Ministry of Higher Education& Scientific Research
University of Technology
Materials Engineering Department

وزارة التعليم العالي والبحث العلمي
الجامعة التكنولوجية
قسم هندسة المواد

Subject: Materials inspection
Examiner: Assist.Prof.Dr.Laith Kais Abbas
Allowed time: 3 hours

Final Examination (2013-2014)

Class: Third year
Signature :
Date: 28 / 5 / 2014

Note: Answer (Five) Questions only.

Q(1-A): Write the advantages and the limitations of (Gamma Ray) inspection. (12 marks)

Q(1-B): define:

1- Scattering phenomenon of (X-Ray).
2- Fluorescent radiation of (X-Ray). (8 marks)

Q(2-A): When will the inspector use the (Micro-hardness testing) to detect the hardness of the specimen. (7 marks)

Q(2-B): Suggest a (Non Destructive Inspection) method to detect the internal defects that might be exists in the metal plate shown in the figure (1), the method you will suggest can make the inspector able to measure the distance between the specimen surface and the internal defect. Draw all necessary figures and write all related information about the method that you suggest. (13 marks)

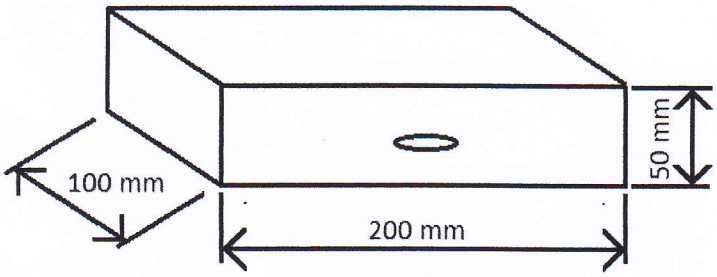

Figure (1)

Q3: Explain the hydrostatic testing which is used in pressure and leak inspection. (20 marks)

Q(4-A): Write about choosing the camera which is used in (Infrared inspection). (12 marks)

Q(4-B): Explain the Inspection for radial defects in cylindrical tubes and shafts by (Ultrasonic Wave Inspection). Draw all figures if it is exist. (8 marks)

Q(5-A): A Vickers diamond impression (d = 0.362 mm) in a hardness test, made on a sample of Aluminum using a load with the value (p = 2.5 kg). Calculate the value of hardness of Aluminum. What size diamond impression would be made in the same material if the used load was (5 kg)? (5 marks)

Q(5-B): In Rockwell hardness test, there are classes or scales. Write in a table the (Indenter shape, Total indenting load (kg) and the Material for which the scale is used), for the scales or the classes (A, B, C, D, E, F, G). (7 marks)

Q(5-C): The stress-strain curves for polymeric materials have been classified into several groups by (Carswell and Nason). Draw these groups which show the highly elastic behavior to the highly plastic behavior. (8 marks)

Q6 is behind the page →

Q(6-A): What kind of materials can the inspector remove from a surface of specimen as a surface preparation to inspect it by liquid penetrant inspection? How the inspector remove these materials. Draw a flow chart represents such case. (8 marks)

Q(6-B): Explain (the inspection for plastic products) by (Visual Inspection). Draw all necessary figures if it is exist. (12 marks)

.....GOOD LUCK.....