Total No. of Questions : 4]

SEAT No. :

P1329

[Total No. of Pages : 2

[5157] -1001
First Year B. Arch. (Semester - I)
BUILDING TECHNOLOGY AND MATERIALS -I
(2015 Pattern)

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

Instructions to the candidates:

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

SECTION -I

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

a) Draw to a scale of 1:10, 315 mm thick Rat trap bond masonary showing.

i) Plans of alternate courses.

ii) Elevation upto six courses.

OR

b) Draw to a scale of 1:10, 450 mm thick square rubble masonary for a length upto 2000mm and upto a height of 1500mm showing suitable coping showing.

i) Plan of one course.

ii) Elevation.

iii) Section assuming foundation depth of 600mm from ground level.

Q2) Answer any three out of five: **[15]**

a) Show with sketch a typical standard size brick with its dimensions and annotation.

b) Describe limitations/restriction of openings in a load bearing structure.

c) Name and sketch any three structural element of a building.

d) Explain with sketch. Concept of load transfer in an arch.

e) Draw sketches of alternate courses of one brick thick wall (230mm thick) in Flemish bond.

P.T.O

SECTION -II

Q3) Answer any two out of three: **[20]**

a) Explain with sketches the construction of entrance steps for a plinth height of 750mm.

b) Explain with sketches showing alternate courses in 'T' junction of $1\frac{1}{2}$ Brick thick walls (350mm thick) in English bond.

c) Explain with sketches difference between English and Flemish bond and their advantages/disadvantages over other.

Q4) Answer any three out of five: **[15]**

a) Classification of rocks.
b) Stabilized mud block.
c) Explain importance of sand in cement mortar.
d) Explain difference between Handmade bricks and Machine made bricks.
e) Explain the concept of 'S' and 'P' waves in earthquakes.

▲ ▲ ▲

Total No. of Questions : 8]

SEAT No. :

P1330

[Total No. of Pages : 3

[5157] -1002
F. Y. B. Arch.
THEORY OF STRUCTURES -I
(2015 Pattern)

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

Instructions to the candidates:

1) ***Q. nos.1 & 5 are compulsory.***
2) ***Solve any 2 questions out of the remaining 3 from each section. Total solve 3 questions from each section.***
3) ***Figures to the right indicte full marks.***
4) ***Assume suitable data wherever required. Mention the assumption.***
5) ***Use of Non-programmable Scientific calculator is allowed.***

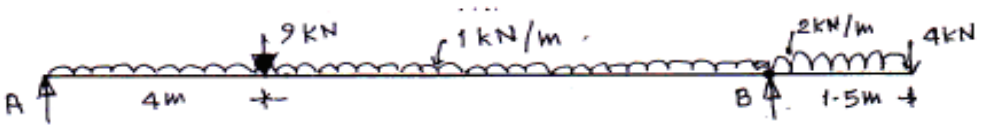
SECTION -I

Q1) For the beam shown in figure below

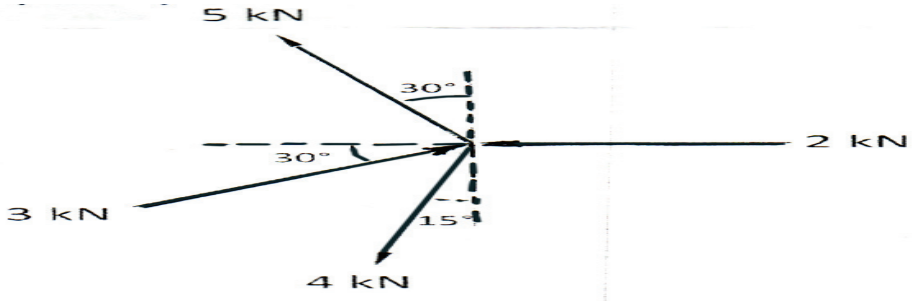
i) Determine reactions at supports **[3]**

ii) Draw the shear force diagram **[6]**

iii) Draw the Bending moment diagram **[6]**



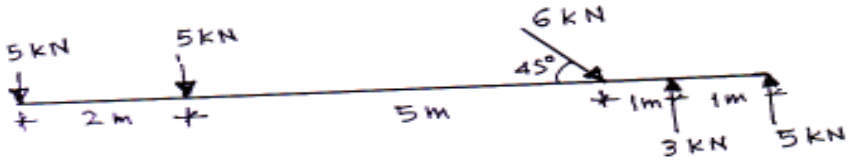
Q2) a) For the concurrent forces shown in figure below, find out the resultant in magnitude & direction, analytically or graphically. **[7]**



b) State the conditions of equilibrium of a system of concurrent or non-concurrent forces. **[3]**

P.T.O

Q3) a) For the non-concurrent forces shown in figure below, find out the resultant in magnitude, direction and position. **[7]**



b) Explain with sketches, Principle of transmissibility of forces. **[3]**

Q4) a) Explain with sketches, Parallel and concurrent forces. **[4]**

b) Explain with sketches, Law of polygon of forces. **[4]**

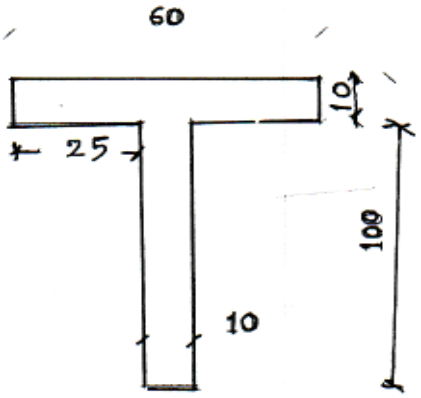
c) Explain with sketches, Moment of a force. **[2]**

SECTION -II

Q5) For the section as shown in figure below

a) Determine the position of C.G. of the section **[6]**

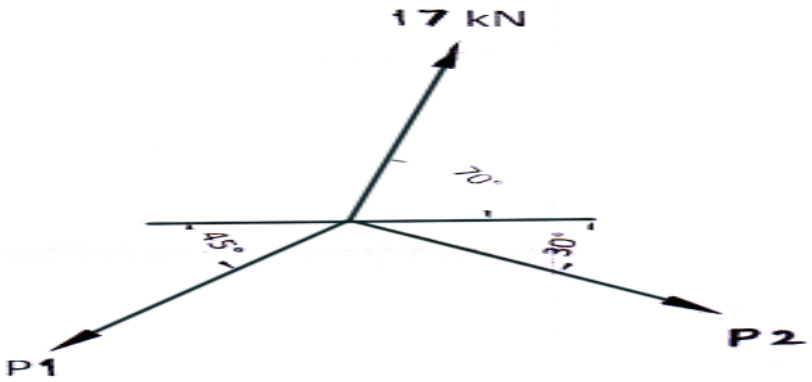
b) Determine the M.I. of the section along both axes passing through its C.G. **[9]**



Q6) a) For the RCC beam of 0.3×0.7×6 M, supporting a wall of 0.23 m thick and height of 3.6 m. find reactions. Take density of concrete = 25 kN/m^3 and density of brickwork =19kN/m^3 **[7]**

b) Define support. Explain with sketches, the difference between hinged and fixed support. **[3]**

Q7) a) If the forces as shown in figure below, are in equilibrium, determine the unknown force P1, P2 **[6]**



b) Define Resultant of a force and Equilibrant force. **[2]**

c) Define Couple. Give examples. **[2]**

Q8) a) What are statically determinate and indeterminate structures? Define degree of indeterminacy with an example of a fixed beam. **[4]**

b) Draw a typical simply supported beam with UDL over the entire span. Draw its SFD & BMD. Mention & show max. values in the diagrams. **[6]**

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Total No. of Questions : 4] **SEAT No. :**

P1331 **[Total No. of Pages : 2**

[5157] -2001
F. Y. B. Arch. (Semester - II)
BUILDING TECHNOLOGY AND MATERIALS -II
(2015 Pattern) (End Sem.)

Time : 3 Hours] ***[Maximum Marks : 70***

Instructions to the candidates:

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

SECTION -I

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

a) Draw plan, section and elevation through a casement window of size 1500mm×1200mm at a scale of 1:10 giving all annotations.

OR

b) A room of size 5.0m×9.0m internal dimension needs a king post truss roofing. Draw key plan at 1:100 and elevation of king post roof truss at 1:20

Q2) Attempt any three questions out of five. **[3×5=15]**

a) Draw and name any three types of lengthening joints.

b) Draw and name any three tools in excavation.

c) Draw proportionate sketches of flat and segmental arch.

d) Draw plan and section through stone and brick type of composite masonry.

e) Describe good qualities of stone for load bearing masonry construction

SECTION -II

Q3) Attempt any two questions out of three. **[2×10=20]**

a) Sketch and explain fixing detail of glass panel in partly glazed door of size 900 mm ×2100mm.

P.T.O

b) Explain and sketch any five terminologies in an arch.

c) Draw plans of alternate courses of both English and flemish bonds in one and half brick thick wall.

Q4) Attempt any three questions out of five. **[3×5=15]**

a) Define magnitude, richter scale, focal point in earth quake.
b) Sketch and explain fixing detail of tread and riser in a timber staircase.
c) Draw and name any five types of carpentary tools used in timber construction.
d) Explain with sketches vaults and domes.
e) Explain with sketches any three joints in bamboo.

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Total No. of Questions : 8]

SEAT No. :

P1332

[Total No. of Pages : 3

[5157] -2002
First Year B. Architecture (End Semester)
THEORY OF STRUCTURES - II
(2015 Pattern)

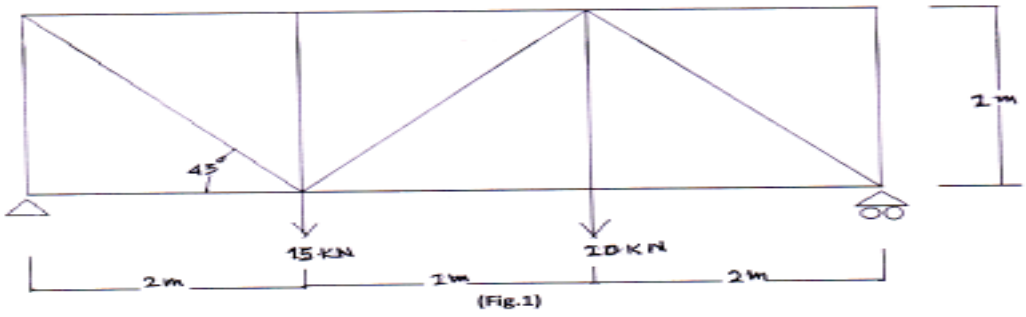
Time : 3 Hours] *[Maximum Marks : 70*

Instructions to the candidates:

1) *Q.1 and Q.5 are compulsory. Solve any two from Q2/3/4 from Section - I and any two from Q.6/7/8 from Section - II*
2) *Use of scientific calculator is allowed.*
3) *Figures to the right indicates full marks.*
4) *Assume suitable data if any.*
5) *Use separate answer booklet to write Section-I and Section - II.*

SECTION - I

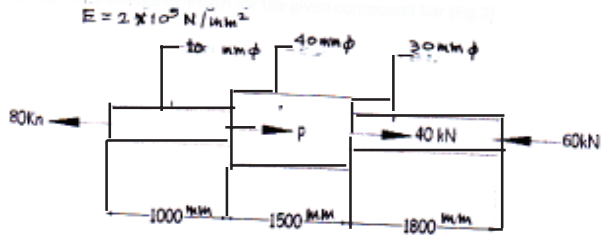
Q1) Analyse the given truss and tabulate forces with their nature in the member. Use method of joint/graphical/section. (Fig1) **[15]**



(Fig.1)

Solve any two from the following.

Q2) a) Find change in length for the given compound bar (Fig 2) **[7]**



(Fig.2)

b) State Hook's Law **[3]**

P.T.O

Q3) a) A beam of cross section 300×500 mm simply supported carries a point load of 3kN/m over entire span of 5m. Calculate bending stresses at tension and compression extreme fibres. Also find stress at a distance of 75mm from top and 100mm from bottom and draw bending stress distribution diagram. **[7]**

b) Explain types of stresses. **[3]**

Q4) Define any five: **[10]**

a) Poisson's Ratio

b) Stress

c) Strain

d) Modulus of elasticity

e) Bulk Modulus

f) Shear Modulus

SECTION - II

Q5) a) A chimney of 15 m height has inside cross sectional dimension 1.5m×1.5m surrounded by a brick masonry of 0.6 m on all four sides, density of brick masonry 19kN/m^3.
It is subjected to a wind pressure of 1.6kN/m^2. Calculate stresses at the four corners of the chimney. **[12]**

b) Define neutral axis with suitable sketch. **[3]**

Q6) a) Find slope and deflection for a simply supported beam with a point load of 5kN at a distance of 1m from left hand support and a point load of 10kN at a span of 3m from left hand support if entire span is 5m. Take EI = 10^{14} Nmm^2. **[8]**

b) Draw shear stress distribution diagram for L-section. **[2]**

Q7) a) A rectangular beam section with dimension 250mm×300mm having span of 6m. It carries a UDL of 5kN/m over entire span. Find shear stresses at the necessary points and draw shear stress distribution diagram. **[7]**

b) Write any three assumptions in theory of simple bending. **[3]**

Q8) Attempt any five: **[10]**

a) Write Flexural formula

b) Shear stress distribution diagram for circle

c) Bending stress distribution diagram for I-section

d) Explain perfect frame

e) Define eccentricity

f) Concept of middle third rule

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Total No. of Questions : 4] **SEAT No. :**

P1333 **[Total No. of Pages : 2**

[5157] - 3001
S. Y. B. Arch. (Semester - III)
BUILDING TECHNOLOGY AND MATERIALS -III
(2015 Pattern)

Time : 3 Hours] ***[Maximum Marks : 70***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Answer to Section I to be drawn on drawing sheet only.***
3) ***Answer to Section II to be written on answer sheet only.***
4) ***Draw neat labelled sketches wherever necessary.***
5) ***Assume suitable data, wherever necessary.***
6) ***Figures on right of each question indicate full marks.***

SECTION -I

Q1) A site office of size 4.0m×2.5m needs to be constructed in RCC frame structure, having a 1.2m wide projecting plinth in front along the longer side having steps to climb up to it. The office is divided equally in two cabins with 150 thk wall having two separate entry doors. Assume plinth as 600mm from the ground level. Draw following details to the suitable scale.

a) Draw key plan showing above features and Draw the framing plan showing plinth beams, columns and foundation. **[10]**

b) Draw detailed section through steps and plinth up to foundation. **[10]**

OR

A terrace door opening of size 2.4×2.1m needs to be provided with a fully-glazed folding door with TW frame. Draw the following to the scale of 1:10 showing all the required details.

a) Draw elevation, sectional elevation & plan, showing all necessary fittings and hardware used. Show door in open and closed state in plan. **[15]**

b) Draw any two fixing details of the hardware used. **[5]**

P.T.O

Q2) Draw neat labelled sketches on sheet for the following. (any three): **[15]**

a) Draw the section showing formwork for beam and slab junction.

b) Draw the detail of fixing chain-link fencing to the post.

c) Draw the fixing of MS wicket gate to the RCC post.

d) Draw the longitudinal section of a typical simply supported beam showing reinforcement details.

e) Draw detail section showing water proofing done for a terrace at the RW outlet.

f) Draw two types of piles used for non-cohesive soil condition for foundation.

SECTION -II

Q3) Answer any two with the help of sketches: **[20]**

a) Procedure of installing an Auger driven pile.

b) Working of sliding and folding door with the help of sketches.

c) Use of steel in RCC Beam.

d) Explain how the transfer of forces take place in RCC framed structure.

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

a) Materials used for water proofing. Explain applications of any one.

b) Slump test for concrete.

c) Raft foundation. State any two applications.

d) Roof covering materials based on climatic condition.

e) Significance of pressure bulb in soil investigation.

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Total No. of Questions : 8]

SEAT No. :

P1334

[Total No. of Pages : 3

[5157] -3002
Second Year B. Arch (End-Semester)
THEORY OF STRUCTURES -III
(2015 Pattern)

Time : 3 Hours] *[Maximum Marks : 70*

Instructions to the candidates:

1) ***Q.Nos.1 & 5 are compulsory. Solve any two questions from 2,3 & 4 and two from 6, 7 & 8.***
2) ***Assume steel of grade Fe410/E250.Yield stress = 250N/mm^2.***
3) ***Take permissible bending stress in steel as 165 N/mm^2 and permissible shear stress as 100N/mm^2.***
4) ***Take permissible tensile stress in steel as 150 N/mm^2.***
5) ***Take permissible bearing stress for bolt =300N/mm^2 and permissible shear stress for bolt as 100 N/mm^2.***
6) ***Take permissible stress in weld = 108N/mm^2.***
7) ***Use of Non-programmable Scientific calculator is allowed.***
8) ***Allow use of steel tables.***

SECTION -I

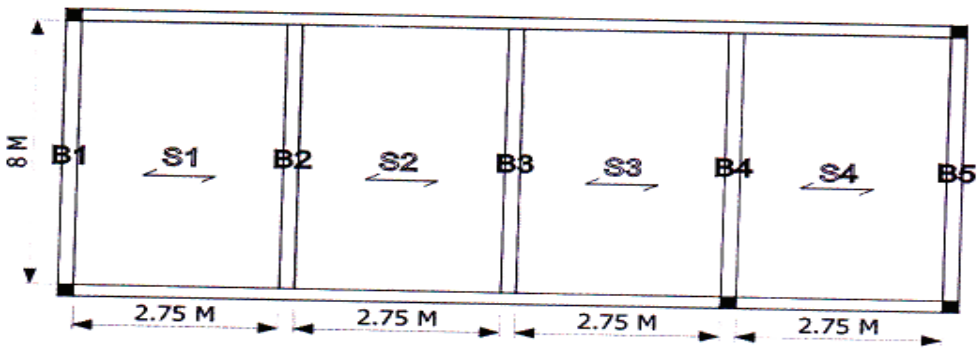
Q1) As per the sketch below,

Given, RCC Slabs S1, S2, S3 & S4 -130mm.thk., Floor finish load =1.25 kN/m^2, Live load =3 kN/m^2.

a) Calculate load on girder B3. **[5]**

b) Design girder B3. **[10]**

Assume permissible bending stress as 165 N/mm^2 and permissible shear stress as 100 N/mm^2. Check for shear and deflection. Take allowable deflection as Span /300.



P.T.O

Q2) a) What are the assumptions of Euler's theory? **[3]**

b) Design a Stanchion for an effective length (L_e) 5m to take a load of 800kN. **[7]**

Q3) Answer any three of the following. **[10]**

a) Write a short note on factor of safety and permissible stresses.

b) Discuss the criteria w.r.t. load bearing structures-. i) opening in walls ii) Wall thickness

c) Draw the BMD only for a 3 equal span continuous beam with a full UDL of w kN/m.

d) Write a short note on snow load.

e) Wind loads & reversal of stresses.

Q4) a) A fixed beam of span 9 m. carries an UDL of 20 kN/m and a central point load of 25 kN.Solve the fixed beam. **[8]**

b) Write the formula for maximum deflection for a fixed with full UDL.**[2]**

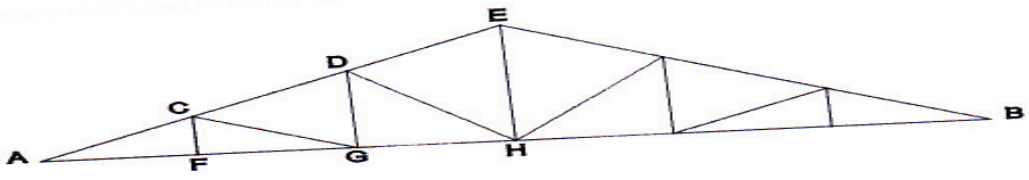
SECTION -II

Q5) For the sketch below, assuming permissible tensile stress as 150 N/mm^2.

a) Design the member AF for a tensile force of 125 kN. **[9]**

b) Design the bolted connection also. **[6]**

Take permissible bearing stress for bolt =300 N/mm^2 and Permissible shear stress for bolt as 100 N/mm^2.



Q6) a) An ISA 80×80×8 is used as compression strut 2.5 m long to carry a load of 100kN. It is welded to a gusset plate. Design the welded connection. Take permissible stress in weld as 108 N/mm^2. **[6]**

b) Explain any two of the following. **[4]**

i) Types of welded joints

ii) Disadvantages of riveted connections.

iii) Disadvantages of welded connections.

Q7) Answer any three of the following. **[10]**

a) How is load transferred across lintels? State any 3 cases.

b) Disadvantages of steel structures.

c) What are different rolled steel sections used in building construction? Explain with applications of each.

d) Common steel structures.

e) Write a short note on two hinged and three hinged arch.

Q8) a) A Hollow steel column with outer diameter 320mm & thickness 10 mm is 4.5m high. If it is fixed at one end & hinged at the other, determine the crippling load, it can take. **[6]**

Given, E= 2×10^5 N/mm^2

b) Explain shortly any 2 of the following: **[4]**

i) Requirement of connections in steel structures.

ii) Seismic load

iii) Live loads

▲ ▲ ▲

Total No. of Questions : 4]

SEAT No. : ____

P1335

[Total No. of Pages : 2

[5157] -3003
S.Y. B. Arch.
BUILDING SERVICES -I
(2015 Pattern)

Time : 3 Hours] ***[Maximum Marks : 70***

Instructions to the candidates:

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

SECTION -I

Q1) Explain in detail, the direct and indirect method of hot water supply. **[15]**

OR

Explain any 3 types of traps in building sanitation system with sketches.

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

a) Anti Siphonage pipe

b) Solar water heater

c) Inspection chamber

d) Single stack system

e) Indian water closet

f) Biogas plant

SECTION -II

Q3) Sketch and explain the working of any three sanitary fittings. **[15]**

OR

Explain the working of a septic tank with neat labeled sketches in reference to its salient parts.

P.T.O

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

a) Wash hand basin

b) Man hole

c) Disconnecting trap

d) Types of storm water drainage system

e) Double stack system

f) Floor trap

▲ ▲ ▲

Total No. of Questions : 4]

SEAT No. :

P1336

[Total No. of Pages : 2

[5157] - 4001
S. Y. B. Arch. (Semester - IV)
BUILDING TECHNOLOGY AND MATERIALS -IV
(2015 Pattern)

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

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Answer to section I to be drawn on drawing sheet only.*
3) *Answer to section II to be written on answer sheet only.*
4) *Draw neat labelled sketches wherever necessary.*
5) *Assume suitable data, wherever necessary.*
6) *Figures on right of each question indicate full marks.*

SECTION - I

Q1) A Cantilever balcony 3.0m long and 1.5m wide is to be provided for a bedroom of size 3.0m×3.5m. The balcony slab is simply supported on beams provided on its shorter sides. Draw following details to the suitable scale.

a) Analyse and Draw plan showing the above condition with reinforcement. **[10]**

b) Draw detailed section showing the reinforcement required for cantilever action of the balcony. **[10]**

OR

A toilet of size 1.5m ×2.4m is provided on the first floor of a Bungalow. This is designed as sunken RCC slab with 200mm sunk. Assume 1.5m side as external wall of the toilet. Draw the following to the scale of 1:10 showing all the required details.

a) Draw two possible alternatives. **[5]**

b) For one of the alternative above, draw the longitudinal and cross section of the toilet slab showing detailed reinforcement. **[15]**

P.T.O

Q2) Draw neat labelled sketches on sheet for the following. (any three) **[15]**

a) Draw the sectional plan of Bay window.

b) Draw the entire vertical section through a lift shaft, Machine room, lift pit showing necessary structural elements for same.

c) Draw a junction between RCC Beam and Column showing reinforcement.

d) Draw a sill level detail for a window opening fitted with Alluminium Glazed sliding window.

e) Draw any two ways of supporting a doglegged RCC staircase.

SECTION -II

Q3) Answer any two with the help of sketches: **[20]**

a) Procedure of tanking method used for water proofing of a basement retaining wall.

b) Explain the working of Hydraulic lifts.

c) Explain the working of an escalator.

d) Explain the function of various extruded sections for Alluminium sliding window.

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

a) Ferro-cement technique
b) Importance of waterproofing in the basement
c) Canopy
d) Light weight concrete
e) Working of RMC plant

▲ ▲ ▲

Total No. of Questions : 8]

SEAT No. :

P1337

[Total No. of Pages : 3

[5157] -4002
S. Y. B. Arch. (End Semester)
THEORY OF STRUCTURES - IV
(2015 Pattern)

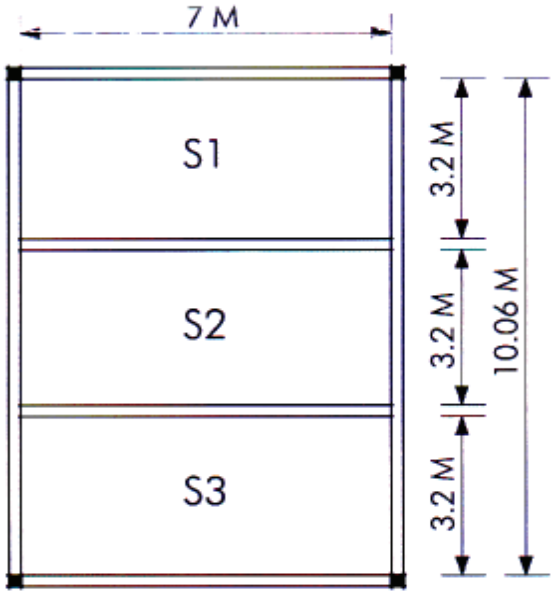
Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Q.nos. 1 & 5 are compulsory. Solve any two questions from 2, 3 &4 and two questions from 6, 7 & 8.***
2) ***Take M20 grade concrete & Fe500 grade steel.***
3) ***Assume suitable data, if required. Mention the assumption.***
4) ***Use of Non-Programmable Scientific calculator is allowed.***

SECTION - I

Q1) W.r.t. the framing plan in the figure below, design the slab S1. Assume all beams as 230 mm thk. Take floor finish load =1.25kN/m^2 & live load = 4kN/m^2 Summarize the design by schedule & sketch. **[15]**



Q2) A simply supported RCC beam of size 230×600, M20 grade concrete, is reinforced with 3 nos.16 ₫ Fe500 bars in the tensile zone. Determine,

a) Moment of resistance of the beam.

b) The safe UDL, the beam can carry for an effective simply supported span of 4.43m. **[10]**

P.T.O

Q3) Design a short RCC rectangular column 300 wide, to take a load of 1100 kN. Take 1.5% steel. Make the Schedule & sketch. **[10]**

Q4) Answer the following **[10]**

a) Short note on bond stress & development length.

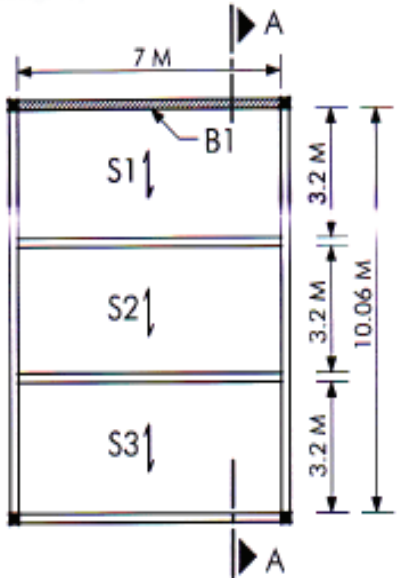
b) Terminology in a typical RCC flexural section.

c) IS 456 provisions for minimum reinforcement in beams and slabs.

SECTION - II

Q5) W.r.t. the framing plan & section in the figure below, design the highlighted beam B1. Assume all slabs to be 130 mm thk. Take floor finish load & live load on slabs as 1.25 kN/m^2 and 4kN/m^2, respectively. Take the beam & columns as 230 mm thk. Take density of brick masonry as 19 kN/m^3. **[15]**

Also design the shear stirrups. Refer the Table 19 below as per IS 456 for the same. Summarize the design by Schedule & sketches.



FRAMING PLAN

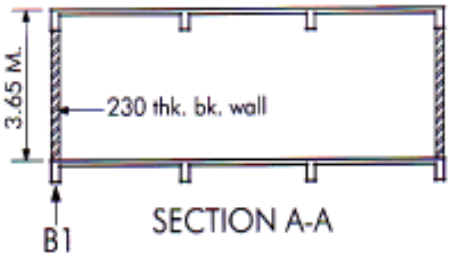


Table 19: Design Shear strength of Concrete

100 As / bd (%)	Tc (N/mm^2)
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

Q6) Design a cantilever balcony slab 1.2 m. wide for a bungalow. Take the beam as 230 thk. Take live load for the balcony = 3 kN/m^2. Conclude with Schedule & sketch. **[10]**

OR

Draw proportionately, a plan & section as per the following schedule. Show all dimensions and nomenclature. Given-Slab dimensions - 7.5m ×4.0m, Beam widths -250 mm.

Slab	Depth	Steel @ shorter span	Steel @ longer span	Remark
S4	160	10 ϕ @110 c/c	8 ϕ @260 c/c	1way slab

Q7) Answer any 3 of the following. **[10]**

a) Explain limit state of deflection and how is it taken care of.

b) Explain compressive strength & characteristic strength of concrete.

c) Explain Limit state of cracking and how is it taken care of .

d) Explain Under-reinforced &over-reinforced sections.

Q8) Design a timber beam in Indian Oak to take a load of 25kN/m inclusive of its own weight for a simply supported clear span of 4.5 m. The beam is supported on 230 thk. bk. walls. Take d = 3b, Permissible bending stress -12.16 N/mm^2, Permissible shear stress - 1.67 N/mm^2, Check for shear only. Check for deflection and form factor not required. **[10]**

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Total No. of Questions : 4]

SEAT No. :

P1338

[Total No. of Pages : 2

[5157] - 4003
S. Y. B. Arch. (End Semester)
BUILDING SERVICES - II
(2015 Pattern)

Time : 3 Hours] *[Maximum Marks : 70*

Instructions to the candidates:

1) ***All questions are compulsory.***

2) ***Draw neat diagrams wherever necessary.***

3) ***Assume suitable data wherever necessary.***

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

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

SECTION -I

Q1) Explain Direct and Indirect lighting and give at least two examples of application of each in different spaces. **[15]**

OR

Explain three methods of garbage disposal at town level.

Q2) Write short notes on (any 4): **[20]**

a) Plate earthing

b) Electric meter board of a house

c) Concealed wiring system

d) Day Light factor and components of Day Light

e) Vermicomposting for a residential building

f) Rain water harvesting

P.T.O

SECTION -II

Q3) What is refuse chute? Explain with sketches a refuse chute system for a hotel building. **[15]**

OR

Draw an electrical Layout with a schedule of switch boards for a doctors' consulting room shown in attached figure to indicate following:

a) General and task lighting points

b) Fan/s

c) A/C

d) Computer and printer point with Wifi connection.

e) Plug points for equipments used for checking patients.

(Draw only proportionate sketch in the regular answer sheet)

Q4) Write short notes for any 4 with sketches wherever necessary. **[20]**

a) Lightening conductor

b) Lumenmethod for calculating no. of Fittings

c) Fluorescent lamps

d) Open wiring system for a house

e) MCB

f) Disposal of Hazardous waste

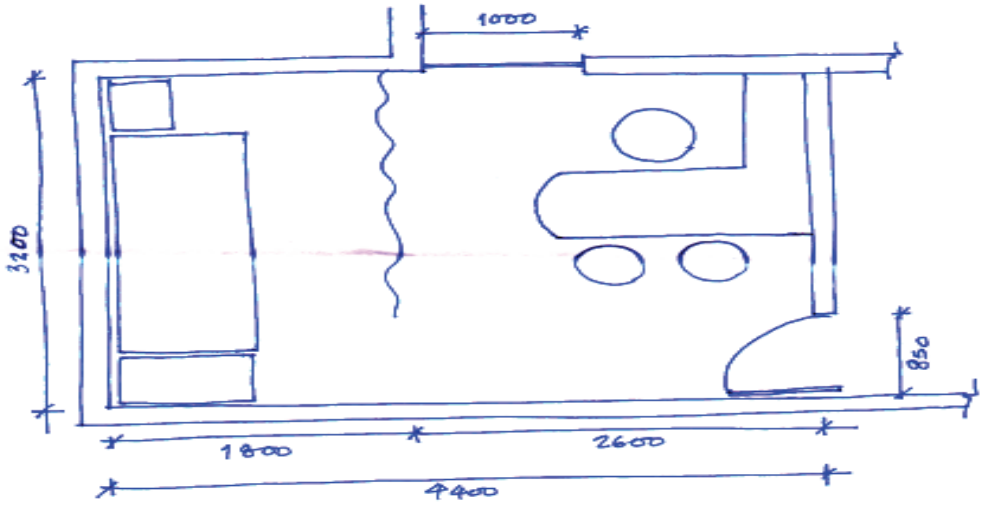

FIGURE FOR Q3 : DOCTOR'S CONSULTING ROOM.

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