

Question 1(3+3+3)

- a) Find the limit  $\lim_{x \rightarrow 0} (\cos x)^{(\csc x)^2}$
- b) Evaluate the integral  $\int (\sqrt{x} \cos \sqrt{x}) dx$
- c) Evaluate the indefinite integral  $\int (\sin x)^4 dx$

Question 2(2+3+3)

- a) Compute the integral  $\int \frac{dx}{\sqrt{x^2 + 6x + 10}}$
- b) Find the integral  $\int \frac{x^2 dx}{(25 - x^2)^{3/2}}$
- c) Evaluate the integral  $\int \frac{4x + 1}{(x^2 + 2x + 5)} dx$

Question 3(3+2+3)

- a) Does the integral  $\int_1^{\infty} \frac{dx}{x(x+1)}$  converge? Find its value if it does.
- b) Compute  $\int (\tan x)^5 (\sec x)^8 dx$
- c) Find  $\int \frac{x^{1/3} dx}{x^{1/2} + x^{1/3}}$