

15/10/2019 C-0
COMPUTER EXAM

- (1) $3te^{2t}$
- (2) $x^2 \sin x$
- (3) $\sin 7x \cos 2x$
- (4) $(2x - 3x^2)/(1-x)$

Sol

(1)

$$3te^{2t} dt$$
$$= \int 3te^{2t} dt$$

~~using~~ integration by parts

$$= \int 3t \frac{d}{dt} e^{2t} dt = \int \frac{d}{dt} 3t \int e^{2t} dt$$

$$= \frac{3}{2} te^{2t} - \frac{3}{2} \int e^{2t} dt$$

$$= \int \left(\frac{d}{dt} 3t \int e^{2t} dt \right) dt$$
$$= \frac{3}{2} te^{2t} - \frac{3}{2} \int e^{2t} dt$$

$$= \frac{3}{2} \int e^{2t} dt$$

$$= \frac{3}{2} te^{2t}$$

$$= \frac{3}{4} e^{2t} + C$$

$$7x^2 \sin 7x$$

$$\sin 7x \cos 2x$$

$$\frac{1}{2} \int \sin(7x + 2x) + \sin(7x - 2x) dx$$

$$= \frac{1}{2} \int \sin(9x) + \sin(5x) dx$$

$$= \frac{1}{2} \int \sin(9x) + \frac{1}{2} \int \sin(5x) dx$$

$$= \frac{1}{2} \int \sin(9x) + \frac{1}{2} \int \sin(5x)$$

$$= \frac{1}{2} \cdot \frac{1}{9} \cos(9x) - \frac{1}{2} \cdot \frac{1}{5} \cos(5x) + c$$

$$= -\frac{1}{18} \cos(9x) - \frac{1}{10} \cos(5x) + c$$

$$= -\left(\frac{1}{18} \cos(9x) + \frac{1}{10} \cos(5x) \right) + c$$

$$(4) \frac{(2x - 3x^2)}{1-x}$$

$$\int (2x - 3x^2) dx \quad \int (1-x) dx$$

$$\int (2x - 3x^2) dx = \frac{2x^{1+1}}{1+1} - 3 \frac{x^{2+1}}{2+1} + C$$

$$\therefore \int (2x - 3x^2) dx = \frac{2x^2}{2} - 3 \frac{x^3}{3} + C$$

$$\therefore \int (2x - 3x^2) dx = x^2 - x^3 + C$$