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UNIVERSITI SAINS MALAYSIA

1<sup>st</sup>. Semester Examination  
2004/2005 Academic Session

October 2004

**EAS 664/4 – Principle Structural Design**

Time : 3 hours

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**Instruction to candidates:**

1. Ensure that this paper contains **FIVE** (5) printed pages before you start your examination.
2. This paper contains **FIVE** (5) questions. Answer **ALL** (5) questions.
3. All questions **MUST BE** answered in English.
4. All questions carry equal marks.
5. All questions **MUST BE** answered on a new sheet.
6. Write the answered question numbers on the cover sheet of the answer script.

1. (a) Briefly describe the following structural forms in order to provide functional spaces of high-rise building to suit the clients's requirement:

- i. Braced - Frame structures
- ii. Shear - Wall structures
- iii. Braced - Tube structures

(9 marks)

(b) A ten storey rigid frames shown in Figure 1.0 is situated at Penang in the terrain category 3 area with the basic wind speed of  $33.5 \text{ m/s}^2$ . The basic wind speed has been converted to equivalent horizontal force as shown in Figure 1.0. The story height is typically 3.5 m, to give a total height of 30m. The frames are spaced at 9m. Using the Portal Method, calculate :

- i. The horizontal external shear at mid-story level for each story.
- ii. The shear to half-columns above and below of fifth story
- iii. The maximum moment above and below joint at fifth story.
- iv. The shear in the girder at fifth story.

Indicates all values ( i - iv) on the diagram.

(9 marks)

(c) Describe TWO advantages for the above analysis in 2 (b) using Portal Method.

(2 marks)

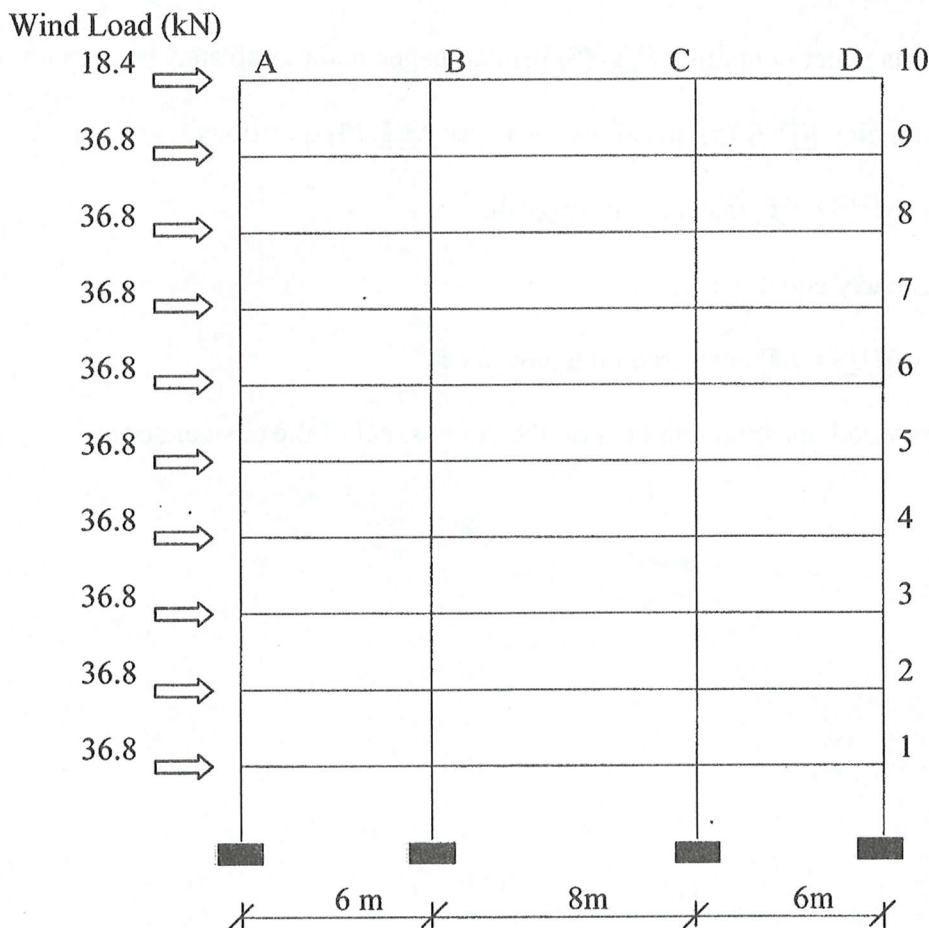


Figure 1.0