

**University of Bahrain  
College of Science  
Department of Mathematics  
Second Semester 2012/2013**

**MATHS 102 - Calculus II  
Test 2**

Date: May 20, 2013.  
Time: 4-5 pm.

Instruction. Check that your exam paper consists of 5 pages.

Student name: .....	I.D. number: .....	Section number: .....
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Serial Number:
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Question number	Max. Marks	Marks obtained
Q1	30	
Q2	20	
Total	50	

Question 1: (6+8+8+8=30 marks).

Decide whether each of the following converge or diverge.

a) The sequence  $a_n = \frac{(-1)^n}{n}$ .

b) The series  $\sum_{n=2}^{\infty} \frac{2n}{\sqrt{n^3+4}}$ .

c) The series  $\sum_{n=1}^{\infty} \frac{\cos^2 n}{3^n}$ .

d) The improper integral  $\int_0^2 \frac{1}{(x-1)^{\frac{2}{3}}} dx$ .

Question 2: (12+8=20 marks).

a) Use the integral test to decide whether the series

$$\sum_{n=2}^{\infty} \frac{1}{n\sqrt{\ln n}}$$

converges or diverges.

b) Find the sum of the series

$$\sum_{n=2}^{\infty} \left( (-1)^n \frac{3}{4^n} + \frac{1}{3^{n+2}} \right).$$