

Roll No: -----



## UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B.Plan  
Subject (Course): Fundamentals of Building Structures  
Course Code: CIVL 1001  
No. of page/s: 2

Semester – I<sup>st</sup>  
Max. Marks: 100  
Duration: 3 Hrs

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### Section A

All questions are compulsory to attempt.

- Q1. What do you understand by Poisson's ratio for a material and explain its relevance. [5]  
[CO1]
- Q2. Explain the methods generally used for analysis of planar trusses. [5] [CO1]
- Q3. Enumerate the essential differences between reinforced concrete and pre-stressed concrete.  
[5] [CO4]
- Q4. Analyze the load transfer action/phenomenon in framed structures. [5] [CO4]

### Section B

All questions are compulsory to attempt.

- Q1. Explain the term "soil-structure interaction" and its relevance/significance during structural design. [10] [CO2]
- Q2. A cantilever beam of span length 4 m is carrying a concentrated load of 20 kN at the centre along with a uniformly distributed load of 6 kN/m along the entire span. Analyze the beam and draw the Bending Moment diagram for the same. [10] [CO3]
- Q3. What do you understand by column in structures and discuss in detail the various stresses which can be responsible for the failure of a column. [10] [CO2]

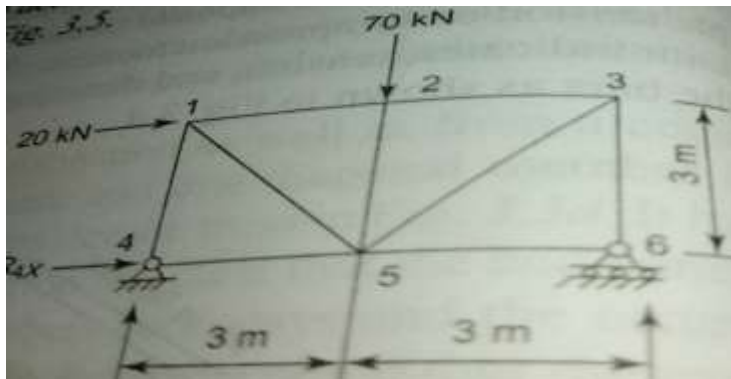
Q4. Discuss in detail the different type of foundations and suitability conditions for their use in structural system. [10] [CO4]

### Section C

**All questions are compulsory to attempt.**

Q1. Consider a column with clear height/length of 3m and rectangular cross-section area of 1.5 m X 1m. The ends of the column are fixed, assuming all the above conditions determine the maximum load which can be taken by the column before its failure. Modulus of elasticity for the column material is  $4 \times 10^4 \text{ N/mm}^2$  and crushing stress of the material is  $25 \text{ N/mm}^2$ . [20] [CO2]

Q2. Analyze the truss given in the figure below:



[20] [CO1]

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### Section A

All questions are compulsory to attempt.

- Q1. What do you understand by slenderness ratio in columns and explain its relevance. [5]  
[CO1]
- Q2. Enumerate the essential differences between pre-tensioned and post-tensioned pre-stressed concrete. [5] [CO4]
- Q3. Accordance to structural point of view, how do high rise buildings differ from low-rise buildings. [5] [CO4]
- Q4. What do you understand by characteristic compressive strength of concrete. [5]  
[CO4]

### Section B

All questions are compulsory to attempt.

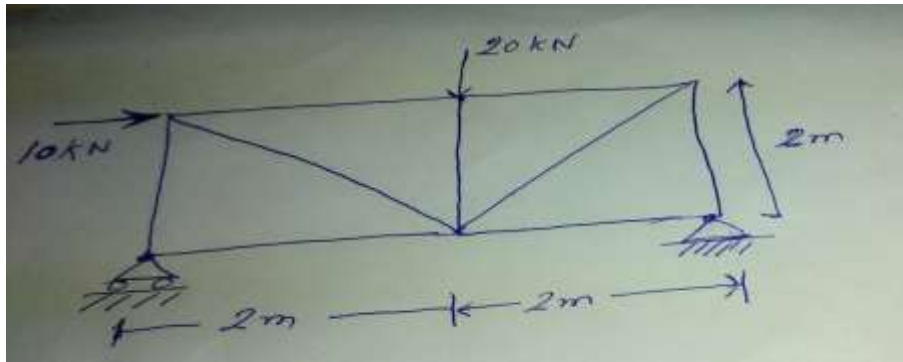
- Q1. . A simply supported beam of span length 5 m is carrying a concentrated load of 10 kN at the centre along with a uniformly distributed load of 4 kN/m along the entire span. Analyze the beam and draw the Bending Moment diagram for the same. [10] [CO3]
- Q2. Describe the important aspects which are considered during the design of high-rise buildings. [10] [CO4]
- Q3. Discuss in detail the different type of shallow foundations and suitability conditions for their use in structural system [10] [CO4]

Q4. Explain the various stresses which can be responsible for the failure of a column in structures. [10] [CO2]

### Section C

All questions are compulsory to attempt.

Q1. Analyze the truss given in the figure below:



[20] [CO1]

Q2. Suppose a column with clear height/length of 4 m and rectangular cross-section area of 2 m X 1m is constructed with one end of the column as fixed and other end as hinged. Considering all the above conditions, determine the maximum load which can be taken by the column before its failure. Modulus of elasticity for the column material is  $4 \times 10^4 \text{ N/mm}^2$  and crushing stress of the material is  $30 \text{ N/mm}^2$ . [20] [CO2]