

**Question 5****(7 marks)**

Evaluate the following definite integrals exactly.

(a)  $\int_0^{\frac{\pi}{4}} 12 \sin^4 2x \cos 2x \, dx$  Put  $u = \sin 2x$

**(4 marks)**

(b)  $\int_0^{\frac{1}{2}} \tan^2\left(\frac{\pi x}{2}\right) dx$

(3 marks)