text{M}$)

(Footing size: $1.2\text{M} \times 1.5\text{M}$).



- Draw detail section of footing and plinth beam Y-Y'. (Scale 1:10) [10]
- Draw detail section of X-X' at the plinth level through toilet and the room. (Scale 1:20) [10]

Q2) Answer with Neat labelled sketches on Sheet (Any 3). [15]

- RCC lintel beam and RCC weather shed showing its Reinforcement
- Lapping of a Steel Bars in RCC Column
- Any one type of a Non-Timber Window
- Types of combined footing.
- Fixing of Concrete Paver block for Garden walkway.

SECTION - II

Q3) Answer the following (Any 2) : **[20]**

- a) Write any 5 types of flooring material and its applications. Explain the process of laying of any one type of flooring material showing its section
- b) Explain the need of formwork and the material used for formwork. Explain the process of curing of concrete.
- c) Sketch and Explain different types of shallow foundations.

Q4) Write Short notes on (any 3) : **[15]**

- a) Admixtures used in Concrete
- b) Explain bearing capacity of soil and name different types of soil.
- c) What is water-cement ratio?
- d) Difference between One-way slab and Two-way slab.
- e) Bleeding and Segregation in Concrete



Total No. of Questions : 8]

SEAT No. :

PD-5150

[Total No. of Pages : 3

[6407]-1906

S.Y. B.Arch.

THEORY OF STRUCTURES - III
(2019 Pattern) (Semester - III) (2201920)

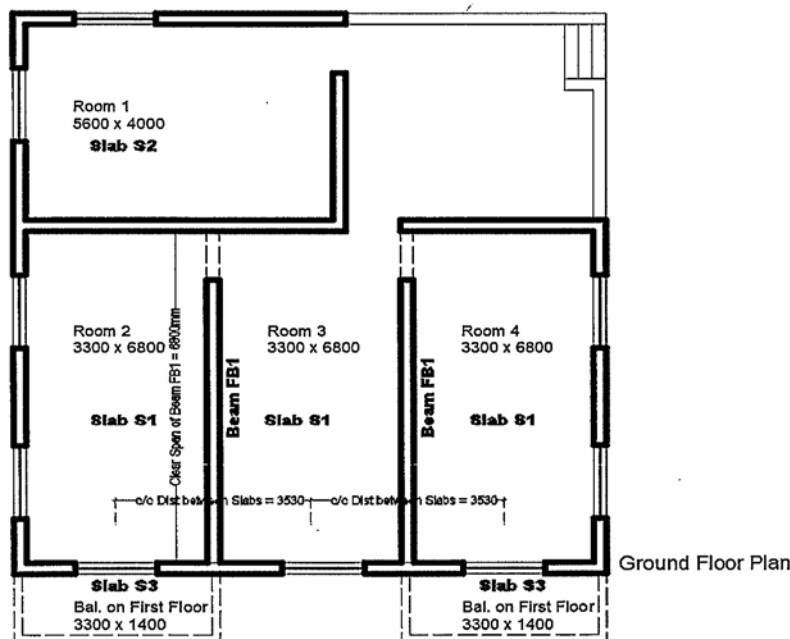
Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question No 1 and 5 are Compulsory in each Section. Any two out of Q2,3,4 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) *The Sketch Shown Below is applicable to both Sections*
- 6) *Use of non-programmable Calculators and Standard Steel Tables of Plastic Design Allowed*

SECTION - I



- Q1)** Design Slab S1 from the Sketch. It is supported on all four sides by 230mm wide R.C.C. Beams. Consider Live Load = 4kN/m^2 and Floor Finish = 2.25kN/m^2 . Use 10mm diameter bars as main steel, 8mm diameter as distribution steel. Write the answer in the form of schedule.

[11]

P.T.O.

Q2) A fixed beam of length 8m, carrying a UDL of 25kN/m over its entire span. It is also carrying a point load of 38kN at distance of 2m from LHS Support. Find support reactions and Draw S.F.D and B.M.D. [12]

Q3) Design Beam FB1 from the sketch. Assume Slab S1 as 140mm thick. Assume wall 230thk and 2.5m high. Live Load on slab S1 and Floor Finish are 4kN/m² and 1.25kN/m². Design for Flexure only. Reinforcement Section not expected. Design for Shear not expected [12]

Q4) Answer any 3 of the Following : [12]

- a) Write a short note on Manufactured Sand
- b) Explain Primaru Torsion and Secondary Torsion
- c) Explain I.S.456 Standards w.r.t Minimum and Maximum Spacing of Steel in Slabs and Beams
- d) Write a short note on Cover: Functions and list of covers for different R.C.C. Elements
- e) Explain why only Steel is used as the Reinforcing Material

SECTION - II

Q5) For a short axially loaded RCC column subjected to Service Load of 1250kN having one dimension 230mm, Design the Column. Consider 2% steel. Find spacing of 8mm links. Make the schedule and draw a sketch of reinforcement details. [11]

Q6) A room of size 9.7m × 3.6m with 230mm thick walls on all four sides is to be provided with a loft made of Block Boards 50mm thick to be supported on timber joists 3 in number (2.44m center to center) along the shorter span. The Block Boards are to be finished with 12mm thick timber flooring slats. Design the middle Timber Beam Considering Indian Oak as the type of Timber and Live Load as 3kN/m². Let $d = 3b$. d = depth of the beam, b = width of the beam [12]

Q7) Design Slab S2 from the Sketch above. Use 10mm dia steel bars as main steel and 8mm dia for distribution. Use Floor Finish as 2.5kN/m² and Live Load as 5kN/m². Make Schedule and Do not Draw Sketch of Reinforcement [12]

Q8) Answer any three of the Following :

[12]

- a) Explain w.r.t Wooden Beams Form Factor
- b) Explain any 3 Disadvantages of Wood as a Structural Material
- c) Explain differences in a Two Way Slab and One Way Slab
- d) Explain Why Alternate bars are Bent Up in a Simple Supported Slab
- e) Explain Requirements of a Good Concrete



Total No. of Questions : 4]

SEAT No. :

PD-5151

[Total No. of Pages : 2

[6407]-1907

S.Y. B.Arch.

BUILDING SERVICES - I

(2019 Pattern) (Semester - III) (1201923)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data wherever necessary.
- 4) Draw suitable diagram wherever necessary.
- 5) Answer to the two sections to be written on separate answer sheets.

SECTION - I

Q1) a) What is the function of traps? Explain any 3 traps with neat sketches in the building sanitation system. [15]

OR

b) Explain the working of septic tank with neat labelled sketch. [15]

Q2) Write short notes with neat labelled sketches (any 4): [20]

- a) Ferrule connection
- b) Overhead tank: explain with diagram
- c) Types of valves in water supply system
- d) Direct & Indirect water supply
- e) Explain any 2 taps in water supply
- f) Centrifugal pump

P.T.O.

SECTION - II

Q3) a) Explain one pipe and two pipe system in vertical drainage system. **[15]**

OR

b) Explain P and S trap. Its location in the drainage system. Explain with neat labelled sketch. **[15]**

Q4) Write short notes with sketch (Any 4): **[20]**

- a) Rain water harvesting
- b) Inspection chamber
- c) Wash hand basin
- d) Invert level and gradient in drainage pipe network
- e) Gully trap
- f) Storm water drainage system



Total No. of Questions : 4]

SEAT No. :

PD-5152

[Total No. of Pages : 2

[6407]-1908

S.Y B.Architecture

BUILDING CONSTRUCTION AND MATERIALS - IV
(2019 Pattern) (Semester - IV) (1201927)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) *All Questions are compulsory.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *Neat Diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Assume suitable, if necessary.*

SECTION - I

Q1) A spine wall staircase in RCC is to be designed for residential building. Consider flight width as 1200mm and floor to floor height as 3000mm draw, with proper nomenclature and dimensions, the following at scale of 1:20 **[20]**

- a) Framing plan showing RCC support system.
- b) Section of one flight with main and distribution steel clearly indicated.

OR

A surface sliding door is to be designed for an opening of 1200mm. Draw the following indicating material and dimensions with proper nomenclature. **[20]**

- a) Plan of opening with door details. (1:20)
- b) Elevation and section of same (1:20)
- c) Any one detail of fixture used (1:5)

Q2) Draw well labelled sketches (Any Three) :

[15]

- a) Cantilever balcony with reinforcement in plan and section.
- b) Working of traction elevator
- c) Typical bay window plan and section.
- d) Sketch any 2 details of sliding folding door for opening of 2400mm.
- e) Reinforcement details for dog leg staircase.

P.T.O.

SECTION - II

Q3) Explain with help of well labelled sketches (Any 2) : [20]

- a) RMC batching plant with flow chart of the process.
- b) Water proofing in toilets.
- c) Composition of ferrocement and its uses.

Q4) Write short notes (Any 3) : [15]

- a) Advantages and disadvantages of LWC.
- b) Difference between hydraulic and traction elevators.
- c) Glass as an architectural material and use of any 3 types of glass.
- d) Use of plastic in building industry.



Total No. of Questions : 8]

SEAT No. :

PD-5153

[Total No. of Pages : 4

[6407]-1909

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. **[9]**

Q2) Design Doglegged staircase for an office building. Flight is supported on 230mm wide beams at the outer edges of the landings Width of Flight = Width of Landing = 1500mm, 9 Treads of 280mm in each Flight, Riser is 170mm and floor-to-floor Height = 3400mm. Consider Floor Finish = 1.25kN/m². Use 12 mm diameter bars for main steel and 8mm diameter bars for distribution (secondary steel). Write your answers in the Form of a Schedule and no need to draw reinforcement details. **[13]**

P.T.O.

Q3) A room of residential building having clear dimensions $7.2 \text{ m} \times 3.4 \text{ m}$ has a balcony of $1.4 \text{ m} \times 7.2 \text{ m}$ with 1.4 m clear overhang. Design R.C.C. overhanging slab for the same if beams supporting overhang slab have 230 mm width. Consider Live Load = 3 kN/m^2 and Floor Finish = 2 kN/m^2 . Use 10 mm diameter bars as main steel, clear cover of 20 mm . Draw RCC sketch only. [13]

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

- a) Sketch out conceptually the different ways in which a Balcony Projecting Slab can be supported.
- b) Write Short Notes on Balanced Sections, Under- Reinforced Sections, Over-Reinforced Sections.
- c) Explain Plastic sections & Compact sections.
- d) A Beam of size $230 \text{ mm} \times 500 \text{ mm}$ is reinforced with 3no 20 mm Bars. Calculate its Moment of Resistance.

SECTION - II

Q5) Design rectangular RCC Cantilever Beam of clear overhang length 14 m . These Beams are subjected to working loads of 16 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 . [11]

Q6) Design a Steel Girder using ISMB for a clear Span of 3.25 m , udl (service load) of 22 kN/m , simply supported on 230 mm wide supports on each side. Select a Section for Flexure. Classify the Section and Check for Shear Strength only. [12]

Q7) Design a Stanchion using ISHB section for the following conditions. Load = 800 kN . The Height along ZZ direction is 8 m with both ends fixed. (Assume Stress = 120 N/mm^2) [12]

Q8) Answer any three of the following :

[12]

- Explain with sketch RCC details of a section of three span one way continuous slab.
- What is to be done to avoid lateral bending in load bearing structure (explain with sketches)
- Draw and explain structural elements of a Typical Factory Building in Section.
- Write a short note on RCC Folded Plate Staircase.

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	$\frac{84\epsilon}{1+r_1}$	$\frac{105.0\epsilon}{1+r_1}$	$\frac{126.0\epsilon}{1+2r_2}$ but $\leq 42\epsilon$
		If r_1 is positive :	d/t_w	but $\leq 42\epsilon$	$\frac{105.0\epsilon}{1+1.5r_1}$	
					but $\leq 42\epsilon$	
	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

Note 2: $\epsilon = (250/f_y)^{1/2}$

Note 3: Check webs for shear buckling in accordance when $d/t > 67 \epsilon$. 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

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

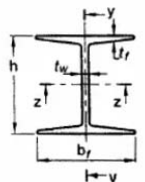
End Conditions and effective lengths for Stanchions

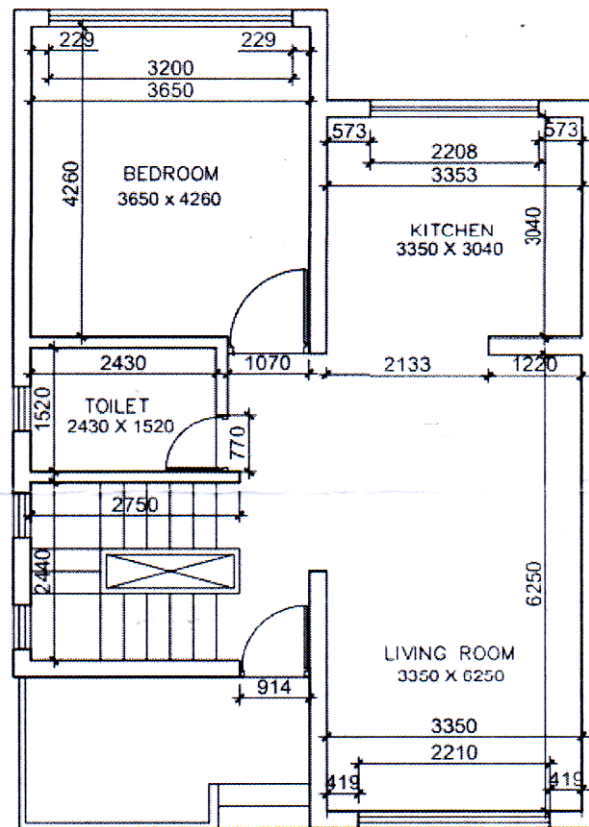
- Both Ends Fixed $L_e = 0.65L$
- One End Fixed other end Hinged $L_e = 0.8L$
- Both Ends Hinged $L_e = 1.0L$
- One End Fixed One End Free $L_e = 2L$

Table 10 Buckling Class of Cross-Sections

IS 800 : 2007

(Clause 7.1.2.2)

Cross-Section (1)	Limits (2)	Buckling About Axis (3)	Buckling Class (4)
	$h/b_f > 1.2$ $t_f \leq 40$ mm	z-z y-y	a b
	$40 \leq \text{mm} < t_f \leq 100$ 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



ALL DIMENSIONS ARE IN MM



Total No. of Questions : 4]

SEAT No. :

PD-5154

[Total No. of Pages : 2

[6407]-1910
S.Y B.Arch.
BUILDING SERVICES - II
(2019 Pattern) (Semester - IV) (1201932)

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 side indicate full marks.*
- 5) *Assume suitable, if necessary.*

SECTION - I

- Q1) a)** Explain with sketch any five Passive design strategies. **[10]**
b) What is Day-light factor? Explain components of Daylight factor with sketches. **[10]**

OR

A room of size 15.00 x 10.00 x 3.60 M has a design illumination is 500 lux on the working plane (0.75 metres above the floor). The Utilisation factor is 0.5 and the Maintenance factor is 0.8.

- a) If the LDL output of each fitting is 2750 lumens, calculate the number of fittings required. **[10]**
- b) Show the fittings layout with no. of fixtures in each row and column. **[10]**

Q2) Answer the following (Any Three) : **[15]**

- a) Compare Natural Lighting with Artificial Lighting.
- b) What different factors affecting for Lighting design?
- c) Explain Landfill method to dump waste. State its advantages and disadvantages.
- d) Define the following with their units of measurement: Luminous Flux, Luminous intensity, Illuminance, LUX, Luminance.
- e) Explain Vermicomposting process.

P.T.O.

SECTION - II

Q3) Answer the following (Any Three) : **[15]**

- a) Define the terms: Current, Resistance, Circuit, Volts, Conductor.
- b) Differentiate between Single & three Phase circuits.
- c) What is MCB? Explain with its advantages.
- d) Explain with sketch lightning arrester.
- e) Explain the purpose of different color-codes of electrical wires used in electrification.

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

- a) Explain any three new technologies used to access daylight in indoor spaces.
- b) Explain in brief any three alternative sources of energy that could be integrated in building design.
- c) Differentiate between Open & Concealed wiring system.
- d) Explain the process of current generation by using Solar PV panel?
- e) What are various Low Voltage Network systems?
- f) What is plate earthing and rod earthing?



Total No. of Questions : 3]

SEAT No. :

PD-5155

[Total No. of Pages : 2

[6407]-1911

T.Y. B.Arch.

BUILDING CONSTRUCTION & MATERIALS - V
(2019 Pattern) (Semester - V) (3201936)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) Answer to the two sections should be written in separate answer books.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) All questions are compulsory.*
- 4) Figures to the right indicate full marks.*

SECTION - I

(To be solved on drawing sheets only)

Q1) Partition is proposed for two adjacent wall of office conference room of size 3.5 x 4.5 M with height of 3M. The partition possesses an acoustical treatment. There is window opening of size 1.8M X 1.5M at a sill level of 0.90M to a longer wall. **[20]**

- a) Draw a plan of partition to the scale of 1:20
- b) Draw the section and elevation of partition with framing members to the scale of 1:20
- c) Draw details to suitable scale
 - i) Draw at Window sill level & fixing with partition
 - ii) Partition detail at the corner where two partitions meet each other.

OR

Q1) A Conference room of size 5M X 4M is to be provided with proprietary open grid false ceiling system.

- a) Draw a reflected ceiling plan at 1:20 showing framing system, lighting system and AC diffuser grills.
- b) Draw a section to 1:20 scale through false ceiling
- c) Draw details of panel fixing and light fixing to suitable scale.

Q2) Draw sketches of **any three of the following:**

[3 x 5 = 15]

- a) Two joinery details for master bed unit constructed in plywood.
- b) Any two alternatives of fixing of shelves in storage unit
- c) Fixing detail of glass top to wooden frame and leg in dining table
- d) Drawer fixing detail in any furniture unit.

SECTION - II

(To be solved in answer books only)

Q3) Write short notes of the following with neat sketches wherever necessary(Any Seven).

[35]

- a) Any two types of paints
- b) Medium Density Fiberboard (MDF)
- c) Process of painting to newly constructed external wall
- d) Post tensioning Slab
- e) Concept of waffle slab and advantages
- f) External tanking in basement construction
- g) Any 2 defects in timber
- h) Counterfort Retaining wall
- i) Any 2 defects in painting



[6407]-1912

T.Y. B.Arch.

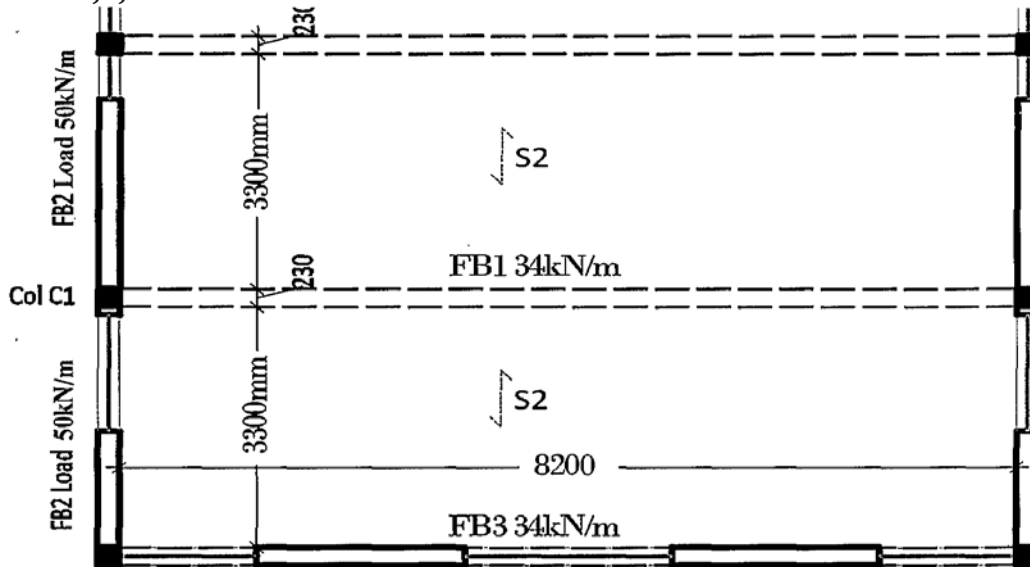
THEORY OF STRUCTURES - V**(2019 Pattern) (Semester - V) (3201938)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Question No 1 and 5 are Compulsory in 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 in R.C.C. Problems and Steel of Grade Fe 250 for Structural 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.
- 8) Answer any Two questions from Q. No. 2, 3, 4 & any two questions from Q.No. 6,7,8.

**SECTION - I**

- Q1)** Find the Load acting on column C1 per floor. Assume Load on FB1 to be 34kN/m and Clear Span = 8.2m and Load on FB2 to be 50kN/m and Clear Span = 3.3m. Calculate Load on every Floor considering Parking + 5 Floors. Design Column of 230mm width on First Floor using 2%steel and M25 Grade Concrete. Keep the Size same and Design Column on Parking Floor. Make Schedule and Draw Sketch of reinforcement of both the columns

[13]**P.T.O.**

% Steel	M25	M30	M35
1	13.25 Ag	15.23 Ag	17.21 Ag
1.5	14.875 Ag	16.845 Ag	18.815 Ag
2	16.5 Ag	18.46 Ag	20.42 Ag
2.5	18.125 Ag	20.075 Ag	22.025 Ag
3	19.75 Ag	21.69 Ag	23.63 Ag

- Q2) a)** Design the Beam FB3 as a L. Beam (Shown Dashed) across Clear span 8.2m. Calculate Load (Do not take load as per q no 1). Take the overall depth to 475mm. Assume Slab Depth = 135mm of Slab S2. Take Live Load as 4kN/m². Consider 2 rows of 20mm bars in Tension. Design for Flexure only. Assume N.A Position within Flange. Calculate N.A Position. Do not design for Shear. **[8]**
- b)** Explain the conditions under which a Beam can be considered a Flanged T or L Beam. **[3]**
- Q3) a)** FB3 is a Pre Cast Beam and cannot be considered as a Flanged Beam. Design Beam FB3 as a Doubly Reinforced Beam of Clear Span 8.2m to carry an u.d.l of 34kN/m. Restrict the Overall depth to 475mm. Design for flexure only. Consider 2 rows of 20mm bars in Tension. Do not design for Shear. **[8]**
- b)** Explain the Situations in which Restrictions in depth lead to Double Reinforcement in a Beam. **[3]**
- Q4) a)** Write Short Notes on any two of the Following drawing sketches wherever necessary : **[8]**
- Raft Foundation - Types and when used
 - Flat Slab Construction - I.S.456 Clauses w.r.t Thickness, Drops and Openings
 - Cofferred Slab - I.S.456 w.r.t Blocks and formers and Size and Position of Ribs
 - Two columns P1 and P2 of size 400mm × 400mm and 500mm × 500mm respectively each carrying a load of 1600kN and 2500kN rest in a soil of 240kN/m². They are spaced 3.5m apart centre to centre. Do they require a Combined Footing.
- b)** Three Pin Portal Frame - B.M.D and Detail of Pin Joint at Foundation in Steel. **[3]**

SECTION - II

Q5) Beam FB1 of Clear span 8.2m is to be replaced by ISMB 350

Calculate the load it can carry if welded with Flange Plates of $180\text{mm} \times 15\text{mm}$ on each side.

Check for Deflection for calculated Load

Explain Web Buckling and Web Crippling [13]

OR

a) Calculate the Load taken by ISHB 450 @ 859N/m . if it is welded with Flange Plates of $350\text{mm} \times 16\text{mm}$ on each side. Length = 7500mm with both ends fixed in both Directions. [8]

b) Write a Short Note on Parts and Features of a Plate Girder. [5]

Q6) a) An U.C.R Masonry wall is to be provided to retain Earth on its Vertical Face
Density of Retained Earth = 17kN/m^3 , Density of Masonary = 24kN/m^3
Top Width of Wall = 1.2m, Take Bottom Width of wall = 0.6h

Height of Wall = 5.0m = h

Angle of Repose = 28° , Coefficient of Friction $\mu = 0.6$, S.B.C of Soil = 250kN/m^2

Check the Stability of the wall with respect to Overturning and Sliding [8]

b) Write a Short Note on Disadvantages of Gravity Retaining Wall. [3]

Q7) a) Explain why High Strength Concrete is to be used in PreStressed Construction. [3]

b) A Pre- stressed beam of size $230\text{mm} \times 600\text{mm}$ is used as Beam FB1 It carries an udl of 34kN/m over its Effective span of 8.43m exclusive of its self-weight. It is pre-stressed by tendons supplying 2100kN force which are placed at 100mm below the neutral axis. Calculate the extreme fiber stresses at end span (support) and at mid span and End Span. [8]

Q8) Design the Isolated Pad Footing of a Column $230\text{mm} \times 550\text{mm}$ C1 to carry a load of Service Load of 1750kN in a Soil of S.B.C 250kN/m^2 . Assume 0.25% Steel and Design Shear Stress as 0.36N/mm^2 for the assumed % of Steel. Do not Design or Check for Double Shear [11]



Total No. of Questions : 4]

SEAT No. :

PD-5157

[Total No. of Pages :2

[6407]-1913

T.Y. B.Arch.

BUILDING SERVICES - III

(2019 Pattern) (Semester - V) (3201941)

Time : 2½ Hour]

[Max. Marks : 70

Instructions to the candidates :

- 1) Answer to the two sections should be written in separate answer books.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) All questions are compulsory.
- 3) Figures to the right indicate full marks.

SECTION - I

Q1) Explain in detail with sketches: (Anyone) [15]

- a) Describe with sketches Principles & Strategies to effect natural ventilation.
- b) Calculate Hybrid Ventilation required by Wind Velocity method for a Bakery of size 10m×6m×4.5m height. with
 - i) Three Ventilators of 1.5x0.45m. on North Side.
 - ii) Assume Air change 20-30 as per N.B.C.
 - iii) Air Velocity as 4.5Km/Hour.
 - iv) Find out Fan required & placement of it in Plan & Section

Q2) Write short notes on any FOUR of the following: [20]

- a) Describe with sketches Factors affecting Human Comfort.
- b) Describe with sketches Systems of mechanical ventilation
- c) Describe with sketches Components of mechanical ventilation systems
- d) Describe with sketches Low energy mechanical cooling techniques
- e) Describe with sketches Passive heating and cooling techniques
- f) Describe with sketches how Psychrometric Chart is design tool for air conditioning

P.T.O.

SECTION - II

Q3) Explain in detail with sketches: (any one) **[15]**

- a) Describe in detail with neat sketches, the components of air-conditioning.
- b) What are the different types of Air conditioning system. Describe with sketches.

Q4) Write short note on any **FOUR of the following:** **[20]**

- a) Principles of An Air Conditioning System.
- b) Illustrate the basic refrigeration cycle.
- c) Cooling Load in air-conditioning system.
- d) How Vrv or Vrf units in Air Conditioning Works.
- e) Air handling Unit
- f) Different profiles of A.C.Ducting



Total No. of Questions : 8]

SEAT No. :

PD-5158

[Total No. of Pages : 5

[6407]-1914

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 and L.S.M of Design in R.C.C Problems.
- 5) For Structural Steel Use Steel Fe410 (E250)whose $f_y = 250\text{N/mm}^2$. 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

Q. No. 1 compulsory. Answer any 2 from Q No 2,3 and 4.

Q1) Make the Framing Plan for the Given Ground Floor And First Floor. [15]

Framing Plan to be shown on Ground Floor Plan Only

Show Columns only on Ground Floor, Size could be 230mm × 350mm

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 **150mm**. 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]

- Top width of stem- 250mm Width of base – 3100mm S.B.C of soil – 250 kN/m²
- Bottom width of stem – 520mm thickness of base – 500mm Density of soil – 17 kN/m³
- Height of stem – 5400mm Toe projection – 750mm Coefficient of friction – 0.6
- Density of Concrete – 25 kN/m³ Angle of repose - 28°
- Stabilising or Restoring Moment = 483kNm Total Weight of Wall = 259kN

Calculate Maximum and Minimum Pressure at Base

Q3) a) Distances to be observed for Plate Tearing Failure in a Bolted Connection. [3]

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

- Spacing of Trusses = 4.25m, Span of Truss = 15m and Height of Truss = 2.5m
- Roof Covering = G.I. Sheets
- Spacing of Purlins = 1.35m
- Neglect Wind Load

Angle Section	Ze _{xx} in mm ³	Angle Section	Ze _{xx} in mm ³	Angle Section	Ze _{xx} in mm ³
ISA 75x50x6	6700	ISA 100x65x6	14200	ISA 125x95x6	23100
ISA 75x50x8	8000	ISA 100x65x8	18700	ISA 125x95x8	30600
ISA 75x50x10	10400	ISA 100x65x10	23100	ISA 125x95x10	37800
ISA 75x50x12	12700			ISA 125x95x12	44800
ISA 80x50x6	7500	ISA 100x75x6	14400	ISA 150x75x8	41700
ISA 80x50x8	9000	ISA 100x75x8	19100	ISA 150x75x9	51600
ISA 80x50x10	11700	ISA 100x75x10	23600	ISA 150x75x10	61200
ISA 80x50x12	14400	ISA 100x75x12	27900		
ISA 90x60x6	11500	ISA 125x75x6	22200	ISA 150x115x8	44200
ISA 90x60x8	15100	ISA 125x75x8	29400	ISA 150x115x10	54900
ISA 90x60x10	18600	ISA 125x75x10	36300	ISA 150x115x12	65300
ISA 90x60x12	22000			ISA 150x115x15	80400

Q4) Write Short Notes with relevant sketches on any Two of the Following [10]

- Reinforcement Detailing in a Circular Water Tank with a Rigid Joint at the Base
- Advantages of Welded Connection
- Some parameters that will influence Column Positions. in a R.C.C. Building
- Design the Reinforcement of the Stem in Question No 2

SECTION - II

Q. No. 5 Compulsory. Answer any 2 From Q No 6, 7 and 8

Q5) A Factory Building is to be Built over a Plinth Area of $15.5\text{m} \times 33\text{m}$. [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 single 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 Purlins (You may use Thumb Rules for the same)
- c) Suggest Angle Section 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 Compound Stanchion consisting of 2no ISMC placed front to front with a Battened Lateral system to take a load of 1450kN. Height of the Stanchion is 9.4m, with both ends fixed in both directions. (Hint: Assume Stress = 200N/mm^2). Assume End Battens of Size $200\text{mm} \times 8\text{mm}$ and Intermediate Battens $150\text{mm} \times 8\text{mm}$ 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 on Folded Plates and their Applications

OR

Design a Tension Member to take a Service load of 160kN. It is to be bolted with 20mm Bolts. Design the Bolted Connection. Use $\beta = 1.08$

Q8) Calculate Design equivalent static wind forces on an R.C.C Multistory building having size $11\text{m} \times 22\text{m} \times 31\text{m}$ located in Pune in a flat land Average storey height is 3.1m and frames are spaced at 5.5m c/c in both directions. The building is oriented with smaller dimension facing the wind.

$v_b = 39\text{m/s}$, $k_1 = 1$, $k_3 = 1$, $k_4 = 1$, $k_d = 0.9$, $k_a = 0.9$, $k_c = 0.95$, $\phi_f = 1.35$. k_2 as per following table

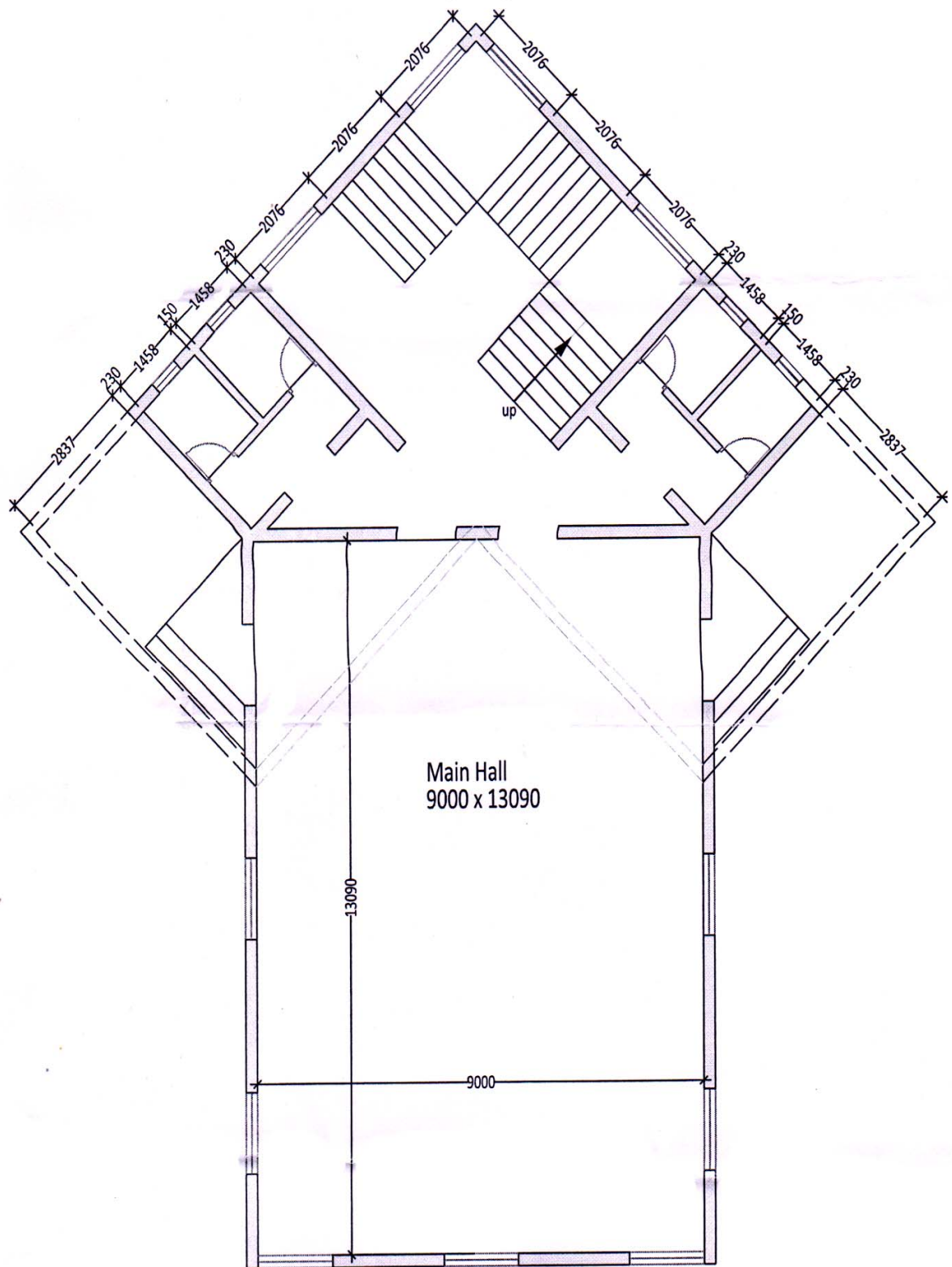
$k_2 = 0.91, 0.97, 1.01, 1.06$ at height of 10m, 15m, 20m, 30m

Calculate the Design Nodal Wind Load on all floors above the fifth floor Explain

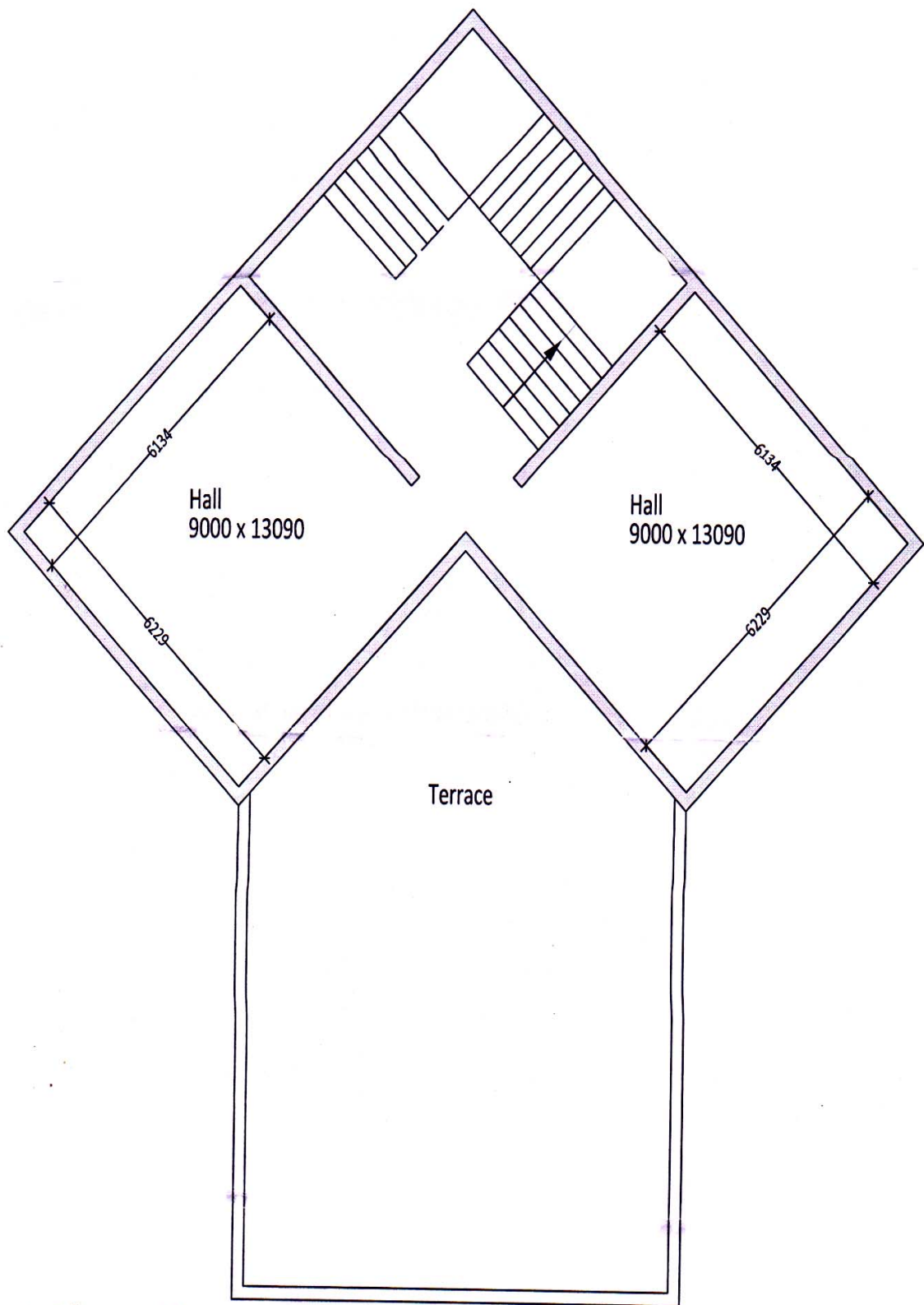
$k_3 =$ Topography Factor

[10]





Ground Floor Plan
Scale 1:100



First Floor Plan

Scale 1:100

Doors & Windows Not Shown on this Plan

Total No. of Questions : 4]

SEAT No. :

PD-5159

[Total No. of Pages : 2

[6407]-1915

T.Y. B.Arch.

BUILDING SERVICES - IV

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

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION - I

Q1) What is fire sprinkler system? Explain with the neat sketches types of Sprinkler system. Also explain static storage tank with neat sketches. **[15]**

OR

Explain classification of fire with neat sketches. Also explain fire triangle.

Q2) Write short notes on any FOUR of the following :

[20]

- a) Dry and wet riser system
- b) Smoke detector
- c) Fire resistance of materials
- d) Types of sprinklers
- e) Refuge area
- f) Fire signage

P.T.O.

SECTION - II

Q3) Explain the properties of sound, any four defects of sound and classification of material according to the use with neat sketches. **[15]**

OR

Explain the principal of auditorium acoustics and reverberation time to achieve good hearing condition with the neat sketches.

Q4) Write short notes on any **FOUR** of the following : **[20]**

- a) Noise control in building
- b) Masking effect of noise
- c) Formation of Echo
- d) Sabine's formula
- e) Sound foci and dead spot
- f) List with sketches 2 different ways to mitigate outdoor noise



PD5160

SEAT No. :

[Total No. of Pages : 3]

[6407]-1916

Third Year B. Arch.

**ARCHITECTURAL DESIGN - V
(2019 Pattern) (Semester - VI) (3201945)**

Time : 12 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) The design will be valued as whole.*
- 2) Line drawings of plan and section at 1: 100 scale must be submitted at the end of the first day. This drawing will not be returned the next day. No major deviation shall be allowed.*
- 3) Draw neat sketches where necessary.*
- 4) Assume and mention suitable data where necessary.*
- 5) All drawings should be clear and self-explanatory.*
- 6) Assume suitable data if necessary.*

Students center in College Campus

A reputed college of city in **hot and humid climate** proposes a recreational center for its students in its campus having multiple usage build spaces. The center would have various indoor as well as some outdoor play areas along with amenities like convenience shops, multipurpose hall, internet café, and Cafétaria. The center will act as a activity center, for the youths for their overall personality development along with Academics.

Sustainable approach towards design proposals will be desirous.

Area requirements -

Administration/Entrance lobby Areas

- | | |
|--|-------------|
| 1) Gymkhana incharges office | 20 sqm |
| 2) Building maintenance office | 40 sqm |
| 3) First Aid Room with attached Toilet | 20sqm |
| 4) Store room for sports equipment | 20 sqm |
| 5) Changing rooms (2 nos) | 20 sqm-each |

P.T.O.

Recreational Areas

- | | |
|--|-------------|
| 1) Table tennis room | 30 sqm |
| 2) Chess and Carom room | 30 sqm |
| 3) Billiards room | 30 sqm |
| 4) Badminton cum Multipurpose hall (2 nos) | 60sqm- each |
| (which could be connected if required) | |
| 5) Backstage rooms with attached toilet (2 nos) | 15 sqm-each |
| 6) TV lounge for 20 seating capacity | 60 sqm |
| 7) Exercise Hall with Weight Training Machines | 120 sqm |
| 8) Yoga/Aerobics/Meditation hall | 120 sqm |
| 9) Adequate Toilets/change rooms for male/female - as required | |

Out Door Sports Areas

- 1) Tennis court (court size 18m × 34m approx, including Margins)
- 2) Swimming Pool (12m × 15m without diving facility)
- 3) Basket ball court (court size 16m × 30m approx., including Margins)

Caffetaria

- | | |
|------------------------------------|----------------------|
| 1) Indoor seating | 80 sqm |
| 2) Out door seating for 50 persons | |
| 3) Kitchen/store/pantry/washing | 60 sqm |
| 4) Staff rm with attached Toilet | 12 sqm |
| 5) Visitors Toilets | Adequate as required |

Parking

For 6 cars and 20 two wheelers.

The Campus has its own central Parking lot for Students within 200 meters.

Site parameters-

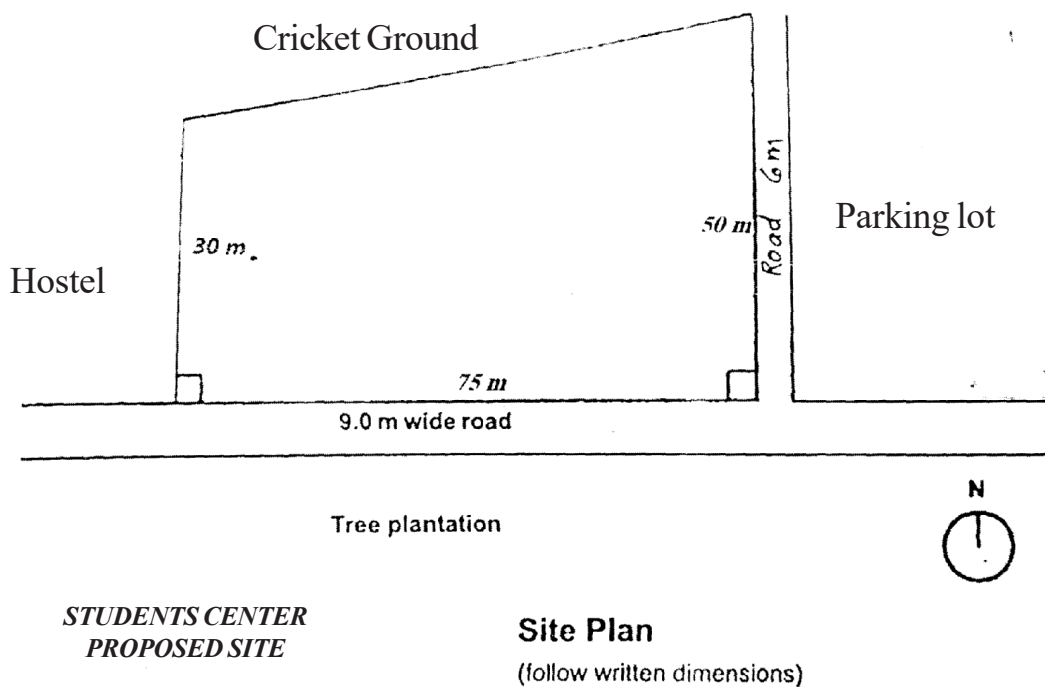
- | | |
|---------------------------|-----------------------------------|
| • Plot Area | 3000 sqm approx |
| • Set back from road | (4.5 m front & 3m from all sides) |
| • Maximum Ground coverage | 50% of plot area |
| • Permissible FSI | 1.0 |

Note-

- 1) Add 30% area for circulation, Toilets and wall areas
- 2) Add appropriate open to sky, semi covered areas & landscape areas as per design requirement
- 3) Maximum height of building is - G+1

Drawing requirements

- 1) Concept drawing/Design approach drawing with appropriate sketches.
- 2) Site plan showing ground floor plan with all furniture and external site development. (1:100)
- 3) All other floor plans with furniture and roof plan (1:100)
- 4) Sectional elevations explaining the design 2 nos. (1:100)
- 5) Road side Elevations-min two (1:100)
- 6) Constructional details significant to building (1:20)
- 7) Perspective view of structure. Appropriate



Total No. of Questions : 9]

SEAT No. :

PD5161

[Total No. of Pages : 4

[6407]-1918

Fourth Year B. Arch.

QUANTITY SURVEYING & SPECIFICATION WRITING - I
(2019 Pattern) (Semester - VII) (4201958)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Solve Section I and Section II in separate answer books.*
- 3) Figures on the right - hand side show maximum marks for the question.*
- 4) Assume suitable data wherever necessary.*
- 5) Draw required formats diagrams wherever necessary.*
- 6) Use of scientific calculators, steel tables is allowed.*

SECTION - I

Q1) Calculate the quantities of the following from the Figure 1 attached :(any two)
[10]

- a) Excavation
- b) PCC below Masonry Wall
- c) Masonry Wall

Q2) Calculate the quantities of the following from the Figure 2 attached : (any two)
[10]

- a) Excavation for footings
- b) RCC Slab
- c) Doors & Windows

Q3) Write short notes on the following : (any two). **[10]**

- a) Explain the purpose of Measurement Sheet along with format of the same.
- b) Schedule of Quantities.
- c) Essential qualities of an estimator.

P.T.O.

Q4) Write the Units of the following Items (any five). **[5]**

- a) RCC Slab
- b) Half Brick Wall
- c) Aluminium Windows
- d) Underground Water Storage Tank
- e) Drainage Chamber
- f) Gully Trap

SECTION - II

Q5) Explain the various types of specifications and their classifications? **[5]**

Q6) Specifications is an integral part of contract document. Explain. **[5]**

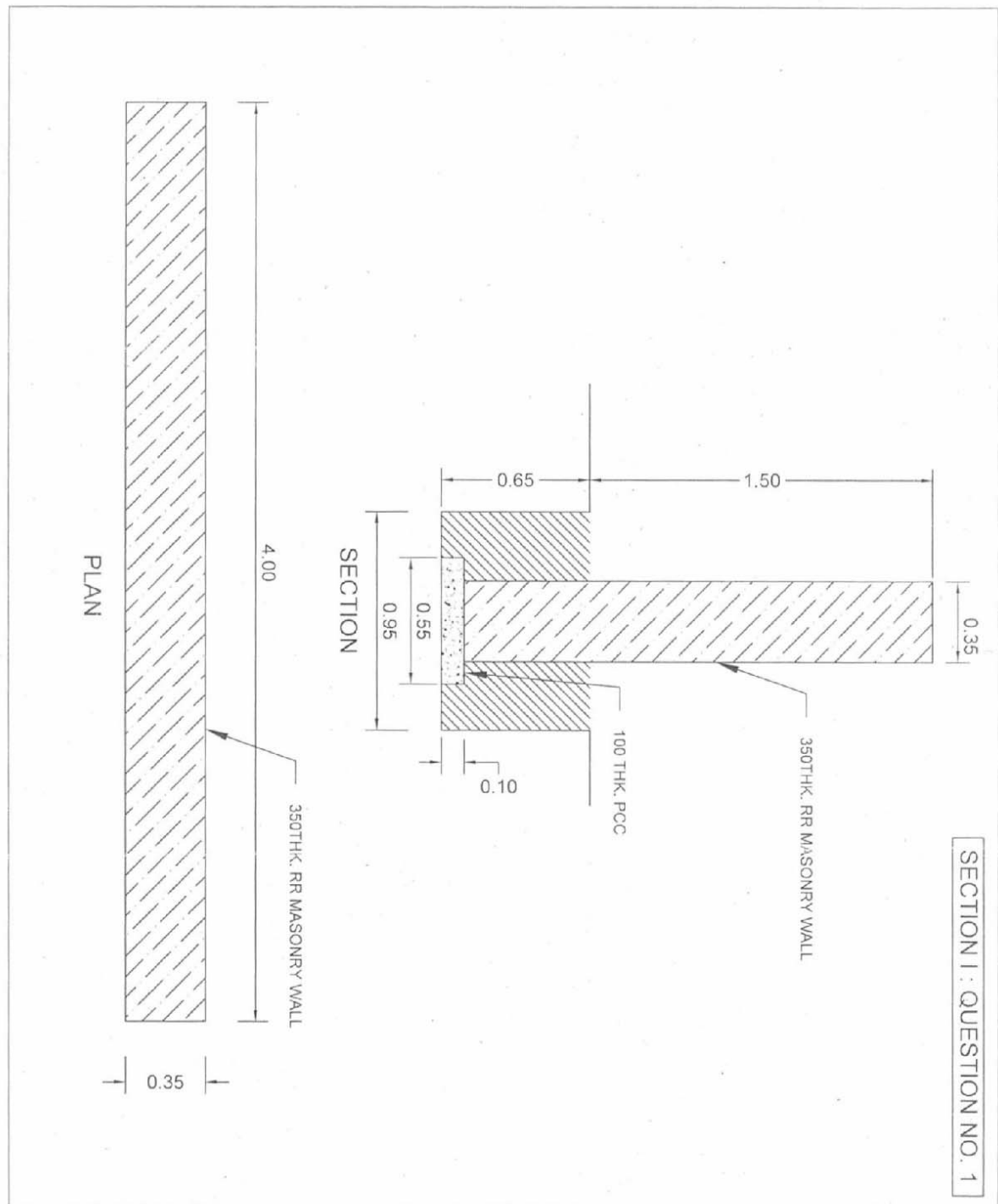
Q7) Write the details specifications for (any three). **[15]**

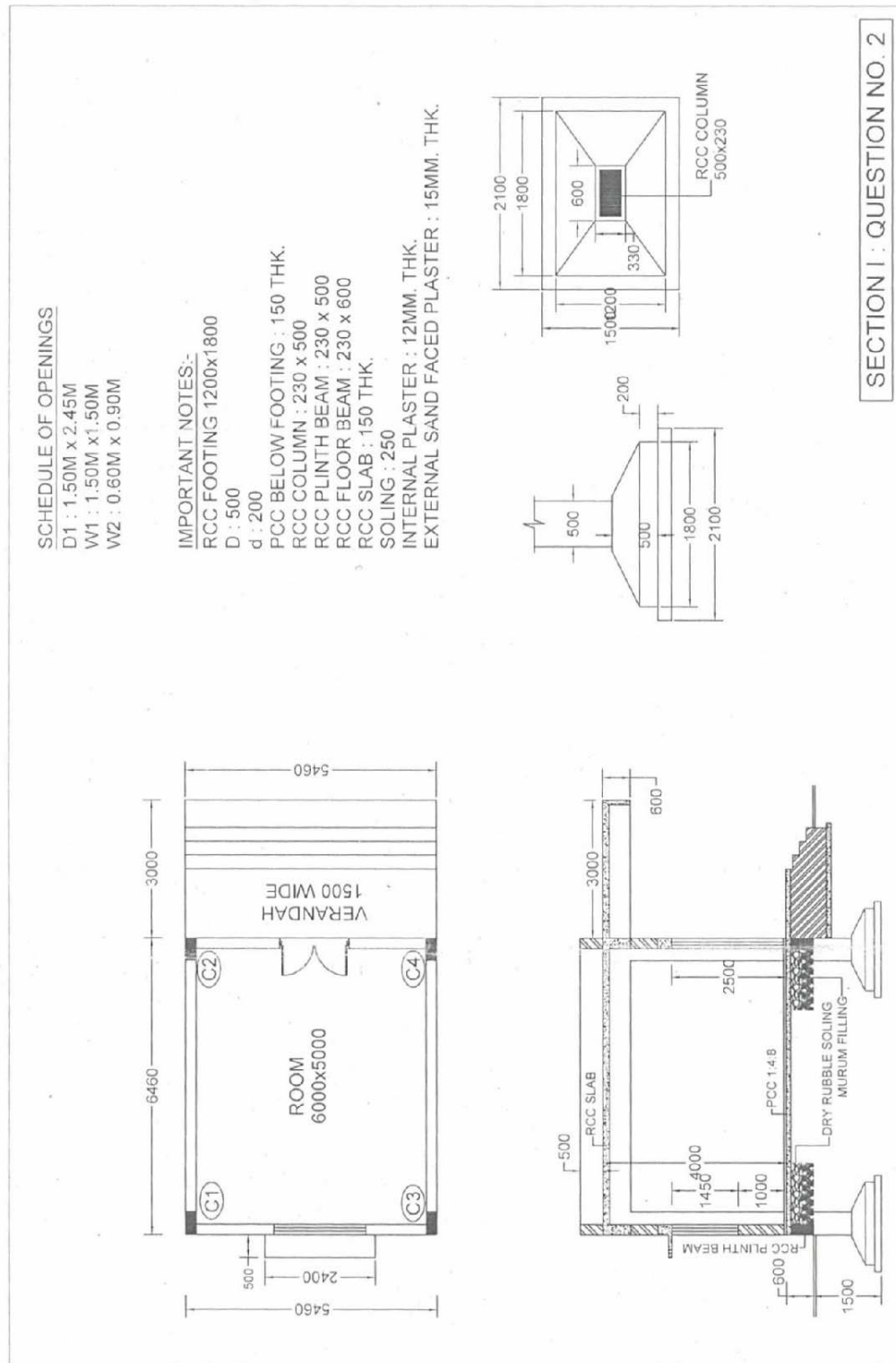
- a) RCC slab
- b) Excavation
- c) Stone masonry
- d) Sand faced plaster

Q8) What is the importance of manufacturers guides and how can they be effectively used for specification writing? **[5]**

Q9) Write the manufacturers for the following. **[5]**

- a) Cement
- b) Reinforcement Steel
- c) Aluminium Sections
- d) Vitrified Tiles
- e) AAC blocks





Total No. of Questions : 8]

SEAT No. :

PD-5162

[Total No. of Pages : 2

[6407]-1919

Fourth Year B.Arch.

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 Question nos 2,3 and 4 in Section I and any Two Questions out of Question nos 6, 7 and 8 in Section II.
- 4) Figures to the right indicate full marks.

SECTION - I

Q1) a) What are the conditions and factors that would make an Architect responsible and liable for an accident on the construction site? List the professional Duties and Liabilities of an architect with reference to the Architects (Professional Conduct) Regulations, 1989. **[11]**

Q2) Write Short Notes on Any Three of the following : **[12]**

- a) Professional adviser in Architectural Competitions.
- b) Reasons for disqualification from an Architectural Competition.
- c) Open, Limited and Special Competitions.
- d) Guidelines for the Board of Assessors in Architectural Competition.

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

- a) Explain the Role of an Architect as a coordinator in a building project.
- b) Explain in brief the allied fields in which architects can offer services.
- c) Explain advantages and disadvantages of architecture practice as sole proprietor.
- d) Explain the basic differences between a Business and Profession.

P.T.O.

Q4) Explain with reference to an Architectural firm : [12]

- a) What are the salient features of an Architect's Office?
- b) Specimen sketch layout plan of an Architect's office for medium size practice.
- c) Explain the Client's role and responsibilities in a construction project.

SECTION - II

Q5) Describe in detail the stagewise activities of an Architect in a building project, from his appointment by the client to the final completion and occupation by the Client. [11]

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

- a) Differences between a Savings Account and Current Account.
- b) Income tax - Slabs, Deductions and Exemptions.
- c) Importance and benefits of having an Insurance cover.
- d) Tax deducted at source (T.D.S) and Income Tax Refunds.

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

- a) Define Arbitration, What is the role of an Architect as an Arbitrator?
- b) List a few factors that affect the valuation of Land and Buildings.
- c) When is an Umpire required in the process of Arbitration?
- d) Distinguish between Market Value, Sentimental Value and Distress Value.

Q8) Explain ANY THREE of the following : [12]

- a) Why is it necessary for Architects to be sensitive and aware of Civic and Social issues?
- b) What are the activities of the Indian Institute of Architects?
- c) List the professional Associations/ Organisations that an Architect can actively join.
- d) Give examples of a few controversial Social and Civic development issues in your City.



Total No. of Questions : 6]

SEAT No. :

PD-5163

[Total No. of Pages : 3

[6407]-1920

Fourth Year B.Arch.

QUANTITY SURVEY & SPECIFICATION WRITING - II
(2019 Pattern) (Semester - VIII) (4201965)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) All Questions are Compulsory.
- 2) Solve Section I and II in separate Answer Books.
- 3) Figure on Right Hand Side Shows the Maximum Marks for the Questions.
- 4) Assume Suitable Data where ever necessary.
- 5) Draw the required formats, Diagrams in the Answer sheet wherever necessary.
- 6) Use of Logarithmic Table, Electronic Scientific Calculators, Steel table is allowed.

SECTION - I

Q1) Answer of the Following : (Any one) :

[1 × 10 = 10]

- a) Explain Rate Analysis and Essential of Rate Analysis?
- b) Explain the Factors Affecting Rate Analysis of an Item?

Q2) A) Prepare Rate Analysis for: (Any Two).

[2 × 5 = 10]

- a) Vitrified tiles for Toilet wall (Dado) with 15mm thick backing mortar in C.M. 1:2
- b) Internal Neeru Finish plaster 12-15mm thick for wall in C.M. 1:4 in River Sand
- c) Stone Masonry in Plinth in C.M. 1:6
- d) Reinforced Cement Concrete (RCC) for Columns in 1:1.5:3 design mix concrete.

Material Rates :

- | | |
|------------------------|-----------------------|
| i) Vitrified tiles | - Rs. 750/- per Sqmt. |
| ii) River Sand | - Rs. 3175/- per Cum. |
| iii) Stone for Masonry | - Rs. 650/- per Cum. |
| iv) Crush Sand | - Rs. 1150/- per Cum. |
| v) Stone Metal | - Rs. 1050/- per Cum. |
| vi) Cement | - Rs. 320/- per Bag. |
| vii) Sanla (Neeru) | - Rs. 80/- per Bag. |

P.T.O.

Labour Rates :

- i) Vitrified Tiles for Dado - Rs. 900/- per Sqm.
- ii) Internal Neeru Finish wall Plaster - Rs. 330/- per Sqm.
- iii) Stone Masonry in Plinth - Rs. 900/- per Cum.
- iv) Reinforced Cement Concrete for Columns - Rs. 2250/- per Cum

B) Prepare Indent of Materials for: (Any One) [1 × 5 = 5]

- a) 230mm thick Brick Masonry in C.M. 1:6 – 110 Cum.
- b) Sand Faced Plaster 15-18 mm thick for Wall in C.M. 1:4 – 175 Sqm.

Q3) Answer the following (Any Two) : [2 × 5 = 10]

- a) Components of Fire Fighting.
- b) Explain Skilled and Unskilled Labour.
- c) Explain Mason as a Trade.
- d) Explain the importance of Checklist in Construction Work.

SECTION - II

Q4) Work out Quantity for the Following items (Refer Fig-1) (Any Three) [3 × 5 = 15]

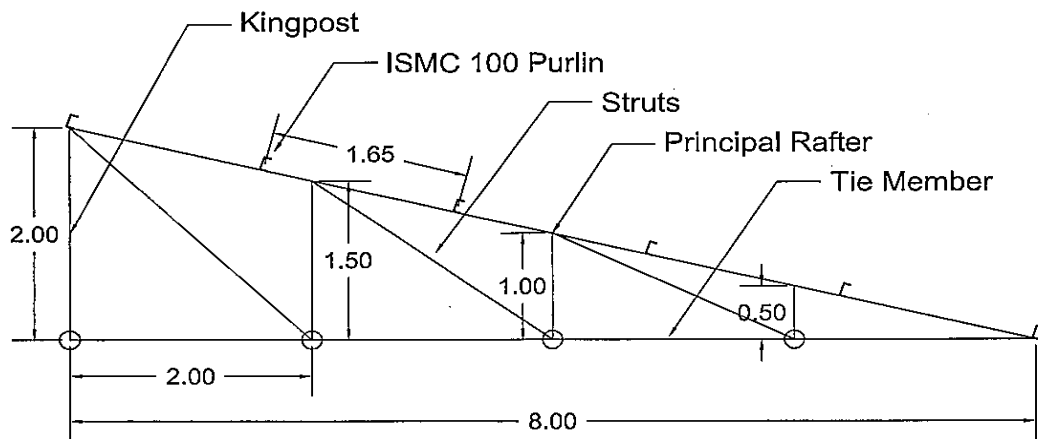
- a) Tie member with Kingpost for all Trusses.
- b) Principal Rafter for all Trusses.
- c) All Struts (Vertical and Slat members) except Kingpost for single Truss.
- d) Purlins for Full Shed.
- e) Roof Sheeting for Entire Shed.

Q5) Answer the Following: (Any Two) [2 × 5 = 10]

- a) Write Specification for Escalators for Passengers.
- b) Explain components of HVAC System.
- c) Write Specification for Water Supply to a Bungalow.
- d) Name any five type of Acoustical Materials.

Q6) Name Manufacturers for the Following Equipment's: (All Ten)[10 × 1 = 10]

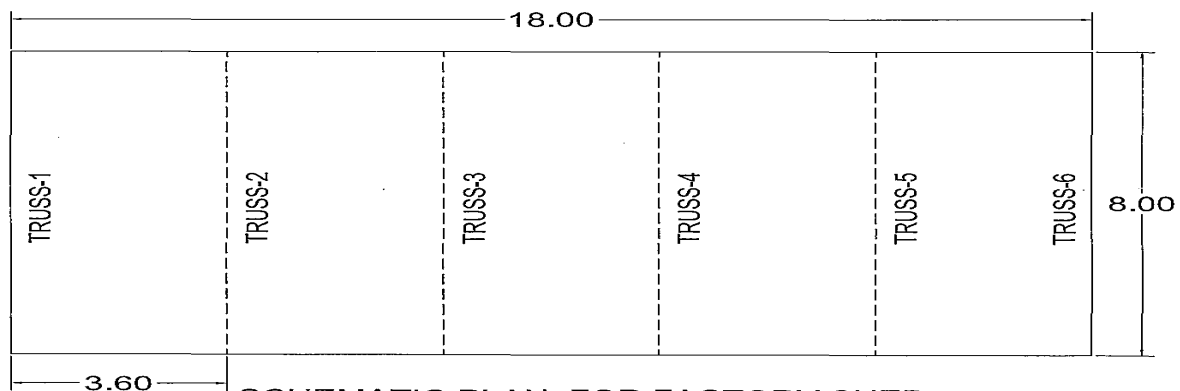
- Plumbing Fixtures.
- Elevators.
- Escalators.
- Sanitary wares.
- Air Conditioners.
- Electric Switches.
- Electrical Cables.
- Fire Extinguishers.
- Plumbing Pipes.
- Light Fixtures.



SCHEMATIC ELEVATION OF TRUSS

WEIGHT PER RMT FOR STEEL MEMBERS:

- Tie member - 2 NO'S Angles -75×75×6 (6.80 Kg/M)
- Rafter Member & king post - 2 NO'S Angles -75×75×6 (6.80 Kg/M)
- All verticles Except king Post -65×65×6 (5.93 Kg/M)
- All struts (Slant) Angle -65×65×6 (5.93 Kg/M)
- Purlins ISMC 100 (8.90 Kg/M)



**SCHEMATIC PLAN FOR FACTORY SHED
(FIG-1)**



Total No. of Questions : 8]

SEAT No. :

PD-5164

[Total No. of Pages : 2

[6407]-1921
F.Y.B.Arch
PROJECT MANAGEMENT
(2019 Pattern) (Semester - VIII) (4201966)

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 of Question no 2,3 and 4 in Section I and any Two Questions of Question no 6,7 and 8 in Section II.*
- 4) Figures to the right indicate full marks.*

Section - I

Q1) List and explain the characteristics features of a 'Project' **[11]**

Q2) Write Short Notes on 3 **[12]**

- a) Explain the benefits of traditional Project management.
- b) Importance of Project Manager.
- c) Explain with example what you understand by Program.
- d) Explain role of architect in Manpower management.
- e) Importance of collaborative project management.

Q3) Answer any 2 questions (6 marks each): **[12]**

- a) Explain the statement 'PM supervises the CM'
- b) Explain how is feasibility study conducted? Give example.
- c) Processes in Construction Project Execution Phase.
- d) Explain S.M.A.R.T Goals

P.T.O.

Q4) Answer any 2 questions:

[12]

- a) Explain the importance of Project Cost Management.
- b) Explain the concept of integrated management in construction management.
- c) What are different types of costs in project cost management?

Section - II

Q5) Explain B1, B2 and C type tender system with respect to the following points.[11]

- a) Method
- b) Where used?
- c) How the contract does Quotes?
- d) Advantage over other types.
- e) Disadvantages over other types

Q6) Write Short Notes on any 3

[12]

- a) Security deposit amount
- b) Write a short note on demolition tender?
- c) Defects Liability Period
- d) Explain Interim or R.A. bill.
- e) Explain Liquidated damages

Q7) Answer any 3

[12]

- a) Explain the key concepts for Project Communication management.
- b) Explain validity of an Architects verbal instructions on site.
- c) Explain the procedures to be followed for site meetings.
- d) List various Risk factors in a project.

Q8) Explain any 3 the following

[12]

- a) Explain the role of Safety manager.
- b) Identify the hazards on construction site.
- c) Function of Financial management.
- d) What are the skill sets a Facility manager should possess?

