

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) Find the following indefinite integrals

a.

$$\int \frac{2x\sqrt{x} + 3x - x^2 \sec x \tan x}{x^2} dx$$

b.

$$\int \frac{4}{x\sqrt{1 - (\ln x)^2}} dx$$

**Question 2.** (5 marks) Find  $f$  where  $f''(t) = 2e^t + 3 \sin t$ ,  $f(0) = 0$ ,  $f(\pi) = 0$ .

**Question 3.** (5 marks) Find:

$$\int \frac{x^3}{\sqrt{x^2+1}} dx$$