

Books, watches, notes or cell phones are **not** allowed. The **only** calculators allowed are the Sharp EL-531***. You **must** show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1. (5 marks each) Determine whether each series is absolutely convergent, conditionally convergent, or divergent. Justify your answer carefully, and clearly state the test that you use.

a.

$$\sum_{n=1}^{\infty} (-1)^n \frac{3^n n!}{n^n}$$

b.

$$\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^3}$$

Question 2. (5 marks each) Determine whether each series is absolutely convergent, conditionally convergent, or divergent. Justify your answer carefully, and clearly state the test that you use.

a.

$$\sum_{n=1}^{\infty} \frac{\sin(1/n)}{n}$$

b.

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{\sqrt{n+1} - \sqrt{n}}{\sqrt{n+1}}$$