

**POLITEKNIK**  
Jabatan Pengajian Politeknik

EXAMINATION AND EVALUATION DIVISION  
DEPARTMENT OF POLYTECHNIC EDUCATION

(MINISTRY OF HIGHER EDUCATION)

CIVIL ENGINEERING DEPARTMENT

FINAL EXAMINATION  
JUNE 2012 SESSION

**CA306 : ARCHITECTURE STRUCTURES 1**

**DATE : 23 NOVEMBER 2012**

**DURATION : -2 HOURS (8.30 AM – 10.30 AM)**

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This paper consists of **ELEVEN (11)** pages including the front page.

**SECTION A : OBJECTIVE (25 QUESTIONS – ANSWER ALL)**

**SECTION B : ESSAY (4 QUESTIONS – ANSWER 3 ONLY)**

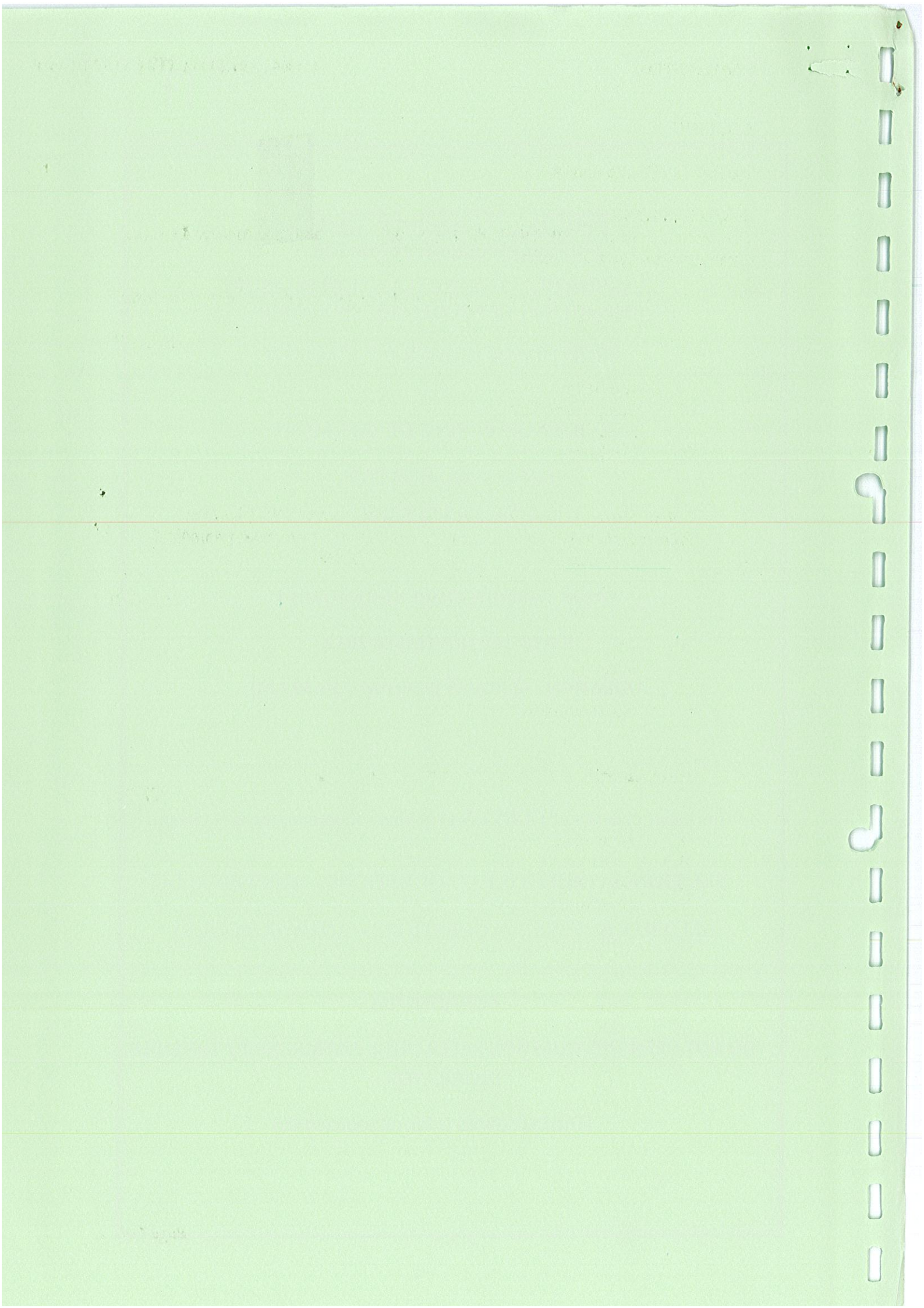
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INVIGILATOR**

(The CLO stated is for reference only)





## SECTION A

## OBJECTIVES (25 marks)

## INSTRUCTIONS:

This section consists of **TWENTY FIVE (25)** objective questions. Answer **ALL** the questions in the answer booklet.

1. If a structure member is being pulled and elongated in the processes, the force acting on it is known as \_\_\_\_\_

[CLO 3]

- A. Tensile force
- B. Compressive force
- C. Shear force
- D. Bending moment

2. Columns are designed to withstand compressive stress. Which of the following materials are suitable for a column for its structural properties?

- i - brick
- ii - concrete
- iii - steel
- iv - timber

[CLO 3]

- A. i and ii
- B. ii and iv
- C. i and iv
- D. All of the above

3. Fixed furniture is an example of which type of load?

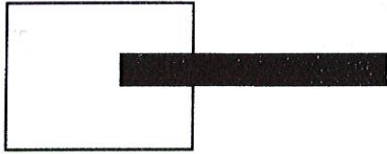
[CLO 3]

- A. Wind load
- B. Live load
- C. Dead load
- D. None of the above



4. Figure 1 refers to:

[CLO 1]



*Figure 1*

- A. Truss
- B. Cantilever beam
- C. Simple beam
- D. Column and beam

5. Columns and beams can be described as:

[CLO 1]

- A. Structural members that distribute the loads through their vertical and horizontal components that support the loading
- B. Structural members that distribute the loads through horizontal components
- C. Structural members that distribute the loads through vertical component, with vertical part to withstand compression
- D. Structural members that distribute the loads through vertical and horizontal component with vertical part withstand the compression while the horizontal part prevents the bending.

Act as shear walls that prevent the movement of lateral forces.

6. The above statement refers to which stability method of column and beam?

[CLO 2]

- A. Diagonal Rod Ties
- B. Concrete Shear Walls
- C. Field Rock
- D. Knee Ties

7. Below are stability methods for which frame structure system?

Pole Support	Lattice
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[CLO 2]

- A. Column and beam
- B. Space Frame
- C. Cantilever
- D. Truss

8. How does load being distributed in a vault?

[CLO 3]

- A. Through rigid frames
- B. Through cable support
- C. Through membrane suspension
- D. Through continuous plane curve

9. Shell structural system is weak against \_\_\_\_\_

[CLO 3]

- A. Bending Moment
- B. Tensile Force
- C. Shear Force
- D. Compressive Force

10. Which of the following is a single curve shell structural system?

[CLO 3]

- A. Hyperboloid Parabolic
- B. Plain Hyperboloid
- C. Short Barrel Vault
- D. Vault

11. Suspension cables can be stabilized by using :

[CLO 1]

- i. dead load
- ii. additional structural members
- iii. geometrical shape
- iv. wind load

- A. i , iii, iv
- B. ii , iii , iv
- C. i , iv
- D. i , ii

12. The arch structure resembles \_\_\_\_\_ and \_\_\_\_\_.

[CLO 1]

- A. Beaks , cave
- B. Sandstone arches , human footprints
- C. Cave , sandstone arches
- D. Human footprints , beaks

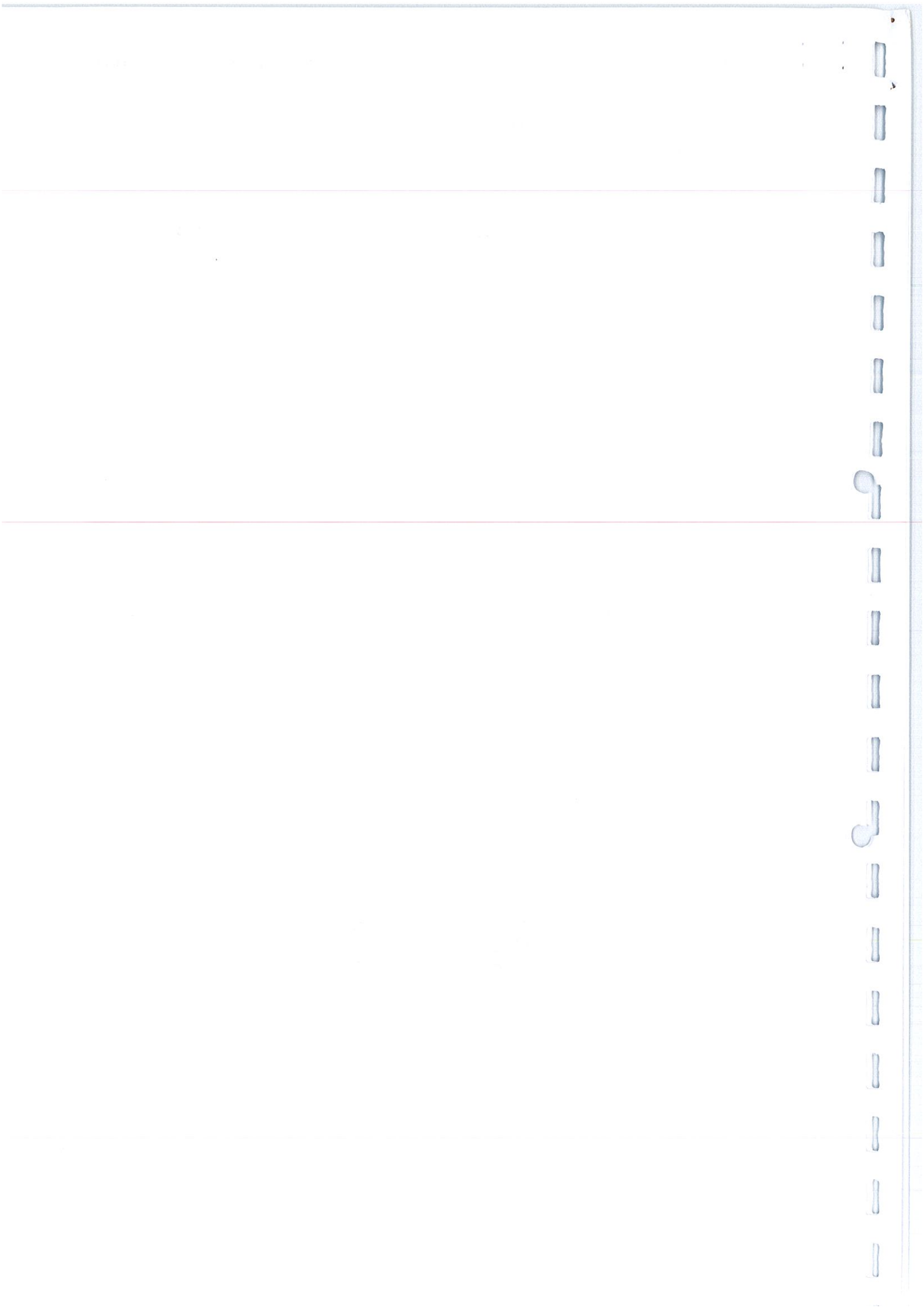
13. Which of the followings refer to pneumatic structure?

[CLO 2]

- i. Single Curve
- ii. Double Curve
- iii. Air Supported
- iv. Air Inflated

- A. i and ii
- B. ii and iii
- C. iii and iv
- D. i and iv

14. Which of the statements below refers to characteristics of suspension membrane? [CLO 2]
- i. Resist tension force only
  - ii. Resist tension and shear force
  - iii. Load is distributed through membrane
  - iv. Load is distributed through beams to columns
- A. i and iii  
B. ii and iii  
C. iii and iv  
D. ii and iv
15. Pneumatic system is classified into... [CLO3]
- i) Air supported structure
  - ii) Air inflated structure
  - iii) Hyperboloid
  - iv) Dome
- A. i, ii, iii, iv  
B. ii, iii, iv  
C. iii, iv,  
D. i, ii
16. What is the method used to stabilize the arch structure? [CLO3]
- A. Cross Bracing
  - B. Dual System
  - C. Box beam
  - D. Single - curvature structure
17. The suspension or cable structure system is designed to support \_\_\_\_\_ [CLO2]
- A. Tension
  - B. Compression
  - C. Shear
  - D. Bending





24. Arrange the following statements in order to show how load is distributed for double curve shell structure

- i. Load received
- ii. Load is distributed over cable then transmits to the substructure through load bearing walls.
- iii. Load distributed to the whole surfaces of shell then transmitted to the side beam.
- iv. Side beam received the loads then transmitted the compression received to the supports (column)

- A. i,ii,iii
- B. i,iii,iv
- C. ii,iii,iv
- D. i,ii,iii,iv

25. How does the load being distributed in a shell structure? [CLO 3]

- i. Load is distributed in multiple direction through its continuous plane surface
- ii. Load is distributed through its internal forces known as membrane stress
- iii. Load distributed in one direction through continuous surface
- iv. Load is distributed immediately to substructure through cable stayed structure

- A. i,ii
- B. i,iv
- C. ii,iii
- D. iii,iv

**SECTION B****ESSAY (75 marks)****INSTRUCTION:**

This section consists of **FOUR (4)** essay questions. Answer **THREE (3)** questions **ONLY**.

**QUESTION 1**

- a) With the aid of sketches, explain briefly the type of force involves and how it acts on columns and beams.

[CLO 2]

(10 marks)

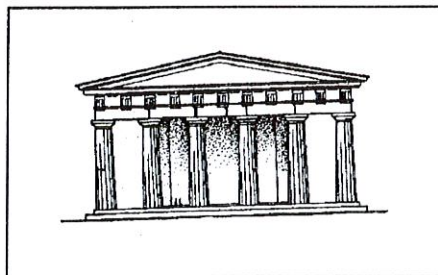
- b) There are 4 (four) types of material used in construction. Name three (3) types of material used and describe the strength of their structural properties.

[CLO 2]

(15 marks)

**QUESTION 2**

- a) Analyze the usage of columns and beams on The Theseien 449-444BC building.



[CLO 3]

[10 marks]

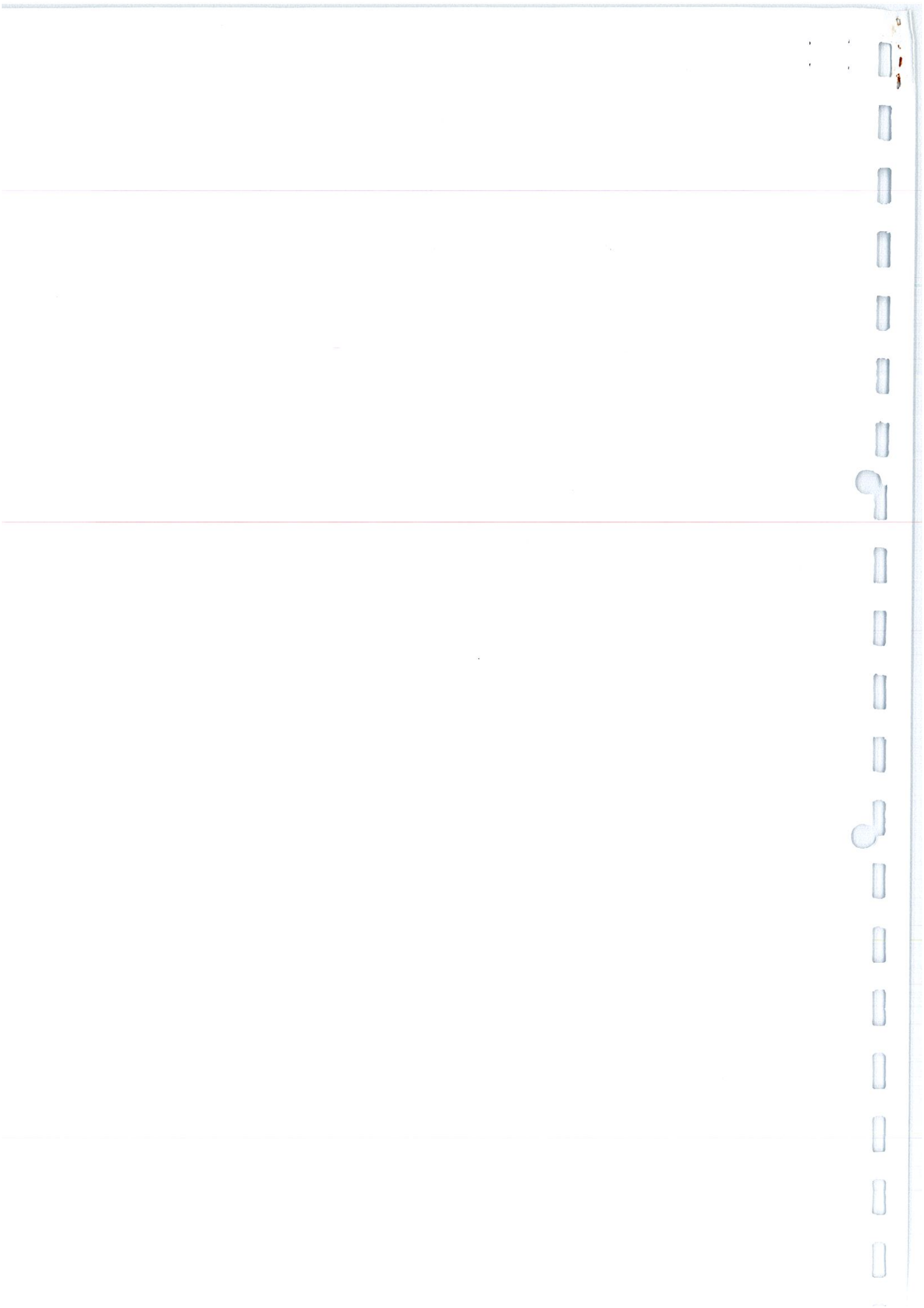
**QUESTION 3**

- (a) With the aid of sketches, discuss two (2) methods that are used to achieve lateral stability in arch structure. [CLO 3]  
( 10 marks)
- (b) With the aid of sketches, discuss the differences between two (2) types of pneumatic structure. [CLO 3]  
( 15 marks)

**QUESTION 4**

- a) With the aid of sketches, analyze the loads distribution for a shell structure. [CLO 3]  
(10 marks)
- b) With the aid of sketches, analyze the loads distribution for a double curve shell structure. [CLO 3]  
(15marks)





**RALAT SOALAN 2 (SECTION B)**

- b) Analyze loads distribution on;
- i. Geodesic frame
  - ii. Space frame
  - iii. Truss

[CLO 3]

[15 marks]

