

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) Determine whether the integral is convergent or divergent. Evaluate if it is convergent.

$$\int_0^1 \frac{\ln x}{\sqrt{x}} dx$$

**Question 2.** (5 marks) Find the limit.

$$\lim_{x \rightarrow 0} \csc x \int_{0.1}^{0.1-x} \frac{\ln(0.9+t)}{t} dt$$

**Question 3.** (5 marks) Find the values of  $p$  for which the integral converges and evaluate the integral for those values of  $p$ .

$$\int_2^{\infty} \frac{(\operatorname{arcsec} x)^p}{x\sqrt{x^2-1}} dx$$