



ÇANKAYA UNIVERSITY
Department of Mathematics and Computer Science

MATH 156 Calculus for Engineering II

Practice Exam 1(B)

March 19 , 2007

17:40-19:30

Surname : _____
Name : _____
ID # : _____
Department : _____
Section : _____
Instructor : _____
Signature : _____

- This exam is meant to suggest the kind difficulty, and number of problems on the real exam. Note that topics covered in the course, but not included on this practice exam, still might appear on the real exam.
- Set aside 110 min. during which you can work on this exam without interruption. Refer to no books, notes, or calculators while working on the exam. This will give you a sense of your level of preparation for the real exam.

GOOD LUCK!

Please do not write below this line.

Q1	Q2	Q3	Q4	Q5	Q6	TOTAL

1. For the sequence determine whether it is convergent or divergent. Justify your answer

$$\{a_k\} = \left\{ \frac{\cos(k\pi)}{e^k} \right\}$$

2. Calculate if possible the sum of the series

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

3. Determine whether the series is convergent or divergent. Briefly justify your conclusions.

a) $\sum_{n=1}^{\infty} \frac{n!2^n}{(2n)!}$ b) $\sum_{n=1}^{\infty} \left(\frac{n+1}{n}\right)^n$ c) $\sum_{n=1}^{\infty} \left(\frac{n+1}{2n}\right)^n$ d) $\sum_{n=1}^{\infty} \frac{\sqrt{2n+1}}{n^2+1}$

4. Decide giving reasons whether the following series converges absolutely, converges conditionally, or diverges?

a) $\sum_{n=1}^{\infty} (-1)^n \frac{n}{n\sqrt{\ln n}}$ b) $\sum_{n=1}^{\infty} \frac{\cos(n\pi)}{e^n}$

5. Determine the radius of convergence and interval of convergence of the series.

a)
$$\sum_{n=1}^{\infty} \frac{(x+2)^n}{4^{n+1} \sqrt[3]{n+1}}$$

6.

a) Find the Maclaurin series for representation of $\int_0^1 \sin(t^2) dt$.

b) Estimate $\int_0^1 \sin(t^2) dt$ with an error less than 0.001. Be sure to justify your answer.

7.

a) Find the Maclaurin series for $\frac{x - \sin x}{x^3}$.

b) Use the series (from 7(a)) to calculate the limit $\lim_{x \rightarrow 0} \frac{x - \sin x}{x^3}$.
