Q6. (a) Truck 1:

$BV_t = 50000 - \frac{15}{100} \times 50000t$

$= 50000 - 7500t, \quad 0 \leq t \leq 6$

Truck 2:

$BV_t = 50000\left(1 - \frac{22}{100}\right)^t$

$= 50000(0.78)^t, \quad 0 \leq t \leq 6$

Use above equations to construct tables.

See answer in textbook.

(b) See answer in text book.

(c) First solve (using a g.c)

$50000 - 7500t = 50000(0.78)^t$

$t = 4.4724$

i.e, 4 years and 5 months (approx)

∴ during the fifth year

(d) Truck 1: $BV_6 = 50000 - 7500 \times 6$

$= 5000$

Truck 2: $BV_6 = 50000(0.78)^6$

$= 11259.98$

i.e, Truck 1: \$5000

Truck 2: \$112.60.

Q7. $6210 = 62000(0.75)^t$

$\Leftrightarrow 0.10016 = (0.75)^t$

$\Leftrightarrow \quad t = 7.9983$

ie, approx 8 yrs.

Q8. (a) $C = 32000$

$\therefore 6700 = 32000(0.80)^t$

$\Leftrightarrow \quad t = 7.00728$

ie, 7 yrs.

(b) At the end of 7 yrs, Rory needs \$x, where

$6700 + x = 35000$

↑ scrap value of 1st van ↑ New van

i.e, $x = 28300$

Let Rory invest \$M at 12% p.a. for 7 yrs.

Then, $M \times (1.12)^7 = 28300$

$\Leftrightarrow \quad M = \frac{28300}{(1.12)^7}$

$= 12801.5$

i.e, Rory must invest \$12801.50.

EXERCISES 21.3.4

Q1. (a) At 24 cents per km car depreciated by

$0.24 \times 18,660 = 4478.40$

i.e., \$4478.40.

(b) If the car has travelled x km by the time its scrap value reaches \$6000, then

$6000 = 42000 - 0.24x$

$\Leftrightarrow 0.24x = 36000$

$\Leftrightarrow x = 150000$

i.e., a life of 150,000 km.

Q2. (a) dep = \$0.20 per 100 copies.

∴ If 812000 copies are printed

$\Rightarrow dep = 0.20 \times \frac{812000}{100}$

$= 1624$

i.e., \$1624

(b) In the second year 900,000 are printed

$\Rightarrow dep = 0.2 \times \frac{900000}{100}$

$= 1800$

i.e., depreciates by \$1800

Similarly in the 3rd year.

Therefore, the book value by the end of 3rd year is:

$BV = 18000 - 1624 - 1800 - 1800$

$= 12776$

i.e., \$12,776.

(c) Written off when BV = 0.

$\therefore 0 = 18000 - 1624 - 1800t$

$\Leftrightarrow 1800t = 16376$

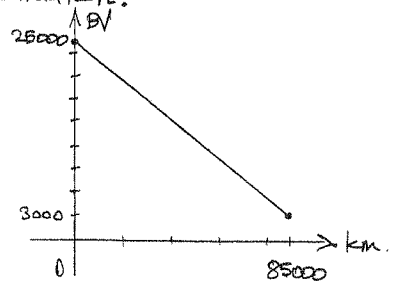
$\Leftrightarrow t = 9.0977$

∴ It takes 9.0977 yrs at the constant rate of \$1800 per year

i.e., 9 yrs and 1 month.

Therefore, in all it takes 10yrs & 1month

Q3. We sketch a graph of the situation:



$Rate = \frac{3000 - 25000}{85000}$

$= -0.2588$

In first year car depreciates by

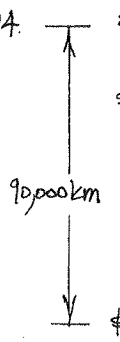
$\$22000 \times 0.2588 = \$5694.1176$

i.e., $BV = 25000 - 5694.12$

$= 19305.88$

i.e., \$19305.88

Q4.



(a) BV = 30000 − 3600 = 26400
i.e, $26400

(b) Rate = $\frac{2300 - 30000}{90000}$
= −0.3077

If car depreciated by $3600 at $0.3077 per km, then, the car travelled a total of
$\frac{3600}{0.3077} = 11696.75$
i.e, 11696.75 km.

Q5. (a) Rate per car is $\frac{750000}{15000}$
= $50
∴ 1st yr = 50 × 2200
= 110000

yr.	Dep.
1	$110 000
2	$50 × 2650 = $132500
3	$50 × 3000 = $150000
4	$50 × 2840 = $142000

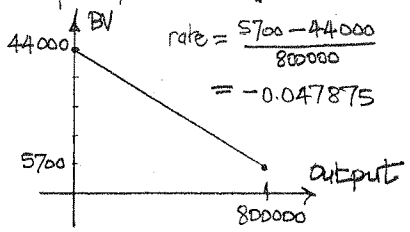
(b) At the end of the 4th yr the machinery is worth
750000 − (110000 + 132500 + 150000 + 142000)
= $215500

Then, at $50 per car
⇒ $\frac{215500}{50}$ = 4310 cars still need to be processed.

Then, at N cars per year
means $\frac{4310}{N}$ yrs.

Q6. (a) Machine has depreciated by $44000 − $5700
= $38300

(b) We first need to determine the rate of depreciation:



rate = $\frac{5700 - 44000}{800000}$
= −0.047875

∴ for an output of 80,000, machine depreciates by 0.047875 × 80000
= $3830
∴ BV = 44000 − 3830
= 40170
i.e, $40170.

(c) After 1st yr, machine still needs to depreciate by $34,470 (i.e, $(40170 − 5700)$)
∴ In 11 yrs, must depreciate by
$\frac{34470}{11}$ = $3133.64 per yr.
∴ # of output per yr = $\frac{3133.64}{0.047875}$
= 65454.54
i.e, 65455 outputs per yr.