

Total No. of Questions : 4]

SEAT No. :

**P3864**

[Total No. of Pages : 2

**[5062] - 1001**

**F.Y. 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]**

Draw at a scale of 1:10, L-Junction in DOUBLE FLEMISH BOND, Where both walls are one and a half brick thick (350 mm) each

- a) Plan of alternate odd/even courses.
- b) Elevation of wall with six courses.

OR

Draw at a scale of 1:10, a typical SEMI-CIRCULAR ARCH of span 2000mm, with all necessary terminology.

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

- a) Explain with a sketch the concept of BULB of pressure.
- b) Explain with sketch, strip foundation.
- c) Draw sketches of (05) five types of special bricks.
- d) What are different grades of cement? Explain in brief cement mortar.
- e) Sketch and state purpose of use of any (03) three tools used in excavation.

**P.T.O.**

## SECTION - II

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

- a) Explain with sketches any (05) Five earthquake resistance measures for load bearing construction.
- b) Sketch any (02) two types of stone masonry used in construction. Explain basic terminology.
- c) Sketch a well annotated section of a typical ground + 1 load bearing structure.

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

- a) Qualities of a good brick.
- b) What is coping? Draw and explain any three types of coping.
- c) What is pointing? Explain with sketches any three.
- d) Draw alternative courses of 1 Brick thick attached pier.
- e) List any 03 advantages and 03 limitations of concrete blocks.



**[5062] - 1002**  
**F.Y. B.Arch. (Semester - I)**  
**THEORY OF STRUCTURES - I**  
**(2015 Pattern)**

Time : 3 Hours]

[Max. Marks : 70

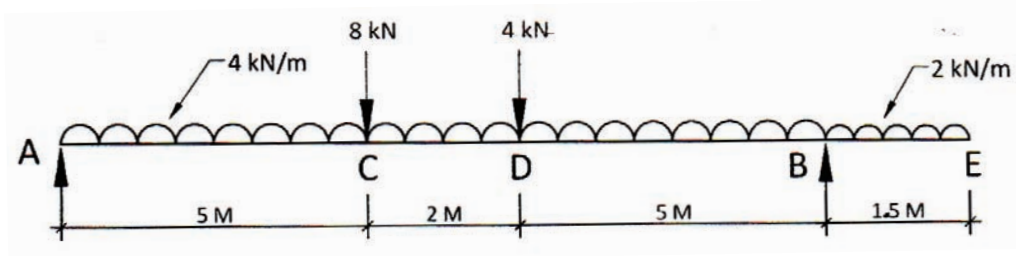
*Instructions to the candidates :-*

- 1) *Q.no. 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 indicate full marks.*
- 4) *Assume suitable data wherever required. Mention the assumption.*
- 5) *Use of Non-programmable scientific calculator is allowed.*

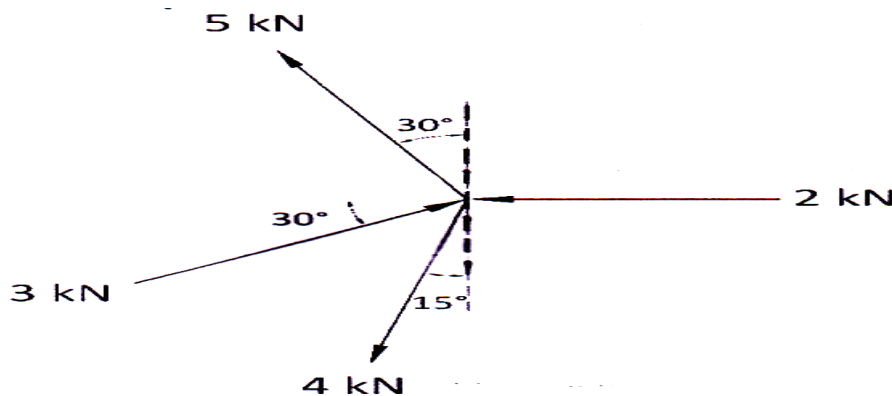
**SECTION - I**

**Q1)** For the beam shown in figure below,

- a) Determine reactions at supports. [3]
- b) Draw the Shear force diagram. [6]
- c) Draw the Bending moment diagram. [6]



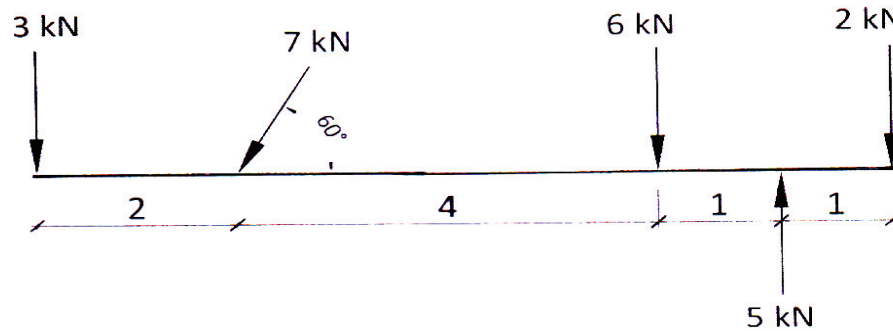
**Q2) a)** For the concurrent forces shown in figure below, find out the resultant in magnitude & direction, analytically or graphically. [7]



**P.T.O.**

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

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



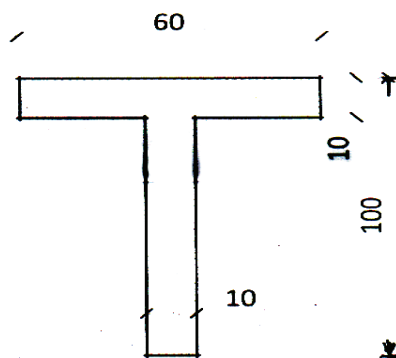
Note: All dimensions in m,

- b) Explain with sketches, Principle of transmissibility of forces. [3]
- Q4) a) Explain with sketches, parallel and collinear forces. [4]
- b) Explain with sketches, law of parallelogram of forces. [4]
- c) Explain with sketches, moment of a force. [2]

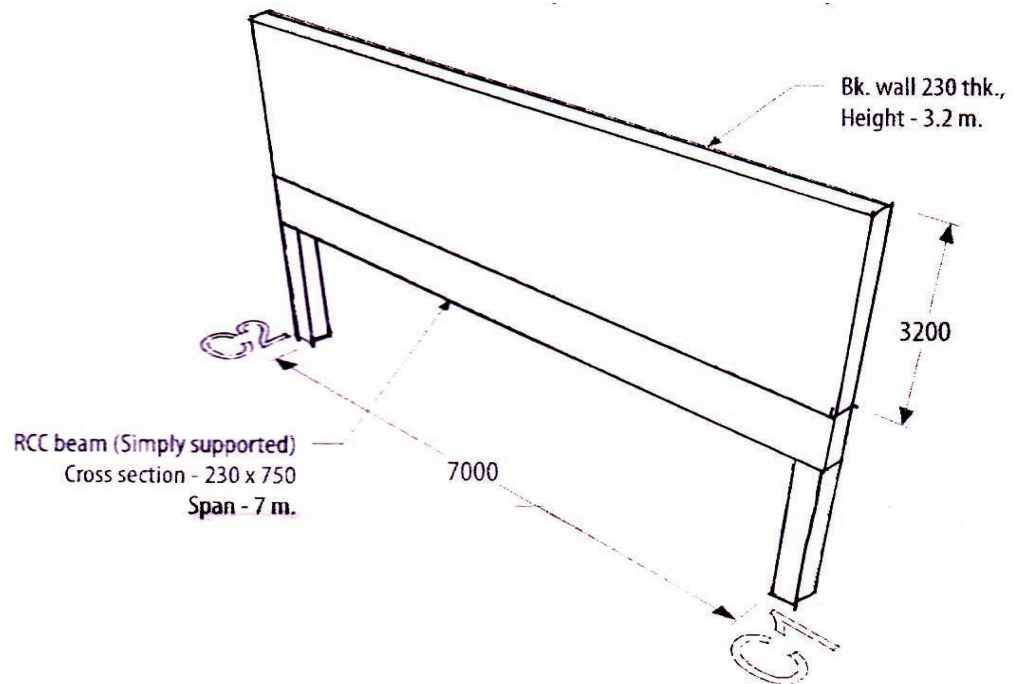
## SECTION - II

- 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]

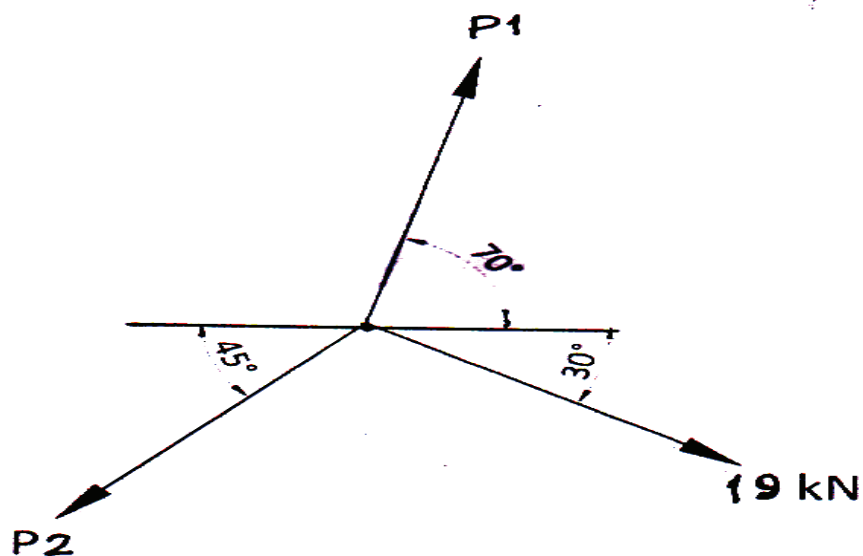


- Q6) a)** For the beam loaded as shown in figure below, determine the reactions at the columns C1 and C2. Take density of concrete =  $25 \text{ kN/m}^3$  and density of brickwork =  $19 \text{ kN/m}^3$ . [7]



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

- Q7) a)** If the forces as shown in figure below, are in equilibrium, determine the unknown force  $P_1$ ,  $P_2$ . [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]



Total No. of Questions : 4]

SEAT No. :

**P3866**

[Total No. of Pages : 2

**[5062] - 2001**

**F.Y. B.Arch. (Semester - II)**

**BUILDING TECHNOLOGY AND MATERIALS - II**

**(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 two :

**[20]**

- a) Draw plan and section through a double timber floor to be provided for a room size of 9.50m × 5.0m (internal measurement) at a scale of 1:20 and any two details at scale of 1:5.
- b) A straight flight T.W. Staircase from ground floor to Mezzanine floor is to be provided with floor height of 2.10m and width of 0.9m. Draw plan and section at a scale of 1:10 and any two details at a scale of 1:2.

**Q2)** Answer any three of five :

**[15]**

- a) Explain with sketches various types of Vaults.
- b) Explain with sketches different types of reinforcement used for any two types of brick masonry.
- c) Explain with sketches purpose of strutting giving two examples.
- d) Explain with sketches any three types of defects in timber.
- e) Explain with sketches any three tools used for timber construction.

**P.T.O.**

## SECTION - II

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

- a) Explain with sketches the openable louvered window operation.
- b) Draw and annotate the section through lean to roof for a span of 2.0m.
- c) Explain with sketches any five types of joineries used in Bamboo construction.

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

- a) Different types of timber seasoning.
- b) Explain good qualities of bricks.
- c) Bearing joints in timber (any three).
- d) Explain any two types of roofing tiles.
- e) Sketches of any three types of Arches.





[5062] - 2002

F.Y. B.Arch. (End-Semester, Term - II)

THEORY OF STRUCTURES - II

(2015 Pattern)

Time : 3 Hours]

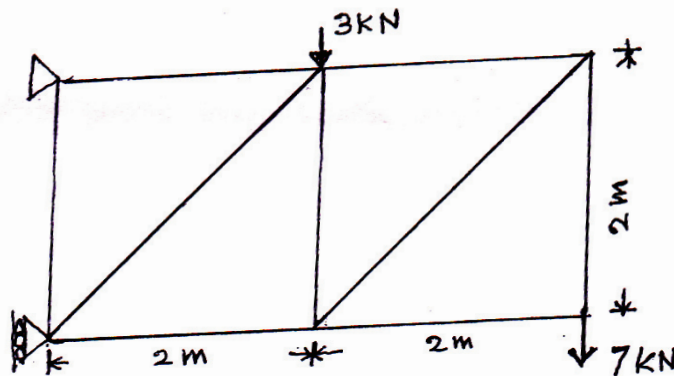
[Max. Marks : 70

Instructions to the candidates :-

- 1) Q.no. 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 indicate full marks.
- 4) Assume suitable data wherever required. Mention the assumption.
- 5) Use of Non-programmable scientific calculator is allowed.

SECTION - I

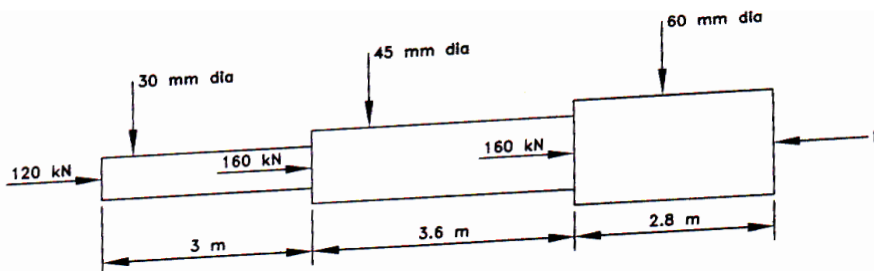
Q1) Analyze the given truss and find out magnitude and nature of forces in all members. [15]



Q2) a) For the member, as per figure below, [7]

- i) Calculate stresses in each part of the member.
- ii) Calculate total change in length.

Take  $E = 2 \times 10^5 \text{ N/mm}^2$



P.T.O.

b) Explain with examples, elastic, plastic and brittle materials. [3]

Q3) a) State the assumptions of theory of simple bending. [4]

b) A simply supported beam of cross section  $230 \times 600$  carries an UDL of  $4.5 \text{ kN/m}$  over the entire span of  $7 \text{ m}$ . Calculate maximum bending stress in compression and tension and sketch the bending stress diagram. [6]

Q4) a) Compare with sketch, the bending stress diagram and shear stress diagram of rectangular cross section. Mention key values. [4]

b) Define with units. [4]

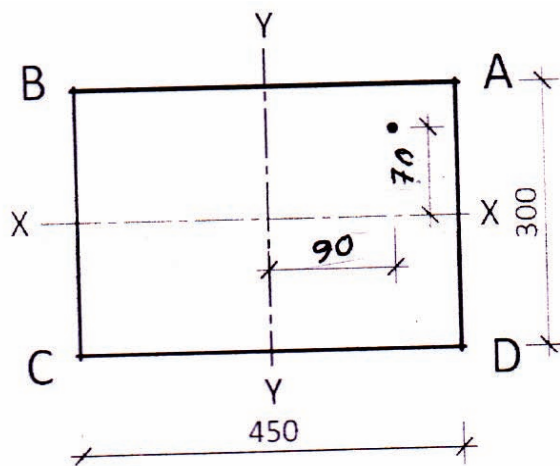
i) Bulk Modulus

ii) Poisson's ratio

c) Define Yield stress & Permissible stress. [2]

### SECTION - II

Q5) a) A column carries an eccentric load of  $550 \text{ kN}$  with eccentricities shown as per figure below. Calculate stresses at all corners of the column. Also sketch the stress diagram. [12]



Note: All dimensions in mm.

b) Explain with sketch, the Middle Third rule. [3]

- Q6)** a) Sketch a typical cantilever beam with end point load. Write the equations for maximum slope and deflection. [3]
- b) A simply supported beam of cross section  $230 \times 600$  carries an UDL of  $10 \text{ kN/m}$  over the entire span of  $5 \text{ m}$ , Calculate maximum deflection only. Take  $E = 0.15 \times 10^5 \text{ N/mm}^2$ . [7]
- Q7)** a) A simply supported beam of cross section  $300 \times 500$  carries an UDL of  $7 \text{ kN/m}$  over the entire span of  $5.8 \text{ m}$ . It also carries a central point load of  $9 \text{ kN}$ . Calculate maximum shear stress and sketch the shear stress diagram. [6]
- b) Sketch proportionately, typical shear stress diagrams for a T, L & I section. show max. values. [4]
- Q8)** a) Explain with sketches, perfect frame. deficient frame and redundant frame. [6]
- b) Explain with sketches, how is Middle third rule applied in eccentrically loaded foundations. [4]



Total No. of Questions : 4]

SEAT No. :

P2917

[Total No. of Pages : 2

[5062]-3001

S.Y. B.Arch.

**BUILDING TECHNOLOGY AND MATERIALS - III**

**(End Semester) (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)** The security cabin of size  $2.4 \times 2.4$ m needs to be constructed in RCC frame structure. The room has flat roof and plinth level of 450mm from the ground level. Draw following details to the scale of 1:10.

- a) Draw sectional elevation and sectional plan showing all necessary RCC elements. **[10]**
- b) Draw detailed section through plinth showing RCC footing and plinth beam. **[10]**

OR

A terrace door opening of size  $2.4 \times 2.1$ m needs to be provided with a partly-glazed sliding & folding door. Draw the following to the scale of 1:10 showing all the required details.

- a) Draw elevation, section & plan through the glazed panel, showing all necessary fittings and hardware used. Show door in open and closed state in elevation and plan. **[15]**
- b) Draw fixing detail of the hardware used for sliding and folding. **[5]**

**P.T.O.**

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

- a) Draw the tools used for slump test of concrete.
- b) Draw the detail of fixing barbed wire fencing to the end angle post for compound wall.
- c) Draw the crosslink details of collapsible door.
- d) Draw the longitudinal section of a typical simply supported beam showing reinforcement details.
- e) Draw detail section showing water proofing done over a RCC weather shed.
- f) Draw the formwork for casting the RCC footing indicating different check points.

### **SECTION - II**

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

- a) Explain the procedure of installing a bored cast-in-situ pile.
- b) Explain in detail the Shahabad tile water proofing method used for underground water tank.
- c) Explain the operation and working of MS Rolling shutter.
- d) What is a two-way slab? Explain the reinforcement details for same.

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

- a) What are the different materials used for damp proofing? Explain applications of any two.
- b) Explain the cube test for testing of concrete.
- c) What is raft foundation? Explain the conditions when raft foundation is used.
- d) Explain the precautions to be taken while casting of RCC structural elements.
- e) Significance of pressure bulb in soil investigation.



Total No. of Questions : 8]

SEAT No. :

P2918

[Total No. of Pages : 3

[5062]-3002

S.Y. B. Arch.

THEORY OF STRUCTURES - III

(End Sem.)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Q. no. 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 250 N/mm<sup>2</sup>.
- 3) Take permissible bending stress in steel as 165 N/mm<sup>2</sup> and permissible shear stress as 100 N/mm<sup>2</sup>.
- 4) Take permissible tensile stress in steel as 150 N/mm<sup>2</sup>.
- 5) Take permissible bearing stress for bolt = 300 N/mm<sup>2</sup> and permissible shear stress for bolt as 100 N/mm<sup>2</sup>.
- 6) Take permissible stress in weld = 108 N/mm<sup>2</sup>.
- 7) Use of Non-Programmable Scientific calculator is allowed.
- 8) Allow use of steel tables.

**SECTION - I**

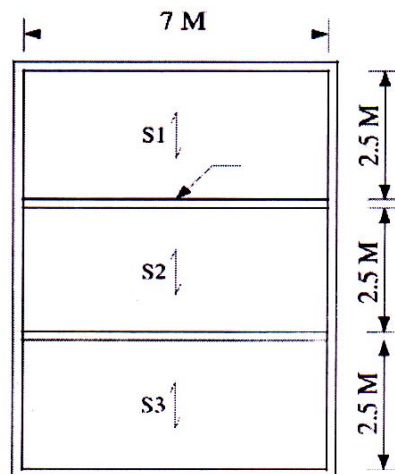
Q1) Refer to the plan given below.

Given that RCC Slabs S1, S2 & S3 are 110 mm. thk., Floor finish load = 2 kN/m<sup>2</sup>, Live load = 4 kN/m<sup>2</sup>.

- a) Calculate load on the girder shown with the arrow. [5]
- b) Design the same girder. [10]

Take permissible bending stress = 165 N/mm<sup>2</sup> and permissible shear stress = 100 N/mm<sup>2</sup>.

Check the girder for shear and deflection. Take allowable deflection = Span /300.



P.T.O.

- Q2) a)** Explain shortly, Slenderness ratio with a sketch. [2]
- b) Design a Stanchion for an effective length ( $L_e$ ) of 4 m to take a load of 750 kN. [8]

**Q3)** Answer any 3 of the following : [10]

- Write a short note on Seismic loads
- Write a short note on Wind loads & reversal of stresses
- Disadvantages of load bearing structures as compared to framed structures.
- Advantages & disadvantages of working stress method?
- Advantages & disadvantages of a continuous beam.

- Q4) a)** A fixed beam of span 7 m. is subjected to a full UDL of 15 kN/m and a central point load of 22 kN. Solve the fixed beam. [7]
- b) Differentiate between a fixed beam and a simply supported beam. [3]

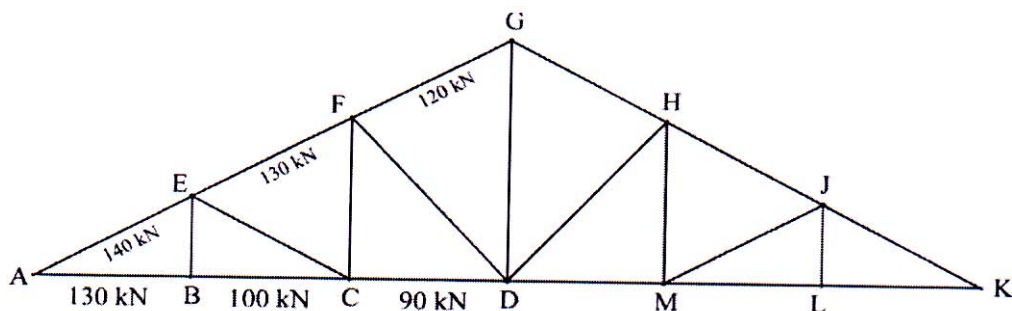
### SECTION - II

**Q5)** Refer to the sketch of the truss below,

- Design the tension member AB to take a force of 130 kN. & [9]
- Design the bolted connection. [6]

Assume permissible tensile stress in steel = 150 N/mm<sup>2</sup>.

Take permissible bearing stress in bolt = 300 N/mm<sup>2</sup> and permissible Shear stress in bolt = 100 N/mm<sup>2</sup>.



**Q6) a)** An equal angle section, ISA  $70 \times 70 \times 8$  is used as a compression strut 2.1 m in length, to take a load of 90 kN and is welded to a gusset plate. Design the welded connection. [6]

Assume permissible stress in weld =  $108 \text{ N/mm}^2$ ,

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

i) Different connections used in structural steel

ii) Various rolled steel section used in building construction.

iii) Disadvantages of bolted connections.

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

a) Write a short note on load transfer in arches with sketches.

b) What are common steel structures?

c) Any 3 cases of transfer of load across lintels.

d) Advantages of steel structures over concrete structures.

e) Draw a cross section of a rolled steel beam and identify, its parts with a sketch.

**Q8) a)** ISHB 300 @ 63.0 kg/m is used as a Stanchion, 6 m high, fixed at one end and hinged at the other. [6]

If  $E = 2 \times 10^5 \text{ N/mm}^2$ , calculate Crippling load of the stanchion.

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

i) Disadvantages of steel structures.

ii) Dead loads

iii) Live loads on buildings





Total No. of Questions : 4]

**P2919**

SEAT No. :

[Total No. of Pages : 2

**[5062]-3003**

**S.Y.B. Arch.**

**BUILDING SERVICES - I**

**(2015 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *All the questions are compulsory.*
- 2) *Draw neat diagrams wherever necessary.*
- 3) *Assume suitable data wherever necessary and appropriate.*
- 4) *Answer to the two sections should be written on separate answer books.*
- 5) *Figures to the right side indicate full marks.*

**SECTION - I**

**Q1)** What are the functions of valves? Explain with neat sketches any two types of valves used in water supply system. **[15]**

OR

Explain with neat sketches direct and indirect systems of hot water supply. **[15]**

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

- a) Bottle trap
- b) Inspection chambers
- c) P and S traps
- d) Biogas plant
- e) Anti siphonage pipe
- f) Gravity system

**SECTION - II**

**Q3)** What are the functions of traps? Draw and explain any two types of traps used in sanitation system. **[15]**

**P.T.O.**

OR

What are the different materials used for drainage pipes. Mention their advantages and disadvantages show their joinery details. [15]

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

- a) Specials used in water supply
- b) Flushing cistern
- c) Types of pipes and their jointing used in water supply
- d) Calorifier
- e) Manhole
- f) Ventilation of drains

