

Menoufia University
Faculty of Engineering
Civil Engineering Dept.
Semester: (II)
Date of Exam: 19/8/2020



Subject: Construction and Design
of Cable-Stayed Bridges

Code: CVE 707

Year: 2019/2020

Time Allowed: (3) hours

Total Marks: 100 marks

General notes:

- Any sketches should be neat, detailed and fully dimensioned.
- Any missing data may be reasonably assumed.
- Read carefully each question and solve as required.

Answer the following questions

Question 1 (10 marks): Mention with neat sketches the types of loads that cable can carry as a structural element.

Question 2 (10 marks): Show with neat sketches the sag effect on vertical and horizontal cables when they are subjected to axial load.

Question 3 (10 marks): Describe with neat sketches the stability of the bridge deck in the vertical direction.

Question 4 (10 marks): Explain the structural behavior of the pylon.

Question 5 (10 marks): For a traditional three-span suspension bridge, explain briefly with neat sketches the selection of supporting conditions to resist the expansion and temperature effects.

Question 6 (10 marks): Define the location of maximum compressive stress concentration due to axial forces in the deck of a cable stayed bridge. Draw neat sketches the variation of the axial force in the deck due to the horizontal components of the cable pull.

Question 7 (10 marks): Explain briefly with neat sketches how to improve the lateral stability of cable stayed bridge.

Question 8 (20 marks):

- (a) Discuss briefly using neat sketches the main components of cable-stayed bridges.
- (b) Discuss briefly using neat sketches the main components of cabled suspended bridges.

Question 9 (10 marks): Draw the relationship between the cost / m² and main span length of the different types of a bridge deck (concrete, steel, and composite deck).

With our best wishes