

III. Answer the Following (5 marks)

1. Integrate the following functions with respect to x :

(i) $\frac{x+1}{(x+2)(x+3)}$

(ii) $\frac{1}{(x-1)(x+2)^2}$

(iii) $\frac{3x-9}{(x-1)(x+2)(x^2+1)}$

(iv) $\frac{x^3}{(x-1)(x-2)}$

2. Integrate the following with respect to x:

(i) $\frac{x \sin^{-1} x}{\sqrt{1-x^2}}$

(ii) $x^5 e^{x^2}$

(iii) $\tan^{-1}\left(\frac{8x}{1-16x^2}\right)$

(iv) $\sin^{-1}\left(\frac{2x}{1-x^2}\right)$

3. Integrate the following with respect to x

(i) $e^{ax} \cos bx$

(ii) $e^{2x} \sin x$

(iii) $e^{-x} \cos 2x$

4. Integrate the following with respect to x :

(i) $\frac{2x-3}{x^2+4x-12}$

(ii) $\frac{3x+1}{2x^2-2x+3}$

(iii) $\frac{2x+3}{\sqrt{x^2+4x+1}}$

