L-3/T-1/ARCH **Date: 07/05/2023**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. ARHC Examinations 2021-2022

Sub: **ARCH 331** (Architecture of Indian Sub-continent)

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 Q. No. 1 and any **TWO** from the rest.

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

   (a) Asokan pillar

   (b) Shore Temple at Mahabalipuram

   (c) Gopuram

2. Describe the "Free standing Monoliths" at Mahabalipuram with necessary sketches. **(20)**

3. Elaborate the architectural characteristics of "Great stupa at Sanchi" with reference to its reconstruction and expansion. **(20)**

4. "The temple become a fort and the fort becomes a city" - explain with reference to the Meenakshi Temple at Madurai. **(20)**

SECTION – B

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

5. How 'Tomb Architecture evolved from the slave dynasty to the Mughal period? Use appropriate examples with sketches. **(30)**

6. How the architecture of 'Houz khas' is novel in terms of functional arrangements, spatial articulation and building volume? **(20)**

7. Write the salient features of the town named 'Shahjanabad' in term of architecture and public space. **(20)**

8. Write short notes on the following: **(10× 2=20)**

   (a) Master plan of 'Fatehpur Sikri'.

   (b) Quwwatul Islam Mosque complex.

L-3/T-1/ARCH **Date : 06/04/2023**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch. Examinations 2021-2022

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

Full Marks : 140 Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FIVE** questions in this section. Answer **Q. No. 1** and any **THREE** from the rest.

1. Which landscape design principles would you adopt to do landscape design in the context of Bangladesh. Give appropriate examples to justify your position. **(22)**

2. How are the landscape design thinking and perception of the twenty-first century different from the 15th-century landscape design precedents? **(16)**

3. Mention the appropriate plant community for the terrain of the Pleistocene clay in terms of its geology, topography and hydrology. **(16)**

4. What are the major landscape calamities we observe every year in Bangladesh? Write in brief, three landscape design strategies to mitigate the adverse impacts of any one such landscape calamity. **(16)**

5. Write short notes on the following: **(8×2=16)**

   (a) Ecological services of the Sundarban (Mangrove Forest)

   (b) Healing garden

SECTION – B

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

6. What are the potential contextual issues to consider while conducting a site analysis for an intended landscape design project? Make a checklist of these issues and explain them briefly. Use diagrams if necessary. **(14)**

7. Define 'space' as a landscape design element. Briefly describe three types of vegetational spaces with diagrams. **(14)**

Contd P/2

ARCH 351

8. What are the most important aspects to consider during the design process of a given landscape project? Briefly explain these aspects with necessary diagrams. **(14)**

9. How do people use and experience paths in a landscape? Mention three types of topographic paths and briefly describe them with diagrams. **(14)**

10. Imagine, you are the designer of a small residential garden. Mention the sequence of your work while implementing the landscape design in your site. What are the issues that you will consider regarding the choice of trees/plants, planting, and future maintenance of the vegetation on the site? **(14)**

11. Write short notes on any two of the following: **(7×2=14)**

    (a) Ecotone

    (b) Foci

    (c) Ecological corridor

L-3/T-1/ARCH **Date: 30/03/2023**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch. Examinations 2021-2022

Sub: **CE 365** (Structure III: Reinforced Concrete Design)

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** questions.

Assume reasonable values of missing data, if any.

1. (a) What are the seismic detailing provisions of RC columns for intermediate moment frames according to BNBC 2020? **(6)**

   (b) Where will you provide corner reinforcements in slabs and why? Describe the corner reinforcement requirements according to ACI Code with the help of neat sketches. **(8)**

   (c) Determine the nominal and design axial compression capacity of a 20″×25″ column reinforced with 4 - #9 and 8 - #8 bars. **(9⅓)**

   Assume, f'_c = 3ksi and f_y = 72.5 ksi.

2. (a) Why is the value of strength reduction factor lower for RC columns compared to that of RC beam? **(6)**

   (b) Show the relationship between the compressive strength and the water-cement ratio of concrete in a qualitative graph. **(3)**

   (c) Design a square tied column to support an axial dead load of 900 kips and a live load of 500 kips. Use, f'_c = 5 ksi, f_y = 60 ksi and a steel ratio of about 2%. Design the necessary ties. **(14⅓)**

3. A five-storied building consists of 6″ thick floor slabs. The typical floor plan is shown in Figure 1.The rectangular floor slabs are supported by beams at all their edges. All beams are 12″ wide and 30″ deep which are simply supported at their ends by columns of cross-section 36″×36″ at the corners. Determine the concentrated factored load on column C1 at the plinth level for gravity loads. **(23⅓)**

   Assume, FF = 30 psf, PW = 40 psf, and LL = 60 psf, floor height = 10′.

4. A four-storied shear wall is subjected to factored wind forces as shown in Figure 2. The wall is 16′ long and 8″ thick. Design reinforcement for the wall. Assume the compressive strength of concrete to be 4 ksi and steel yield strength to be 60 ksi. **(23⅓)**

Contd P/2

CE 365/ARCH

SECTION – B

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

5. (a) A rectangular beam has the dimensions as shown in Figure 3. 28 days concrete cylinder strength is 4000 psi and yield strength of steel is 60 ksi. Modulus of rupture is given as 450 psi. Determine the stresses caused by a bending moment of 60 ft-kips. **(18)**

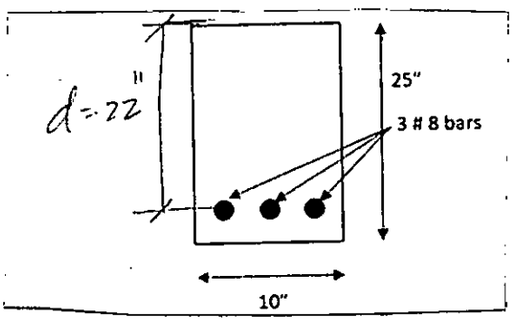

Figure 3

(b) Briefly describe Equivalent Rectangular Stress Distribution with relevant figures. **(5⅓)**

6. A reinforced one way concrete slab is built integrally with its supports and consists of two equal spans, each with a clear span of 14 ft. The service live load is 100 psf, and 4000 psi concrete is specified for use with steel with a yield strength equal to 60 ksi. Design the slab following the provisions of the ACI. (Use the table provided in **Appendix-A)** **(23⅓)**

7. (a) Find the cross sectional and steel area required for a simply supported rectangular beam with a span of 15 ft that is to carry a computed dead load of 1.3 kips/ft and a service live load of 2.1 kips/ft. Materials strength are $f_c' = 4500$ psi, $f_y = 60$ ksi. **(18)**

(b) Briefly describe behavior of diagonally cracked beam. **(5⅓)**

8. (a) Using the equivalent rectangular stress distribution, calculate the nominal strength of a beam having b = 12 in., d = 23 in., $A_s = 2.37$ in^2, $f_c' = 4500$ psi, $f_y = 72.5$ ksi and $\beta_1 = 0.85$. Also calculate the design moment capacity. **(15)**

(b) Classify slabs along with relevant figures. **(8⅓)**

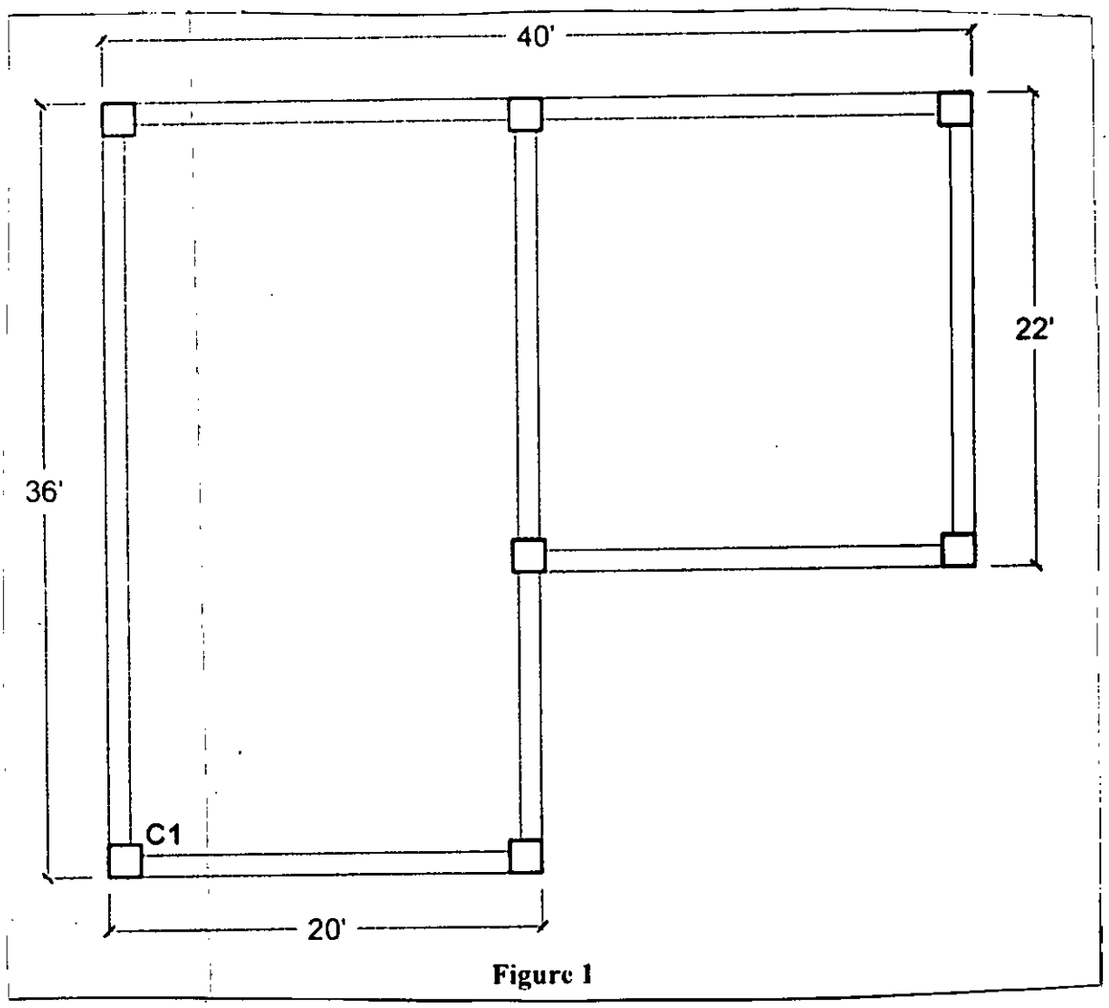

Figure 1

You may use the following equations:

$$A_{vh} = \frac{(V_u - \varphi V_c)s_2}{\varphi f_y d} \geq 0.0025 s_2 h$$

$$A_{vv} \geq \left[0.0025 + 0.5\left(2.5 - \frac{h_w}{l_w}\right)\left(\frac{A_{vh}}{s_2 h} - 0.0025\right)\right] s_1 h$$

$$\varphi M_n = \varphi\left[0.5 A_{st} f_y l_w \left(1 - \frac{z}{l_w}\right)\right]$$

$$\frac{z}{l_w} = \frac{1}{2 + 0.85\beta_1 l_w \frac{h f'_c}{A_{st} f_y}}$$

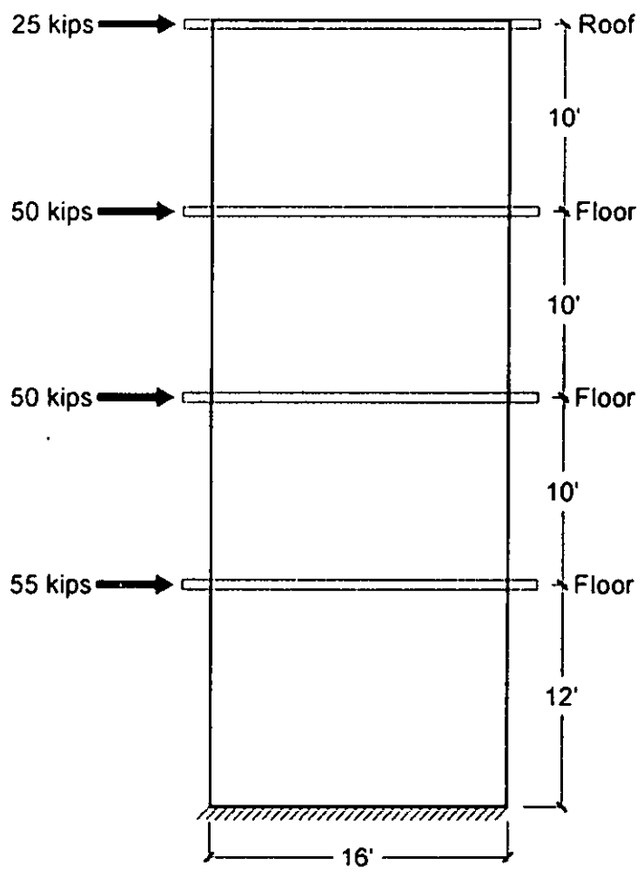

Figure 2

Appendix-A

Moment and shear values using ACI coefficients†

Positive moment	
End spans	
If discontinuous end is unrestrained	$\frac{1}{11} w_u l_n^2$
If discontinuous end is integral with the support	$\frac{1}{14} w_u l_n^2$
Interior spans	$\frac{1}{16} w_u l_n^2$
Negative moment at exterior face of first interior support	
Two spans	$\frac{1}{9} w_u l_n^2$
More than two spans	$\frac{1}{10} w_u l_n^2$
Negative moment at other faces of interior supports	$\frac{1}{11} w_u l_n^2$
Negative moment at face of all supports for (1) slabs with spans not exceeding 10 ft and (2) beams and girders where ratio of sum of column stiffness to beam stiffness exceeds 8 at each end of the span	$\frac{1}{12} w_u l_n^2$
Negative moment at interior faces of exterior supports for members built integrally with their supports	
Where the support is a spandrel beam or girder	$\frac{1}{24} w_u l_n^2$
Where the support is a column	$\frac{1}{16} w_u l_n^2$
Shear in end members at first interior support	$1.15 \frac{w_u l_n}{2}$
Shear at all other supports	$\frac{w_u l_n}{2}$

† w_u = total factored load per unit length of beam or per unit area of slab.
l_n = clear span for positive moment and shear and the average of the two adjacent clear spans for negative moment.

L-3/T-1/ARCH **Date: 13/04/2023**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. ARCH Examinations 2021-2022

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

Full Marks: 140 Time: 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

All the symbols have their usual meaning.
Assume reasonable values for missing data.
The figures in the margin indicate full marks

SECTION – A

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

1. (a) For the circuit shown in Fig. for Q. No. 1(a), if the current through the 6Ω resistor is, I_6 = 1A, then Find V_S and I_S. Also calculate the power supplied by the Source. **(12)**

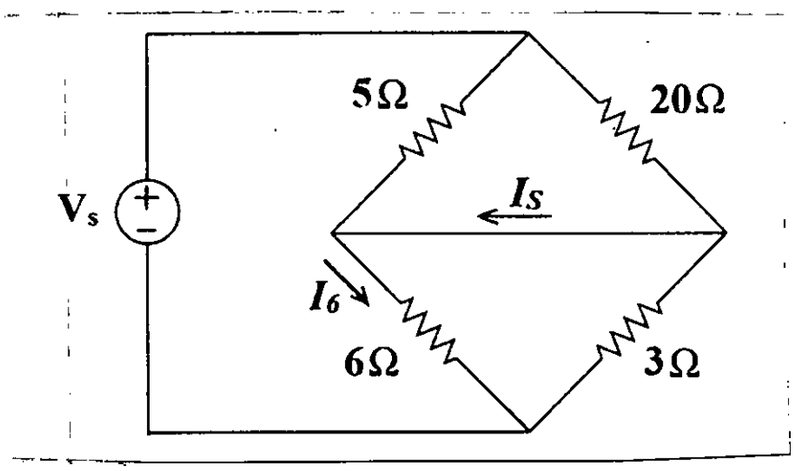

Fig. for Q. No. 1(a)

(b) Determine I_0 in the circuit of Fig. for Q. No. 1(b). **(11 $\frac{1}{3}$)**

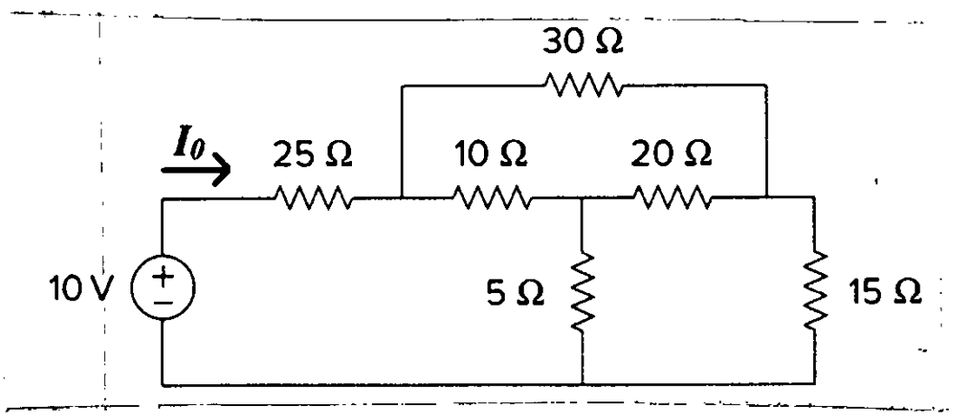

Fig. for Q. No. 1(b)

2. (a) Use Mesh Analysis to determine I_0 in the circuit shown in Fig. for Q. No. 2(a). **(12)**

Contd P/2

EEE 373/ARCH

Contd... Q. No. 2(a)

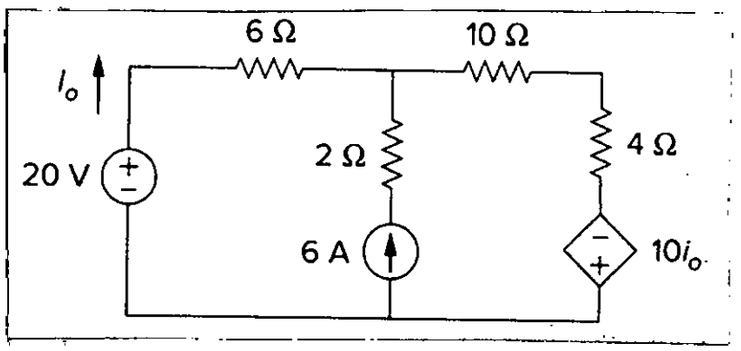

Fig. for Q. No. 2(a)

(b) Find v_0 and I_0 in the circuit of Fig. for Q. No. 2(b) using nodal analysis. **($11\frac{1}{3}$)**

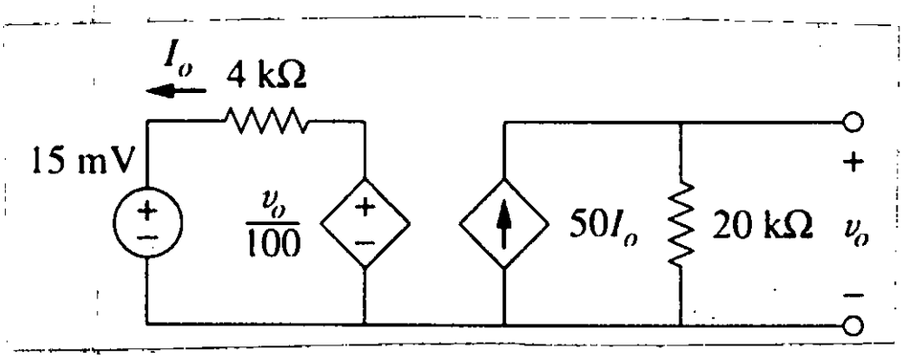

Fig. for Q. No. 2(b)

3. (a) Use superposition to find V_0 and i_0 in the circuit of Fig. for Q. No. 3(a). **(13)**

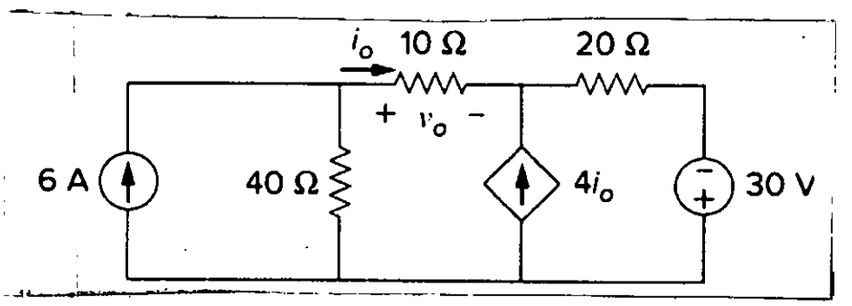

Fig. for Q. No. 3(a)

(b) Use source transformation to find v_x in the circuit of Fig. for Q. No. 3(b). **($10\frac{1}{3}$)**

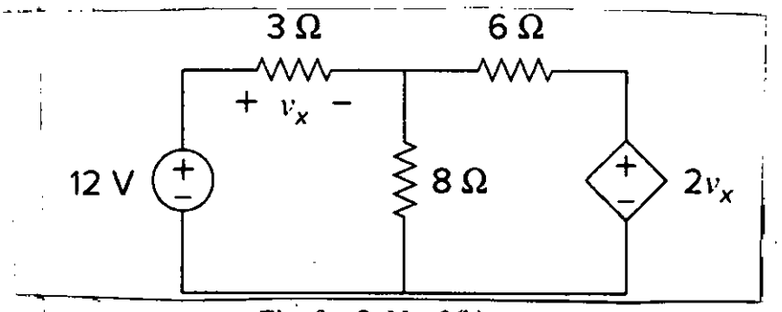

Fig. for Q. No. 3(b)

Contd P/3

EEE 373/ARCH

4. (a) Determine the Thevenin equivalent of the circuit in Fig. for Q. No. 4(a). Determine the load to be connected across terminals a-b to absorb maximum power from the circuit and also find the power. **(13)**

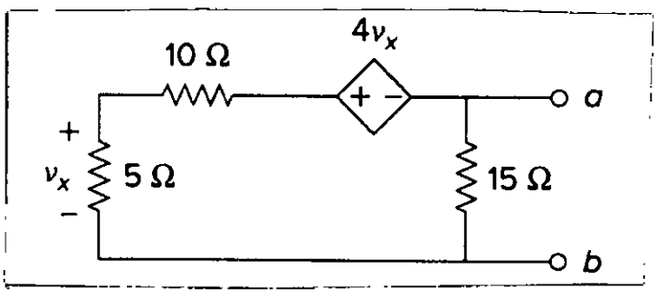

Fig. for Q. No. 4(a)

(b) In the circuit of Fig. for Q. No. 4(b), given that I = 4 amps when V_s = 40 volts and I_s = 4 amps and I = 1 amp when V_s = 20 volts and I_s = 0. Use Superposition and Linearity to calculate the value of I when V_s = 60 volts and I_s = - 2 amps. **($10\frac{1}{3}$)**

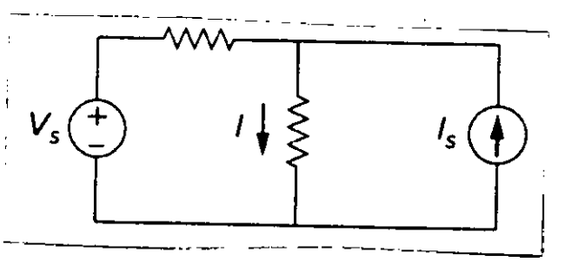

Fig. for Q. No. 4(b)

SECTION – B

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

5. (a) Using the phasor approach , determine the current in a circuit described by the equation, **(10)**

$$4i + 8\int i\,dt - 3\frac{di}{dt} = 50\cos(2t + 75^\circ)$$

(b) Determine the circuit's input impedance as shown in Fig. for Q. No. 5(b) at angular velocity of 10 rad/s. **(10)**

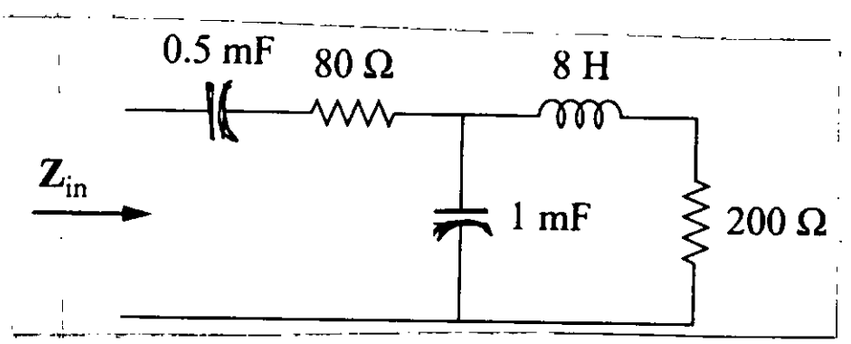

Fig. for Q. No. 5(b)

Contd P/4

EEE 373/ARCH

Contd... Q. No. 5

(c) Show that current through an inductor lags the voltage across it by 90°. $(3\frac{1}{3})$

6. (a) Show that for a linear circuit with load impedance Z_L, the load impedance must be equal to the complex conjugate of the Thevenin impedance for maximum power transfer. **(10)**

(b) Calculate V_x in the circuit of Figure for question 6(b) using the method of source transformation. $(13\frac{1}{3})$

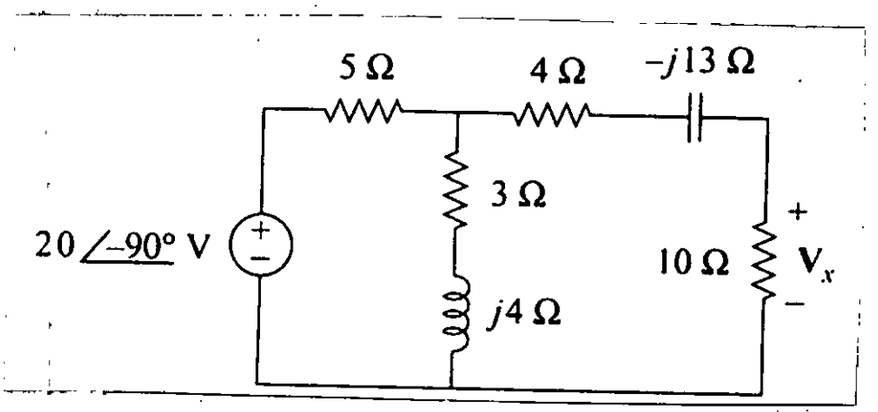

Figure for question 6(b)

7. (a) Find the rms value of the current waveform of Figure for question 7(a). If this rms current flows through a 9Ω resistor, calculate the average power absorbed by the resistor. **(10)**

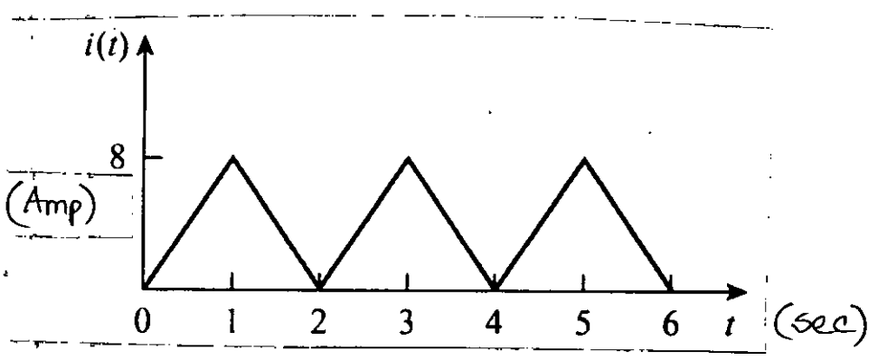

Figure for question 7(a)

(b) For the given floor plan of an apartment in Figure for question 7(b), draw the Fitting and Fixture layout Diagram. Your layout must contain the followings: (i) Wall Bracket Lights, (ii) Switch Board, (iii) Tube Lights, (iv) Celing Fan, (v) Exhaust fan, (vi) Meter Board, (vii) 2-pin sockets and (viii) 3-pin sockets. $(13\frac{1}{3})$

EEE 373/ARCH

Contd... Q. No. 7(b)

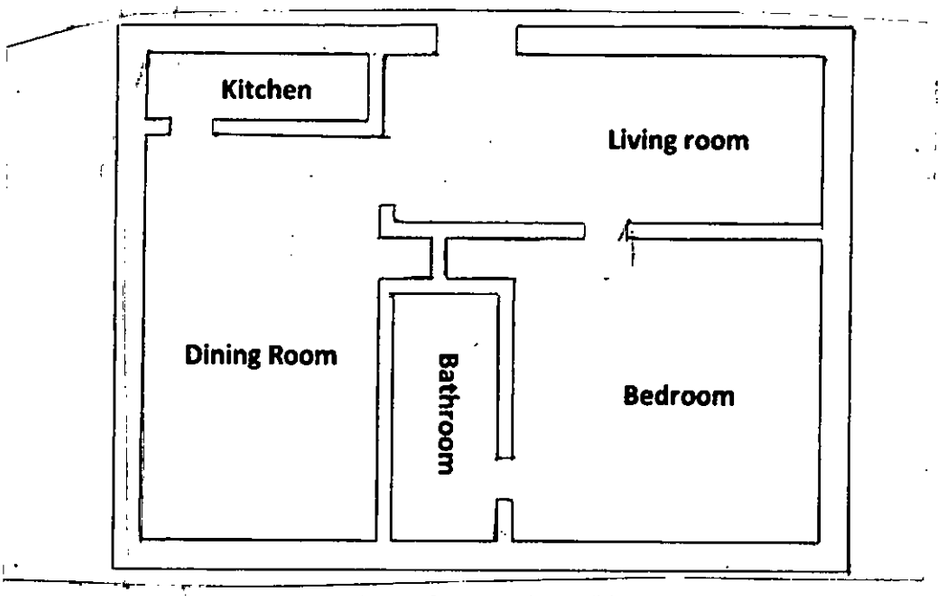

Figure for question 7(b)

8. Draw the **Conduit Layout, Switchboard Connection Diagram** and **Distribution Board Connection Diagram** for the Fitting and Fixture layout given Figure for question 8. $(23\frac{1}{3})$

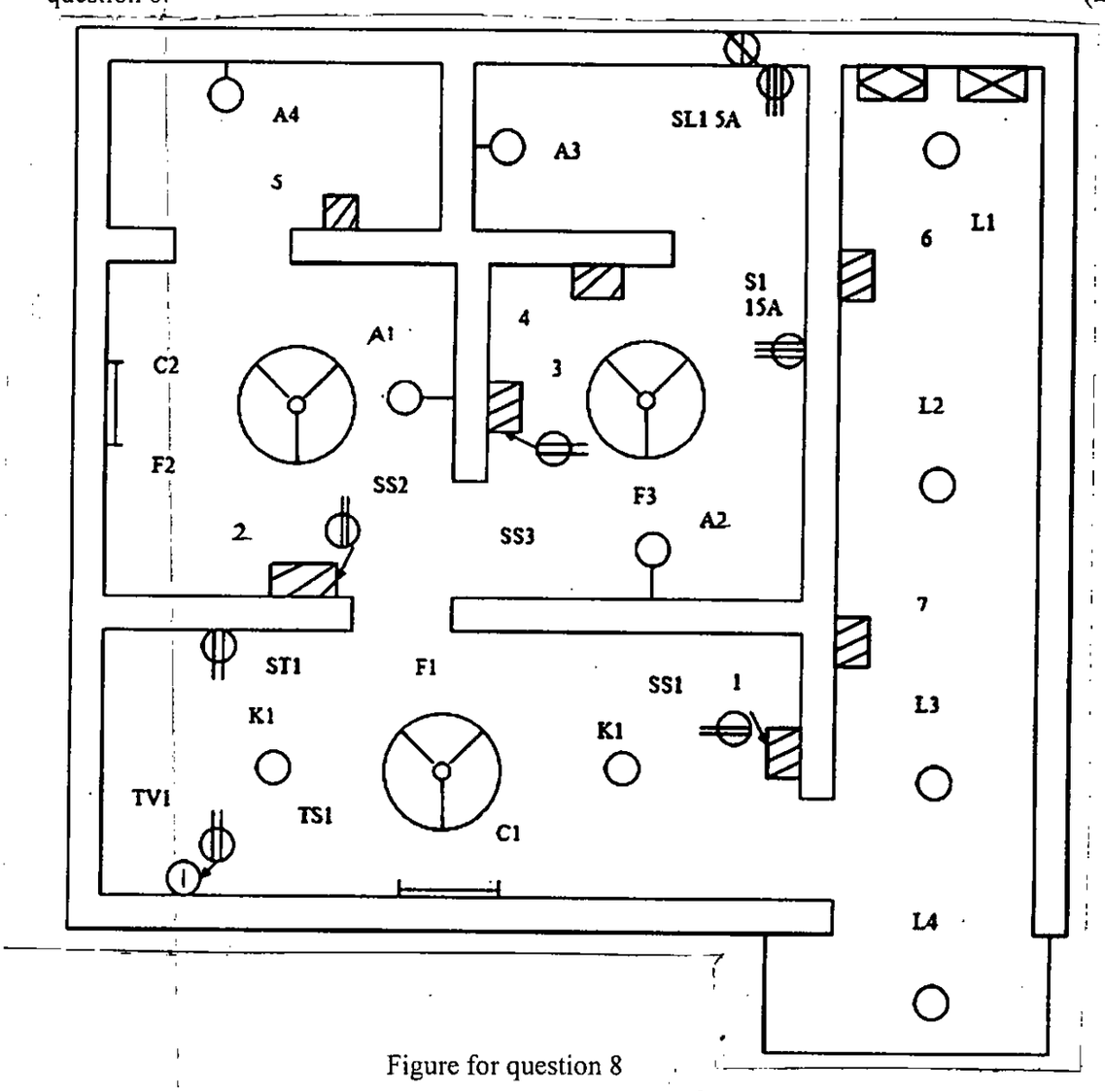

Figure for question 8