L-3/T-1/ARCH **Date: 01/09/2018**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch. Examinations 2017-2018

Sub: **ARCH 331** (Architecture of Indian Subcontinent)

Full Marks: 140 Time: 3 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer **Q. No. 4** and any **TWO** from the rest.

1. (a) Why did Buddhist choose circular form? Explain Great Stupa at Sanchi as the perfect representation of Buddha's philosophy. **(20)**

2. (a) What is Shikhara? Show the changes in Shikhara of North Indian temples through sketches. **(5)**

   (b) Discuss the theme and layout of the Sun temple at Konarak. Show the evidences to justify why it appears to be 'never completed'. **(15)**

3. (a) What can you tell us about 'Gopuram'? **(5)**

   (b) What were the underlying thoughts that generated the 'Fort' like planning layout of Madurai Temple. **(15)**

4. Write short notes on any two: **(15×2=30)**

   (a) Durga temple as the adoption of Buddhist Chaitya hall

   (b) Karli, the cave magnificent

   (c) Vastupurusha-Mandala

SECTION – B

There are **FOUR** questions in this section. Answer **Q. No. 5** and any **TWO** from the rest.

5. "The chief beauty of Tajmahal lies in the complete lucidity and coherence of its architectural effect" — Elucidate the statement with necessary sketches with reference to:

   (a) The high degree of perfection in its proportion. **(12)**

   (b) Superb fluidity of its parts and the quality, texture of materials. **(8)**

   (c) Landscaping features and ornamental gardens with their purpose. **(6)**

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6. Draw the master plan of Fatehpur Sikri with significant buildings and describe the following:

   (a) The concept of Multiple Axis **(10)**

   (b) Visual unity and diversity **(4)**

   (c) Space articulation with respect to the plaza and pavements. **(8)**

7. Compare with the tomb of Humayun, Akbar's tomb is an "architectural retrogression" — critically explain the statement in relation to: **(22)**

   (i) its 3-dimensional massing

   (ii) application of building materials

   (iii) conflicts in architectural character.

8. (a) Mention the architectural features and critically examine the concept of 'compartmentalization' and 'open to sky courts' of Khirki Masjid at Jahanpanah. Use sketches as appropriate. **(11)**

   (b) Describe with neat sketches the essential features of Delhi Jami masjid. Mention how the central dome is negotiated in the elevation of western sanctuary. **(11)**

L-3/T-1/ARCH **Date: 11/09/2018**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

B.Arch. Examinations 2017-2018

Sub : **CE 365** (Structure III: Mechanics of Solids)

Full Marks: 140 Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) What is flexural stress? **(4)**

   (b) A beam of the cross section shown is extruded from an aluminium alloy for which σ_Y = 250 MPa and σ_U = 450 MPa. Using a factor of safety of 3.00, determine the largest couple that can be applied to be the beam when it is bent about the z axis. **(Figure 1)** **(8 1/3)**

   (c) Two vertical forces are applied to a beam of the cross section shown **(Figure 2)**. Determine the maximum tensile and compressive stresses in portion *BC* of the beam and also determine the total force acting on the top flange. **(11)**

2. (a) Write down the value of effective length factors for different end restraints with neat sketches. **(5)**

   (b) Column AB carries a centric load P of magnitude 15 kips. Cables BC and BD are taut and prevent motion of point B in the xz plane. Using Euler's formula and a factor of safety of 2.2, and neglecting the tension in the cables, determine the maximum allowable length L. Use E = 29 × 10^6 psi., I_x = 719 in^4, I_y = 235 in^4. **(Figure 3)** **(8)**

   (c) Column *ABC* has a uniform rectangular cross section with b = 12 mm and d = 22 mm. The column is braced in the *xz* plane at its midpoint *C* and carries a centric load P of magnitude 3.8 kN. Knowing that a factor of safety of 3.2 is required, determine the largest allowable length *L*. Use E = 200 GPa. **(Figure 4)** **(10 1/3)**

3. (a) Knowing that the couple shown acts in a vertical plane, determine the stress at (a) point A, (b) point B. **(Figure 5)** **(10)**

   (b) Column ABC has uniform rectangular cross section and is braced in the xz plane at its midpoint C. (a) Determine the ratio b/d for which the factor of safety is the same with respect to buckling in the xz and yz planes. (b) Using the ratio found in part a, design the cross section of the column so that the factor of safety will be 3.0 when P = 4.4 kN, L = 1 m, and E = 200 GPa. **(Figure 4)** **(13 1/3)**

4. (a) Derive the Euler formula. **(11 1/3)**

   (b) What is stress tensor? Explain with sketches. **(6)**

   (c) Describe different types of columns with sketches. **(6)**

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SECTION – B

There are **SEVEN** questions in this section. Answer any **FIVE** questions.

5. The beam shown in Figure 6 is comprised of two wooden planks. If it transmits a vertical shear of 600 lb and allowable shearing force per nail is 170 lb, what is the necessary spacing of the nails between the two planks to make the beam act as a unit? **(14)**

6. Determine the shearing stresses at the levels indicated of the I beam given in Figure 7. Neglect the weight of the beam. **(14)**

7. A simply supported beam 5m long is loaded with a 30N downward force at a point 4m from the left support, Figure 8. The moment of inertia of the cross section of the beam is $4I_1$ for segment AB and I_1 for the remainder of the beam. Determine the elastic curve. **(14)**

8. (a) Explain the term 'shear flow'. **(4+6+4)**
   (b) Prove that the maximum shear stress in rectangular beam is 3V /2A.
   (c) Elaborate on the basic deformation assumption in bending of beam.

9. Determine the equation of the elastic curve for the uniformly loaded continuous beam shown in Figure 9. Use the second-order differential equation. EI is constant. **(14)**

10. Find the approximate location of the shear center for a beam with the cross section shown in Figure 10. **(14)**

11. For the state of stress shown in the element presented in Figure 11, using the general equation for the transformation of stress **(14)**
    (a) Find the principle stresses and show their direction on property oriented element.
    (b) Find the maximum shear stress and associated natural stresses, if any and show their direction on properly oriented element.

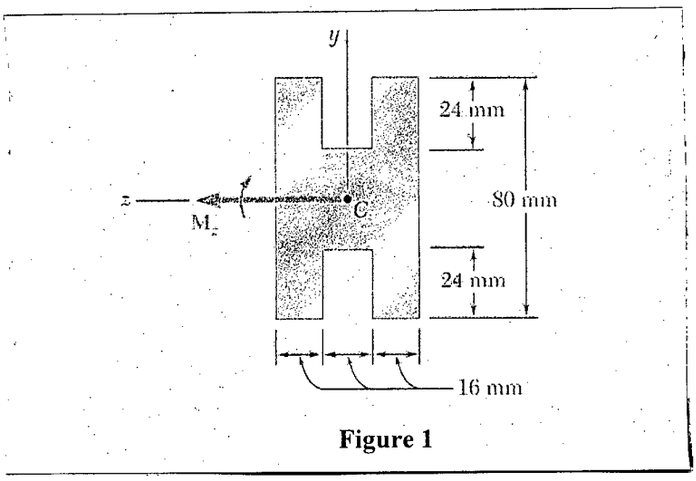

Figure 1

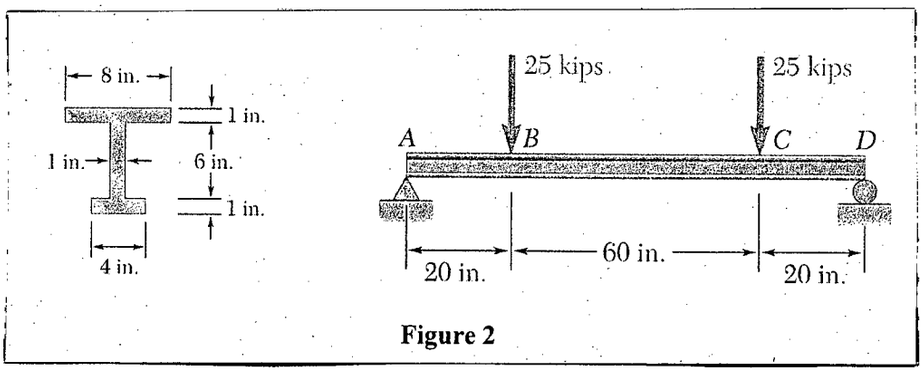

Figure 2

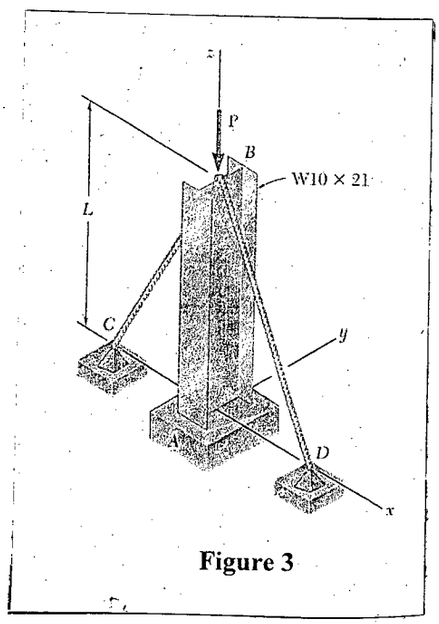

Figure 3

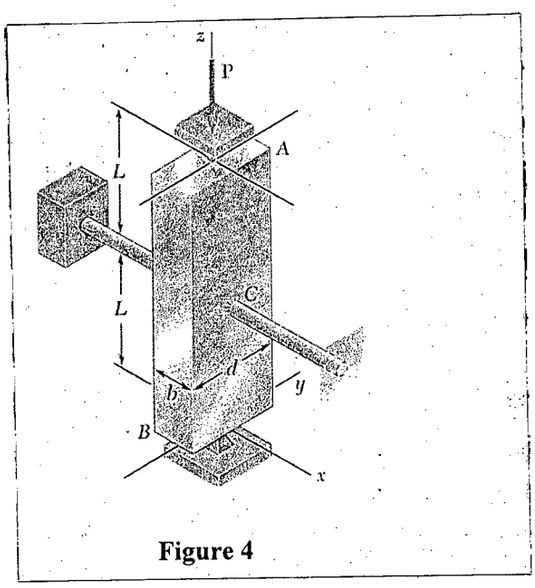

Figure 4

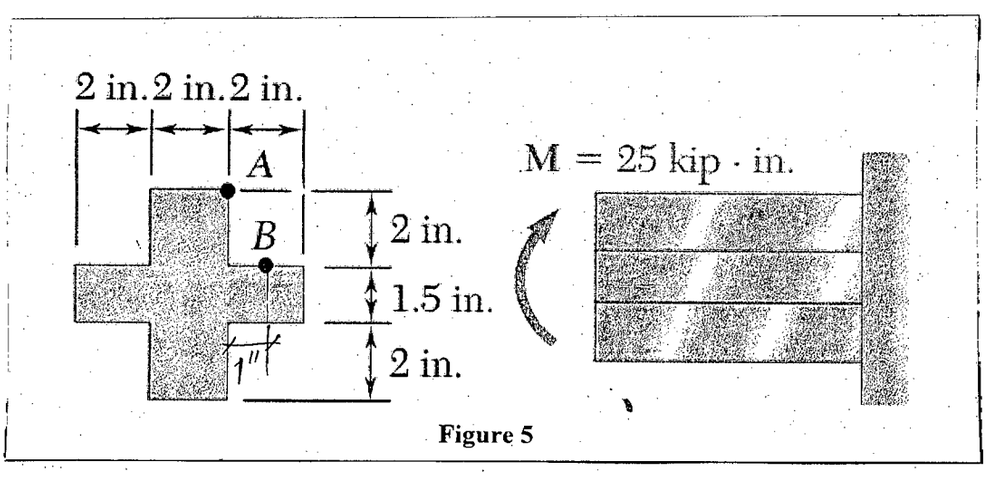

Figure 5

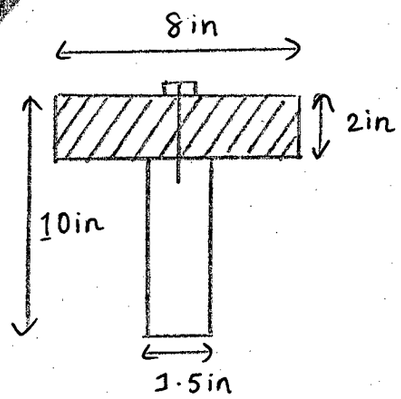

Figure 6

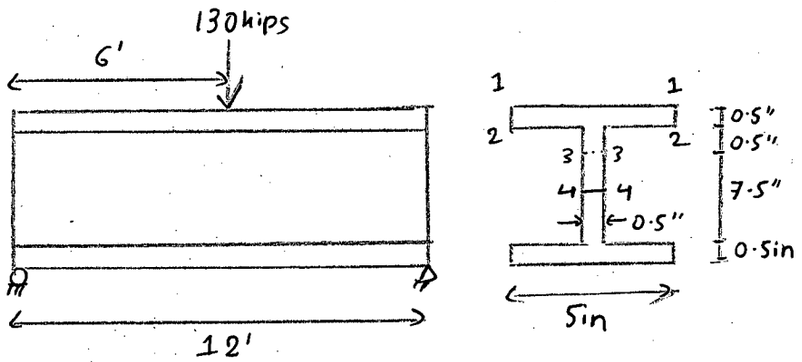

Figure 7

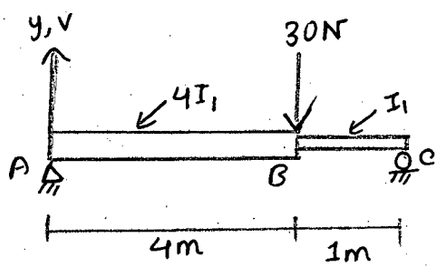

Figure 8

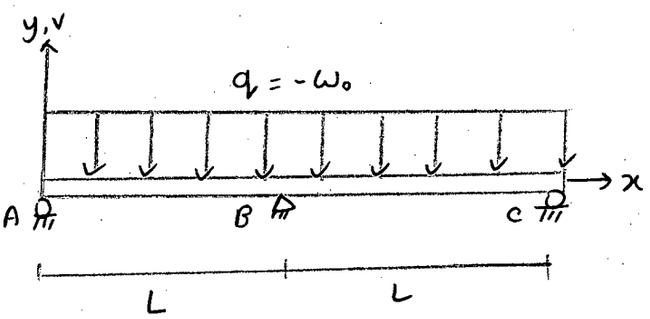

Figure 9

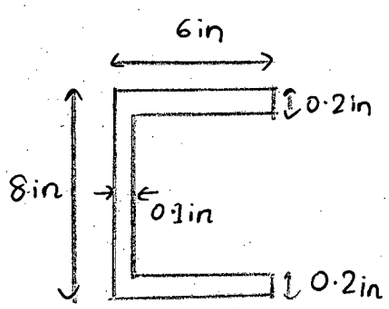

Figure 10

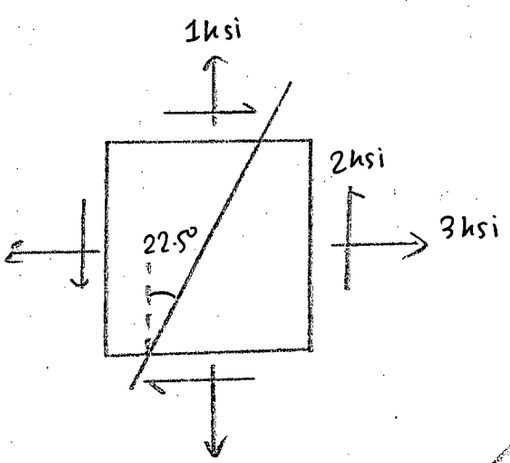

Figure 11

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BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B.Arch. Examinations 2017-2018

Sub : **ARCH 351** (Landscape Design)

Full Marks: 140 Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

There are **SIX** questions in this section. Answer **Q. No. 6** and any **FOUR** from the rest.

1. Discuss the role of 'Landscape Design' in the built-environment. How is it related to the disciplines of 'Architecture', 'Physical Planning' and 'Urban Design'? **(7+6=13)**

2. What are the major elements of space organization? List and discuss. **(13)**

3. Discuss the context and backdrop of Landscape design as an independent discipline. Why is it more relevant in the present built-environment context? **(8+5=13)**

4. Briefly discuss the basis of modern concepts in Landscape design. What are the salient features of Italian, the English and the French landscape design? **(4+9=13)**

5. Analyse the context and trends of landscape design in Bangladesh and propose an appropriate concept for landscape design in this region. **(5+8=13)**

6. Short notes (any two): **(9×2=18)**
   (i) Persian Landscape design
   (ii) Japanese Landscape design
   (iii) Sequential phase relationship in space organization.

SECTION – B

There are **SIX** questions in this section. Answer **Q. No. 6** and any **FOUR** from the rest.

7. Define 'Ecology' and 'Ecosystem'. State law of interdependence. How does this law help a landscape designer to understand 'the landscape' as a whole? **(6+7=13)**

8. Define 'Environment'; 'Habitat'; 'Community'; 'Trophic Levels'; 'Food Web'; and 'Food chain' with reference to the Sundarbans ecosystem. **(13)**

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9. Name five 'cycles' in nature and elaborate any three with appropriate examples and illustrations. **(5+8=13)**

10. What 'site conditions' influences the choice of plants and planting in the landscape design? **(13)**

11. List the function of trees and discuss the plant characteristics that guide the design decision. **(5+8=13)**

12. Short Notes (Any two): **(9×2=18)**

    (i) Site planning for landscape design

    (ii) Site Analysis checklist for landscape design

    (iii) Soil and land grading in landscape design.

L-3/T-1/ARCH **Date: 23/09/2018**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch. Examinations 2017-2018

Sub: **EEE 373** (Basic Electrical Engineering for Architects)

Full Marks: 140 Time: 3 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Find the value of R for the circuit in Fig. for Q. 1(a). **(11)**

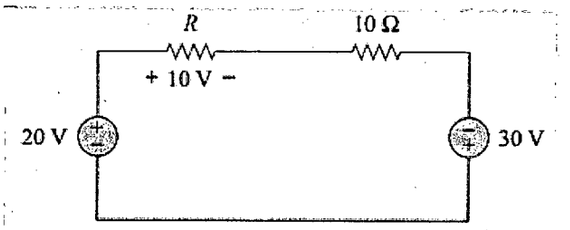

Fig. for Q. 1(a)

(b) Find the equivalent resistance R_{ab} for the circuit shown in Fig. for Q. 1(b) and use the result to find current i. **(12⅓)**

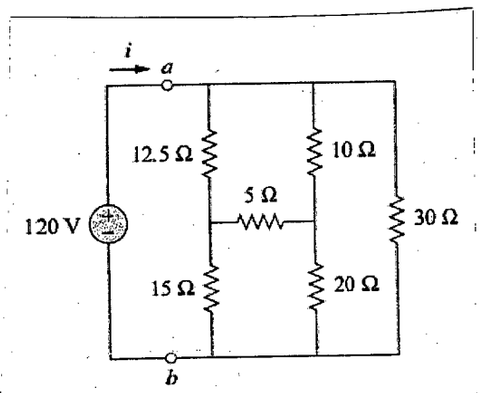

Fig. for Q. 1(b)

2. (a) Using nodal analysis find the power dissipated by the 4Ω resistance for the circuit shown in Fig. for Q. 2(a). **(11)**

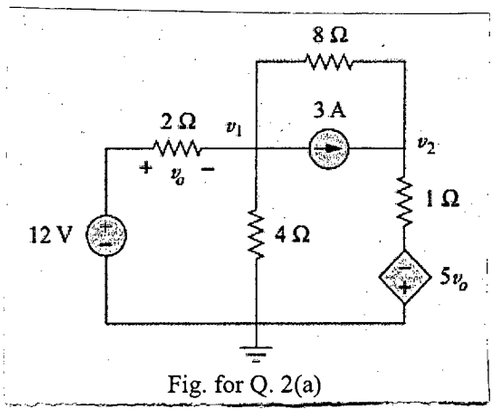

Fig. for Q. 2(a)

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Contd... Q. No. 2

(b) Use mesh analysis to determine i_1, i_2 and i_3 for the circuit shown in Fig. for Q. 2(b). **(12⅓)**

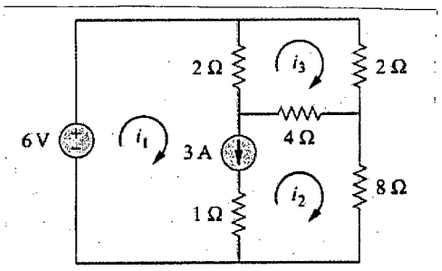

Fig. for Q. 2(b)

3. (a) Find i_1 in the circuit shown in Fig. for Q. 3(a) using superposition principle. **(11)**

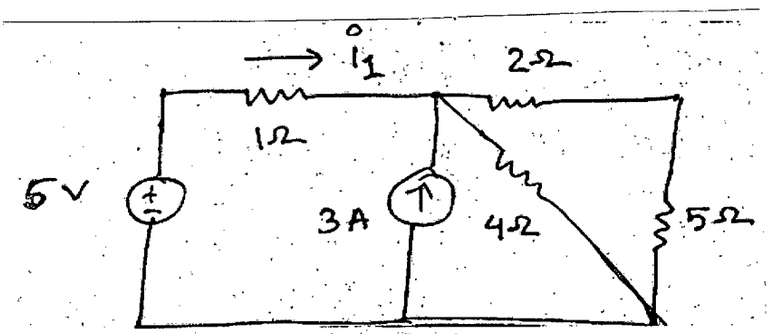

Fig. for Q. 3(a)

(b) Using source transformation, find the voltage v_x in the circuit shown in Fig. for Q. 3(b). **(12⅓)**

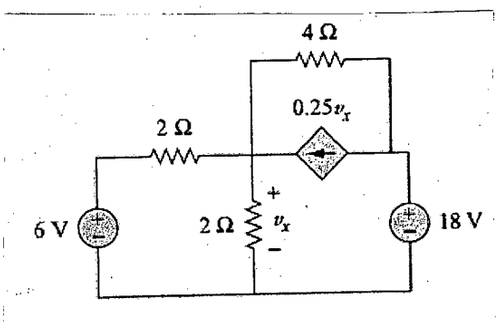

Fig. for Q. 3(b)

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4. (a) Obtain the Thevenin and Norton equivalent circuits at terminal $a-b$ for the circuit shown in Fig. for Q. 4(a). **(12⅓)**

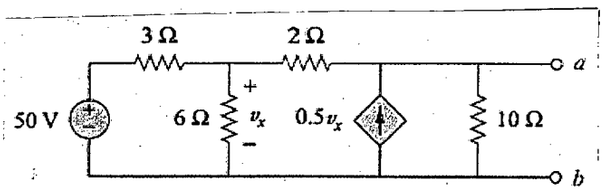

Fig. for Q. 4(a)

(b) Determine the value of R_L that will draw the maximum power from the rest of the circuit shown in Fig. for Q. 4(b). Calculate the maximum power. **(11)**

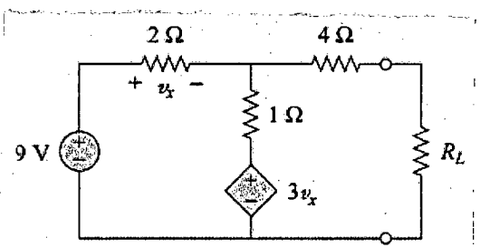

Fig. for Q. 4(b)

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) What is Alternating Current (AC)? **(2⅓)**

(b) For the Figure for Q. 5(b), find the expressions for **(21)**

(i) I (ii) I_1 (iii) I_2 (iv) instantaneous power supplied by the voltage source, P. (v) instantaneous power across inductance L (vi) instantaneous power across capacitance C (vii) instantaneous power across resistance R_3.

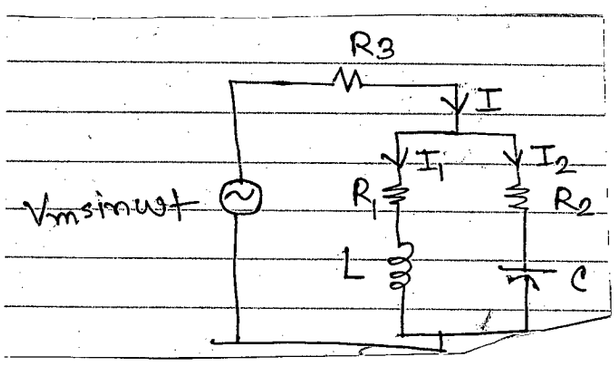

Figure for Q. 5(b)

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6. (a) Define any four of the followings with diagrams. **(13 ⅓)**

   (i) Direct Current (DC)

   (ii) Period

   (iii) Frequency

   (iv) Phase

   (v) Phase difference.

   (b) Give brief description on any two of the followings. **(10)**

   (i) Lightening protection system

   (ii) Safety of men and machines

   (iii) Earthing system.

7. For the layout of Figure for Q. 7, answer the followings.

   (a) Briefly explain Fittings and Fixtures **(6)**

   (b) Show the 'Fittings and Fixtures Layout Design' in Figure for Q. 7 and attach this sheet with your answer script. **(12 ⅓)**

   (c) Show the legends, used in the above design, with short description in your answer script. **(5)**

8. For the layout of Figure for Q. 8, answer the followings.

   (a) Show the 'conduit diagram layout' in Figure for Q. 8 and attach this sheet with your answer script. **(12)**

   (b) Show the switch-board connection diagram of the design in your answer script. **(11 ⅓)**

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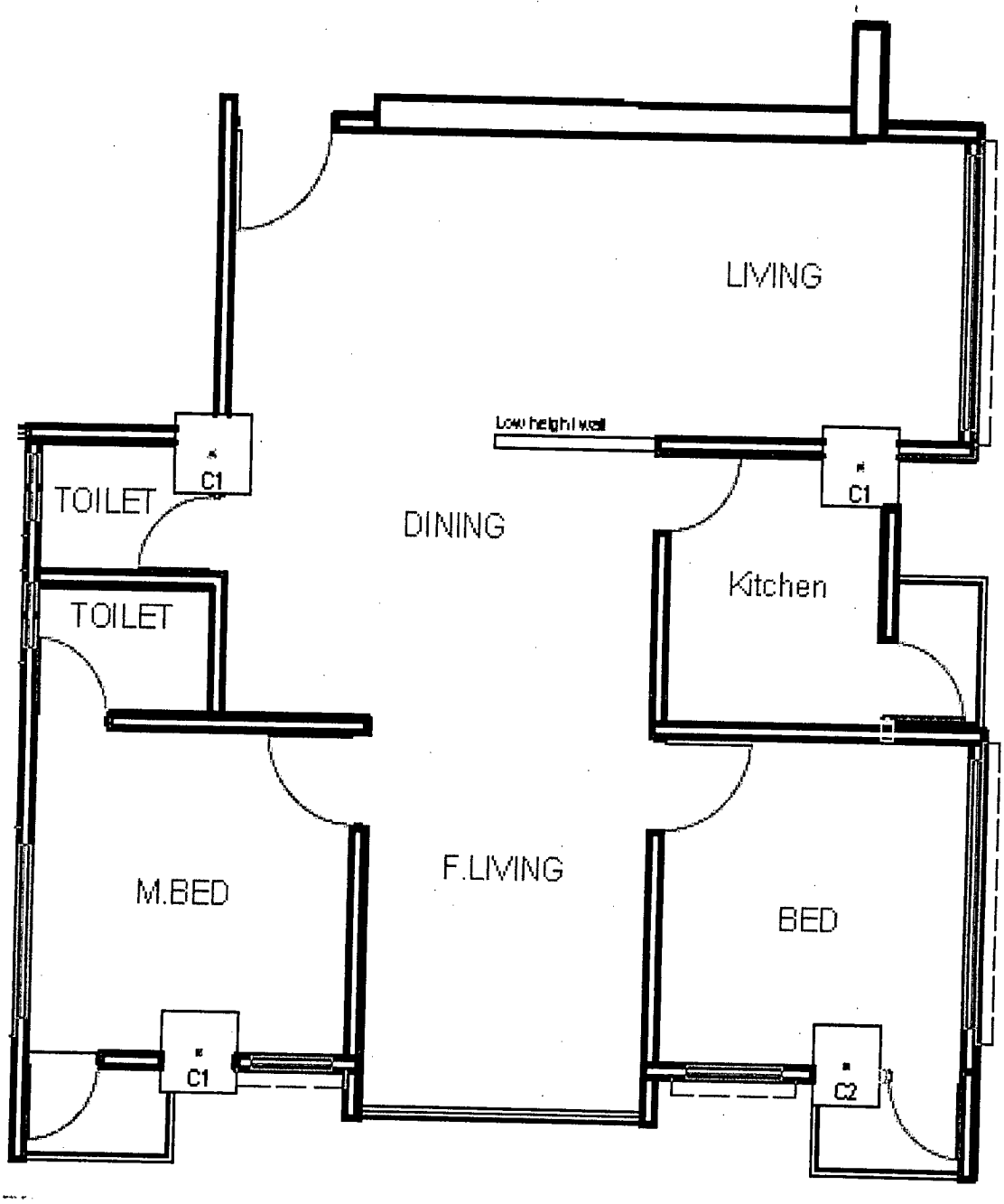

for Q.

Figure 7

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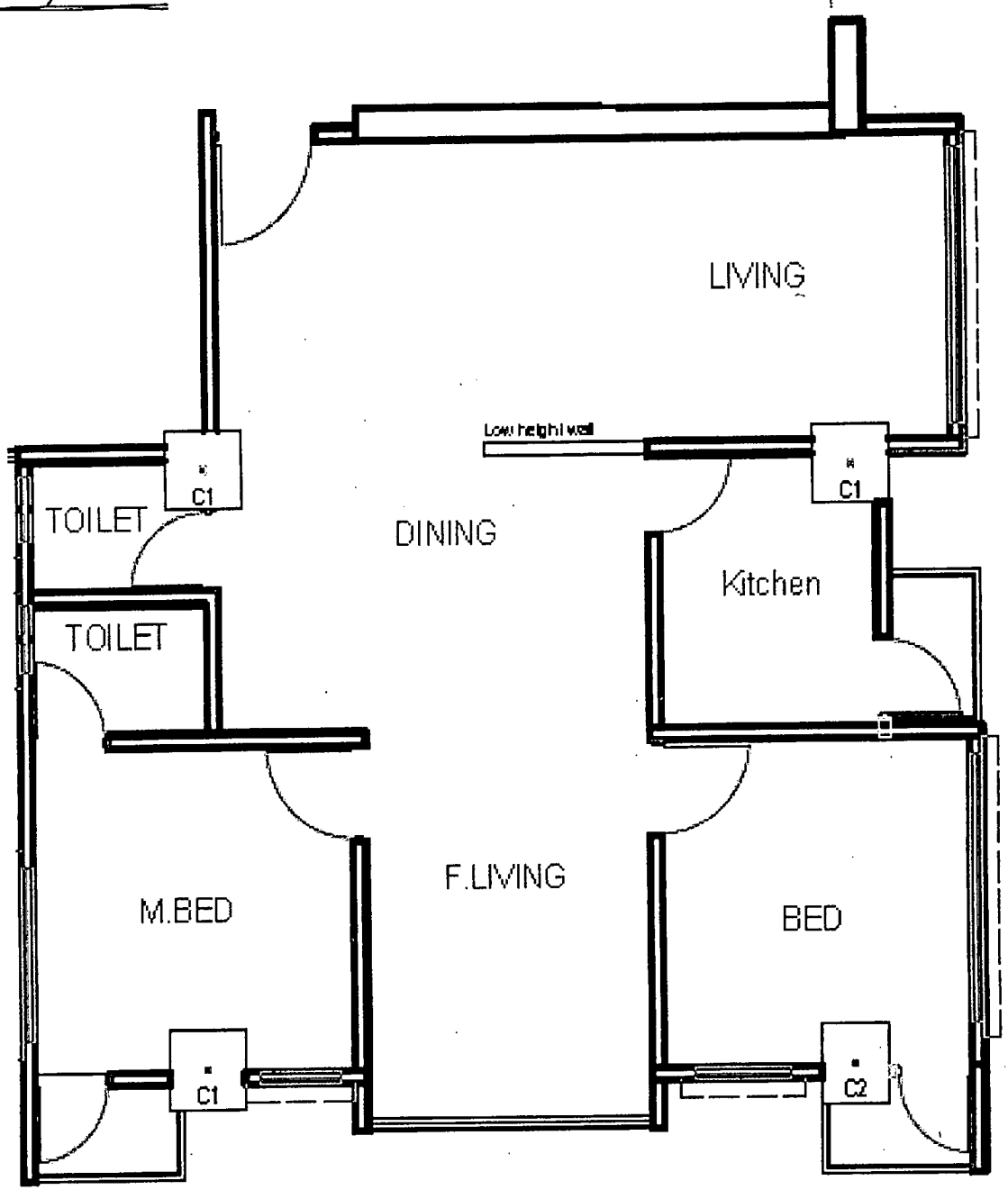

for Q.

Figure 8