

Uva Wellassa University, Sri Lanka
End Semester Examination – July 2010
ENG 422-2 Engineering Design



Time: Two (02) hours

Total 06 Questions

Answer five (05) questions only

1. Fig.Q01 shows a Center-pull Bicycle Brake Arm Assembly. Indicate **four (4)** places where failure can take place using free-body diagrams. Discuss about the mode of failure and how you analyze it in the design giving any equations that are necessary to use in the design.

(100 marks)

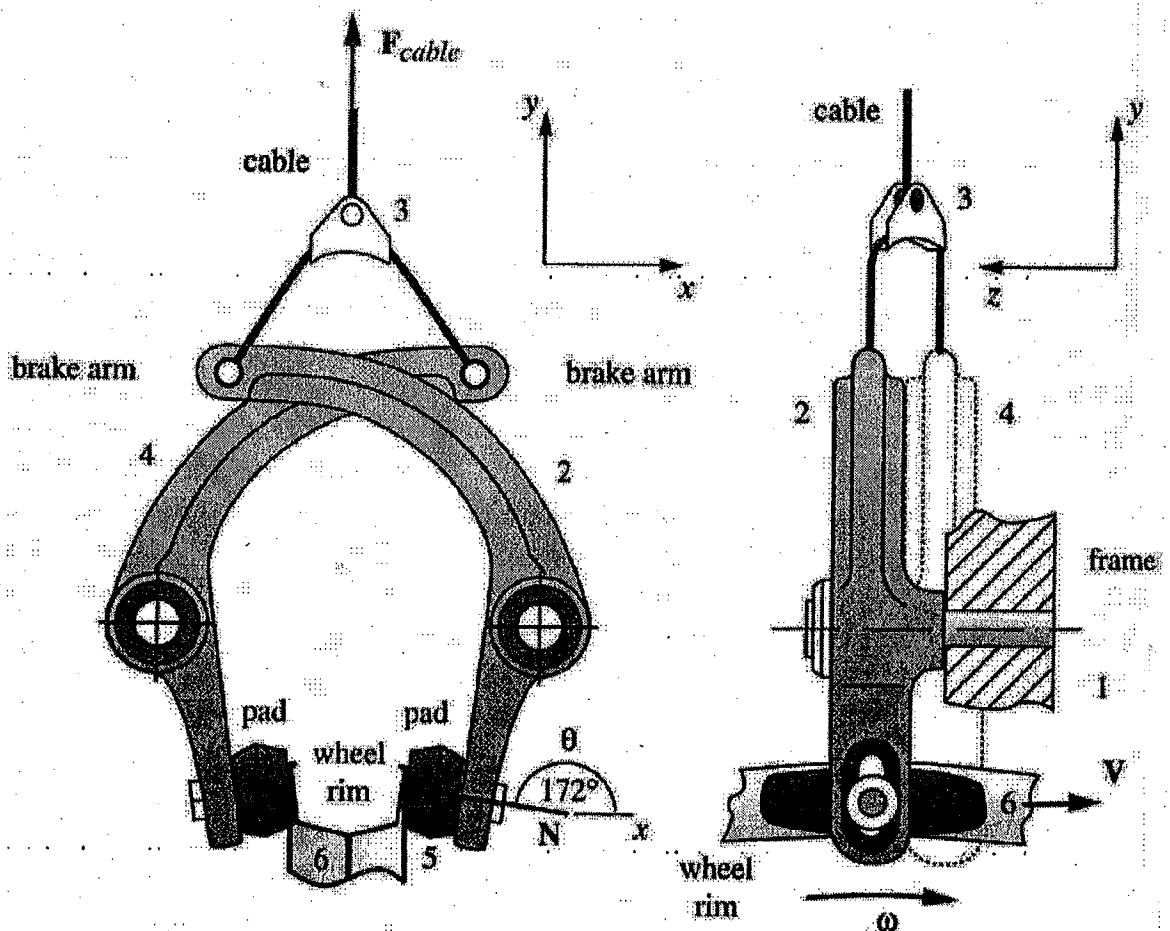


Fig.Q01

2.

a. Explain the engineering design process using a flow chart and describe it.
(50 marks)

b. Name and describe **five (5)** concept generation principles.
(50 marks)

3.

a. What are 'Product Design Specifications'? Explain the procedure of finding design specifications.
(50 marks)

b. Give **ten (10)** design specifications for any product of your interest.
(50 marks)

4.

a. Name and describe **four (4)** Concept Selection Principles.
(50 marks)

b. Give **two (2)** examples for Design for Manufacture and Assembly. Use them to describe the concept.
(50 marks)

5.

a. What is 'Ergonomics'? Describe using an example.
(50 marks)

b. Discuss the importance of mathematical modeling in engineering design.
(50 marks)

6. Consider the Center-pull Bicycle Brake Arm Assembly shown in the Fig.Q01 again. Select materials for each component in the assembly giving reasons for selection. Give two other **two (2)** possible materials that can be used for each component. Indicate the most important properties of materials for the design of each component.

(100 marks)