

Total No. of Questions—4]

[Total No. of Printed Pages—2

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**[5564]-101**

**F.Y. B. Arch. (First Sem.) EXAMINATION, 2019  
BUILDING TECHNOLOGY AND MATERIALS-I  
(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**N.B. :—** (i) All questions are compulsory.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Assume suitable data if necessary.

(v) Answer all questions from Section I on Drawing Sheets,  
and from Section II in answer-book only.

**SECTION I**

1. Draw any *one* of the following : [20]

Draw cross-section from foundation to coping through a 1½ (one and half) brick thick compound wall of height 1500. Assume rubble masonry foundation of depth 1200 mm. scale 1 : 10.

*Or*

Draw L-junction for 1½ bk. thick wall in English bond (scale 1 : 10) :

(i) Plan of alternate courses

(ii) Elevation of six courses

(iii) Isometric view.

2. Draw neat sketches : [15]

Internal one brick thick load bearing wall :

(i) Foundation

(ii) Plinth with DPC.

P.T.O.

Or

Draw neat sketches :

- (i) Semicircular arch with all terminology.
- (ii) Lintel in stone and timber, for an opening of 750 mm with bearing in the wall.

## SECTION II

3. Attempt any *two* : [20]
- (i) Explain load transfer system in load bearing structure.
  - (ii) Explain different types of soils and bearing capacity of soil.
  - (iii) Which are qualities of good building stone ? Write min. 10 qualities.
  - (iv) What is Mortar ? Explain its uses in building construction.
4. Attempt any *three* : [15]
- (i) Enumerate and write in brief about structural and non-structural elements in a building.
  - (ii) Explain advantages of solid concrete blocks over conventional masonry units.
  - (iii) Explain the following with their uses quick setting cement, rapid hardening cement and white cement.
  - (iv) Which are the various methods of improving the bearing capacity of soil ?
  - (v) What do you mean by earthquake ? Explain the following term with sketch focus, epicenter and focal depth.

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[5564]-102

F.Y. B.Arch. (First Semester) EXAMINATION, 2019

THEORY OF STRUCTURES-I

(2015 PATTERN)

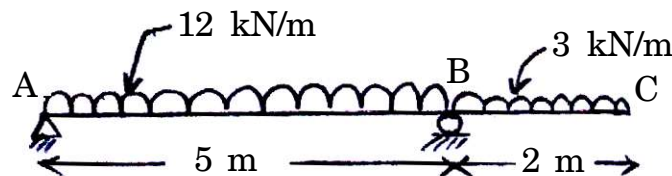
Time : Three Hours

Maximum Marks : 70

- N.B. :-** (i) Q. No. 1 in section I and Q. No. 5 in section II are compulsory questions.
- (ii) Answer any *two* Questions out of remaining Three in each section.
- (iii) Use of Scientific Calculator is allowed.
- (iv) Marks to the right indicate Full Marks.

SECTION I

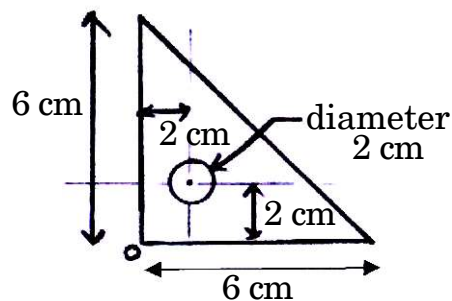
1. Draw shear force and bending moment diagram for the given beam figure.



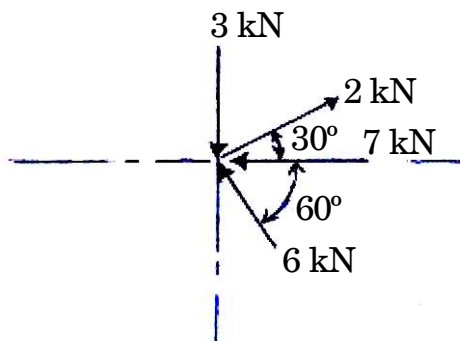
- Finding reactions [4]
- Shear force diagram with point of contra-shear if any [5]
- Bending moment diagram [4]
- Maximum bending moment [1]
- Point of contraflexure if any [1]

P.T.O.

2. (A) Explain following terms with neat diagrams :
- (1) Continuous beam
  - (2) Cantilever beam. [4]
- (B) Draw shear force and bending moment diagram for a simply supported beam having length  $L$  with central point load  $P$ . Indicate maximum values of shear force and bending moment. [4]
- (C) State and explain Varignon's theorem. [2]
3. (A) Find centroidal co-ordinates of lamina given in figure with respect to point O. [7]



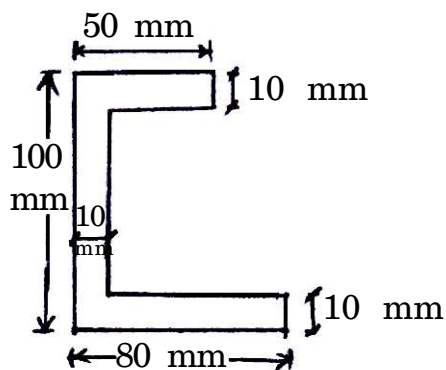
- (B) What is equilibrium ? State and explain conditions of equilibrium for coplanar nonconcurrent force system. [3]
4. (A) Find resultant of given force system given in figure. [8]



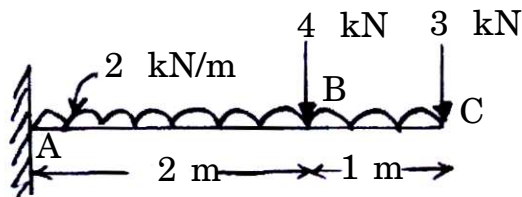
- (B) Explain the terms : Force polygon, collinear forces. [2]

## SECTION II

5. (A) Find centroidal X and Y co-ordinates with respect to point A. [6]
- (B) Also find moment of inertia about centroidal XX and YY axis for the lamina shown in figure. [9]



6. (A) Find support reactions for the simply supported RCC beam of 230 mm × 500 mm, carrying load of brick wall of 230 mm thickness and 2.5 m height above it. Length of beam is 4 m. [7]
- (B) Write formulae for Moment of Inertia of circular section of diameter  $d$  with respect to its centroidal XX, YY and ZZ axis. [3]
7. (A) Find support reactions for the beam shown in figure. [6]



- (B) State and explain Lami's theorem. [4]

8. (A) Explain parallel axis theorem. [4]
- (B) Explain the following : [6]
- (i) Radius of gyration
  - (ii) Resultant of force system
  - (iii) Centre of gravity.

Total No. of Questions—4]

[Total No. of Printed Pages—3

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**[5564]-201**

**F.Y. B. Arch. (Second Semester) EXAMINATION, 2019**

**BUILDING TECHNOLOGY AND MATERIALS—II**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**N.B. :—** (i) *All* questions are compulsory.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to right indicate full marks.

(iv) Assume suitable data if necessary.

(v) Answer all questions from Section-I on Drawing Sheets, and from Section-II in Answer Book only.

**Section I**

**1.** Draw any *one* of the following : [20]

A store room of 3000 × 5000 mm in size has an opening of 900 × 2100, with wall thickness of 230 mm provide single leaf paneled door.

Draw well labelled :

(i) Plan, Elevation and Section of a paneled Door at 1 : 10 Scale.

(ii) Draw isometric of any *one* joinery detail used in this door construction.

P.T.O.

*Or*

A timber straight flight stair of 900 mm clear width is to be provided to access a Mezzanine Floor of a shop measuring 4000 × 6000 mm. The mezzanine floor height is 2100 mm and the shop height is 4200 mm.

Draw well labelled :

- (i) Key plan showing position of staircase in the shop (1 : 100)
- (ii) Plan of the Staircase at 1 : 10 Scale
- (iii) Longitudinal Section of the stair at 1 : 10 Scale
- (iv) Draw details of tread, riser and nosing.

2. Write short notes with sketch any *three* out of five of the following : [15]

- (i) Sketch any *two* types of wooden joints in floor board, with dimensions, sizes.
- (ii) Explain any *two* types of clay roofing tiles with sketches and dimensions.
- (iii) Draw a well labelled section through a collar roof.
- (iv) Explain with sketch joint between floor joist and wall plate.
- (v) Sketch and explain any *five* carpentry tools.

### **Section-II**

3. Explain with sketch any *two* out of four of the following : [20]

- (i) Explain with a neat labelled sketch with sizes, a King Post Truss.



- (ii) Explain with sketches different types of reinforcements used in 350 mm thick brick masonry wall.
  - (iii) Explain with sketches a Single timber Floor.
  - (iv) Fixing details of ridge and eaves of a Mangalore Tile Roofing.
4. Explain any *three* out of five of the following : [15]
- (i) Sketch a typical elevation of a Timber Window and label its parts.
  - (ii) Advantages and disadvantages of Plywood.
  - (iii) Explain Brick Vaults and domes with sketch and short note.
  - (iv) What is Seasoning of Timber ? Mention various methods.
  - (v) Different types of Hardware fittings used in Timber doors (Draw sketches).

Total No. of Questions—8]

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[5564]-202

F.Y. B. Arch. (Second Semester) EXAMINATION, 2019

THEORY OF STRUCTURES—II

(2015 PATTERN)

Time : Three Hours

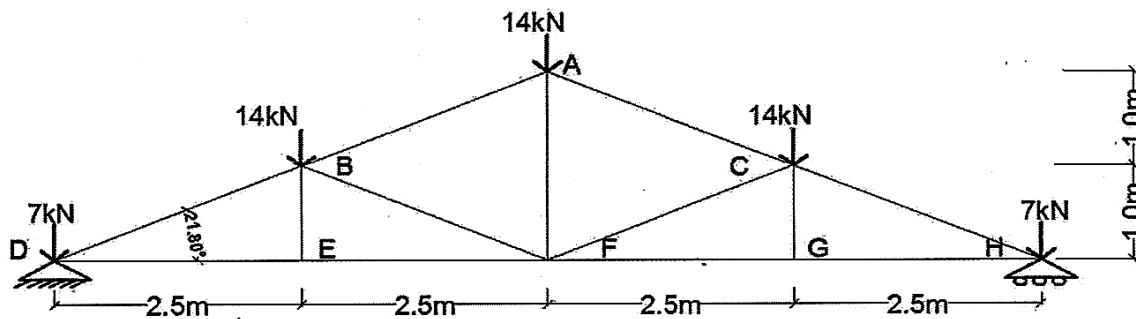
Maximum Marks : 70

Instructions to candidates

- 1 Q No 1 and Q No 5 are compulsory , Answer any 2 of the 3 remaining in each section
- 2 Figures to the right indicate full marks
- 3 Assume suitable data where necessary only
- 4 Use of non-programmable Calculators Allowed.

Section I (Q No 1 is Compulsory, Solve any two from Q2, Q3, Q4)

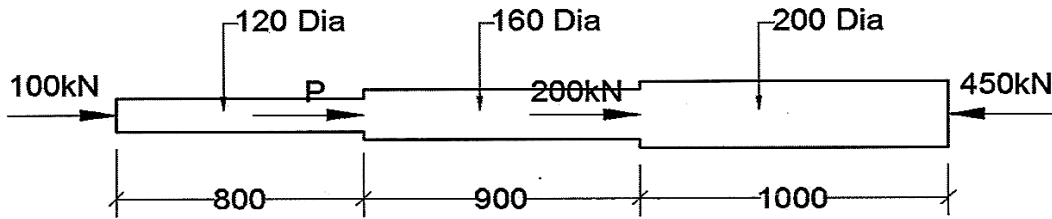
Q1 a Calculate the Forces in magnitude and type in each member. Present your Answers in the form of a Table 12



Q1 b Prove that the above Frame is a Perfect One. Give one example of a building where Trusses are used. 3

P.T.O.

**Q2** Find P for equilibrium. Calculate stresses in each part of the rod. Also calculate total Change in length. Lengths Shown below are in mm 10



**Q3 a** A Steel section of 100mm dia is used as a cantilever over a span of 2.5m. What udl can it carry so that the maximum compressive or tensile stress should not exceed  $150\text{N/mm}^2$ . Draw the Bending Stress Diagram across the section 7

**Q3 b** Write down the Flexural formula and explain each term. 3

**Q4 a** Define and State Units 4

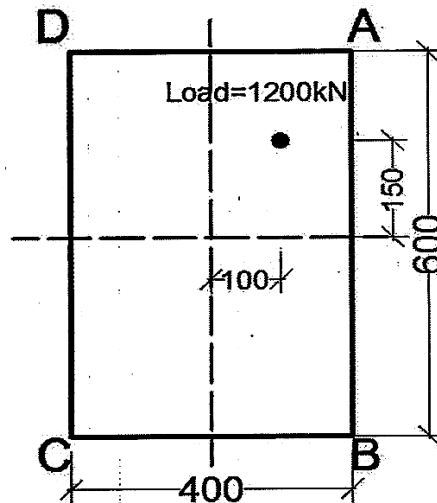
- 1 Linear Stress
- 2 Linear Strain
- 3 Hooke's Law
- 4 Young's Modulus

**Q4 b** Explain the Following 6

- 1 Neutral Axis
- 2 Moment of Resistance
- 3 Section Modulus

**Section II (Q No 5 is Compulsory, Solve any two from Q6, Q7, Q8)**

**Q5 a** Find the stresses at all the four corners of the column shown below subjected to an eccentric load of 1200kN placed as shown. Draw the stress diagram. Dimensions shown are in mm 12

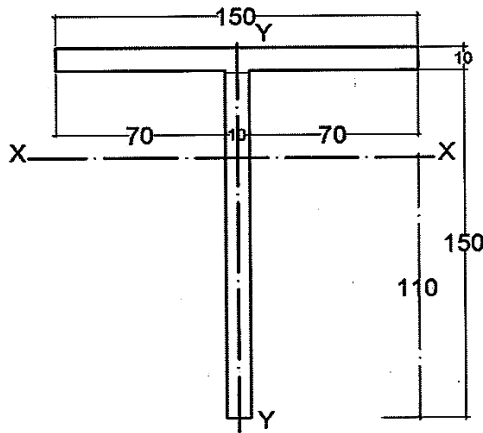


**Q5 b** Explain the Core or Kernel of a Column 3

**Q6 a** A simply supported beam of span 6.23m and section 300mm x 600mm is subjected to an u.d.l of 35kN/m over the entire span and a central point load of 12kN . Calculate Maximum Deflection.  $E = 0.15 \times 10^5 \text{ N/mm}^2$  **7**

**Q6 b** Write down the formula for maximum slope and deflection in a cantilever beam of span l and subjected to a u.d.l of w over entire span **3**

**Q7** A Beam is of T Shaped section as shown below and spanned across a simple supported span of 4m and carries a udl of 32kN/m over entire span. Draw Shear Stress Diagram across the section showing all important values. Given C.G along Y axis from bottom is 110mm as shown .  $I_{xx} = 650 \times 10^4 \text{ mm}^4$  **10**



**Q8 a** Draw the Shear Stress Diagram across a T, Rectangular Section, I Section showing maximum and minimum value positions **6**

**Q8 b** Draw a Cantilever Beam and a Simple Supported Beam. Show their Deflection curves. Show points of maximum and minimum deflections. Also show maximum and minimum slopes **4**

Total No. of Questions—4]

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**[5564]-301**

**S.Y. B.Arch. (III Sem.) EXAMINATION, 2019**  
**BUILDING TECHNOLOGY AND MATERIALS-III**  
**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**N.B. :—** (i) *All questions are compulsory.*

(ii) *Answers to Section I to be drawn on drawing sheet only.*

(iii) *Answers to Section II to be written on answer sheet only.*

(iv) *Draw neat sketches wherever necessary.*

(v) *Assume suitable data wherever necessary.*

(vi) *Figures to the right indicate full marks.*

**SECTION I**

1. A glazed and panelled TW sliding folding door is to be provided between living room and sit out of a residence. The opening size being 2.4 mts × 2.1 mts. Draw the following to the scale of 1 : 10 showing all the required detail.

(a) Draw plan, elevation and section through the glazed panel, showing all the necessary fittings and hardware used. [15]

(b) Draw fixing detail of the hardware used for sliding and folding. [5]

P.T.O.

*Or*

A store room outdoors of size 2.4 mts × 3.0 mts needs to be constructed in RCC frame structure. Plinth level of the room is 450 mm from ground level. Draw the following details to the scale of 1 : 10.

- (a) Draw sectional elevation and sectional plan showing all necessary RCC elements. [10]
  - (b) Draw detailed section through plinth showing RCC footing and plinth beam. [10]
- 2.** Draw labelled sketches and explain the following (any *three*) : [15]
- (a) Cross link details of collapsible door.
  - (b) Barbed wire fencing detail to the end angle post of compound wall.
  - (c) Section of RCC column and beam junction
  - (d) Detail section showing waterproofing done for a terrace at the rain water outlet.
  - (e) Gutter fixing detail for G.I. sheet roofing.
  - (f) Tools used for slump test of concrete.

## **SECTION II**

- 3.** Answer any *two* with the help of sketches : [20]
- (a) Explain the traditional waterproofing method for underground water tank.

- (b) Explain combined footing.
- (c) The operation and working of M.S. rolling shutter.
- (d) What is the procedure for under rimmed cast in situ piles ?

4. Write short notes on any *three* of the following : [15]

- (a) Cube test for testing of concrete.
- (b) What is raft foundation ? Explain the conditions when raft foundation is used.
- (c) Methods of damp proofing. Explain any *two* methods.
- (d) Lap length, development length and splicing of steel bars
- (e) Roof covering materials based on climate condition.

Total No. of Questions—8]

[Total No. of Printed Pages—4

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**[5564]-302**

**S.Y. B.Arch. (Third Semester) EXAMINATION, 2019**  
**THEORY OF STRUCTURES—III**  
**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

- N.B. :—** (i) Q. Nos. 1 and 5 are compulsory.  
(ii) Solve any *two* questions from Q. Nos. 2, 3 and 4 and any *two* questions from Q. Nos. 6, 7 and 8.  
(iii) Assume steel of grade Fe-410/E-250. Yield stress = 250 N/mm<sup>2</sup>.  
(iv) Use of Non-programmable scientific calculator and steel tables is allowed.

*Take the following values :*

Permissible Bending Stress in steel in Compression and Tension = 165 N/mm<sup>2</sup>.  
Permissible Shear Stress = 100 N/mm<sup>2</sup>.  
Allowable Deflection for a simple Supported Beam = Span/300.  
Allowable Deflection for a Cantilever Beam = Span/150.  
Permissible Weld Stress = 108 N/mm<sup>2</sup>  
Permissible Bearing Stress for Bolt = 300 N/mm<sup>2</sup>  
Permissible Shear Stress for Bolt = 100 N/mm<sup>2</sup>.

**SECTION I**

1. As per the sketch below with RCC slabs, S1, S2, S3 and S4-130 mm thk., Floor finish load = 1.25 kN/m<sup>2</sup>, Live Load = 3 kN/m<sup>2</sup> :

(a) Calculate load on girder B3

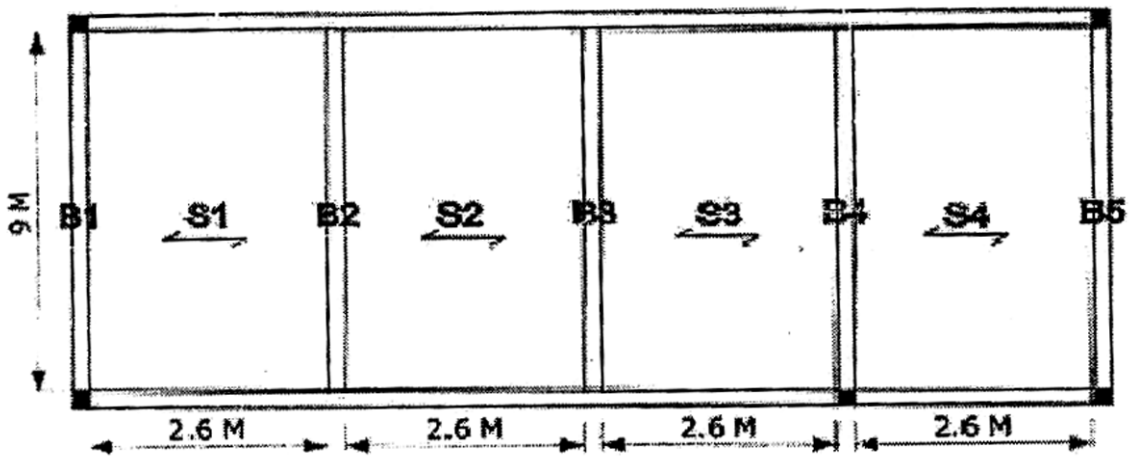
[5]

P.T.O.



(b) Design girder B3

[10]



2. (a) What is the slenderness ratio and relationship to buckling ? [3]

(b) Design a stanchion for an effective length 4 m to take load of 750 kN. [7]

3. Write short notes on any *three* of the following : [10]

(a) Dead load

(b) Live load

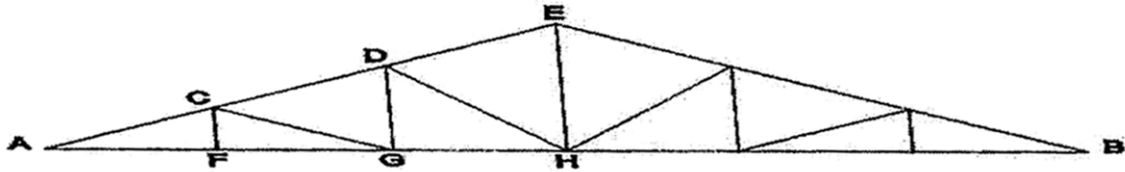
(c) Load transfer across arches

(d) Three hinged and two hinged arch.

4. A fixed beam of span 7 m carries an udl of 10 kN/m & point load of 30 kN at a distance of 2 m from left hand support. Draw SFD and BMD for fixed beam [10]

## SECTION II

5. Design the member AF for a tensile force of 130 kN. Design the bolted connection also : [15]



6. (a) An ISA  $80 \times 80 \times 8$  is used as compression strut 2.6 m long to carry a load of 100 kN. It is welded to a gusset plate design welded connection. [5]
- (b) Explain any *two* : [5]
- (1) Advantages bolted connection
  - (2) Disadvantages of rivetted connection
  - (3) Advantages of welded connection
7. Write short notes on any *three* : [10]
- (1) Continuous beams and their advantages
  - (2) Advantages of steel structures
  - (3) Disadvantages of steel structures
  - (4) Write a short note on working stress method. Define permissible stress

8. (a) A Hollow steel column with outer diameter 200 mm and thickness 10 mm is 4 m high. If it is fixed at one end and hinged at the other, determine the crippling load, it can take.  
Given,  $E = 2 \times 10^5 \text{ N/mm}^2$ . [6]
- (b) Write formula for Rankine's theory and explain how it took care of the limitations of Euler's theory. [4]

Total No. of Questions—4]

[Total No. of Printed Pages—2

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**[5564]-303**

**S.Y. B.ARCH. (III Semester) EXAMINATION, 2019**

**BUILDING SERVICES-I**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

- N.B. :—** (i) Answer to the two Sections should be written in separate books.
- (ii) All questions are compulsory.
- (iii) Draw neat diagrams wherever necessary.
- (iv) Assume suitable data.
- (v) Figures to the right indicate full marks.

**Section-I**

1. Explain bottle trap, floor trap and gully trap with labelled sketch.[15]

*Or*

Explain safety devices in hot water supply and, solar hot water system for a house.

2. Write short notes on any *four* : [20]
- (1) Ferrule connection
  - (2) Section of Overhead tank
  - (3) Cement pipes—advantages and disadvantages.
  - (4) Non-return valve
  - (5) Pillar taps
  - (6) Radial system.

P.T.O.

## Section II

3. Explain working of septic tank with plan and section. [15]

*Or*

Explain principles of laying underground drainage system.

4. Write short notes on any *four* : [20]

- (1) Inspection chamber
- (2) Double stack system
- (3) Testing of building drains
- (4) Jointing of cement pipes
- (5) Combined storm water drainage
- (6) Bio-gas plant.

Total No. of Questions—5]

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**[5564]-401**

**S.Y. B. Arch. (Fourth Semester) EXAMINATION, 2019**

**BUILDING TECHNOLOGY AND MATERIALS—IV**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

*INSTRUCTIONS TO THE CANDIDATES:*

1. *ALL QUESTIONS ARE COMPULSORY.*
2. *ANSWERS TO SECTION I MUST BE ON THE DRAWING SHEETS ONLY.*
3. *ANSWERS TO SECTION II MUST BE WRITTEN IN THE ANSWER SHEET BOOKLET 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 1**

**Q 1.** A RCC dog legged staircase is to be built for a bungalow having 3000 mm height .The mid landing slab is at height is 1500 mm with suitable landing space. Analyse the structure as follows :

- a. Draw Plan of dog legged staircase showing necessary framing & reinforcement to 1:10 scale.
- b. Draw Section through dog legged at mid landing showing necessary reinforcement details to scale 1: 10 (20 marks)

**OR**

**Q 2.** RCC slab for clear span of 4500mm X 3500mm supported on RCC beams of size 230 X 450 on all four sides. Draw details at 1:20 of

- c. Sectional elevation and sectional plan showing all necessary RCC structural elements.
- d. Show details of reinforcement. (20 marks)

P.T.O.

**Q3. Answer with neat labeled sketches on sheet any Three**

1. Cantilevered staircase.
2. Draw a typical elevator shaft with machine room & label important parts of it.
3. What is tanking to basement. Discuss with sketch.
4. Precast staircase.

(15 marks)

## **SECTION 2**

**Q 4. Answer any Two with neat sketches**

- a. Steel framed window using a Z section & a box section.
- b. Longitudinal section of a typical simply supported beam showing reinforcement details.
- c. RCC column & beam junction.
- d. What are escalators ? Discuss its applications.

( 20 marks )

**Q 5. Write short notes on any Three of the following:**

- a. What is LWC and discuss its applications.
- b. Advantages & disadvantages of RMC.
- c. Ferrocement and its application in the building Industry.
- d. Lapping of steel bars in RCC columns.
- e. Role of reinforcement in concrete.

(15 marks)

Total No. of Questions—8]

[Total No. of Printed Pages—3

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**[5564]-402**

**S.Y. B. Arch. (Fourth Semester) EXAMINATION, 2019**

**THEORY OF STRUCTURES—IV**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**Instructions to candidates**

- 1 Question No 1 and 5 are compulsory
- 2 Answer any two of the remaining three in each section
- 3 Figures to the right indicate full marks
- 4 Assume suitable data where necessary
- 5 Use M 20 Grade concrete and Fe 500 steel
- 6 Refer to the Plan Attached to the paper
- 7 Every R.C.C Design should be accompanied by relevant Schedule and Reinforcement Sketch

**Section I**

- 1.a Design Slab S1 of clear room size 6400 x 3100 Considering Floor Finish of 2kN/m<sup>2</sup>. Take Live Load 4kN/m<sup>2</sup> (Refer plan attached) 12
- 1.b Explain three reasons why Steel as the material used for Reinforcing Concrete. 3
- 2.a Design a 250mm wide R.C.C Short Column to take a load of 1325kN . Use 1.5% Steel 8
- 2.b Explain the functions of transverse reinforcement or lateral ties in a column 2
- 3 Write Short Notes on any Three 10
- 1 Load Distribution in a two way slab
  - 2 An Over Reinforced Section and Why I.S.456 does not recommend it
  - 3 Requirements of a Good Concrete
  - 4 Water Cement Ratio
  - 5 Fine Aggregate Used in Concrete

**A R.C.C Beam 250 x 525 is reinforced with 3 no 20mm bars. Find its Moment of Resistance.**

P.T.O.



- 4.a This beam is to be simple supported for a span of  $L_e$  effective. Calculate safe span  $L_e$  if the load it has to carry is 28kN/m. 8
- b. Give importance of cover to reinforcement 2

### Section II

- 5 Design Beam B1 considering the following 15

Slab S1 thickness = 125mm, with floor finish of 2kN/m<sup>2</sup>

Height of brick wall to be supported by Beam B1 is 2.4m and is 230 thick

Design beam for Flexure and Shear Reinforcement. Given Below are Design Shear Strength Values

<b>Design Shear Strength of Concrete <math>\tau_c</math> N/mm<sup>2</sup></b>	
<b>100Ast/bd</b>	<b>For M20 grade concrete</b>
≤ 0.15	0.28
0.25	0.36
0.5	0.48
0.75	0.56
1	0.62
1.25	0.67
1.5	0.72
1.75	0.75
2	0.79
2.25	0.81
2.5	0.82
2.75	0.82
3 and Above	0.82

- 6 Design Cantilever Slab S3 from the institute Building 10

- 7 Write Short Notes on any three 10

- 1 Anchorage Length and Development Length
- 2 Design of Timber Beams w.r.t to Lateral Restraint, Minimum Width and Bearing
- 3 Any Four Advanatges of Timber Beam
- 4 Stripping of Concrete Elements - Definition - Stripping Times for various R.C.C elements
- 5 Limit State of Serviceability and Span to Depth Ratios

- 8 Design a Timber Beam to take a load of 12kN/m over a Cantilever span of 2.4m considering the following. Overlook Form Factor. Check for Shear and Deflection 10

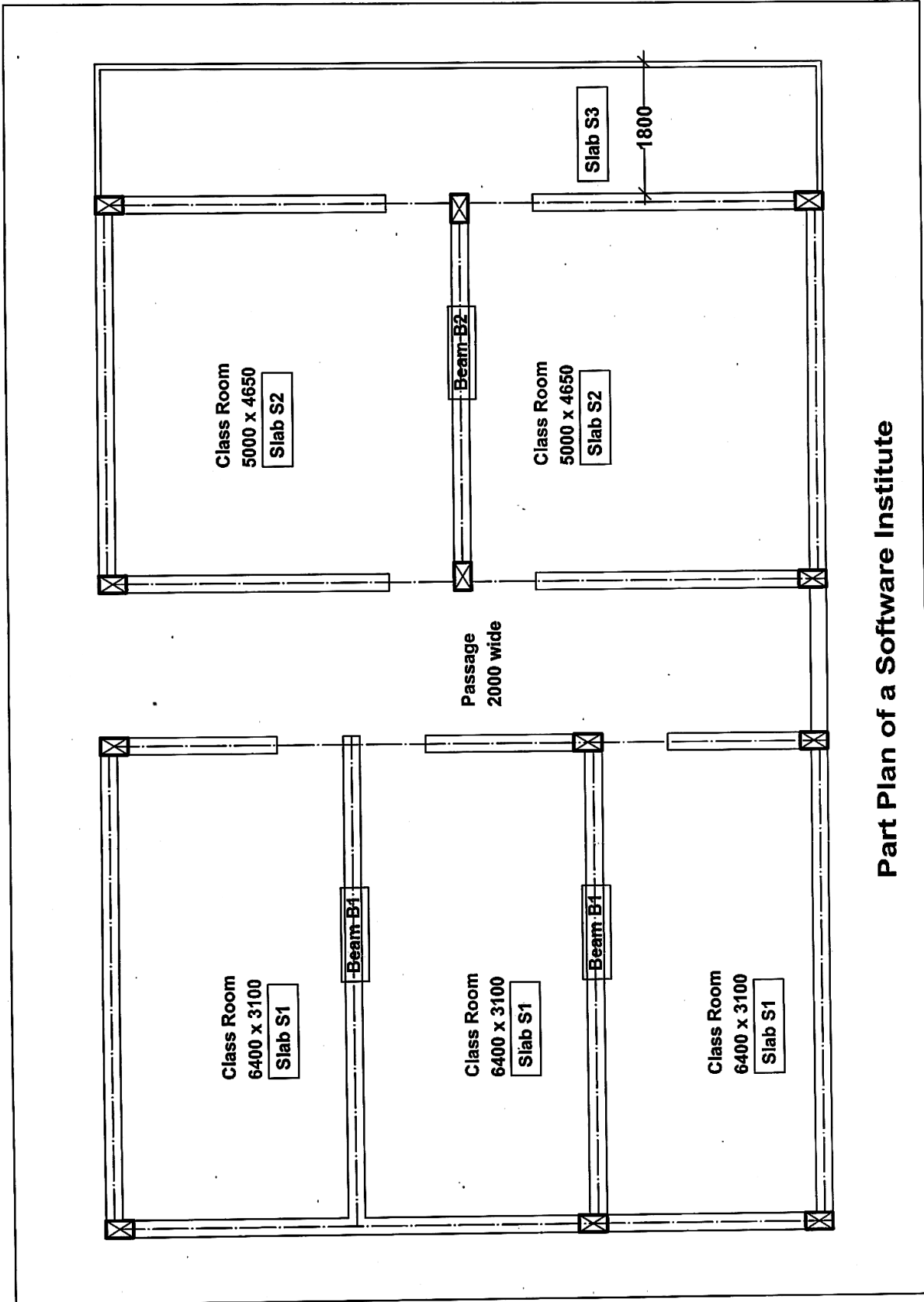
Take  $d = 3b$

Permissible Bending Stress for inside location – 12.16 N/mm<sup>2</sup>

Permissible Shear Stress – 1.37 N/mm<sup>2</sup>

Allowable Deflection – Span/180

$E = 8.93 \times 10^3 \text{ N/mm}^2$



Part Plan of a Software Institute

Total No. of Questions—4]

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**[5564]-403**

**S.Y. B. Arch. (Fourth Semester) EXAMINATION, 2019**

**BUILDING SERVICES—II**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**N.B. :—** (i) Answers to the two sections should be written in separate answer books.

(ii) All questions are compulsory.

(iii) Draw neat diagrams wherever necessary.

(iv) Assume suitable data.

(v) Figures to the right indicate full marks.

**SECTION I**

1. Explain Incandescent lamp, Fluorescent lamp and Fluorescent lamp in detail. [15]

*Or*

Explain Day light factor and Lumen method with necessary sketches, formula.

2. Write short notes on any *four* : [20]

(a) Indirect Lighting

(b) Glare and its types

(c) 3R concept

(d) Types of solid wastes in city

(e) Circuit breaker

(f) Light shelf.

P.T.O.

## SECTION II

3. Explain process of Earthing and types of earthing with labelled sketches. [15]

*Or*

Explain the flow of electricity from service station to a particular building with labelled sketch.

4. Write short notes on any *four* : [20]
- (a) Rain water harvesting
  - (b) Concealed wiring
  - (c) Safety devices
  - (d) Bus Bar
  - (e) Types of switches
  - (f) Household solar lighting system.

Total No. of Questions—3]

[Total No. of Printed Pages—2

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**[5564]-501**

**T.Y. B.Arch. (Fifth Semester) EXAMINATION, 2019**

**BUILDING TECHNOLOGY AND MATERIALS-V**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

- N.B. :—** (i) Answers to Section I and Section II should be written in separate books.
- (ii) Use drawing sheets for section I and answer sheets for Section II.
- (iii) Neat diagrams must be drawn wherever necessary.
- (iv) Figures to the right indicate full marks.
- (v) Assume suitable data, if necessary.

**SECTION I**

1. Solve any *one* : [30]
- A Sandwiched Partition is to be provided for a conference room. Length of partition is 3.5 m × 3 m in height with door of size 1.2 m × 2.1 m.
- Draw plan showing framing of partition with the door opening at a scale of 1 : 10.
- Draw the section through partition to a scale of 1 : 10.
- Draw details to a suitable scale of 1 : 5.
- (a) Detail of fixing of door.
- (b) Frame assembly and panel fixing detail.

P.T.O.

*Or*

Draw plan, section of T.W. Single bed.

Draw plan and Section to scale of 1 : 10.

Draw any *two* joinery detail to scale 1 : 5.

- 2.** Draw sketches of the following (any *one*) : [10]
- (a) Detail in plan of fixing wardrobe shutter to the side ply.
  - (b) Any *two* alternatives of joinery in plywood.
  - (c) Fixing of AC diffuser in suspended ceiling.

## **SECTION II**

- 3.** Write short notes on the following with neat sketches wherever necessary (any *five*) : [30]
- (a) Form Active systems
  - (b) Different types of Boards used in interior furniture work
  - (c) Ingredients of Paints
  - (d) Advantages of timber derivatives over timber
  - (e) Differentiate between Laminate and Veneer
  - (f) Band Beam and Ribbed Slab
  - (g) Prestressed slabs.

Total No. of Questions—8]

[Total No. of Printed Pages—7

<b>Seat No.</b>	
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**[5564]-502**

**T.Y. B.Arch. (V Sem.) EXAMINATION, 2019**

**THEORY OF STRUCTURES—V**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

- N.B. :—**
- (i) Solve any *three* questions from each section.
  - (ii) Figures to the right indicate full marks.
  - (iii) Assume suitable data, if required. Mention the assumption.
  - (iv) Use M20 grade concrete & Fe500 grade steel & Limit state design method for RCC design.
  - (v) Every RCC design shall be accompanied by the relevant schedule & sketch.
  - (vi) Use of Non-programmable scientific calculator is allowed.

**SECTION-I**

1. W.r.t. the attached framing plan, design the beam B2 as a typical 230 wide T-beam. Restrict the beam depth to 650 mm. Assume slab thickness as 135 mm. Take a floor finish load of  $1.5 \text{ kN/m}^2$  while a live load of  $4 \text{ kN/m}^2$ . Design the beam for flexure. Also design

P.T.O.

the shear stirrups. Conclude the design with a schedule & a sketch of the reinforcement. [12]

**Design Shear strength of concrete ( $\tau_c$ ) N/mm<sup>2</sup>**

<b>100 <math>A_{st}/bd</math></b>	<b>For M20 grade concrete</b>
$\leq 0.15$	0.28
0.25	0.36
0.50	0.48
0.75	0.56
1.00	0.62
1.25	0.67
1.50	0.72
1.75	0.75
2.00	0.79
2.25	0.81
2.50	0.82
2.75	0.82
$\geq 3.00$	0.82

- W.r.t. the attached framing plan, Design the slabs S1, as continuous one way slabs, for the main hall measuring 11.5 m  $\times$  7.5 m., supported on 2 nos. 230 wide intermediate T-beams & 2 nos. 230 wide end L-beams. Take a floor finish load of 1.5 kN/m<sup>2</sup> while a live load of 4 kN/m<sup>2</sup>. Conclude the design with a schedule & a sketch of the reinforcement. [11]



3. (a) W.r.t. the attached framing plan, make neat & proportionate sketches of both the types of sections, as per the schedule given below : [6]

Slab	Depth	Steel @ long span	Steel @ short span	Remark
S4	220	16 Tor @ 160 c/c	8 Tor @ 200 c/c	Waist slab supported on 230 wide beams on outer edges of both landings
S5	150	16 Tor @ 230 c/c	8 Tor @ 280 c/c	Waist slab supported on 230 wide beams on inner edges of both landings

- (b) Attempt any *two* of the following. Support the explanation with sketches : [6]

- (i) Write a short note on different types of flat slab construction and its elements.
- (ii) Sketch the BMD of a typical combined footing. Also show the reinforcement details of the same.
- (iii) Write a short note on various types of piles and their structural action.
- (iv) What are the assumptions of Rankine's theory of Earth pressure ?

4. (a) A pre-stressed beam of cross section  $300 \times 750$  is carrying an UDL of  $39 \text{ kN/m}$  inclusive of its self weight, over an effective simply supported span of  $9.50 \text{ m}$ . It is pre-stressed using tendons placed at  $260 \text{ mm}$  from the beam bottom, and supplying a pre-stressing force of  $2200 \text{ kN}$ . Calculate maximum fibre stresses in the beam at : [8]
- (i) Mid span &
- (ii) End supports.
- (b) Explain the concept of pre-stressing. How does post-tensioning method differ from pre-tensioning in pre-stressed concrete ? Sketch the common types of sections used in pre-stressing. [4]

### SECTION-II

5. (a) W.r.t. the attached framing plan, due to headroom considerations, the depth of the  $230$  wide beam B6, is to be restricted to  $500 \text{ mm}$ . Design the beam as doubly reinforced, to take a load of  $36 \text{ kN/m}$  over the span of  $6.20 \text{ m}$ . Design for flexure only. Design of shear stirrups not required. Conclude the design with a schedule & a sketch of the reinforcement. [9]

	$d'/d_e$			
	0.05	0.10	0.15	0.20
$f_{sc}$ (N/mm <sup>2</sup> ) for				
Fe500	424	412	395	370

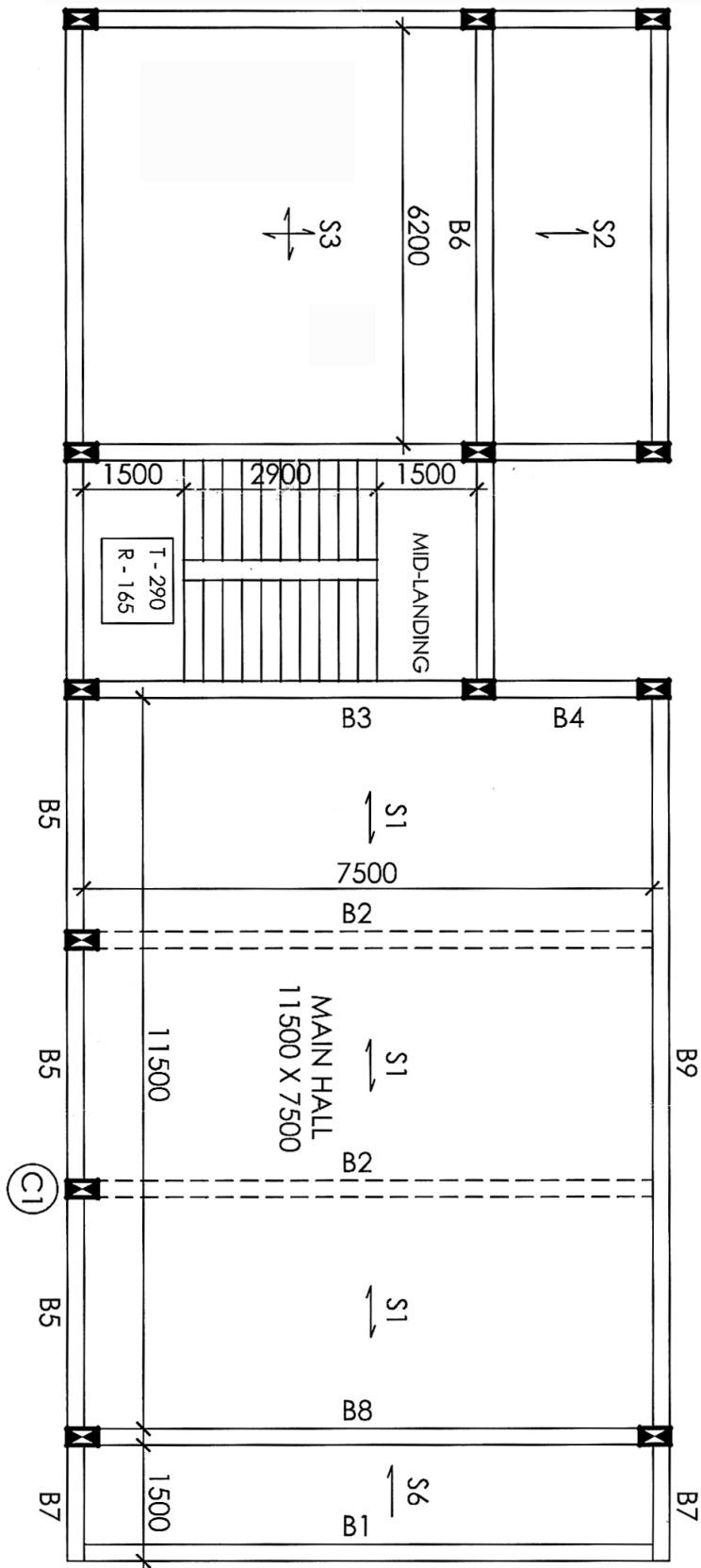
- (b) Explain in what cases, a doubly reinforced beam is required. [3]

6. (a) Check the stability w.r.t. (i) Overturning & (ii) Sliding of a mass retaining wall, retaining soil on its vertical face, as per the following data : [9]
- Wall dimensions : Top width — 900 mm, Height — 5000 mm,  
Bottom width — 0.6 h
- Densities : Soil —  $16 \text{ kN/m}^3$ , Masonry —  $24 \text{ kN/m}^3$
- Soil data : Angle of repose —  $30^\circ$ , Coefficient of friction — 0.62.
- (b) Explain the criteria of safety for maximum & minimum pressure on base of a mass retaining wall. Also sketch an annotated sample pressure diagram on base. [3]
7. W.r.t. the attached framing plan, considering the building to be P + 5 floors, calculate the load on the column C1 on every floor. Design the column C1 in the 2nd floor considering 1.5% steel, one side as 230 mm, and also in the 1st floor keeping the same size as that of 2nd floor, but changing steel percentage. Assume load on beam B2 as  $32 \text{ kN/m}$ , while that on B5 as  $28 \text{ kN/m}$ . Conclude the designs with a schedule & a sketch of the reinforcement of each. [12]

8. (a) Two columns of size  $300 \times 300$  and  $450 \times 450$  which are spaced apart at a distance of 1.85 m c/c are carrying a load of 900 kN and 1500 kN respectively. Design the combined footing for the same to be resting on a soil of SBC  $220 \text{ kN/m}^2$ . Derive the dimensions of the footing in plan only, by taking the length of the footing, as twice its width. [7]
- (b) Explain raft foundation in terms of
- (i) Need,
  - (ii) Types. [4]

*Or*

Design an isolated pad footing resting on a soil of SBC  $240 \text{ kN/m}^2$  to carry a load of 1600 kN in a column of cross sectional size  $300 \times 750$ . Check the footing for single shear only. Sketch the reinforcement detail. [11]



Total No. of Questions—4]

[Total No. of Printed Pages—2

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**[5564]-503**

**T.Y. B. Arch. (Fifth Semester) EXAMINATION, 2019**

**BUILDING SERVICES—III**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**N.B. :—** (i) Answers to the *two* sections should be written in separate answer books.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) *All* questions are compulsory.

(iv) Figures to the right indicate full marks.

**Section I**

1. Calculate the no. of exhaust fans required for a basement to be used as an office, Measuring 8m × 12m × 3.2m. Show the positions of the fans in plan and section. [15]

Assume the appropriate air cycles required.

You may choose fans from the following :

Diameter of fan	Air handling capacity of fan in cu.m/hr
(a) 305 mm	1900
(b) 380 mm	4000
(c) 457 mm	6800
(d) 610 mm	7900

P.T.O.

*Or*

Explain with neat sketches the different systems used for Mechanical Ventilation.

2. Write short notes on any *four* of the following : [20]
- (a) Roof Pond
  - (b) Stack Effect
  - (c) Wind Catchers
  - (d) Cross Ventilation
  - (e) Axial Fan
  - (f) Diffusers.

**Section-II**

3. What is “Refrigeration cycle” ? How is it used in Air-conditioning ? Explain different components of RAC. [15]

*Or*

Explain with neat sketches the working of Window Air-conditioner.

4. Write short notes on any *four* of the following : [20]
- (a) Filters used in Air-conditioning
  - (b) Compressor
  - (c) Central DX System
  - (d) Ducting Material
  - (e) Cooling Tower
  - (f) Evaporator.

Total No. of Questions—4]

[Total No. of Printed Pages—2

<b>Seat No.</b>	
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**[5564]-601**

**T.Y B. Arch. (Sixth Semester) EXAMINATION, 2019**

**BUILDING TECHNOLOGY AND MATERIAL—VI**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**Instruction for the Candidates.**

- 1) Answer Section I should be solved on drawing sheets only & Section II should be written in separate answer book.
- 2) Neat diagram with dimension s must be drawn whenever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

**Section I**

**Q 1.** A Fabrication shop of size 10 M X 22.5M X 3.5 M height at tie level is to be constructed using steel truss & stanchion column.

Draw key plan & section of entire arrangement to 1:100 scale (10)

Draw a part plan to scale 1:20 showing truss spacing along with purlins & stanchion column (10)

Draw part sectional elevation to scale 1:20 of the truss along with sheet roofing. (10)

**OR**

**Q 1.** Draw plan and section of a marriage hall of size 5 M X 15 M X 4.5 M (Ht) using Appropriate Precast Roofing system.

Draw key plan& Section to scale 1:100 (10)

Draw part Detail Plan & section to 1:10 scale (10)

Draw any twodetail to suitable scale (10)

**P.T.O.**



Q3. Draw neat Sketches of any one of following (10)

1. Draw detail section showing the waterproofing treatment for basement.
2. Section through Steel stair for a mezzanine at a height of 3 m.
3. Mass (Gravity) Retaining wall & Precast retaining wall.

## Section II

Q 4. Write short notes Any five of following with neat sketches wherever necessary. (30)

1. Modular co-ordination in buildings
2. Any 2 applications of the following in building Industry
3. 1. Sealant      2. Safety Glass
4. Cavity Drain System in basement.
5. Application of Moment resisting frames,
6. Use of Metal & Metal alloys in building Industry
7. Characteristics & Properties of Rubber,
8. Difference between Adhesives and sealants.
9. Role of Floor and Roof Diaphragm in earth quake resistance.

Total No. of Questions—8]

[Total No. of Printed Pages—6

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**[5564]-602**

**T.Y. B.Arch. (VI Semester) EXAMINATION, 2019  
THEORY OF STRUCTURES—VI  
(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

Instructions to candidates

1. **Q.1 & 5 are compulsory.** Answer any 2 out of the remaining 3 in each section.
2. Figures to the right indicate full marks.
3. Assume suitable data, if required. Mention the assumption.
4. Use M20 grade concrete & Fe500 grade steel & Limit state design method for RCC design.
5. Use Structural steel Fe410 grade (E250,  $f_y = 250$  N/mm<sup>2</sup>) & Limit state design for Steel design.
5. Every RCC design shall be accompanied by the relevant schedule & sketch.
6. Use of Non-programmable scientific calculator & Standard Steel tables is allowed.

**SECTION - I**

Q.1

11

Prepare the framing plan for the attached **Ground floor plan only** and show the following.

1. Column positions (size can be conceptually taken as 230 x 450) in **Ground floor only**.
2. All beams. **Restrict beam depth to 600 mm.** Indicate depth in plan. Also mention span to depth ratio considered for the same.
3. All slabs with indications, including those for staircase. Mention depth & span to depth ratio considered. **Restrict slab depths to 145 mm**, except that of staircase.
4. Note that no columns to be provided within the main hall. Window positions are conceptual, and flexible in position w.r.t. column positions.

Q.2 Attempt any 3 of the following. Support the explanation with sketches.

12

- a. Explain a Counterfort retaining wall in terms of i) structural action on each part & ii) Reinforcement details.
- b. Explain the various conditions of pressure on an underground water tank and how is the combined pressure of water and earth taken care of.
- c. Explain the basic concept of a portal frame. Draw the BMD of a rigid portal frame. Also draw the detail of the rigid joint of the column with the foundation.
- d. Explain the advantages & disadvantages of a RCC portal frame.
- e. What are the remedial measures as per the Limit state method to control crack width in a RCC water tank.?

P.T.O.

**Q.3**

The **vertical face** of a RCC cantilever retaining wall, supports retained soil and is detailed as below.

Stem dimensions: Top width – 300 mm, Bottom width – 600 mm, Height – 5500 mm

Base dimensions: Width – 3200 mm, Thickness – 600 mm, Toe projection – 800 mm

Densities of materials: Soil – 17 kN/m<sup>3</sup>, Concrete – 25 kN/m<sup>3</sup>

Soil data: SBC – 240 kN/m<sup>2</sup>, Coefficient of friction – 0.62, Angle of repose – 30°

**a** **8**

Check the stability of the wall w.r.t. **Overturning & Sliding**

**b** **4**

Determine **maximum & minimum** pressure on base.

**Q.4**

**a** **4**

Design the **stem reinforcement** of the retaining wall in Q.3 above. Conclude with a neat sketch.

**b** **4**

Sketch the structural system worked out for **Detail A** in Q.1 above.

**c** **4**

W.r.t. the schedule below, sketch the detailed **plan** of the column. Mention cover of the same.

Also sketch neatly, the **plan & section** of the footing. Mention cover of that too.

Col.	Footing				Col. on parking floor		
	Size	Depth	Steel @ shorter span	Steel @ longer span	Size	Main steel	Links
C1	2700 X 2500	650	16 Tor @ 150 c/c	16 Tor @ 160 c/c	300 x 750	10 Nos. 20 Tor	8 Tor @ 250 c/c

## SECTION - II

Q.5

11

A factory building is to be constructed over a **plinth area of 16 m x 35 m**.

Decide the centre to centre distance at which, the stanchions can be placed to support roof trusses. Draw a neat **key plan** showing Stanchions & the bracing system. A **Fink** or a **Howe** truss may be used. Draw the **single line elevation** of the truss showing key dimensions, like **truss spacing, purlin spacing**, etc. Calculate the **live load** as per the **angle of the truss**. Suggest an **unequal angle purlin** using thumb rules.

Explain the importance and **structural need of a bracing system** in an assembly of trusses.

Q.6 Attempt any 3 of the following. Support the explanation with sketches.

12

- a. Explain the IS provisions for a battening system for a compound stanchion, in terms of width, thickness & spacing.
- b. Explain the need and advantages of a castellated girder.
- c. Explain various loads on all members of a factory building.
- d. Explain the structural action of short and long barrel vaults. What is edge stiffening?
- e. What is the difference between exterior and interior tubing system in view of structural behaviour for a high rise building?
- f. Explain the structural action of a dome. Show the RCC details of the same.

Q.7

a

3

Sketch the various section options for a Compound stanchion.

b

9

Design a compound stanchion with **2 Nos. ISMC placed back to back with laced lateral system** to take a load of **1400 kN**. The stanchion is **7 m**. high with **both ends fixed**. Assume a suitable lacing system and sketch the same. (Hint: Assume compressive stress as  $200 \text{ N/mm}^2$  to start with the design process)

Compressive stresses for Fe410 grade steel ( $f_y = 250 \text{ N/mm}^2$ )				
SR	Buckling class a	Buckling class b	Buckling class c	Buckling class d
30	220	216	211	204
40	213	206	198	185
50	205	194	183	167
60	195	181	168	150
70	182	166	152	133

OR

Q.7

a

3

---

What is web buckling of a girder.? Explain with causes.

b

9

---

A built-up Stanchion with ISHB 450 @ 87.2 kg/m and 300 x 25 mm plates welded to the flanges is 5.5 m. high, is fixed and one end, while hinged at the other. Determine load taken by the same.

Q.8

a

3

---

What conditions need to be satisfied to avoid disproportionate collapse of a steel structure as per IS 800.?

b

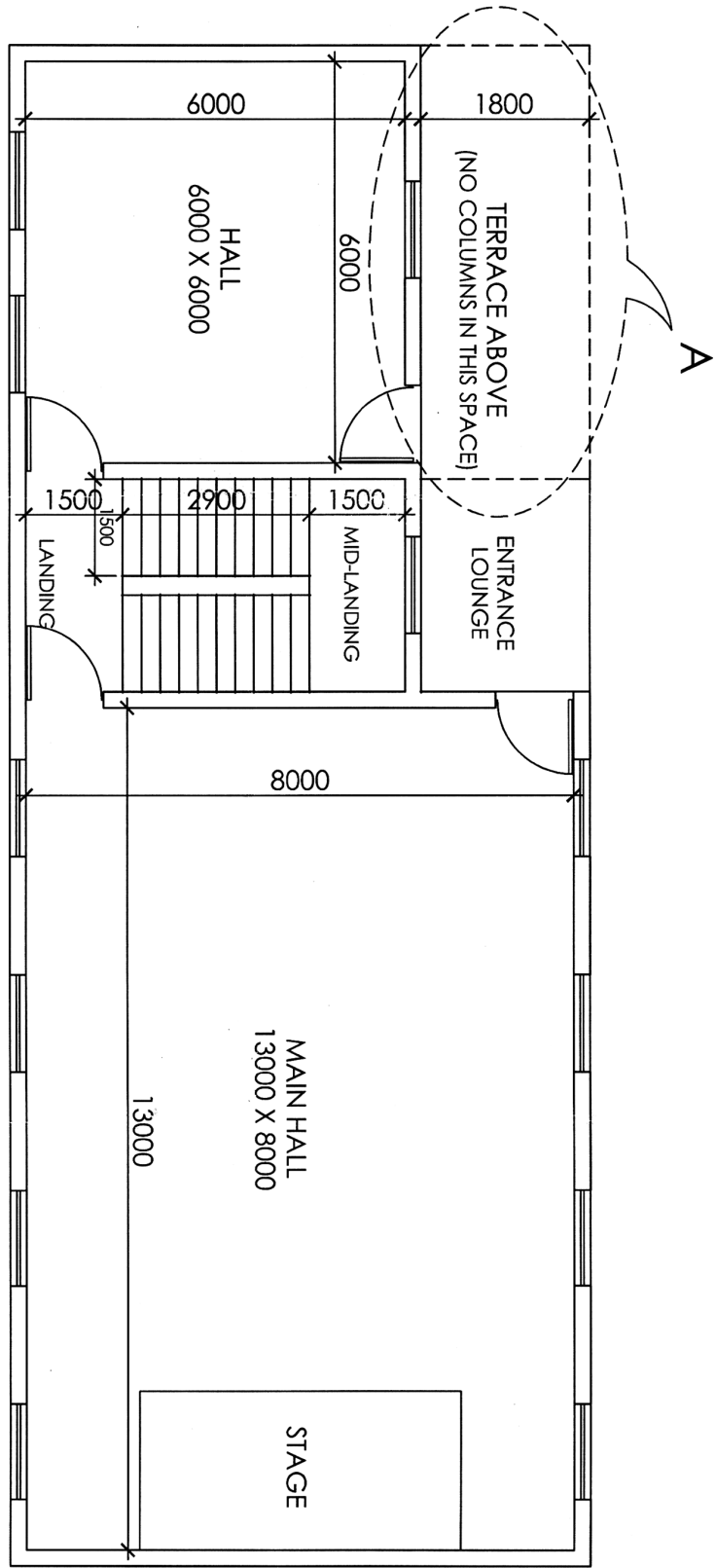
9

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ISMB 450 is welded with 200 x 20 mm plates to both flanges. Determine the safe UDL, it can carry over an effective simply supported span of 9.23 m. Classify the ISMB section. Also check the built-up section for deflection w.r.t an allowable deflection of Span / 240.

Hint . Ixx of the built-up section needs to be calculated.

Given,  $Z_p$  for ISMB 450 = 1533.36 cm<sup>3</sup> Shape factor = 1.150 0



### 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 ( $\beta_1$ )	Compact ( $\beta_2$ )	Semi-compact ( $\beta_3$ )	
Outstanding element of compression flange	Rolled section	$b/t_f$	$9.4\epsilon$	$10.5\epsilon$	$15.7\epsilon$	
	Welded section	$b/t_f$	$8.4\epsilon$	$9.4\epsilon$	$13.6\epsilon$	
	Compression due to bending	$b/t_f$	$29.3\epsilon$	$33.5\epsilon$	$42\epsilon$	
Internal element of compression flange	Axial compression	$b/t_f$	Not applicable			
Web of an I- or box section <sup>c</sup>	Neutral axis at mid-depth	$d/t_w$	$84\epsilon$	$105\epsilon$	$126\epsilon$	
	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 $\leq 42\epsilon$	$\frac{105.0\epsilon}{1+1.5r_1}$	
	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*  
 $r_1 = \frac{\text{actual average axial compressive stress}}{\text{design compressive stress of web alone}}$  ,  $r_2 = \frac{\text{actual average axial compressive stress}}{\text{design compressive stress of overall section}}$

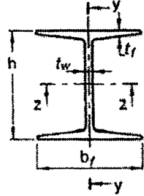
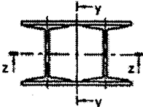
#### End Conditions and effective lengths for Stanchions

- a. Both Ends Fixed  $L_e = 0.65L$
- b. One End Fixed other end Hinged  $L_e = 0.8L$
- c. Both Ends Hinged =  $1.0L$
- d. 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)
Rolled I-Sections 	$h/b_f > 1.2$ $t_f \leq 40$ 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
Built-up Member 		Any	c

Total No. of Questions—4]

[Total No. of Printed Pages—2

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**[5564]-603**

**T.Y. B.Arch. (VI Sem.) EXAMINATION, 2019**  
**BUILDING SERVICES—IV**  
**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**Instructions to 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)** List the different types of fire extinguishers used in firefighting systems with the help of neat sketches. **(15)**

**OR**

Explain with neat sketches the water supply scheme for firefighting in a high-rise building.

**Q2)** Write short notes on any **FOUR** of the following: **(20)**

- a) General bye laws for firefighting as per NBC
- b) Sprinklers.
- c) Fixed Apparatus for Fire Fighting.
- d) Fire Hydrants
- e) Smoke Detectors.
- f) Refuge Area.

**SECTION –II**

**Q3)** Explain with neat sketches the principles of auditorium acoustics. **(15)**

**OR**

Explain with neat sketches Air borne sound and Structure Borne Sound and ways of controlling air borne and structure borne Sound.

**P.T.O.**



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

**(20)**

- a) Reverberation Time.
- b) Sound Amplification Systems
- c) Smoke Detector
- d) Masking Effect of Sound
- e) Effect of plan shapes on hearing conditions
- f) Acoustical Materials.

Total No. of Questions—1]

[Total No. of Printed Pages—4

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[5564]-604

T.Y. B. Arch. EXAMINATION, 2019

DESIGN-VI  
(2015 PATTERN)

Time : 12 Hours (Enlodge 6 hours)

Maximum Marks : 100

1. *Your design will be valued as a whole.*
2. *Assume suitable date, if necessary.*
3. *The candidate must submit Layout plan to 1:200 scale and schematic Floor plans and Sections to 1:100 scale at the end of the first day. These sketches will not be returned to the candidates therefore due record of the same should be kept for reference on the subsequent day. Candidates should avoid serious and abrupt deviations from the sketches (Planning scheme & Concept) submitted on the first day.*
4. *The drawings should be self-explanatory with requisite graphics, nomenclature, dimensions, levels and structural concept clarity.*

**DESIGN TOPIC: PRIMARY HEALTH CENTRE AT VILLAGE MULSHI, NEAR PUNE**

**Site:**

To Design a Primary health centre at Mulshi Village, situated at the entry point to the village, adjacent the main road & easily accessible to the people of nearby villages, in addition to the locals. The site is a flat site on an independent plot outside of the village settlement and conveniently located with no immediate structures around

The students have to design adhering to the design brief as given below with a permitted 5% variation in floor area or as justified by a specific furniture layout.

**Objectives:**

Providing primary healthcare facilities under one roof to the villagers, which are presently lacking or present in scattered pattern as standalone clinics etc,

P.T.O.

Much needed I.P.D in addition to regular O.P.D for better treatment & patient observation.

Minor O.T for conducting minor surgeries, deliveries, and providing preliminary treatment in emergencies before moving the patient to city hospitals.

Fully equipped drug store & pathology lab for self-sufficiency & catering to village needs.

X-Ray room & Plaster room for aiding basic diagnostics & treatment during fractures etc.

## **DESIGN BRIEF:**

## **CARPET AREA**

### **A. OUT PATIENT DEPARTMENT (O.P.D)**

A1. Entrance porch with stretcher ramp (For a medium sized ambulance van)	30 sq m
A2. Entrance Lobby, reception and O.P.D. waiting (With seating for about 30 people)	60 sq m
A3. Administration office and records room (For two tables)	15 sq m
A4. Nurse station counter (with patient treatment bed)	15 sq m
A5. Pharmacy (with sale counter)	10 sq m
A6. Resident Doctor's consultancy room (A.C) (With attached toilet)	18 sq m
A7. Visiting Doctor's consultancy room(A.C)	15 sq m
A8. X-ray room with dark room (A.C)	15 sq m
A9. Pathology Lab with Attached toilet	15 sq m
A10. Store	10 sq m
A11. Staff toilets(Ladies and Gents)	as per standards
A12. Visitors toilets(Ladies, Gents and Handicap)	as per standards

### **B. IN PATIENT DEPARTMENT (I.P.D)**

B1. General wards for male and female (10 patients each and with attached toilet block as per standards with handicap considerations)	200 sqm
B.2 Nurse stations (in respective wards)	As suited
B.3 Autoclave and sterilization room	10 sq m

### C. MINOR OPERATION THEATRE

C1.	Operation theatre(A.C)	20 sq m
C2.	Patient preparation room	15 sq m
C3.	Patient recovery room (for 2 beds) (A.C)	15 sq m
C4.	Autoclave and sterilization room	10 sq m
C5.	Changing and wash room(for doctors and nurses)	10 sq m
C6.	Isolation area	as reqd
C9.	Oxygen bank(oxygen cylinder store)	5 sq m
C10.	Medical waste store (A.C) Medical waste (dry & organic) storage room with separate corridor & exit door to incinerator room, without cutting across other areas or sterile corridors	5 sq m

### D. STAFF AREAS AND SERVICES

D1.	Staff areas(small dining, staff resting area, pantry and wash)	50 sq.m
D2.	Kitchen with Pantry, wash area and store	25 sq m
D3.	Seperate linen, furniture & equipment store.	30 sq.m
D4.	Clean and dirty utility store (20+20)	40 sq.m
D5.	Garbage, Medical waste & Incinerator room (detached & outside of building)	30 sq.m

E1. Parking - 1 Ambulance van , as per standards  
2 Cars, 10 Two wheelers, 10 Bicycles

Students should use area figures only as a guideline and ascertain actual areas as per furniture sizes and layout.

Primary circulation area (corridors) should be coloured yellow.

A.C. refers to air conditioned spaces

#### AREA CALCULATION

Approximate carpet area: 850 sq. m

15% circulation on basic carpet +20 % walls on net carpet: 300 sq. m

Total built up area : **1150 sq.m**

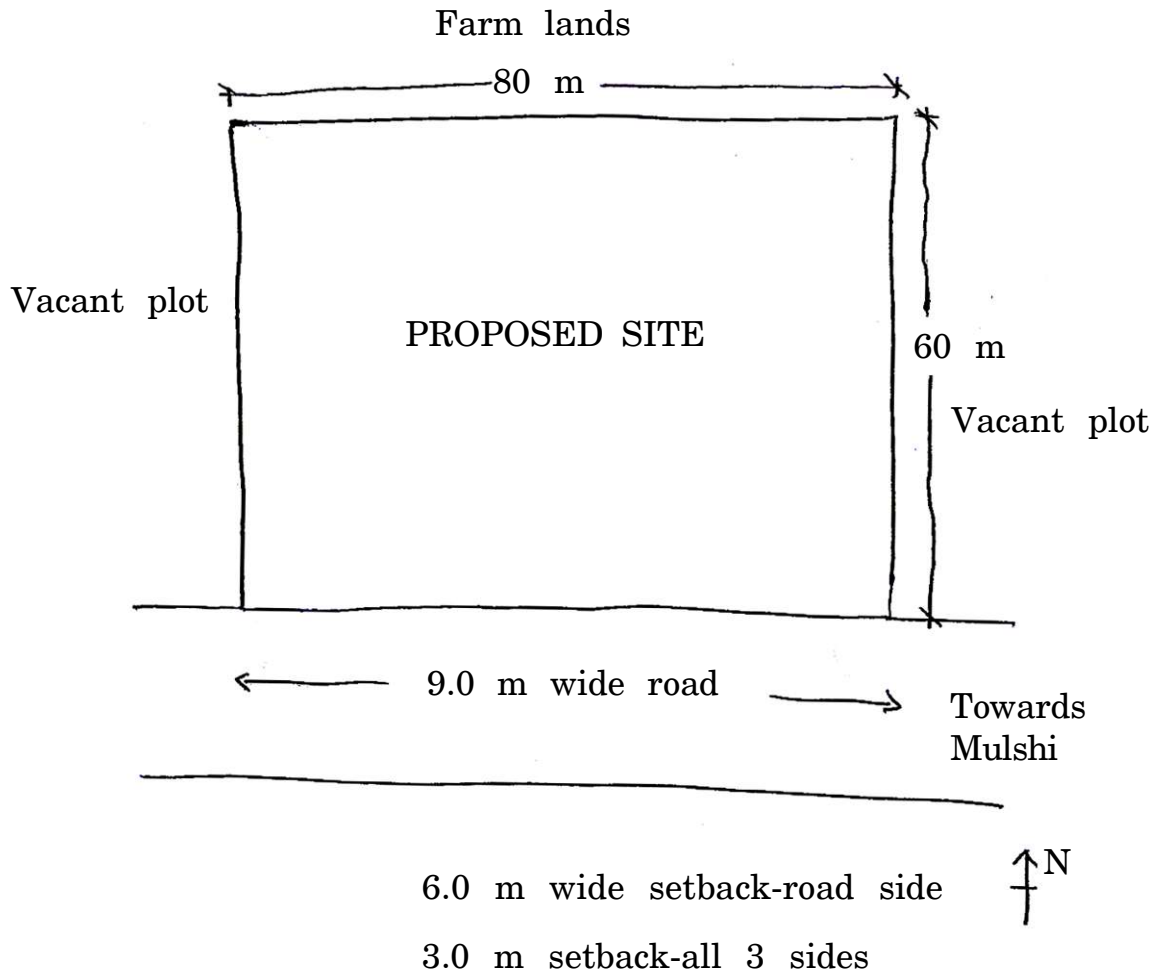
Lobby & waiting areas will be additional.

Thus, Maximum built up area: **1300 sq.m**

#### DRAWING REQUIREMENTS:

1. Design criteria and concept
2. Location plan with building outline on site 1:200

- |  |        |
|--|--------|
| 3. Site plan cum ground floor plan showing site development and interior layout respectively.<br>Structural grid to be shown | 1:100  |
| 4. Sections(minimum 2)   | 1: 100 |
| 5. Elevation(roadside)   | 1:100  |
| 6. Sketch view   |        |



Total No. of Questions—8]

[Total No. of Printed Pages—4

<b>Seat No.</b>	
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**[5564]-701**

**Fourth Year B.Arch. (VII Sem.) EXAMINATION, 2019**

**PROFESSIONAL PRACTICE-I**

**(Theory)**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**N.B. :—** (i) Answers to the two sections I and II must be written on separate answer books.

(ii) Answers to question No. 1 from Section I and question No. 5 from Section II are compulsory.

(iii) Attempt any *two* out of the remaining questions in each section.

(iv) Figures in brackets to the right indicate full marks.

### **SECTION I**

#### **Compulsory Question :**

1. As a pass out Architect, would you prefer to go into architectural practice as a single proprietary firm or as a partnership firm ? Base your reasons on the advantages and disadvantages of each type.

Also explain the basic difference between a proprietorship firm and partnership firm w.r.t. the following points : [15]

- Basic Definition
- Work load
- Liability
- Overall working mode
- Investment.

P.T.O.

*Or*

What do you understand by the term 'Architect' ? Describe the various stages of services offered by an Architect to a client in a residential bungalow project and the percentage of professional Fee charged at each stage as prescribed by Council of Architecture.

**Answer any *two* of the following :**

2. Why do you think that the registration from Council of Architecture will be required after graduation ? Explain the procedure of application for same. [10]
  
3. Write short notes on (any *two*) (5 marks each) : [10]
  - (a) Members of the Council of Architecture.
  - (b) Allied fields for Architects as per Council of Architecture.
  - (c) Duties of the Architect towards the Client.
  - (d) Reimbursable Expenses to an Architect as per Council of Architecture norms.
  
4. Give your opinion regarding the Architecture being a Profession or Business w.r.t. the following points : [10]
  - Basic Definition
  - Mode of Establishment
  - Nature of Work
  - Risk
  - Investment.

## SECTION II

### Compulsory Question :

5. As an architect, do you consider Architectural competitions as a good way of getting architectural projects ? Weigh your statements as per the advantages and disadvantages of architectural competitions. Also explain, in brief, the types of architectural competitions as prescribed by Council of Architecture. [15]

*Or*

What should be the qualities, features and attributes of an Architect's office ? Also, explain, in brief, the various departments of an Architect's office and describe the organisational structure through layout/tree diagram of a medium scale Architect's Office.

### Answer any *two* of the following :

6. Write short notes on (any *two*) (5 marks each) : [10]
- (a) Taxation for the Principal Architect of a proprietary firm.
  - (b) Role of allied/specialized consultants in Architectural Profession.
  - (c) Awareness of architect towards social and civic issues.
  - (d) Removal of name of Architect from the register maintained by C.o.A.
7. As a passout Architect, if you established your own proprietary firm then what will be the methods you adopt to promote yourself/your firm in the professional field ? Explain any *five* methods. [10]



8. Explain the brief history and procedure for getting Membership of the following organization (any *two*) (5 marks each) : [10]

(a) IIA

(b) IID

(c) IUDI

(d) ITPI

(e) ISOLA.

Total No. of Questions—6]

[Total No. of Printed Pages—5

<b>Seat No.</b>	
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**[5564]-702**

**B. Arch. (Fourth Year) (Seventh Semester) EXAMINATION, 2019**

**QUANTITY SURVEYING AND ESTIMATING—I**

**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**N.B. :—** (i) All questions are compulsory.

(ii) Answers to the two sections MUST be written in separate books.

(iii) Neat sketches must be drawn wherever necessary.

(iv) Figures to right indicate full marks.

(v) Assume suitable data wherever necessary.

**Section I**

1. Work out quantities for the following items of work based on the details given in the accompanying diagram (Fig. 1) (any *three*):

[15]

1. P.C.C. (1 : 4 : 8) below footing
2. R.C.C. Beams at Slab level
3. Vitrefied flooring in shops
4. Excavation for Column footings
5. Internal painting for walls and ceiling for all shops

P.T.O.

2. State the unit of measurement as per IS Code 1200 (any *five*): [5]

1. Soft Soil Excavation
2. WC in toilet
3. External Painting Work
4. G.I. Pipe 50 mm dia
5. R.C.C. Staircase in 1 : 2 : 4
6. Bk. Bat water proofing for Terrace
7. T. W. door Frame.

3. Work out quantities for the following items of work based on the details given in the accompanying diagram (Fig. 2) (any *three*):

[15]

1. P.C.C. (1 : 4 : 8) below foundation
2. Foundation Wall in R R Masonry
3. PCC at Plinth level
4. Excavation for Foundation
5. Murum Filling

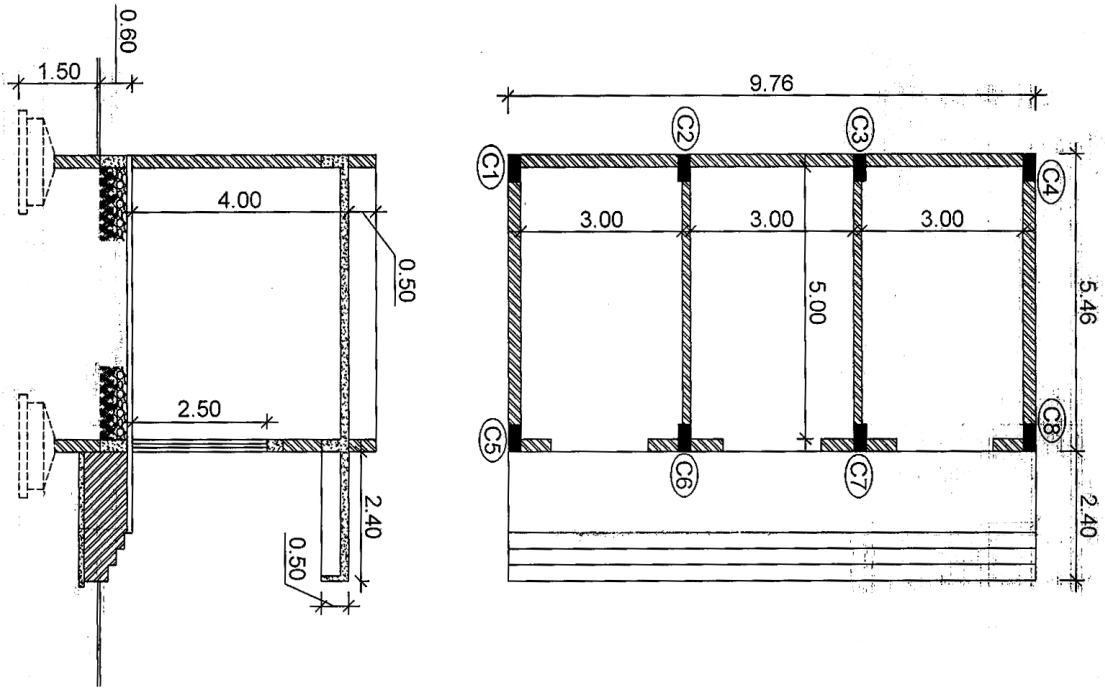
### Section II

4. Write short notes on (any *three*):

[15]

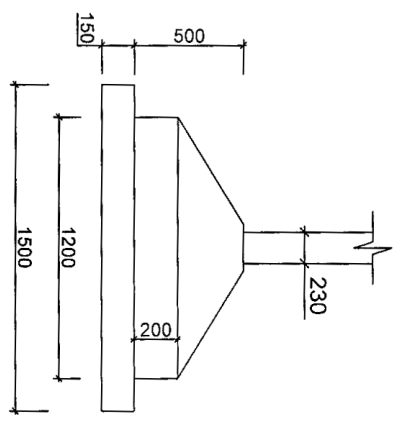
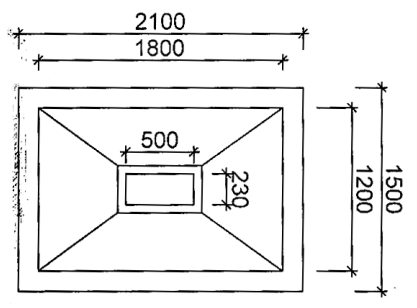
1. Contingencies and Spot Items
2. Bill of Quantities
3. Explain deductions for different junctions in centre line method of quantity calculation of load bearing structure.
4. Overheads and Profits.

- 5.** Explain in detail the following (any *two*) : [10]
- (i) Explain the format and use of Measurement sheet and Abstract sheet.
  - (ii) Explain types of estimates with example (any *two*)
  - (iii) Contingencies.
- 6.** Write the description for an item as described in the schedule of rates (any *two*) : [10]
- (a) Excavation in hard rock
  - (b) Brick masonry 230 mm. thk.
  - (c) Sand-faced plaster.

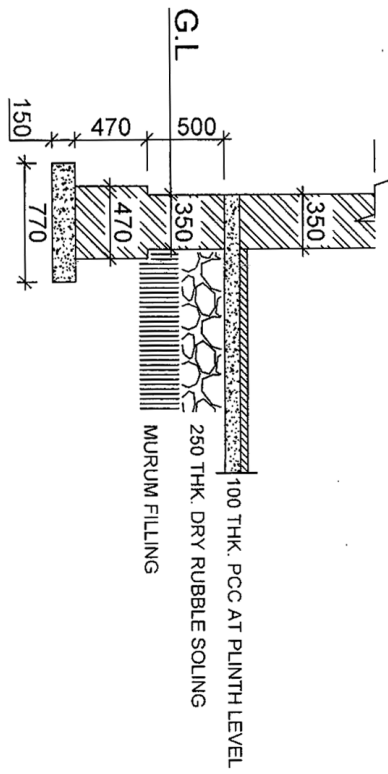
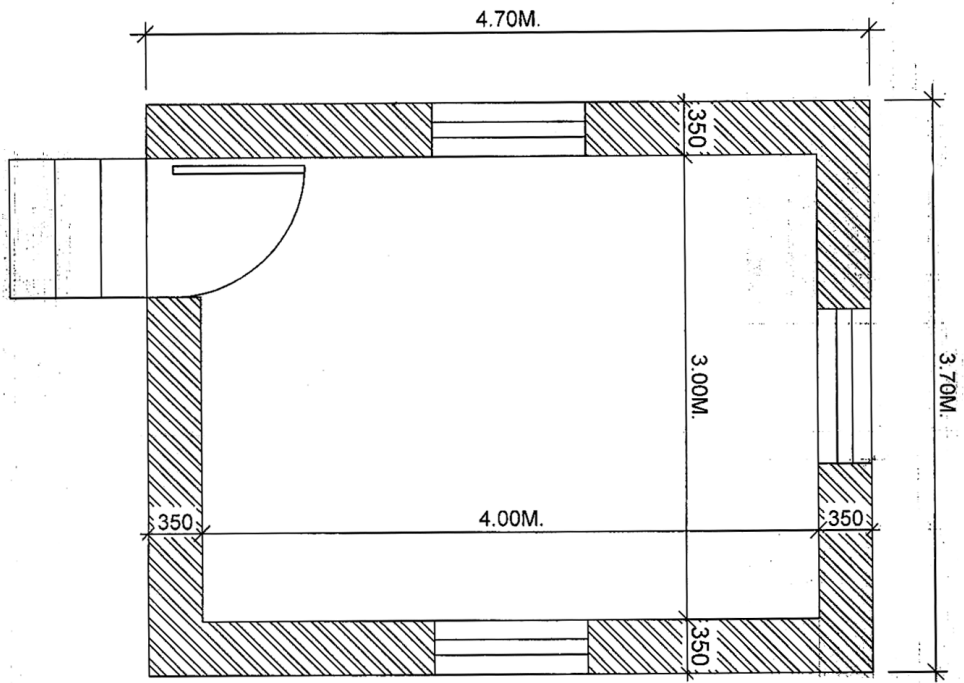


**SCHEDULE OF OPENINGS**  
 D1 : 1.50M x 2.45M  
 W1 : 1.50M x 1.50M  
 W2 : 0.60M x 0.90M

**IMPORTANT NOTES:-**  
 RCC FOOTING : 1200x1800  
 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.  
 INTERNAL PLASTER : 12MM. THK.  
 EXTERNAL SAND FACED PLASTER : 15MM. THK.



**SECTION I : QUESTION NO. 1**



SECTION I : QUESTION NO. 3

Total No. of Questions—6]

[Total No. of Printed Pages—2

Seat No.	
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**[5564]-703**

**Fourth Year B.Arch. (VII Semester) EXAMINATION, 2019**  
**SPECIFICATION WRITING-I**  
**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

- N.B. :—** (i) All questions are compulsory.  
(ii) Figures to the right hand side indicate marks.  
(iii) Answers to two sections to be written in two different answer books.

**Section-I**

1. Discuss the relationship between working drawings and specification writing. [10]

*Or*

Discuss the importance of specification writing in contract document. Explain the principles of specification writing.

2. Explain, what do you mean by restricted standard and performance specifications. [10]

*Or*

Write material specifications for cement and ms reinforcement. Explain the arrangements for storage of cement and mild steel reinforcement.

3. Write brief specifications for (any three) : [15]  
(a) Random rubble masonry  
(b) Internal Plaster  
(c) External brick wall  
(d) Brick Bat Waterproofing.

P.T.O.

## Section II

4. Write short notes on (any *three*) : [15]
- (a) Water bound macadam roads
  - (b) Stages of demolition work
  - (c) Chemical waterproofing
  - (d) Box type waterproofing
  - (e) Propping and centering
  - (f) Materials for formwork
  - (g) Mode of measurement for formwork
  - (h) Safety measures in demolition work.
5. Explain the function of (any *two*) : [10]
- (a) Construction equipments for excavation
  - (b) Ready-mix concrete
  - (c) Scaffolding
  - (d) Dr. Fixit
  - (e) Safety nets at construction site.
6. Write names of manufacturer for the materials (any *ten*) : [10]
- (a) Roofing sheets
  - (b) Barbed wire
  - (c) Cement
  - (d) Tiles
  - (e) Plywood
  - (f) European water closet
  - (g) Air conditioner
  - (h) Elevators
  - (i) Aluminium windows
  - (j) Light weight Doors
  - (k) Water storage tank
  - (l) Wash Basin.



Total No. of Questions—8]

[Total No. of Printed Pages—3

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[5564]-801

Fourth Year B. Arch. (VIII Semester) EXAMINATION, 2019

PROFESSIONAL PRACTICE-II

(2015 PATTERN)

Time : Three Hours

Maximum 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 1 and **Question no 5** from Section 2 are **compulsory**.
- 3) Attempt any **Two out of the remaining** questions in **each Section**
- 4) Figures in brackets to the right indicate full marks.

**Section - I**

**Compulsory Question**

Q.1

Define Tender system and explain the purpose.

(15)

Compare between B1, B2 & C Type tender with respect to the following:

- a. Scrutiny of Tender
- b. Balance
- c. Work Load For Architects
- d. Commencement of Work
- e. Extra Work

**Or**

Define 'Contract' & explain the following terms

- a. Contract Documents
- b. Contract Drawings
- c. Articles of Agreement
- d. Conditions of Contract

Also, Explain the importance of a Construction Contract for an Architectural Project.

P.T.O.

**Answer any two of the following**

- Q.2** As an Architect, do you think that 'tender system' is a good way of appointing a contractor for your architectural project? Weigh your answer with the advantages & disadvantages. Also, list & explain various ways of appointing a contractor for an architectural project. **(10)**
- Q.3** Write short notes on: **(Any 2) – (5 marks each)** **(10)**
- a. Virtual completion certificate
  - b. Liquidated damages
  - c. Interim Bills/ R.A. Bills
  - d. Defect liability Period
- Q.4** Give your opinion about the importance of Construction in Architectural projects for Architects? **(10)**  
Also, Explain how the following things would be important for monitoring the construction process (in terms of speed & quality) on site:
- Site Supervisor
  - Minutes of Meeting
  - Site Visit Report

**Section - II**

**Compulsory Question**

- Q.5** Define Valuation & Explain the various factors affecting. Also, what are the various methodologies adopted for the Valuation. **(15)**

**Or**

What is Valuation & explain the purpose? Define the market value & its characteristics. Also, elaborate the following classification of market value:

- Fair Value
- Book Value
- Rate-able Value

**Answer any two of the following**

- Q.6** Write short notes on: **(Any 2) – (5 marks each)** **(10)**
- a. Demolition Tender
  - b. Types of Arbitration
  - c. Sinking Fund
  - d. Clerk of Work

- Q.7** What is the history of National Building Code? As an Architect, what is the Importance & significance of National Building Code for your projects? **(10)**
- Q.8** Compare & contrast between the following: **(Any 2) - (5 marks each)** **(10)**
- a. Cost, Price & Value
  - b. Freehold Property & Leasehold Property
  - c. Earnest Money Deposit & Security Deposit
  - d. Construction Management & Project Management

Total No. of Questions—7]

[Total No. of Printed Pages—3

Seat No.	
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[5564]-802

**Fourth Year B. Arch. (VIII Semester) EXAMINATION, 2019**  
**QUANTITY SURVEYING AND ESTIMATION—II**  
**(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**Instructions to the candidates:**

- 1) All questions are compulsory.
- 2) Answers to Section-I and Section-II must be answered in two separate answer sheets
- 3) Figures to the right indicate full marks
- 4) Assume suitable data wherever necessary.

**Section I**

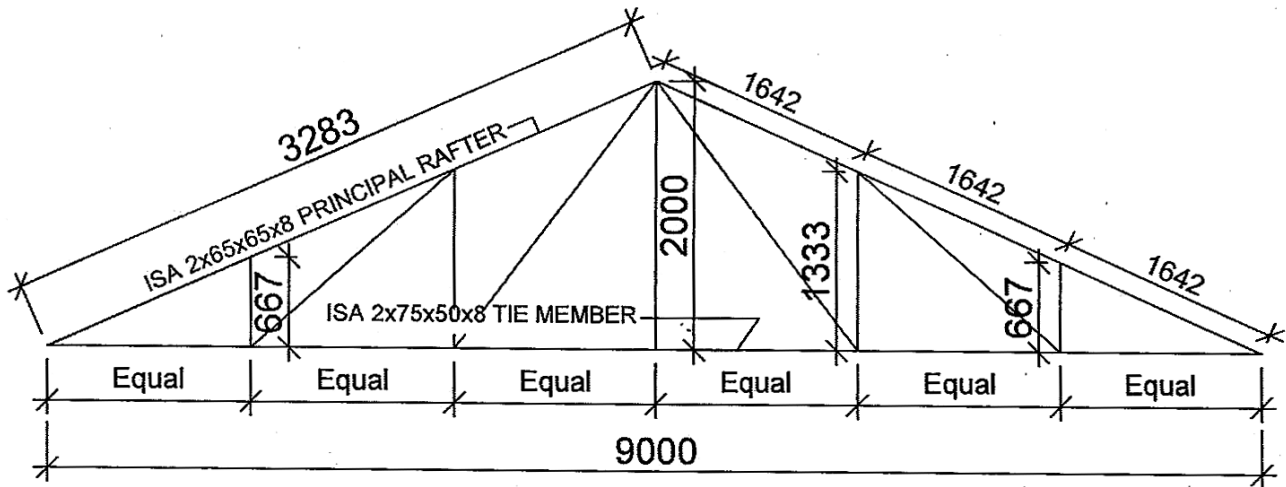
<b>Q.1</b>	Calculate the quantities for items with the help of the accompanying sketch <b>Any Four (4)</b>	<b>(20)</b>
	1. M S Tie member for all trusses	
	2. All Struts in single truss	
	3. Principal Rafters for all trusses	
	4. G I Sheets for roofing	
	5. Rain Water Gutter	
	6. Ridge Cap	
<b>Q.2</b>	List out the fittings and fixtures required for providing and fixing a wash basin.	<b>(5)</b>
<b>Q.3</b>	What is Day-Work and Piece Work? Explain with examples	<b>(5)</b>
<b>Q.4</b>	Write the Units for the following <b>Any Five (5)</b>	<b>(5)</b>
	1. Nahni Trap	
	2. G I Sheets	
	3. WC Pans	
	4. Inspection Chambers	
	5. Gully Traps	
	6. Pillar Cock	
	7. UPVC Plumbing Pipe	

P.T.O.

## Section II

<b>Q. 5</b>	What is rate analysis and what is the purpose of doing rate analysis? What are the factors affecting rate analysis?	<b>(5)</b>
<b>Q. 6</b>	Calculate the rate analysis for any 3 (three) items listed below a. RCC Beam in 1:2:4 grade concrete b. 230 thk. Brick masonry with 1:6 cement mortar c. 450 thk. U.C.R. Stone masonry d. 15mm. thk. Sand faced external plaster in 1:4 cement mortar	<b>(15)</b>
<b>Q. 7</b>	Calculate the indent for the items listed below i. Concrete for RCC Beam ( 1:2:4) for 17 cu.m. ii. Kotah stone flooring on 50 mm thick 1:3 c.m. bedding for 75 sq.m. iii. Sand faced plaster in 1:3 cement mortar for 104 sq.m. iv. Concrete for PCC in 1:4:8 for 50 sq.m.	<b>(15)</b>

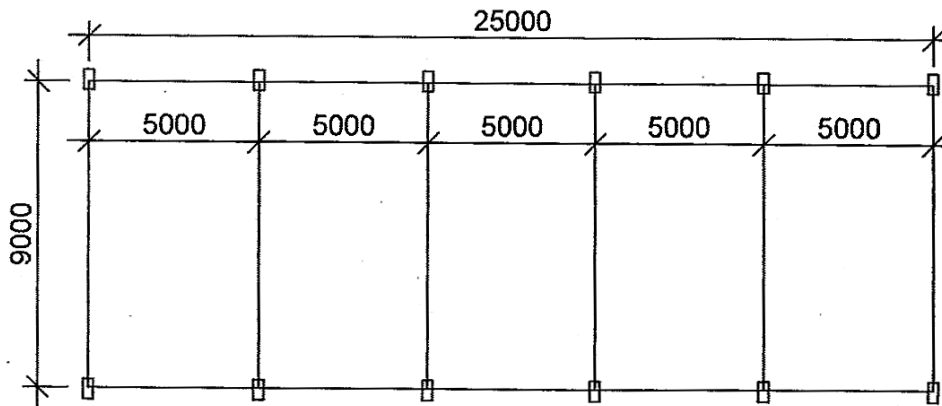
<u>Material Rates</u>		<u>Labour Rates</u>	
Cement	: Rs. 300/- per Bag	RCC for BEAM	: Rs. 3000/- per cu.m.
Sand	: Rs. 2500/- per cu.m.	Plastering	: Rs. 250/- per sq.m.
Aggregate (Metal)	: Rs. 850/- per cu.m.	White Wash	: Rs. 15/- per sq.m.
Sealant Compound	: Rs. 50/- per Kg.	DPC	: Rs. 40/- per sq.m.
Burnt Bricks	: Rs. 7/ piece	UCR masonry	: Rs. 520/cum
Rubble	: Rs. 600/cu.m.	Burnt Brick Masonary	: Rs. 800/cum



WEIGHT PER RMtr. FOR MEMBERS:

1. 75x50x8 : 7.40 Kg. / Mtr.
2. 65x65x8 : 9.76 Kg. / Mtr.
3. 50x50x6 : 7.40 Kg. / Mtr.

ALL STRUTS - ISA 2X50X50X6



SCHMATIC PLAN OF FACTORY SHED

SECTION I : QUESTION NO. 1

Total No. of Questions—6]

[Total No. of Printed Pages—2

<b>Seat No.</b>	
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**[5564]-803**

**Fourth Year B. Arch. (VIII Sem.) EXAMINATION, 2019  
SPECIFICATION WRITING—II  
(2015 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 70**

**Instructions to the candidates:**

- 1) All questions are compulsory.
- 2) Answers to the two sections should be written in separate books.

**Section I**

**Q.1 Write check list for the following construction items (Any two – 2) 10**

1. Rubble soling in plinth
2. RCC Slabs
3. External Plaster
4. TW Doors

**Q.2 Explain the following - (Any three - 3) 15**

1. Building trades
2. Types of railings
3. Ideal Toilet design for disabled persons
4. Types of fencing systems
5. Earthing systems
6. Mode of measurement for water supply pipes

**Q.3 Write brief Specification for – (Any two - 2) 10**

1. Brick Compound Walls
2. Ramps for Disabled persons
3. Inspection chamber
4. Acoustical wall paneling

P.T.O.

## Section II

**Q.4 Write short notes on – (Any three-3) 15**

1. Skilled and unskilled labour
2. Toilet design for disabled persons
3. Types of fencing systems
4. Water bound macadam roads

**Q.5 Write Brief Specification (Any two- 2) 10**

1. Acoustical partitions
2. Gypsum false Ceiling
3. Overhead RCC water storage tank

**Q.6 Write 2 Manufacturers Names for the construction items (Any - 5) 10**

- |                   |                   |
|-------------------|-------------------|
| 1. External Paint | 2. Electric Cable |
| 3. Vitrified Tile | 4. Mangalore Tile |
| 5. Wash Basin     | 6. European WC    |
| 7. Cement         | 8. Elevators      |