P231

[5874]-01

S. Y. B.Arch.

BUILDING CONSTRUCTION & MATERIALS - III

(2019 Pattern) (Semester - III) (2201918)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

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

SECTION - I

Q1) A single floor garage of size 5m × 5m has peripheral columns. Each column is of size 450 × 230. Design an appropriate foundation for the given column. The Depth of the Hard strata is 1.5M. Show plinth beam at appropriate height. Draw the foundation detail and section at a scale of 1:10. Support with extra details if necessary. **[20]**

OR

A slab has to be designed for room of size 3m × 4.5m. Design the appropriate reinforcement details. The drawing has to be drafted at a scale of 1:20. The drafted plan and 2 sections drawn should contain all the necessary dimensions & nomenclature.

Q2) Draw well labelled sketches of any 3 out of five given questions. **[15]**

a) Sketch raft footing with necessary details.

b) Sketch appropriate foundation for a sloping site.

c) Sketch detail at column beam junction.

d) Sketch detail of lintel and Chajja for a window of Height 1.2 M.

e) Sketch formwork for a column.

SECTION - II

Q3) Answer any seven from the following 10 questions : [35]

    a)   What is soil mechanics and why is it important in footing design?

    b)   Explain in detail the behaviour and properties of Red and Black cotton soil.

    c)   Explain in detail different types of failures in foundations.

    d)   Explain with sketches different types of raft footings.

    e)   What is combined footing and why is it necessary. Support your answer with sketches.

    f)   Explain the different constituents of concrete and their mix ratio used in practice.

    g)   What is curing? Explain how we cure different curing methods for various RCC building elements.

    h)   Explain different types of test we conduct on concrete.

    i)   Explain the reinforcement steel and its types.

    j)   Explain different types of flooring.

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P232

[5874]-02

S. Y. B.Arch.

THEORY OF STRUCTURES - III

(2019 Pattern) (Semester - III)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Question No 1 and 5 are compulsory in each section*

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

3) *Assume suitable data where necessary only.*

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

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

SECTION - I

Q1) A room of residential building having clear size 6.9 m × 3.4 m has to be covered with RCC simply supported slab resting on two beams having 230 mm width and 6.9 m length. Consider Live Load = 2kN/m² and Floor Finish = 1.25 kN/m² . Use 10 mm diameter bars as main steel, 8 mm diameter as distribution (secondary) steel. Write the answer in the form of schedule. Do not draw RCC details.   **[11]**

Q2) For a fixed beam AB having 12 m length, udl of 10 kN/m, point load of 25 kN is acting at 2m from support A, Find support reactions and draw shear force and bending moment diagram.   **[12]**

Q3) A rectangular simply supported RCC beam having clear length of 5.6 m and resting on 300 mm thick brick wall has to be designed. The beam is supporting slab load of 8 kN/m and wall load of 11 kN/m. Calculate the self weight of beam and design the beam for all the loads mentioned. For flexure use 16 mm dia bars and for shear use 8 mm dia 2 legged stirrups. Width of beam is 230 mm.   **[12]**

Table 19 Design Shear Strength of Concrete, τ_c, N/mm²
(Clauses 40.2.1, 40.2.2, 40.3, 40.4, 40.5.3, 41.3.2, 41.3.3 and 41.4.3)

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

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

a) State comparison of fixed beam to simply supported beam with sketch for 1) bending moment 2) a maximum deflection and deflected shape 3) support reactions, Both beams have span 'L' and udl 'w' over entire span.

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

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

d) What are defects in timber? Explain any four.

SECTION - II

Q5) For a short axially loaded RCC column subjected to working load of 1200 kN if the size is 230 mm × 350 mm, find longitudinal steel. Find spacing of links. Write answer in the form of schedule and draw a sketch of reinforcement details. [11]

Q6) A balcony of 4.8m × 1.5m, with cantilever timber joists having 1.5m cantilever length placed at 1.6 m c/c has timber flooring of 60 mm thick. Consider 3 kN/m^2 live load. Design intermediate timber joist with Working Stress Method, where depth of joist d = 3 times width b. Use Indian oak for joist and flooring. Indian Oak has permissible bending stress 12.16 N/mm^2, Modulus of elasticity 12.26 × 10³ N/m^3, density 8.48 kN/m^3, permissible shear stress 1.67 N/mm^2 and permissible deflection is L/180. [12]

Q7) For a room having size 4 m × 4 m, RCC simply supported slab has to be designed using limit state method. Consider load including self weight, live load and floor finish as 7 kN/m^2. Use 8 mm dia steel bars and 20 mm cover. No need for schedule or sketch. Slab is resting on 230 mm wide beams at four edges. **[12]**

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

a) What is main steel and secondary (distribution steel)?

b) Why is nominal cover required in RCC elements? State minimum nominal cover required for slabs, beams, columns and footings as per IS 456.

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

d) What is water cement ratio? Explain its importance.

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[5874]-03

S.Y. B.Arch

BUILDING SERVICES - I

(2201923) (2019 Pattern) (Semester - III)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

   1)   All questions are compulsory.

   2)   Figures to right indicate full marks.

   3)   Assume suitable data wherever necessary.

   4)   Draw suitable diagrams wherever necessary.

   5)   Answers to the two sections to be written on separate answer sheets.

SECTION - I

Q1) A 6 Storied apartment Building has 6 flats per floor. An Overhead water storage tank is to be provided for the building. Calculate the required water tank capacity and Size of the overhead Water tank. And Draw a Detailed well annotated Section for the Overhead Water tank.   **[15]**

OR

How is water tapped from Municipal Mains. Explain with suitable sketches.

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

   a)   Centrifugal Pump.

   b)   Butterfly Valve.

   c)   Calorifier.

   d)   Difference between Bib Tap & Pillar Tap.

   e)   Any 5 Specials used in water supply pipe Joinery. Draw a schematic.

   f)   Draw neat labelled Plan and Section of Underground Water Tank.

SECTION - II

Q3) Draw a neat labelled Plan and Section of Septic Tank. Explain working of the Septic Tank in detail. **[15]**

OR

What is function of a trap in drainage system? Explain any three types of traps used in building drainage system along with neat labelled sketches.

Q4) Write short notes with neat labelled sketches (any 4) : **[20]**
   a)   Two Pipe System for House Drainage.
   b)   Invert Level.
   c)   Wash Hand Basin.
   d)   Inspection Chamber.
   e)   Joint in Stoneware Pipe.
   f)   Bio Gas Plant.

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[5874] - 04

Second Year B.Arch.

BUILDING CONSTRUCTION AND MATERIALS - IV

(2019 Pattern) (Semester - IV)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :

    1)   *All questions are compulsory.*

    2)   *Answers to the two sections should be written in separate answer books.*

    3)   *Neat diagrams must be drawn wherever necessary.*

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

    5)   *Assume suitable data if necessary.*

<u>SECTION - I</u>

Q1) A balcony, 1.2 m wide is to be provided along the shorter span of a room measuring 3.0 m × 4.0 m. Consider appropriate support system for the same Draw : Framing Plan, section for the same at 1:20 scale.

      : Draw necessary reinforcement details at 1:5 scale.   **[20]**

OR

A sliding Folding door is to be provided for a Family room of a bungalow. The opening size is 2.4 m × 1.2 m.

Draw : Plan, Section, Elevation at 1:20 scale.

      : Details of assembly at 1:5 scale.   **[20]**

Q2) Draw well labelled sketches (Any 3)   **[15]**

    a)   Ferrocrete construction method.

    b)   Reinforcement details of spine wall staircase.

    c)   Bay Window.

    d)   Pre cast spiral staircase.

    e)   Section of a traction lift, label all parts of it.

P.T.O.

SECTION - II

Q3) Write short notes on (Any 3)   **[15]**

    a)   Damp proof course.

    b)   No fines concrete.

    c)   Various types of glass used in Building Construction.

    d)   Ferrocrete and its application.

    e)   Escalators.

Q4) Write short notes on (Any 4)   **[20]**

    a)   Advantages and Disadvantages of RMC.

    b)   Various types sealents and use in Building-Industry.

    c)   Cavity walls.

    d)   Placing of concrete in ref to RMC.

    e)   Advantages & applications of light weight concrete.

    f)   Differentiate between hydraulic lift & traction lift.

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SEAT No. :

[Total No. of Pages : 4

[5874]-05

S.Y. B. Architecture
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.*
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, wherever necessary only.*
5) *Use M 25 Grade concrete adn 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) A Doglegged Staircase is made of 11 Treads of 275 mm in each flight. Riser is 160 mm. The width of Landing = Width of Flight = 1500 mm. The Staircase is supported of 230 mm wide Beams on outer edges of the Landing. Consider the Staircase as part of an Office Building. Consider Floor Finish = 1.25 kN/m². Use 12 diameter bars for main steel and 8 mm diameter bars for distribution (secondary steel). Write your answers in the Form of a Schedule. Do not draw Reinforcement Sketch. **[13]**

Q3) A room of residential building having clear dimensions 6.5 m × 3 m has a balcony of 1.5 m × 3 m with 1.5 m clear overhang. Design R.C.C. overhanging slab for the same if beams supporting overhang slab have 230 mm width. Consider Live Load = 4 kN/m² and Floor Finish = 1.25 kN/m². Use 10 mm diameter bars as main steel, clear cover of 20 mm. Draw RCC skecth only. Draw reinforcement details for the same. No need to make a Schedule. **[13]**

P.T.O.

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

    a)   Explain under reinforced R.C.C. section with its strain diagram.

    b)   A Beam in R.C.C. is of size 230 mm × 450 mm and is Reinforced with 4 no 20mm bars in one row. Find its Moment of Resistance.

    c)   Explain with sketch : various slab and beam formations for balcony.

    d)   Draw the reinforcement details of a Folded Plate Staircase.

SECTION - II

Q5) Design rectangular RCC Cantilever Beam of clear overhang length 2.6 m. These Beams are subjected to working loads of 10 kN/m. If the beams are fixed to 300 mm wall support at one end. Add self weight and design the beams for Flexure using 16 mm dia bars. Do not design the Shear. Consider width of beam 230 mm. **[9]**

Q6) Design a Steel Girder using ISMB for a Clear Span of 4 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. **[13]**

Q7) Design a One way Continuous Slab over 3 equal clear spans of 3.5m each with a Live Load of $3kN/m^2$. Consider 230 mm wide supports and Floor Finish of $2.5 kN/m^2$. Reinforcement of 8 mm diameter for main and secondary (distribution) steel shall be used. **[13]**

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

    a)   Explain any 4 advantages and Steel Structures over Concrete Structures.

    b)   State different Steel Sections used as Girders, Stanchions, Purlins etc with Sketches.

    c)   Draw and explain structural elements of a Typical Factory Building in Section.

    d)   Define plastic Section Modulus and Plastic Moment.

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
Internal element of compression flange		Compression due to bending	b/t_f	29.3ε	33.5ε	42ε
		Axial compression	b/t_f	Not applicable		
Web of an I-H-or box section ^{c}	Neutral axis at mid-depth		d/t_w	84ε	105ε	126ε
	Generally	If r_1 is negative:	d/t_w	$\dfrac{84\varepsilon}{1+r_1}$ but $\leq 42\varepsilon$	$\dfrac{105.0\varepsilon}{1+r_1}$	$\dfrac{126.0\varepsilon}{1+2\,r_2}$ but $\leq 42\varepsilon$
		If r_1 is positive :	d/t_w		$\dfrac{105.0\varepsilon}{1+1.5r_1}$ but $\leq 42\varepsilon$	
	Axial compression		d/t_w	Not applicable		

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

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

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

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

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

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

End Conditions and effective lengths for Stanchions
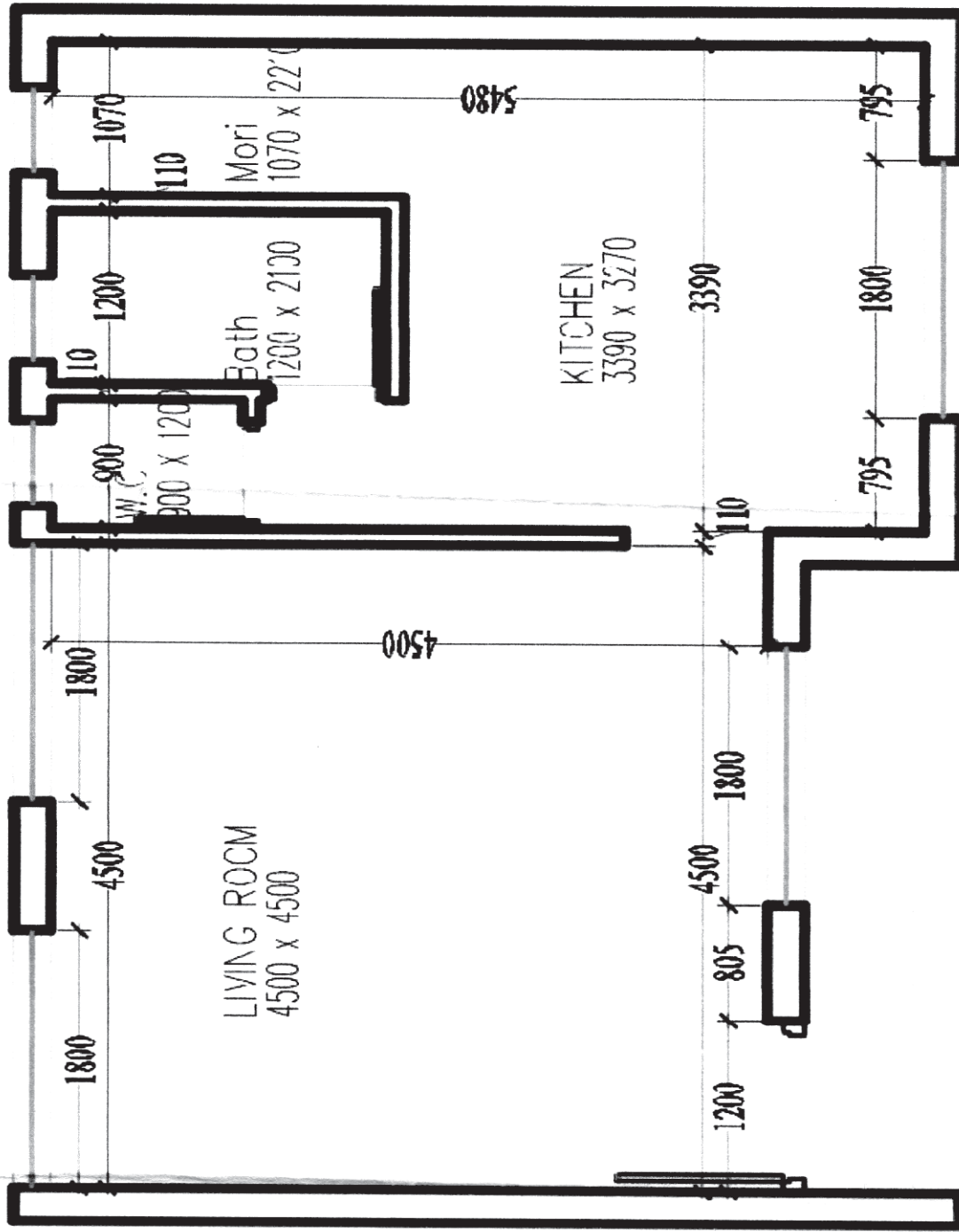a. Both Ends Fixed Le= 0.65L
b. One End Fixed other end Hinged Le = 0.8L
c. Both Ends Hinged = 1.0L
d. One End Fixed One End Free Le=2L

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	$h/b_t > 1.2$: $t_t \leq 40$ mm	z-z y-y	a b
	$40 \leq$ mm $< t_t \leq 100$ mm	z-z y-y	b c
	$h/b_t \leq 1.2$: $t_t \leq 100$ mm	z-z y-y	b c
	$t_t > 100$ mm	z-z y-y	d d

All Dimensions in mm

LIVING ROOM
4500 x 4500

KITCHEN
3390 x 3270

Mori
1070 x 2200

Bath
1200 x 2100

W.C
900 x 1200

5480

3390

4500

4500

4500

1800

1800

1800

1800

1800

1200

1070

1110

1200

10

900

110

795

795

805

[5874]-06

S.Y. B. Architecture

BUILDING SERVICES - II

(2019 Pattern) (Semester - IV) (2201932)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *All questions are compulsory.*

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

3) *Draw neat sketches wherever necessary.*

SECTION - I

Q1) What is Day lighting? Explain day light factor with its components through appropriate sketches.   **[15]**

OR

Explain any two methods of garbage disposal at a town level. Also explain 3R concept in solid waste disposal.

Q2) Write short notes with sketches with label wherever necessary. (any four)**[20]**

     a)   Lumen method.

     b)   Direct & Indirect lighting.

     c)   Types of conduct wiring.

     d)   EPABX system.

     e)   Task Lighting & Mood lighting.

     f)   Types of earthing.

Q3) A general office measuring 14m × 8m × 3.5m is to be illuminated to a design level of 400 Lux using 85 watts fluorescent having a BZ classification 3 (class). The fittings are to be flushed with the ceiling & working plane is 0.85m above the floor. Design a lighting system for office when installed Lux is 8000 Lumen per fitting. **[15]**

OR

What is Biogas system? Explain Janata model with neat sketches.

Q4) Write short notes with sketches with label wherever necessary. (any four)**[20]**

a) Three phase supply.

b) Distribution board.

c) Types of switches.

d) Differentiate between LAN, MAN & WAN.

e) Lightening arrester.

f) Which are the Network communications Devices?

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[5874]-07

Third Year B. Architecture
BUILDING CONSTRUCTION AND MATERIALS - V
(2019 Pattern) (Semester - V)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1)   All questions are compulsory.

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

3)   Neat diagrams must be drawn wherever necessary.

4)   Figures to the right indicate full marks.

5)   Assume suitable data if necessary.

SECTION-A

Q1) Draft plan and section of suspended ceiling using exposed grid system for a living rooms of size 4.5M×3.5M.   **[10]**

   a)   Draft enlarged detail of light fixing.   **[5]**

   b)   Draft enlarged detail of hanger in falseceiling system.   **[5]**

OR

Draft plan and section of T.W. single bed without storage.   **[20]**

   a)   Draft plan and section to scale of 1:10.

   b)   Draft any two joineries to the scale of 1:5.

Q2) Answer the following (Any three).   **[15]**

   a)   Sketch detail section showing the waterproofing treatment for the basement.

   b)   Differentiate between the buttress and counterfort retaining wall.

   c)   Explain with sketch raft foundation.

   d)   Sketch any two details of shelf fixing in a shoe rack unit.

   e)   Write a short note on the cavity drain system in basements.

P.T.O.

SECTION-II

Q3) Answer the following (Any seven). [35]

   a)   Write a short note on a flat slab.

   b)   Write a note on the ingredients of paints.

   c)   Write a short note on post-tensioning.

   d)   Differentiate between laminate and venener.

   e)   Sketch and describe the waffle slab.

   f)   List five advantages and disadvantages of plastics.

   g)   Write advantages of band beam flooring.

   h)   Write short notes on a ribbed slab.

   i)   Write a note on different types of boards used in furniture work.

   j)   Write short notes on pre-stressed slabs.

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[5874]-08
T.Y.B. (Arch.)
THEORY OF STRUCTURES - V
(2019 Pattern) (Semester - V)

Time : 2½ Hours] *[Max. Marks : 70*

*Instructions to the candidates:*

1) *Question No. 1 and 5 are Compulsory in each Section. Attempt any two questions from remaining from each section.*
2) *The Plan given Below applies to questions in Both Sections.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data where necessary only.*
5) *Use M 25 Grade concrete and Fe 500 grade steel.*
6) *Every R.C.C. Design should be accompanied by relevant Schedule and Reinforcement Sketch.*
7) *Use of non-programmable Calculators and Standard Steel Tables of Plastic Design Allowed.*

Plan for Section 1 and Section 11
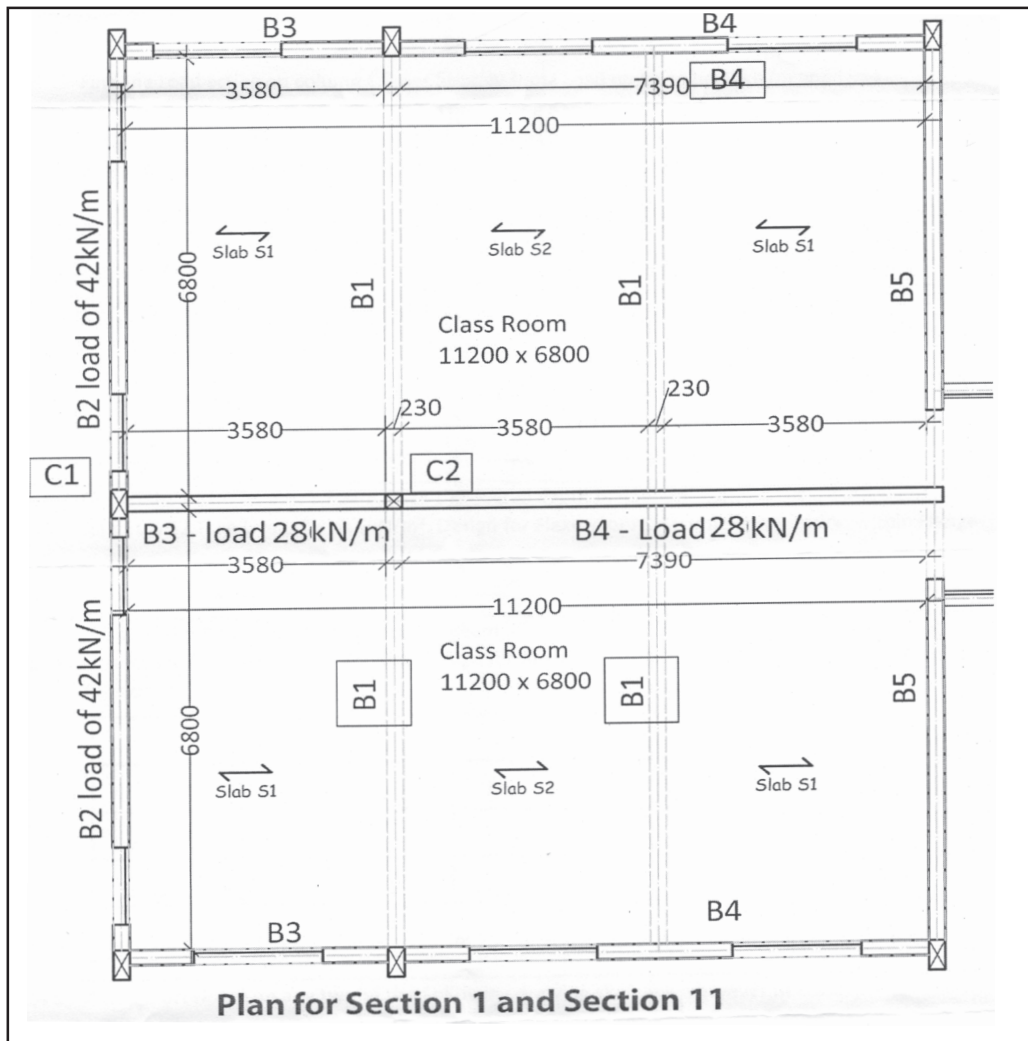
SECTION - I

Q1)
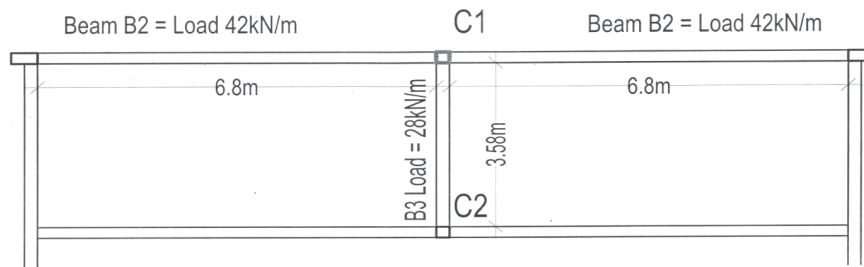
Find the Load acting on column C1 per floor. Assume Load on B2 to be 42kN/m and Load on B3 to be 28kN/m. Calculate Load on every Floor considering Parking + 5 Floors. Design Column of 230mm width on First Floor using 3% steel and M25 Grade Concrete. Keep the Size same and Design Column on Parking Floor. Make Schedule and Draw Sketch of reinforcement of both the columns. **[13]**

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

Q2) a) Design the Beam B1 as a T Beam. Take the overall depth to 450mm. Assume Slab Depth = 150mm of Slab S1 & S2 Take Live Load as 5kN/m^2. Design for Flexure only. Assume N.A Position within Flange. **[8]**

b) Explain a 3 situations in which reversal of Stresses in Beams leads to Doubly Reinforcing it. **[3]**

Q3) a) Design Beam B4 as a Doubly Reinforced Beam of Clear Span 7.39m to carry an u.d.l of 28kN/m. Restrict the Overall depth to 450mm. Design for flexure only. Consider 2 rows of 20mm bars in Tension. **[8]**

fy in N/mm²	d' / de			
	0.05	0.1	0.15	0.2
fsc for fy = 415 N/mm²	355	353	342	329
fsc for fy = 500 N/mm²	424	412	395	370

b) Explain why Flanged Beams for a cantilever will be at the top of the slab and not at bottom. **[3]**

Q4) a) Write Short Notes on any two of the Following drawing sketches wherever necessary **[8]**

  i) Raft Foundations - Need and Types

  ii) Coffered Slab Construction - Structural Action and Applications

  iii) Proportioning of a Flat Slab

  iv) Situations where eccentricity of Loading Develops in a Column

b) Explain the Situations in which a Combined Footing needs to be provided. **[3]**

SECTION - II (Solve Any Three)

Q5) a) Beam B4 of span 7.39m and service Load of 28kN/m is to be replaced by ISMB 300 with $Zp = 651700 mm^3$. Calculate the thickness of 180mm wide Flange Plates to be welded to each flange. Check the Built up Section for Bending Strength only. Izz of ISMB 300 = 98210000mm⁴. No need to Classify the Section or Check for Shear and Deflection. **[13]**

OR

Column C1 carrying Service Load of 2200kN is of ISHB 350 of Area = 8591mm² with 16mm thick flange plates on either side. Calculate the width of the Flange Plates. Consider Length of 6460mm with Both Ends Fixed along Y direction which is the Governing Axis. Iyy of Bare Section = $2451 \times 10^4 mm^4$. Design Compressive Stress for S.R of 40, 50 and 60 is 198, 183 and 168N/mm² respectively. (Hint Assume Compressive Strength to begin Design Process = 180N/mm²) **[8]**

b) Write a Short Note on the Advantages of Plate Girders - Need and Parts. **[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/m³, Density of Mansonary = 25kN/m³
Top Width of Wall = 1.3m, Take Bottom Width of wall = 0.6h.
Height of Wall = 5.0m = h
Angle of Repose = 25°, Coefficient of Friction μ = 0.6, S.B.C of Soil = 225kN/m²
Calculate Maximum and Minimum Pressure at Base and Comment. **[8]**

b) What are the Assumptions in Rankine's Theory of Earth Pressures? **[3]**

Q7) a) List the Dis - Advantages of Pre - Stressed Constructions over conventional R.C.C. Construction. A Pre - stressed beam of size 230mm×450mm is used as Beam B4 It carries an udl of 28kN/m over its entire span of 7.39m inclusive of its self-weight. It is pre-stressed by tendons supplying 1400kN force. **[3]**

b) Which are placed at 75mm 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 230mm × 650mm C1 to carry a load of Service Load of 1750kN in a Soil of S.B.C 250kN/m². Assume 0.25% Steel and Design Shear Stress as 0.36N/mm² for the assumed % of Steel. Do not Design or Check for Double Shear. No Need to Draw Reinforcement Diagram. **[11]**

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[5874]-09

T.Y. B.Arch.

BUILDING SERVICES - III

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

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

  1) *Answer all questions.*

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

  3) *Assume suitable data if necessary.*

SECTION - I

Q1) Explain with neat sketches the different passive strategies that can be used for Heating and Cooling of a building. **[15]**

OR

Explain the various parameters associated with Human Comfort conditions. Explain with sketches various Natural Ventilation strategies. Explain what is mechanical ventilation?

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

  a) Axial Flow Fan.

  b) Evaporative cooling.

  c) Sensible Heat and Latent Heat.

  d) Wind catcher.

  e) Psychrometric chart.

  f) Centrifugal Fan.

P.T.O.

Q3) Draw and describe Refrigeration cycle in the process of Air Conditioning. Describe the purpose and function of each of the system component with appropriate sketches. **[15]**

OR

What is the function of an Air Handling Unit (AHU) of Central Air Conditioning system of a building? Explain location criteria of AHU in the building and network of distribution ducts.

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

a) Central DX plant.

b) Types of filters used in Air Conditioning.

c) Cooling Tower and its types.

d) Window Type Air Conditioner.

e) Explain role of compressor and refrigerant in refrigeration cycle.

f) Expansion valves.

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[5874]-10
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 side indicate full marks.*

   3)   *Assume suitable data if necessary.*

   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 fy = 250 N/mm². Use L.S.M. of Design.*

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

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

   8)   *Use of approved standard steel tables in LSM and Wind Load Tables allowed.*

SECTION - I

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

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

Show all Beams. Restrict Depth of Beams to **550 mm**. Indicate depth on plan and the Span to Depth Ratio considered for type of beam.

Show Spans of all Slabs (Including Staircase) and Indicate Depth considered, **Span to Depth Ratio**. Slab depths to be restricted to 125 mm. Staircase Slab depth upto **200 mm**.

No Columns to be provided within the Main Halls.

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

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

a) Top width of stem - 250mm Width of base - 3100mm S.B.C. of soil - 250 kN/m²

b) Bottom width of stem - 520mm thickness of base - 500mm Density of soil - 17 kN/m³

c) Height of stem - 5400mm Toe projection - 750mm Coefficient of friction - 0.6

d) Density fo Concrete - 25 kN/m³ Angle of repose - 28°

Check the stability of the retaining wall with respect to Over Turning and Sliding.

Q3) a) List and explain the Dis-Advantages of a Bolted Connection. **[3]**

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

i) Spacing of Trusses = 4.2m, Span of Truss = 15m and Height of Truss = 2.6m.

ii) Roof Covering = G.I. Sheets.

iii) Spacing of Purlins = 1.75m

iv) Neglect Wind Load.

Angle Section	Zezz in mm³
ISA 75x50x6	6700
ISA 75x50x8	8000
ISA 75x50x10	10400
ISA 75x50x12	12700
ISA 80x50x6	7500
ISA 80x50x8	9000
ISA 80x50x10	11700
ISA 80x50x12	14400
ISA 90x60x6	11500
ISA 90x60x8	15100
ISA 90x60x10	18600
ISA 90x60x12	22000

Angle Section	Zezz in mm³
ISA 100x65x6	14200
ISA 100x65x8	18700
ISA 100x65x10	23100
ISA 100x75x6	14400
ISA 100x75x8	19100
ISA 100x75x10	23600
ISA 100x75x12	27900
ISA 125x75x6	22200
ISA 125x75x8	29400
ISA 125x75x10	36300

Angle Section	Zezz in mm³
ISA 125x95x6	23100
ISA 125x95x8	30600
ISA 125x95x10	37800
ISA 125x95x12	44800
ISA 150x75x8	41700
ISA 150x75x9	51600
ISA 150x75x10	61200
ISA 150x115x8	44200
ISA 150x115x10	54900
ISA 150x115x12	65300
ISA 150x115x15	80400

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

a) Reinforcement detailing in a Square Water Tank.

b) Difference in Structural Action in the Stem of a R.C.C. Cantilever Retaining Wall and the Upright Slab of a Counterfort Type Retaining Wall.

c) Check list before concreting of columns on Site.

d) Failure of Bolted Connections.

SECTION - II

Q5) A factory building is to be built over a plinth area of 15.5m × 33m. **[15]**

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

    b) Use a Fink Truss. Draw the 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 Purlin (You may use Thumb Rules for the same).

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

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

Q6) Desing a Compound Stanchion consisting of 2no ISMC placed front to front with a Battened Lateral system to take a load of 1500kN. Height of the Stanchion is 9.5m, with both ends fixed in both directions. (Hint: Assume Stress = 200 N/mm²). Assume End Battens of Size 200mm × 8mm and Intermediate Battens 150mm × 8mm wide. Draw Sketch. **[10]**

Q7) Attempt any two : **[10]**

    a) Write a short note on Structural Action of Barrel Vaults.

    b) Write a short note on Out Rigger Systems used in High Rise Buildings.

    c) Write a short note on Structural Action on a R.C.C. Dome.
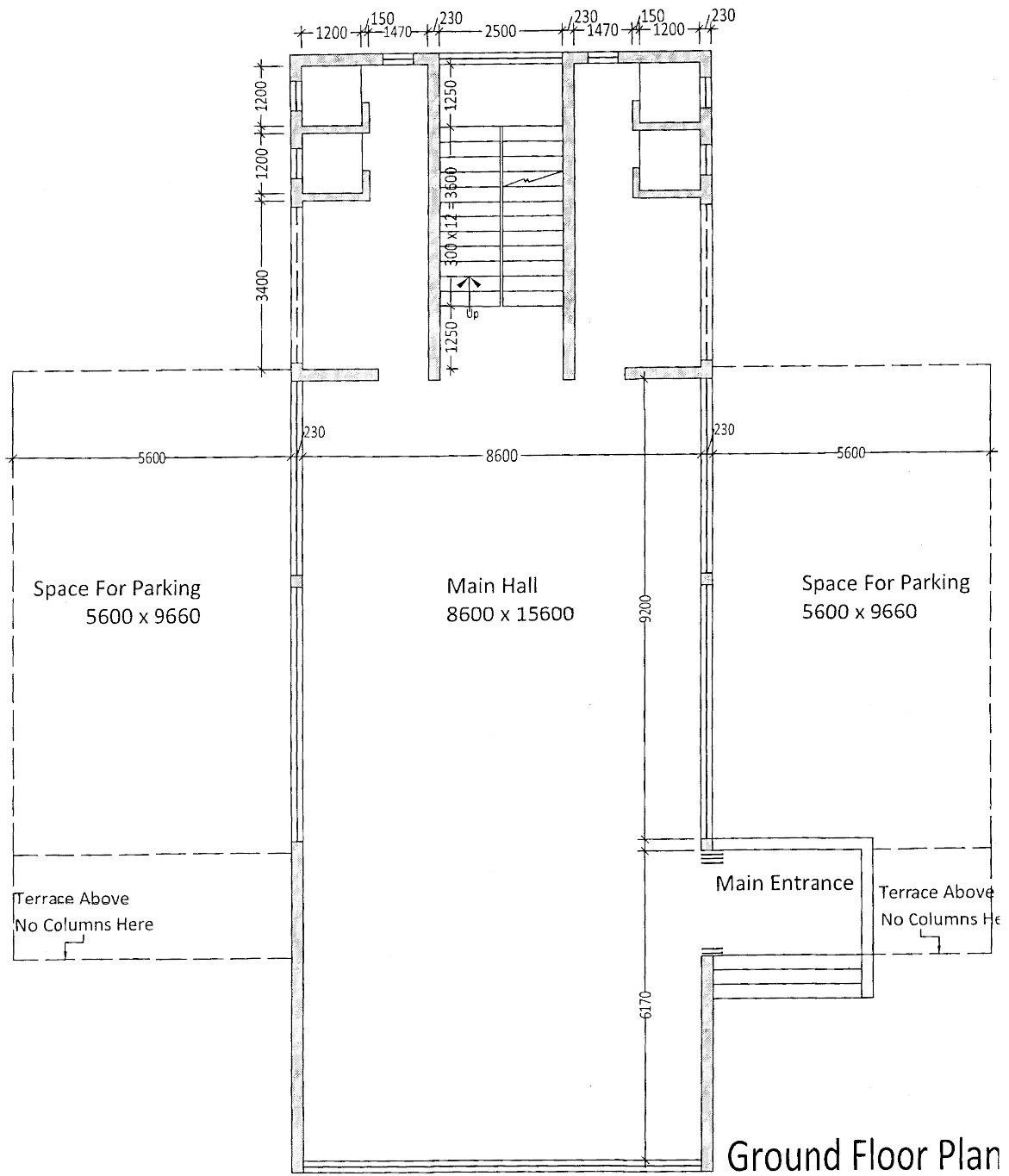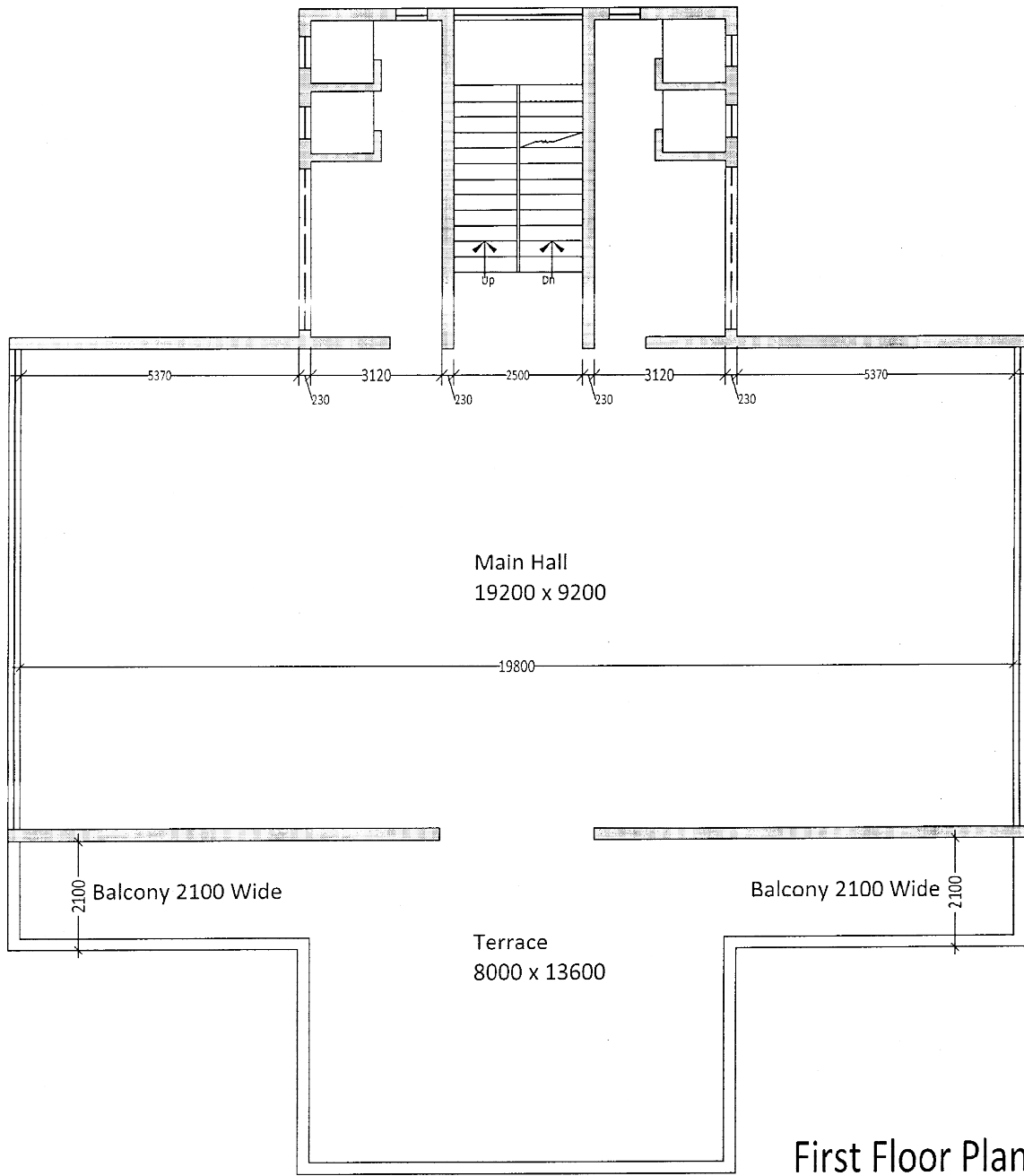
<div align="center">OR</div>

Design a Tension Member to take a Service load of 140kN. It is to be bolted with 20mm Bolts. Design the Bolted connection. Use $\beta = 1.08$. **[10]**

Q8) Calculate Design equivalent static wind forces on an R.C.C. Multistory building having size 10m × 20m × 30m located in Pune in a flat land Average storey height is 3m and frames are spaced at 5m c/c in both directions. The building is oriented with smaller dimension facing the wind. **[10]**

$v_b = 39$m/s, $k_1 = 1$, $k_3 = 1$, $k_4 = 1$, $k_d = 0.9$, $k_a = 0.9$, $k_c = 0.95$, $c_f = 1.35$. 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.

Space For Parking
5600 x 9660

Main Hall
8600 x 15600

Space For Parking
5600 x 9660

Terrace Above
No Columns Here

Main Entrance

Terrace Above
No Columns He

Ground Floor Plan

Main Hall
19200 x 9200

19800

5370   3120   2500   3120   5370

230   230   230   230

2100   Balcony 2100 Wide

Balcony 2100 Wide   2100

Up   Dn

Terrace
8000 x 13600

First Floor Plan

[5874] - 11
T.Y. B. ArcH.
BUILDING SERVICES - IV
(2019 Pattern) (Semester - VI) (3201950)

Time : 2½ Hours]   *[Max. Marks : 70*
Instructions to the candidates:
   1)   *All questions are compulsory.*
   2)   *Figures to the right indicate full marks.*

SECTION - I

Q1) Explain with sketches, various methods of controlling the structure Borne noise in construction of lecture room. **[15]**

OR

What is Reverberation and Reverberation time. Explain method of calculation of reverberation time. What is the different strategies for optimization of reverberation time of an auditorium? **[15]**

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

   a)   Method of cutting of air borne noise.

   b)   Acoustical shadow.

   c)   Direct and indirect sound.

   d)   Sound foci and Dead spot.

   e)   Sound absorption coefficient.

   f)   Defects of Sound.

SECTION - II

Q3) Explain with the help of neat sketches, different type of sprinkler system and their advantages and disadvantages. **[15]**

OR

Explain Building regulations for high-rise building in-terms of five protection system with neat sketches.

P.T.O.

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

    a)   Classification of fire.

    b)   Sprinkler system

    c)   Fire hydrants

    d)   Dry risers and wet risers

    e)   Fire resistance of materials

    f)   Fire Tower

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[5874]-12

T. Y. B. Arch.

ARCHITECTURAL DESIGN - V

(2019 Pattern) (Semester - VI) (3201945)

Time : 12 Hours]

    (First Day : 6 Hours)

    (Second Day : 6 Hours)   *[Max. Marks : 100*

Instructions to the candidates:

    1)   *Do not write anything on question paper except seat no.*

    2)   *Your design will be valued as a whole.*

    3)   *Assume suitable data, if necessary.*

    4)   *The candidate must submit Layout plan to 1:200 scale and schematic floor plan and section to 1:100 scale at the end of the first day. These sketches will not be returned to the candidate 's subsequent day. Candidate should avoid serious and abrupt deviations from the sketches (Planning scheme and Concept) submitted on the first day.*

    5)   *The drawings should be self explanatory with requisite graphics, nomenclature, dimensions, levels and structural concept clarity.*

INSTITUTIONAL LIBRARY AT PUNE

A **library** is a collection of materials, books or media that are easily accessible for use and not just for display purposes. A library provides physical (hard copies documents) or digital access (soft copies) materials, and may be a physical location or a virtual space, or both. A library's collection can include printed materials and other physical resources in many formats such as DVD, CD and Cassette as well as access to information, music or other content held on bibliographic databases.

Project is to design library for education institution and to provide space for self- study and interaction. Light in a library must be adequate for the user to see a particular task, usually for reading purpose and visual comfort. The first requirement is enough Natural light distributed over the area of the page or the screen so that the information can be readable.

P.T.O.

SPACE PROGRAM :

1. Plot Area (80m × 60m)
2. 15m wide main road situated on the east side (Refer to the attached site plan)
3. Road side setback for building - 6.00 mts
4. All other setbacks - 4.50 mts
5. The detail requirements of the building are as follows (carpet area is mentioned)

REQUIREMENTS AND AREAS :

Space requirements

Sr. No.	PARTICULARS	No.	AREA IN SQ. M
1	Entrance Lobby + waiting + bag storage	1	60
2	Issuing centers	1	35
3	Receiving and display		As per design
4	Librarian Cabin attached toilet	1	40
5	Library assistant cabin	2	15
6	Clerk, account area	1	30
7	Xerox and printing	1	25
	Conference Room	1	60
	New books display + book review area	1	40
8	Store room	1	15
9	Record room	1	30
10	Stack area	1	150
11	Reading hall	1	180
12	Reading hall (reference section)	1	100
	Informal reading area	1	As per design
13	Digital library	1	60
14	Classrooms	2	80
15	Toilet for ladies and gents		30
17	Cafe	1	60
16	Parking		5 four-wheelers, 20 two-wheelers
	Built-up		1010 sq.m.
	Circulation 15%		151
	Total Built-up		1161 sq.m.

DESIGN PARAMETERS :
1. Maximum ground coverage 50% of the plot area.
2. Maximum ground plus one floor to be considered.
3. Adequate horizontal and vertical circulation areas over and above the mentioned areas to be provided.

DRAWING REQUIREMENTS - DAY ONE :

		Scale
i.	Single line Site layout	1:200
ii.	Single line floor plans with at least one schematic sction	1:100

FINAL DRAWING REQUIREMENTS :

No.	**Drawings**	**Scale**
i.	Location plan with building outline on site 1:200	1:200
ii.	Site plan cum ground floor plan showing site development and interior layout respectively	1:200
iii.	Structural grid to be shown 1:100	1:100
iv.	Sections (minimum 2)	1:100
v.	Elevation (roadside)	1:100
vi.	Sketch view	1:100

SITE PLAN :

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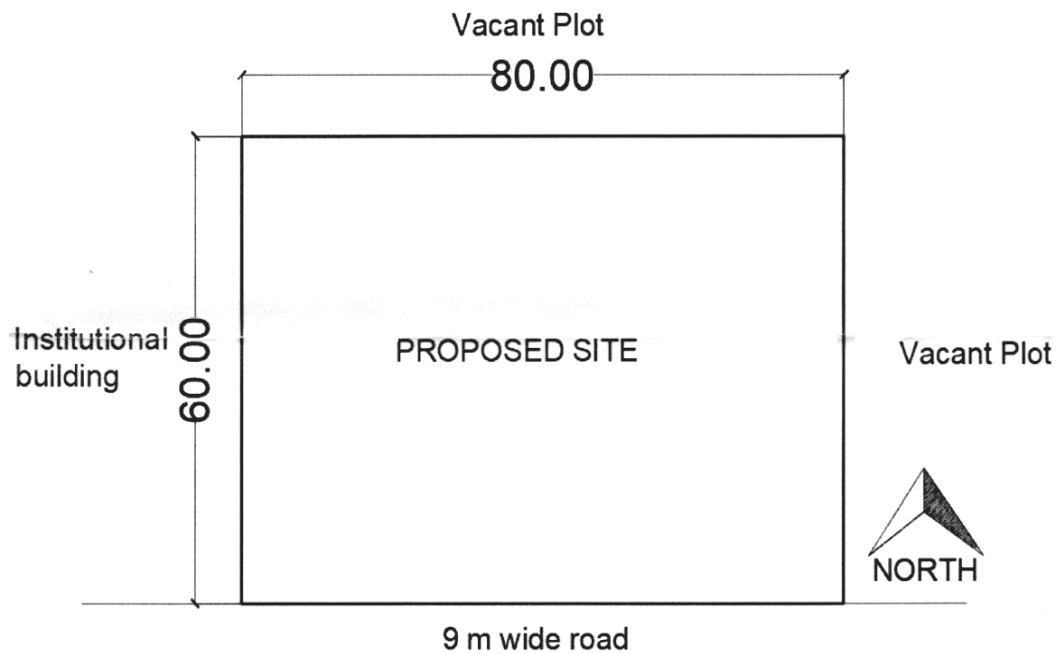
[5874]-14

Third Year B. Architecture

BUILDING TECHNOLOGY AND MATERIALS - VI

(2015 Pattern) (Semester - VI) (3201547)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *All questions are compulsory.*

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

3) *Neat diagrams must be drawn wherever necessary.*

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

5) *Assume suitable data, if necessary.*

SECTION - I

Q1) Draft steel truss suitable for 12.00 M. Span. Show raffers, main tie, and diagonal ties consisting of double angles placed back to back between which 10 mm gusset plates are fixed. **[20]**

a) Draw elevation of Truss

b) Draw detail of Truss resting on steel stanchion.

c) Ridge detail.

OR

Design a room of size 3.0M × 3.0M using Modular coordination system developed by CBRI. Draw the following.

a) Framing plan of cabin

b) Section of cabin

c) Details of any slab system.

P.T.O.

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

a) Describe pressures on retaining wall, and failure of retaining wall.

b) List and sketch any five types of retaining wall.

c) Sketch and identify retaining wall terminology.

d) Draw sketch of extrenal tanking to basement.

e) What are design considerations involved in single Basement for access (ramp. lift and staircase) and fire fighting.

SECTION - II

Q3) Answer the following (Any Seven) : [35]

a) List & describe any five types of glass used in building.

b) Describe galvanization with its advantages & disadvantages.

c) List different types of plastic and their application as a building material.

d) What is natural and synthetic rubber?

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

f) How do beam-column joints in RC building resist earthquake?

g) Why short columns cause more damage during earthquakes?

h) What is base isolation?

i) How seismic dampers control damage of RC building.

j) What is advantage of shear wall in RC building?

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[5874] - 15
Fourth Year B.Arch.
PROFESSIONAL PRACTICE - I
(2015 Pattern) (Semester - VII) (Theory)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :

1) *Answers to the two sections I and II must be written on separate answer books.*
2) *Answers to Question No.1 from section I and Question No.5 from section II are compulsory.*
3) *Attempt any two out of the remaining questions in each section.*
4) *Figures to the right indicate full marks.*

SECTION - I

Q1) Why Architecture is considered as a profession and not business? Explain basic difference between business and profession. **[15]**

OR

Who can use the title 'Architect'? What are the duties and responsibilities of an architect w.r.t. the following points.

- Clients
- Council of Architecture or the institute in which he is a member
- Professional brothers
- Society
- Conduct in promoting himself.

Q2) Mention the provisions under Architect's Act 1972. Explain the power and functions of Council of Architecture as prescribed in the Architect's Act 1972, along with composition of the council of Architecture. **[10]**

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

    a)   Enlist the various departments in an Architect's office. Sketch a layout or three diagram of an Architect's office.

    b)   Enlist the various types of insurance. Explain indemnity insurance.

    c)   Explain : - T.D.S. and E.P.F.

Q4) What are the codes of professional conduct - 1989 under the Architect's Act 1972?   **[10]**

SECTION - II

Q5) As an architect, how would you like to establish your own firm : Proprietary or partnership (mention the partners), explain with advantages and disadvantages of each type.   **[15]**

OR

What are the purposes of organisation of Architectural competitions? What is the necessity to follow the guidelines laid by council of Architecture? Explain the types of Architectural competition as prescribed by council of Architecture.

Q6) Write short notes (any 2) :   **[2 × 5 = 10]**

    a)   Registrar of council of Architecture.

    b)   Duties and Responsibilities of the client towards architect.

    c)   Functional structure of ITA & details of membership of ITA.

Q7) Enlist the various stages of services offered by an architect to a client for a small bunglow. Mention the percentage of professional fees charged at every stage.   **[10]**

Q8) Explain the brief history and procedure for getting membership of the organisation (any 2) :   **[2 × 5 = 10]**

    a)   IIID

    b)   IUDI

    c)   ITPI

    d)   ISOLA

▽ ▽ ▽ ▽

[5874] - 16

Fourth Year B.Arch.

QUANTITY SURVEYING AND ESTIMATION - I

(2015 Pattern) (Semester - VII)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :

　　1)　All questions are compulsory.

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

　　3)　Neat sketches must be drawn wherever necessary.

　　4)　Figures to right indicate full marks.

　　5)　Assume suitable data wherever necessary.

SECTION - I

Q1) Work out quantities for the following items of work based on the details given in the accompanying diagram Fig. 1. (any three) :　　　　　　　**[15]**

　　a)　P.C.C 1:4:8 below footing

　　b)　R.C.C beams in 1:2:4

　　c)　Dado tiles only for bath and wc upto 2100mm height

　　d)　Internal plaster for walls and ceiling - Hall only

　　e)　Skirting in bed 100 wide.

P.T.O.

Figure. 1.
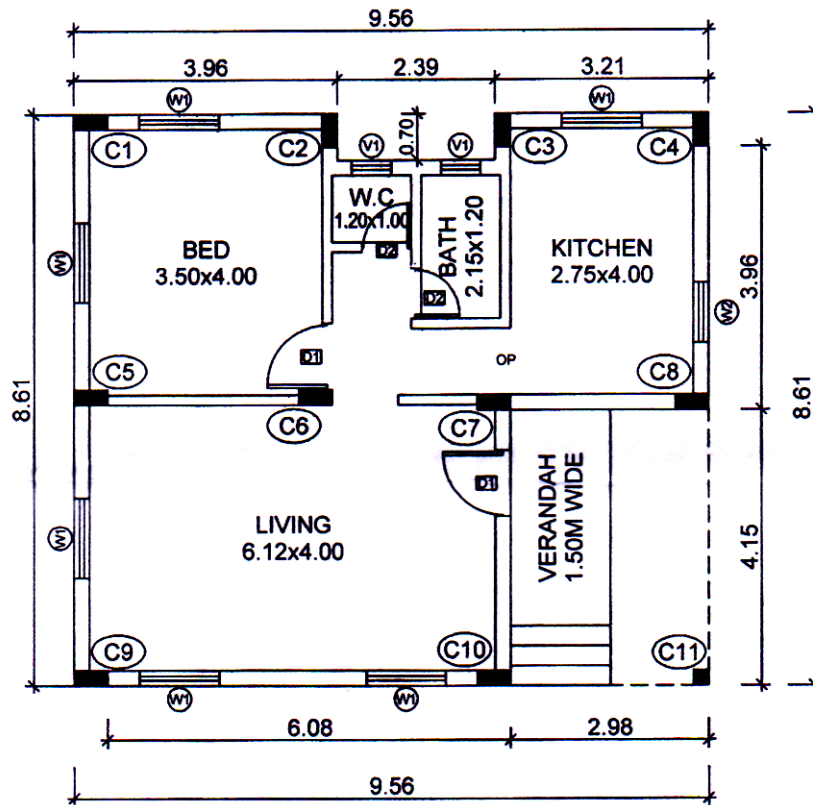

```
DATA:

RCC FOOTINGS              : 1.20M x 1.50M
  D : 500, d : 200
FLOOR TO FLOOR HEIGHT    : 3.20M
RCC COLUMNS : C1-C10     : 0.23M x 0.50M
RCC COLUMNS : C11        : 0.23M x 0.23M
RCC BEAMS                : 0.23M x 0.50M
CILL LEVEL               : 0.90M
LINTEL LEVEL             : 2.10M
SLAB THICKNESS           : 0.15M
PLINTH LEVEL             : 0.60M
DEPTH OF EXCAVATION      : 1.50M
FROM GROUND LEVEL
D1 : 1000x2100 ; D2 : 750x2100
W1 : 1200x1200 ; W2 : 900x1200 ; V : 600x900


ASSUME SUITABLE DATA AS REQUIRED
```

Q2) State the unit of measurement as per IS Code 1200 (any five) : **[5]**

    a)   Exavation in hard murrum

    b)   Vitrified tile flooring

    c)   WC in toilet

    d)   15 amp. Electrical powerpoint

    e)   Chain link fencing

    f)   Inspection chambers

    g)   PCC under footing and foundation

Q3) Work out quantities for the following items of work based on the details given in the accompanying diagram Fig. 2. (any three) : **[15]**

    a)   Brick masonry in superstructure

    b)   Oil bound distemper painting only for ceiling

    c)   Foundation wall in RR masonry

    d)   Excavation for foundation

    e)   Murrum filling

Figure 2.

PLAN

DOOR-WINDOW SCHEDULE
D_1 = 1.10x2.10
D_2 = 0.90x2.10
G_1 = 1.20x2.10
W_1 = 1.80x1.40
W_2 = 1.20x1.40
W_3 = 1.50x1.40
V = 0.60x0.60

NOTES:-

ALL DIMENSIONS ARE IN METER
NOT TO SCALE

[5874] - 16   3
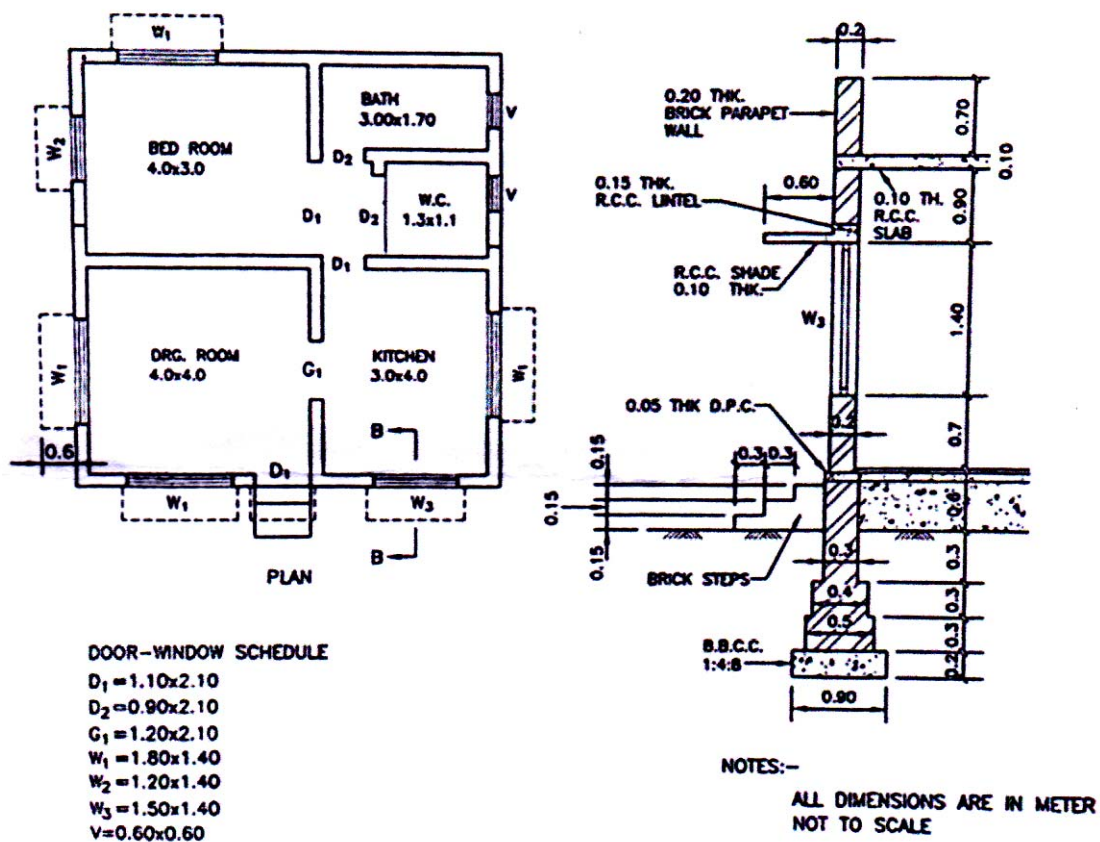
SECTION - II

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

   a)   Work – charged establishment

   b)   Overhead charges

   c)   Service-unit method

   d)   Revised estimate

Q5) Explain in detail the following (any two) : **[10]**

   a)   What are the factors to be considered during preparation of a detailed estimate.

   b)   Different methods of taking out quantities.

   c)   What are the uses of estimate.

Q6) Write the description for an item as described in the Schedule of rates (any two) : **[10]**

   a)   Waterproofing in toilets

   b)   RCC Plinth beam

   c)   Vitrified flooring

▽ ▽ ▽ ▽

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[5874]-17

Fourth Year B.Arch. (Semester - VII)

SPECIFICATION WRITING - I

(2015 Pattern)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

   1) All questions are compulsory.

   2) Answers to the two sections should be written in different books.

   3) Neat diagrams must be drawn wherever necessary.

   4) Figures to the right indicate full marks.

   5) Assume suitable data, if necessary.

SECTION - I

Q1) Define and write need and importance of specification writing. **[10]**

OR

What is the relation between working drawings & specification writing? Explain with examples.

Q2) What are the types of specifications? Explain with examples. **[10]**

OR

What are the advantages of manufacturers specifications over other types of specifications?

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

   a) Glass for aluminium windows.

   b) Formwork for a circular column.

   c) AAC blocks.

   d) Cement concrete.

   e) Bricks.

SECTION - II

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

   a) General Safety precautions on site during demolishion work.

b) Storage of cement on site.

c) Methods of demolishion.

d) types of formwork.

e) Use of manufacturer's guide.

f) Open type specifications.

Q5) Write short notes / Explain the following (any 2) :   **[2 × 5 = 10]**

a) Specifications as an integral part of contract document.

b) What are restricted specification?

c) Water used for building construction, along with its storage on site.

d) Storage of formwork on site.

Q6) Write name (s) of manufacturer for the following: (Any 10).   **[10]**

a) Float glass.

b) Split A/C units.

c) UPVC pipes.

d) Electrical wires.

e) Vitrified tiles.

f) Ply wood.

g) Mild steel.

h) Aluminium sections.

i) UPVC windows / sections.

j) Electrical switches.

k) European W.C.S.

l) Kitchen sinks. (S.S.).

▢▢▢

[5874]-18

Fourth Year B.Arch. (Semester - VIII)
PROFESSIONAL PRACTICE - II
(2015 Pattern) (Semester - VIII)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

1) Answers to both sections I & II shall be written on separate Answer Books.

2) Answers to Q.1 from section - I and Q.5 from. section II are compulsory.

3) Attempt Any Two out of the remaining questions in each section.

4) Figures (in Brackets) to the right of each Question indicate Full Marks.

SECTION - I

Q1) What is the difference between. direct assignment of construction work, and appointment of a. Contractor by a tendering process? State the advantages and dis - advantages of each system. **[15]**

OR

Write a comprehensive note on Construction Management, elaborating the Management of

a) Materials

b) Machinery

c) Manpower

d) Money

Q2) What is the National Building Code (NBC)? Why is the National Building Code Important for building Construction and land development projects? **[10]**

Q3) The Articles of Agreement and Conditions of contract are the two most important components of a Building Construction Contract. Explain why? **[10]**

P.T.O.

Q4) What are the different Types of Tenders? What is the difference between Item - Rate quotations, Lump - sum quotations and percentage quotations?

[10]

SECTION - II

Q5) Write a comprehensive note on the pre - qualification process of Tenders and discuss the advantages and dis - advantages of the system. **[15]**

Q6) Write short notes on Any Two of the following. (5 marks each)**[2 × 5 =10]**

a) Distress value.

b) Defect Liability period.

c) Sinking Fund.

d) Ad - hoc payment of Bills.

Q7) What is arbitration? What are its advantages and dis - advantages if any and what is the procedure prescribed for conducting Arbitrations? **[10]**

□□□

[5874]-19

Fourth Year B. Arch.
QUANTITY SURVEYING AND ESTIMATION - II
(2015 Pattern) (Semester - VIII) (4201567)

Time : 2½ Hours]   [Max. Marks : 70
Instructions to the candidates:
   1) **Answers to the two sections I and II must be written on separate answer books.**
   2) **Figures in brackets to the right indicated full marks.**
   3) **Assume the missing data.**

SECTION - I

Q1) Calculate the quantities for items with the help of the accompanying figure 1
    (any four).   **[20]**
   a)   M.S. Tie member for all trusses
   b)   All struts in single truss
   c)   Principal rafter for all trusses
   d)   GI sheets for roofing
   e)   Rain water gutter
   f)   Ridge cap
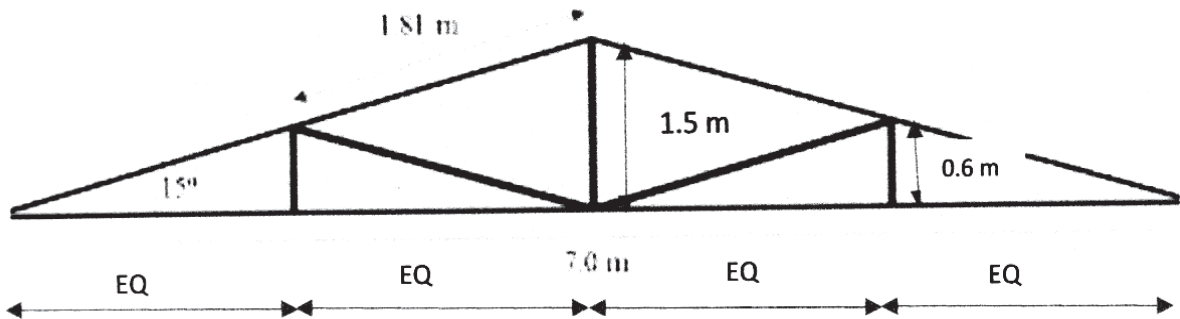
Principal Rafter – ISA 2x65x65x8
Tie member – ISA 2x75x50x8
All Struts – ISA 2x50x50x6
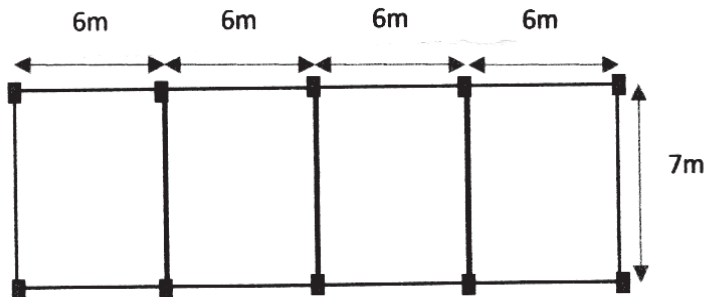
Weight per rmt for members:
65x65x8 – 9.76 kg/mt
75x50x8 – 7.40 kg/mt
50x50x6 – 7.40 kg/mt

Plan of industry shed

Q2) Write in detail the fixtures and fittings required for providing and fixing a kitchen sink and wash basin. **[10]**

Q3) Write the mode of measurement as stated in IS 1200 (any five) : **[5]**

  a) Nahani Trap

  b) GI sheet

  c) Inspection Chamber

  d) Base plate

  e) WC pans

  f) Man hole

  g) Soil pipe

SECTION - II

Q4) What is the direct cost and indirect cost. **[5]**

OR

What are various factors affecting rate of any item of work.

Q5) Prepare rate analysis for unit quantity : (any three) **[15]**

  a) 1 : 2 : 4 PCC at plinth level

  b) 1 : 4 : 8 RCC in column

  c) 1 : 6 UCR Stone Masonry

  d) Polished kota stone flooring in 1 : 3 cement mortar

  e) 12 mm th cement plaster in 1 : 3 cement mortar

Material rates :

Stone - 113/- per cum

Cement - 400/- per bag

Sand - 4000/- per cum

Aggregate - 700/- per cum

Kota stone - 483/- per sqm

Labour rates :

PCC work - 885/- per cum

RCC work - 1090/- per cum

Stone Masonry - 1350/- per cum

Kota stone - 178/- per sqm

Cement plaster - 100/- per sqm

Q6) Prepare indent of material for the following : (any three)　　　　**[15]**

　　a)　18 mm th cement plaster in 1 : 4 mortar for 200 cum

　　b)　230 mm th Brickwork in 1 : 4 mortar for 350 cum

　　c)　RCC beam is 1 : 2 : 4 for 20 cum

　　d)　Kota stone flooring for 70 sqm on 50 mm the bedding in 1 : 3

　　e)　PCC below foundation in 1 : 4 : 8 for 50 cum

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SEAT No. :

[Total No. of Pages : 2

[5874]-20

F.Y. B. Architecture

SPECIFICATION WRITING - II

(2015 Pattern) (Semester - VIII) (4201568)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

   1)   *All questions are compulsory.*

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

   3)   *Neat diagrams must be drawn wherever necessary.*

   4)   *Answers to the two sections should be written in separate books.*

   5)   *Assume suitable data, if necessary.*

SECTION - I

Q1) Write brief specification for Cement concrete roads.   **[10]**

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

Write specifications for WBM roads.

Q2) Write specifications for pavier.   **[10]**

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

Write specifications for escalators.

Q3) Write brief specifications for (any three).   **[3×5=15]**

   a)   Elevators

   b)   Electrician

   c)   Bitumen

   d)   Brick bat coba-waterproofing

   e)   Ramps/pathways for differently abled people, in public places.

SECTION - II

Q4) Write short notes on. (any three) **[3×5=15]**

   a) Specify walkways for visually impaired people.

   b) Checklist for road construction.

   c) Briefly specify Materials for Garden curb.

   d) Write general requirements for garden lighting.

   e) Polymers used for waterproofing, with examples.

   f) Establish the relation between manufacturer's specifications for lifts (elevators) with Architect's working drawings.

Q5) Write short notes / Explain the following. (any two) **[2×5=10]**

   a) Mason

   b) Glazier

   c) Advantages of use of polymers for waterproofing.

   d) Safety measures to be followed for elevator shafts during early stages of construction.

Q6) Write names of manufacturer for the following. (any ten) **[10]**

   a) Elevators.

   b) Concrete paver blocks.

   c) Waterproofing Chemical compounds.

   d) Ready mix concrete.

   e) Electrical wires for elevators.

   f) Company for bitumen road construction.

   g) Equipment for bitumen road construction.

   h) Vitrified tiles for Pathways in gardens.

   i) Mechanical tools for construction, e g breakers.

   j) Cement.

   k) Escalators.

   l) Company constructing Concrete roads.

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[5874]-25
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) *Answers 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 the following for L-junction of the 1½ brick thick double Flemish bond with mortar thickness

a)   Plans of odd and even courses (scale - 1:10)

b)   Elevation of 6 courses (scale 1:10)

OR

Draw a detail of 350 mm thick BUILT TO COURSE square rubble masonry compound wall as follows:

a)   Draw a plan and elevation of stopped end of the compound wall of height 2000mm at scale 1:10

b)   Cross section from foundation to coping at scale 1:10. Assume rubble masonry foundation of depth 1200mm.

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

a)   Sketch any five types of bamboo joinery.

b)   Sketch any five types of pointing.

c)   Elevation of any two types of stone masonry.

d)   Sketch any five tools used in stone masonry.

e)   Sketch alternate courses of detached pier in 1½ brick thick English bond.

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

    a)   What are characteristics of good brick? Explain manufacturing process of bricks.

    b)   Explain load distribution in an arch. Explain with sketches any 3 types of arches.

    c)   What is plastering? Explain any 3 types of plastering techniques.

    d)   What is dead and live load? Sketch and explain any 5 principles of load bearing construction.

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

    a)   Write short note on stabilized mud earth blocks.

    b)   Write short note on bamboo as a construction material.

    c)   Explain purpose of foundation. What is DPC?

    d)   Explain difference between load bearing and non-load bearing structures.

    e)   Explain advantages of concrete blocks.

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[5874]-26
F.Y. B.Arch.
1201904 : THEORY OF STRUCTURES - I
(2019 Pattern) (Semester - I)

Time : 2½ Hours] *[Max. Marks : 70*
Instructions to the candidates:

1) *Q.no. 1 & 5 are compulsory. Solve any 2 from the other 3 in each section.*

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

3) *Assume suitable data, if required, Mention the assumption.*

4) *Use of Non - programmable scientific calculator is allowed.*

SECTION - I

Q1) a) i) Define Lami's Theorem. **[2]**

ii) Explain Vector representation of a force and Bow's notation. **[2]**

b) Calculate the Resultant of the given concurrent forces system. **[9]**
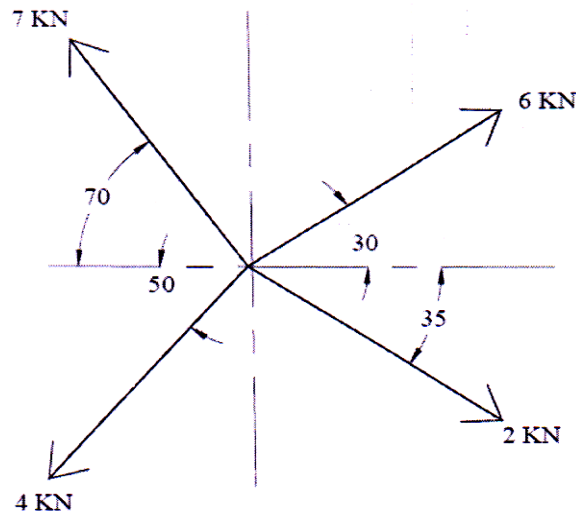
Q2) a) i) Define Hooke's law. **[2]**

ii) Write the Formulae for the relationship between Elastic Moduli. **[2]**

P.T.O.

b) W.r.t. the loaded rod of cross section 50×50 mm, shown below, determine the reaction at the fixed end and stresses in each part of the rod. **[7]**
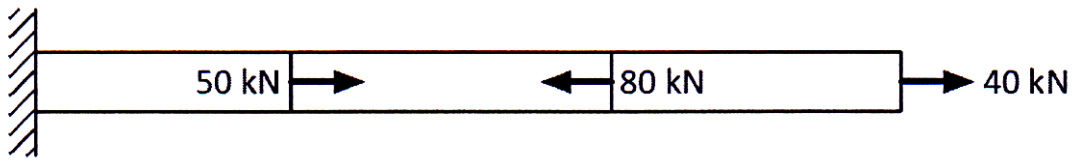

Q3) a) i) Explain the Advantages of Load Bearing Structures. **[2]**

ii) Explain Safe Bearing Capacity (SBC). **[2]**

b) Explain with sketches, Earthquake resistant techniques of load bearing structures. **[7]**

Q4) a) i) Define Young's Modulus. **[2]**

ii) Define Modular ratio and Equivalent area. **[2]**

b) Find stresses in concrete and steel in a RCC column which is subjected to axial compressive force of 1400KN. The column size is 300×550 and it is reinforced with 8 bars of 16 mm diameter bars. Esteel $= 2 \times 10^5$ N/mm² and Econo $= 0.25 \times 10^5$ N/mm². **[7]**

SECTION - II

Q5) A simply supported beam 5m long is loaded with a uniformly distributed load of 8 KN/m and point loads of 3 KN and 6 KN AT 1m and 3m from L.H.S. support respectively, as shown in the fig. Below.

Draw shear force and bending moment diagrams for the beam indicating the point of contra-shear and the value of maximum bending moment. **[13]**
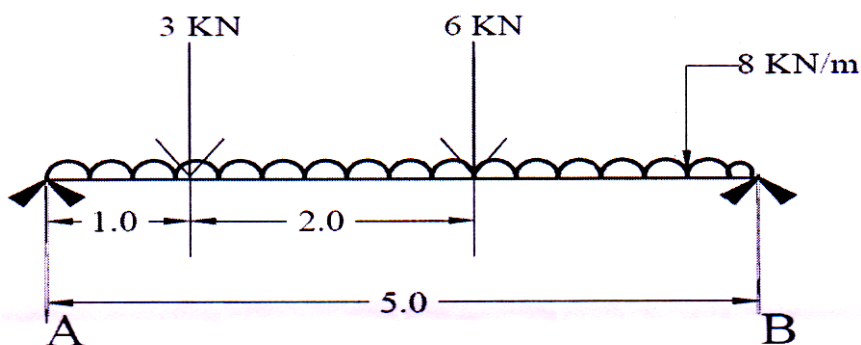
Q6) a) Draw the following beams and explain their degree of indeterminacy w.r.t. to reactions they offer.

    i)   A fixed beam **[2]**

    ii) A propped cantilever Beam **[2]**

  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 1500mm high and 230mm thick wall on its entire span. Take densities of RCC and brick as 25 kN/m³ & 19 KN/m³ respectively. Calculate Support reactions using effective span. **[7]**

Q7) a) i)   Define Centre of Gravity and Centroid. **[2]**

    ii) Define Moment of Inertia with units. **[2]**

  b) Find C.G of the following shape and M.I about Centroidal Axes. Given that the Centroid co-ordinate is at 16 mm from left. **[7]**
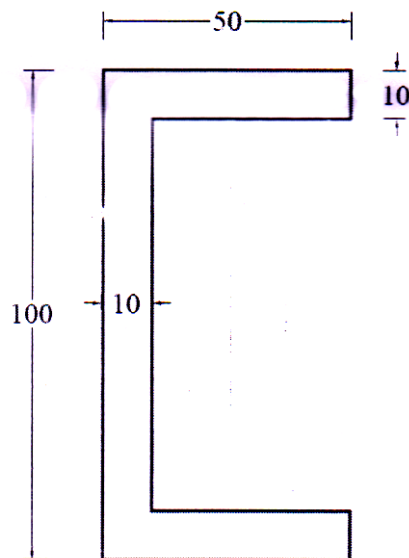
Q8) Draw the Shear force & Bending Moment diagrams for the following standard cases with important values. **[7]**

  a) Simply supported beam with UDL over entire span

  b) Cantilever beam with UDL over entire span

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[5874]-27

F.Y. B. Architecture

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 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]**

A shed of 5.0m × 9.0m internal dimensions needs a king post truss roofing.

a) Draw a key plan at 1:100 scale and elevation of king post truss at scale of 1:20.

b) Any one joinery detail at 1:5 scale.

OR

A store room of 3000 × 4000 mm of size has an opening of 900 × 2100 mm with all thickness of 230 mm. Provide a paneled door for the opening :

a) Plan, section and elevation of the paneled door at scale 1:10.

b) Draw any one joinery detail used in door construction at suitable scale.

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

a) Draw a well labeled section through timber Lean to roof.

b) Draw a joinery between tread and riser in timber staircase.

c) Sketch any 5 types of timber joineries.

d) Sketch any 5 types of tools in timber construction.

e) Sketch any 3 hardware used in Timber doors with nomenclature.

P.T.O.

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

    a)   Explain 2 types of Reinforcement masonry systems with proper sketches.

    b)   Explain with sketches single TW flooring.

    c)   Sketch two types of earthquake waves and how they affect the structure? Explain any two earthquake resistant measures in a load bearing structure.

    d)   Write a not eon seasoning of timber. Draw a cut section showing structure of timber with nomenclature.

Q4) Answer any three of the following (short notes)   **[15]**

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

    b)   Explain with sketches masonry vaults and domes.

    c)   Explain the defects in Timber.

    d)   Write short notes on any two types of Roofing materials used for small span sloping roofs.

    e)   Differentiate between King post and Queen post.

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[5874]-28

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 indicates full marks.*
3) *Assume suitable data, if required mention the assumption.*
4) *Use of non-programmable scientific calculator is allowed.*

SECTION-I

Q1) **Compulsory.**   **[13]**

a)   Define the following terms
   i)   Moment of Resistance.   **[2]**
   ii)   Section Modulus.   **[2]**

b)   A rectangular beam 75mm wide and 150mm deep is loaded as shown below Find the maximum bending stress induced in the beam section. **[7]**
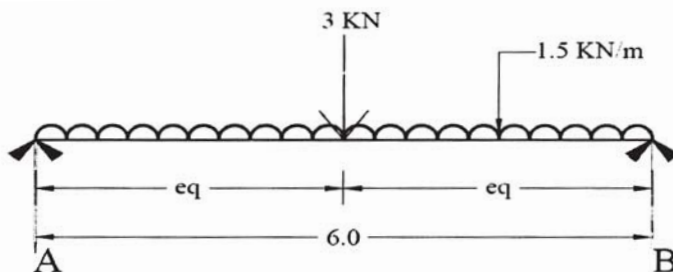
c)   Explain the concept of Neutral axis.   **[2]**

*Q2*   Draw SFD & BMD of the beam shown below. Show the points of contra-shear & contra-flexure.   **[11]**
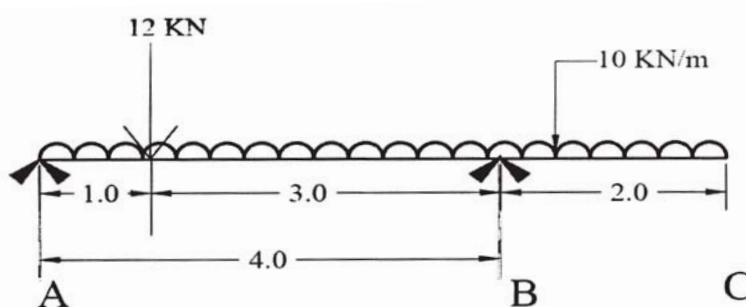
Q3 a) i) Write down the standard formula for Shear Stress across a section and explain the terms. **[2]**

ii) Draw the Shear Stress Diagram across a T cross section showing important values. **[2]**

b) A Beam of size 230mm × 600mm is loaded as shown below. Draw the Shear Strees Diagram. **[7]**
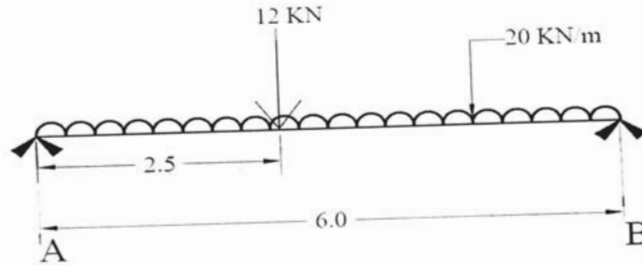

Q4 a) i) What are perfect frames? Explain giving an example. **[2]**

ii) Write the assumptions in solution of perfect frames. **[2]**

b) For the frame shown below, calculate the forces in members AC, AH, CH & HG. **[7]**
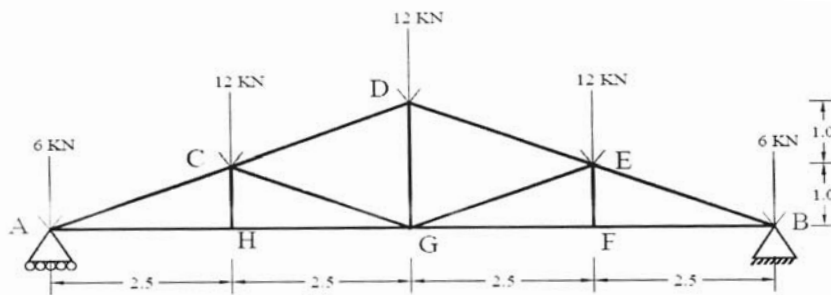
SECTINO-II

Q5 a) i) What are short and Long Columns?. **[2]**

ii) Write down Euler's Formula and explain each term. **[2]**

b) A Concrete Column of size 230 × 600 is used as a column with one end fixed and other free of height 4.2m. If $E = 0.25 \times 10^5$ N/mm², Find the Buckling load. **[7]**

c) Show the effective heights of a column, fixed at both ends, and hinged at both ends. **[2]**

Q6 a) Draw a simply supported beam with full udl. Show the deflection curve, point of max. deflection and point of maximum slope also write down the formulae for the same. **[4]**

b) A wooden beam of size 125mm × 375mm is simply supported over a span of 3m, it carries a udl of 4 kN/m over the entire span and a central point load of 5kN.

Calculate maximum Deflection if $E = 1 \times 10^4$ N/mm². **[7]**

Q7) a) Explain the core a Kernel of the columm with the help of a sketch. **[4]**

b) A masonry column having cross section, 400mm×600mm is subjected to compressive load of 800kN at an eccentricity of 100mm along X axis only. The load is situated between second and third quadrant. Find stresses at four corners. Draw the stress envelope and show tensile zone, if any. **[7]**
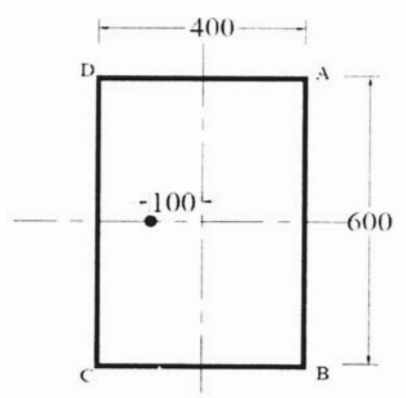
Q8) a) Explain limitations of Euler's theory. **[4]**

b) A hollow square column has cross section 400mm×400mm with 10mm thickness. Height of the column is 4m, with one end fixed and the other hinged. Crushing stress is 320N/mm², $E = 2×10^5$ N/mm². Find the failure laod. **[7]**

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[5874]-51
Fourth Year B.Arch.
409 : TOWN PLANNING
(Bridge 2008 Pattern) (413429)

Time : 3 Hours]   *[Max. Marks : 100*
Instructions to the candidates:

1) *Question 1 and Question 6 are compulsory.*
2) *Answer ANY THREE questions from EACH SECTION from the remaining.*
3) *Answers to the TWO SECTIONS should be written in separate books.*
4) *Draw neat diagrams or sketches wherever necessary.*
5) *Figures to the right indicate marks.*

SECTION - I

Q1) Write a note on Indus valley civilisation. Explain one example with respect to Town Planning.   **[14]**

Q2) Write a note on :   **[12]**

a) Growth of Town

b) Neighbourhood Planning

c) Satellite Town

Q3) Write a note on Radburn Pattern and explain with sketches.   **[12]**

Q4) Describe various types of survey in Town Planning. Explain its importance in Planning Process.   **[12]**

Q5) What are the different types of Housing. Describe with Sketches in Detail.**[12]**

P.T.O.

SECTION - II

Q6) What is the necessity of a Development Plan? How does it help in orderly city development? **[14]**

Q7) Write a note on MRTP Act 1966. **[12]**

Q8) Write a note on the importance of Development Control Regulations. **[12]**

Q9) Write a note on any Two of the following : **[12]**

    a) FSI and TDR

    b) Types of Road junctions

    c) Principles of Urban Design

Q10) Explain the Provision of 74th Amendment in constitution of India. **[12]**

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