

MANSOURA UNIVERSITY
FACULTY OF ENGINEERING

Department of Mechanical Design and Production Engineering

Second Year.
First Term, Final Exam.

Time allowed: 3 Hs.
Jan 2014.

Methods of Experimental Stress Analysis

Answer the following Questions:

1-Write an engineering brief describing in the following subjects:

- Brittle lacquer coatings.
- Two and three dimensional photo-elastic.
- Electrical resistance strain gauge.
- Photo-elastic coating technique.

2-a-Draw the arrangement of the optical elements in the circular polariscope and explain the function of each element.

b- In details, describe the following:

- stress concentration factor,
- stress intensity factor,
- the three fracture modes and
- Fracture mechanics.

3-a- Discuss the basic operating principles of the laser and then summerize with illustrative sketch the formation of laser.

b-The pulsed Nd:YAG laser welding system comprises a number of elements, discuss thes elements and explain the process and technique.

4- a- In details discuss the failure analysis process.

b- Summarize and discuss the processes of data collection, data analysis, conclusions and the contents of the failure analysis final report.

Prof. A.A.Fattah

Reminder:

- Carefully read the given questions and take your time in thinking then write proper answers according to the engineering formatting systems.
- Give an individual answer for each Question in an individual page.
- Don't leave the examination hall before answering all the above questions.