

Assignment-1

Q. No. 1:- ABC company ltd. acquired a plant on April 1, 2012 for Rs.1,50,000 on which freight to the extent of Rs.5000 and installation to the extent of Rs.15,000 was paid. The scrap value of machinery is Rs.10,000 and useful life, of machines, is 8 years. Calculate the cumulative depreciation (d) at the end of 5th year and book value (BV) at the end of 6th year. Using following methods:

[6 marks]

1. Straight line method (SLM)

- a) **d = Rs.1,00,000 & BV = Rs.50,000**
- b) d = Rs.1,20,000 & BV = Rs.30,000
- c) d = Rs.80,000 & BV = Rs.70,000
- d) d = Rs.1,40,000 & BV = Rs.10,000

2. Declining balance method (DBM)

- a) d = Rs.1,55,750.3 & BV = Rs.58,753.07
- b) d = Rs.1,49,694.6 & BV = Rs.14,249.71
- c) d = Rs.1,28,768.9 & BV = Rs.28,934.65
- d) **d = Rs.1,41,065.3 & BV = Rs.20305.43**

3. Sum of years digit method (SYD)

- a) d = Rs.1,15,555.55 & BV = Rs.54,444.44
- b) **d = Rs.1,33,333.33 & BV = Rs.23,333.33**
- c) d = Rs.1,46,666.66 & BV = Rs.36,666.66
- d) d = Rs.1,55,750.30 & BV = Rs.14,249.71

Sol. Given:-

Initial cost = Rs.150000

Transportation cost = Rs.5000

Installation cost = Rs.15000

Total initial cost = Initial cost + Freight + Installation cost

Total initial cost (V_0) = 150000 + 5000 + 15000 = Rs.170000

Service life (N) = 8 years

Scrap Value (V_s) = Rs.10000

Depreciation (d_5) = ? and Book Value (BV_5) = ?

Straight-line method:-

$$\text{Depreciation (d)} = \frac{(\text{Original cost} - \text{Salavge value})}{\text{service life}} = \frac{(V - V_s)}{n}$$

$$\text{Depreciation (d)} = \frac{(170000 - 10000)}{8} = \text{Rs. 20000}$$

Depreciation by straight-line method is same for all years.

$$d_1 = d_2 = \dots = d_5 = d_6 = d_7 = \text{Rs.20000}$$

$$\text{Book value (V}_a) = (V_0 - ad)$$

Book value at the end of 6th year

$$\text{Book value (V}_a) = 170000 - 6 \times 20000 = \text{Rs. 50000}$$

Years	annual depreciation (d) $= \frac{(V - V_s)}{n}$ (Rs.)	Cumulative depreciation	Book value (V_a) = $V_0 - ad$ At the end of 'a' year (Rs.)
1	20000	20000	150000
2	20000	40000	130000
3	20000	60000	110000
4	20000	80000	90000
5	20000	100000	70000
6	20000	120000	50000

7	20000	140000	30000
8	20000	160000	10000

Declining balance method:-

Depreciation per annum = Net Book Value x Rate%

$$\text{Book value } (V_a) = V_0 \times (1 - f)^a$$

Salvage value after 8 years (V_s) is equal to the book value at the end of 8th year

$$V_8 = V_s = V_0 \times (1 - f)^8$$

$$f = 1 - \left(\frac{V_s}{V_0}\right)^{\frac{1}{8}}$$

$$f = 1 - \left(\frac{10000}{170000}\right)^{\frac{1}{8}}$$

$$f = 1 - 0.7017685 = 0.2982315$$

Years	annual depreciation (d) = $V_a \times f$ (Rs.)	Cumulative depreciation	Book value (V_a) = $V_0 \times (1 - f)^a$ At the end of 'a' year (Rs.)
1	50699.36	50699.36	119300.6
2	35579.21	86278.57	83721.43
3	24968.37	111246.9	58753.07
4	17522.01	128768.9	41231.05
5	12296.4	141065.3	28934.65
6	8629.225	149694.6	20305.43
7	6055.718	155750.3	14249.71
8	4249.712	160000	10000

Sum of year's digits method:-

Service life = 8 years

$$\sum n = \frac{n(n+1)}{2} = \frac{8(8+1)}{2} = 36$$

Book value =

The total depreciable value at the start of the service life = 170000-10000 = Rs.160000

Years	annual depreciation (d) = $\frac{(n-a+1)}{\sum n}(V-V_s)$ (Rs.)	Cumulative depreciation	Book value
1	35555.556	35555.556	134444.44
2	31111.11	66666.667	103333.334
3	26666.667	93333.336	76666.667
4	22222.22	115555.556	54444.447
5	17777.778	133333.334	36666.669
6	13333.33	146666.664	23333.339
7	8888.889	155555.553	14444.45
8	4444.44	159999.993	10000.01

Question 2:-ABC Ltd. Purchase a machine for Rs.50,000 on January 1st 2010 and incurred Rs.15000 towards freight and installation charges. It was estimated that its life is 4 years during which period a sum of Rs.15000 is likely to be spent on its repair and maintenance and at the end of the useful life, the scrap value is estimated to be Rs.5000. What will be the annual amount provided for depreciation? Use Repair Provision Method for computation of depreciation.

[2 marks]

- a) Rs.17,950
- b) Rs.18,750**
- c) Rs.20,250
- d) Rs.19,250

Sol. Given:-

Machine cost = Rs.50000

Useful life = 4 years

Freight and installation charges = Rs.15000

Scrap value = Rs.5000

Original cost = Machine cost + Freight and installation charges

Original cost = 50000 + 15000 = Rs.65000

$$\text{Annual amount to be provided for depreciation} = \frac{[(\text{original cost} - \text{salvage value}) + \text{Estimated total cost of repair}]/}{\text{expected useful life}}$$

Annual amount to be provided for depreciation

$$= \frac{[(65000 - 5000) + 15000]}{4} = \text{Rs. 18,750}$$

Question 3:- ABC Company purchased an equipment that has an initial cost of Rs.3,40,000 and expected service life of equipment of 15 years. Company believes that scrap value at the end of service life of equipment will be zero. Calculate the amount of depreciation(d) and book value(V) of equipment at the end of 9th year by using double declining balance method?

[2 marks]

- a) V = Rs.83508 d = Rs.14436
- b) V = Rs.93805 d = Rs.14426**
- c) V = Rs.97654 d = Rs.18433
- d) V = Rs.78976 d = Rs.17634

Sol. Given: -

Initial cost of process plant (V_0) = Rs.3,40,000

Useful life of equipment (n) = 15 years

Scrap value after operational life $V_s = 0$

Here the salvage value of the equipment is NIL, so declining balance method is not useful. So here, we can use double decline balance method.

Equipment value = Book Value

$$V_9 = V_0 \times (1 - f)^9$$

$$f = \frac{2}{n} = \frac{2}{15} = 0.1333 \text{ as salvage value is zero } f = 2/n$$

$$V_9 = 340000 \times (1 - 0.1333)^9$$

$$V_9 = 340000 \times 0.2759$$

$$V_9 = \text{Rs. } 93806$$

Depreciation at the end of 9th year

$$d_9 = V_8 \times f = V_0 \times (1 - f)^8 \times f$$

$$d_9 = 340000 \times (1 - 0.1333)^8 \times 0.1333$$

$$d_9 = 340000 \times 0.3183 \times 0.1333$$

$$d_9 = \text{Rs. } 14425.99 = \text{Rs. } 14426$$

Question 4:-An equipment was purchased on 1st January 2010. The cost of acquisition for equipment was Rs.4,40,000 and at the same time of acquisition useful life and residual value for equipment were estimated to be 10 years and Rs.40,000 respectively. On 1st January 2011 the salvage value was revised to NIL and again on 1st January 2012 the estimated revised useful life was made to 8 years. Using Straight line method calculate depreciation expenses (d) at the end of year 31st Dec. 2010, 2011, 2012 and 2013 respectively?

[3 marks]

- a) $d_1=\text{Rs.}40000, d_2=\text{Rs.}44444, d_3=\text{Rs.}59260, d_4=\text{Rs.}59620$
 b) $d_1=\text{Rs.}59260, d_2=\text{Rs.}59620, d_3=\text{Rs.}44444, d_4=\text{Rs.}40000$
 c) $d_1=\text{Rs.}59260, d_2=\text{Rs.}44444, d_3=\text{Rs.}59620, d_4=\text{Rs.}40000$
 d) $d_1=\text{Rs.}44444, d_2=\text{Rs.}40000, d_3=\text{Rs.}59260, d_4=\text{Rs.}59620$

Sol. Given: -

Cost of acquisition = Rs.4,40,000

Residual value estimated at the time of acquisition = Rs.40,000

Residual value revised on 1st Jan. 2011 = 0

Useful life estimated at time of acquisition = 10 years

Useful life revised on 1st Jan. 2012 = 8 years

Depreciation expense at the end of 31st Dec. 2010

$$d_1 = \frac{(\text{original cost} - \text{Residual value})}{\text{service life}} = \frac{(440000 - 40000)}{10} = \text{Rs. } 40,000$$

From 1stJan. 2011 onwards ($V_s = 0$) so depreciation at the end of 2nd year (31st Dec. 2011) d_2 should be calculated based on the book value at the end of 1st year (as $V_s=0$) and useful life are left i.e. 9 years.

$$d_2 = \frac{(\text{original cost} - \text{Residual value} - d_1)}{\text{service life}} = \frac{(440000 - 0 - 40000)}{9} = \text{Rs. 44,444.44}$$

On 1stJan. 2012 ($V_s = 0$) so depreciation at the end of 3rd year (31st Dec. 2012) d_3 will be computed based on book value at the end of 2nd year (as $V_s=0$) and the left over useful life based on the revised useful life which was 8 years. Thus the useful life left over = revised useful life(8 years)-years for which depreciation has been charged(2 years) = 6 years

$$d_3 = \frac{(\text{original cost} - \text{Residual value} - d_1 - d_2)}{\text{service life}} = \frac{(440000 - 0 - 40000 - 44444.44)}{6} = \text{Rs. 59,259.26}$$

From 1st Jan. 2013 onward the depreciation will be same for all subsequent years, that is

$$d_4=d_5=d_6=d_7=d_8=\text{Rs.}59,259.26$$

Question 5:- A company purchased a vehicle costing Rs.1,00,000 on 1st Jan. 2011. The company expects that the vehicle will be operational for 4 years. At the end of its operational life, it was sold for Rs.30,000. Calculate the depreciation expenses using straight-line method for the year ending 30th June 2011, 2012, 2013, and 2014 instead of 31st Dec. for the above years. What will be the book value at the end of 30th June 2013 and the depreciation for the financial year (FY) ended on 30th June 2011?

[5 marks]

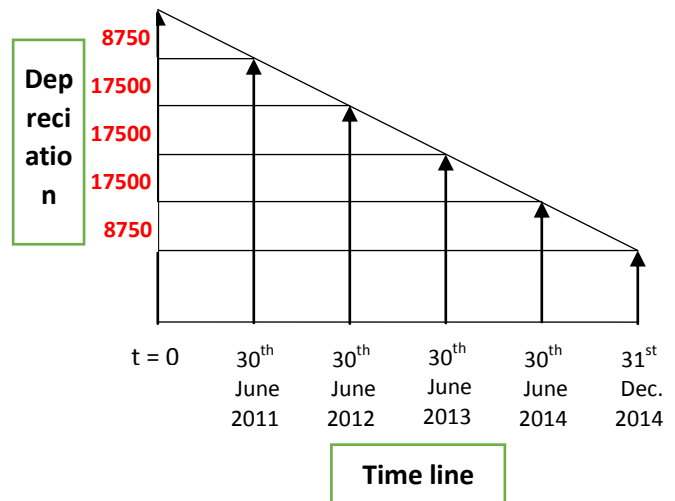
- a) $d = \text{Rs.}14,000$ & $BV = \text{Rs.}38,750$
- b) $d = \text{Rs.}8,750$ & $BV = \text{Rs.}56,250$**
- c) $d = \text{Rs.}14,000$ & $BV = \text{Rs.}56,250$
- d) $d = \text{Rs.}8,750$ & $BV = \text{Rs.}38,750$

Sol. Given: -

Purchased cost of vehicle (V) = Rs.1,00,000

Salvage value (V_s) = Rs.30,000

Service life of vehicle (n) = 4 years



$$\text{Depreciation (d)} = \frac{(\text{Original cost} - \text{Salavge value})}{\text{service life}} = \frac{(V - V_s)}{n}$$

Proportional depreciation ($d_{0.5}$) should be charge for 6 month in the financial year 30th June 2011.

$$\text{Depreciation at the end of 30}^{\text{th}} \text{ June 2011} = \frac{(100000 - 30000)}{4} \times \frac{6}{12} = \text{Rs. 8750}$$

Book value for first six month from time duration of 1st Jan. 2011 to 30th June 2011

$$(BV)_{\frac{1}{2}} = V - d_{0.5} = 100000 - 8750 = \text{Rs. 91,250}$$

Full year depreciation should be charged in FY ending 30th June 2012, 2013 and 2014. Partial depreciation charged in the year of disposal i.e. FY ended 31st Dec. 2014.

d and BV at FY ended 30/06/2012

$$d_{1.5} = \frac{(91250 - 30000)}{3.5} = \text{RS. 17,500}$$

$$BV_{1.5} = 91250 - 17500 = \text{Rs. 73,250}$$

d and BV at FY ended 30/06/2013

$$d_{2.5} = \frac{(73250 - 30000)}{2.5} = \text{RS. 17,500}$$

$$\text{BV}_{2.5} = 73250 - 17500 = \text{Rs. 56,250}$$

d and BV at FY ended 30/06/2014

$$d_{3.5} = \frac{(56250 - 30000)}{1.5} = \text{RS. 17,500}$$

$$BV_{3.5} = 56250 - 17500 = \text{Rs. 38,750}$$

Depreciation(d_4) between time period 30th June to 31st Dec. 2014 = 38750-30000= Rs. 8750

Book value for last six months

$$(BV)_{\text{at the end of 4th year}} = 38750 - 8750 = \text{Rs. 30,000}$$

Question 6:- A courier company purchase a Van on Jan. 1, 2010 at a cost of Rs.5,00,000. The company estimate that the useful life of the van to be 7 years or 430,000 miles and salvage value (SV) at the end of service life to be Rs.1,50,000. The data for the van actual miles driven for first 7 years are given as follows:-

Years	Distance travel (miles)
2010	87000
2011	76000
2012	71000
2013	65000
2014	54000
2015	49000
2016	40000

What will be the sum of the cumulative depreciation amounts (S_d) at the end of year 2013 and at the end of year 2016 and sum of book values (S_{BV}) for the same years, using unit of production method?

[4 marks]

- a) $S_d = \text{Rs. } 5,93,371$ and $S_{BV} = \text{Rs. } 4,06,628$
b) $S_d = \text{Rs. } 5,85,470$ and $S_{BV} = \text{Rs. } 4,96,826$
c) $S_d = \text{Rs. } 4,92,796$ and $S_{BV} = \text{Rs. } 4,29,386$
d) $S_d = \text{Rs. } 4,80,566$ and $S_{BV} = \text{Rs. } 4,59,524$

Sol. Given:-

Cost of van purchased on Jan.1, 2010 = Rs.5,00,000

Useful life of van = 7 years or 430,000 miles

Salvage value = Rs.1,50,000

Using unit of production method, depreciation rate per unit mile is calculated by

$$\text{Depreciation per unit} = \frac{\text{Cost} - \text{SV}}{\text{life in units}} = \frac{500000 - 150000}{430000} = \text{Rs. } 0.813953 \text{ per mile}$$

Years	Mileage	Annual depreciation (0.813953*mileage)	cumulative depreciation	Book Value
2010	87000	70813.91	70813.91	429186.1
2011	76000	61860.43	132674.3	367325.7
2012	71000	57790.66	190465	309535
2013	65000	52906.95	243371.9	256628.1

2014	54000	43953.46	287325.4	212674.6
2015	39000	31744.17	319069.6	180930.4
2016	38000	30930.21	350000	150000.2

Sum of the cumulative depreciation amount (S_d) for year 2013 and 2016 = 243371.9 + 350000 = **Rs.5,93,371.9**

Sum of Book value (S_{BV}) for year 2013 and 2016 = 256628.1 + 150000 = **Rs.4,06,628.1**

Question 7:- A courier company purchased a Van on 1st Jan, 2010 at a cost of Rs.5,00,000. The company estimate the useful life of the van to be 7 years and salvage value (SV) at the end of service life to be Rs.1,50,000. What will be the annual depreciation (d) for the year 2014 and book value (BV) at the end of year 2013, using double declining balance method(DDBM)?

[4 marks]

- a) d = Rs.60,738.58 and BV = Rs.1,51,857.08
- b) d = Rs.30,906.67 and BV = Rs.1,50,000
- c) d = Rs.56,533.33 and BV = Rs.2,26,133.33
- d) d = Rs.45,226.67 and BV = Rs.2,26,133.33**

Sol. Given:-

Cost of van purchased on June 1, 2010 (V) = Rs.5,00,000

Useful life of van (N) = 7 years

Salvage value (V_S)= Rs.1,50,000

Using DDBM

Depreciation rate for DDBM = $2 \times (V - V_S) \times 100 / (V \times N)$

$$\text{Depreciation rate} = \frac{2 \times (500000 - 150000) \times 100}{7 \times 500000} = 20\%$$

Book value at the start of 1st year is Rs.5,00,000 because no depreciation has taken on the asset yet.

Year 2010:-

Depreciation = Depreciation rate * Book value at start of the year

$$\text{Depreciation } (d_1) = 0.2 \times 500000 \times \frac{7}{12} = \text{Rs. } 58,333.33$$

Book value at the end of 2010 (BV_1) = 500000 - 58333.33 = **Rs.4,41,666.67**

Years	Depreciation rate	Annual Depreciation = (Depreciation rate * Book value) (in Rs.)	Cumulative depreciation	Book Value
2010	0.2	58333.33	58333.33	441666.67
2011	0.2	88333.33	146666.67	353333.33
2012	0.2	70666.67	217333.33	282666.67
2013	0.2	56533.33	273866.67	226133.33
2014	0.2	45226.67	319093.33	180906.67
2015	0.2	30906.67	350000	150000
2016	0.2	0	350000	150000

We cannot take the full amount of depreciation calculated. Instead, we are limited to Rs.30,906.668 in 2015. Since we have hit salvage value, there is no depreciation in 2016.

Q. No. 8:- Calculate depreciation over the useful life of an asset using the sum of year's digits method. Cost of the fixed asset is Rs.2,00,000 and the scrap value after 5 years is estimated to be Rs.40,000. What is the depreciation expenses for 4th year and what is the book value at the end of 3rd year?

[3 marks]

- a) d = Rs.42,667 & BV = Rs.1,46,667
- b) d = Rs.32,000 & BV=Rs.50,667
- c) d = Rs.21,333 & BV = Rs.72,000**
- d) d = Rs.10,667 & BV = Rs.1,04,000

Sol. Given: -

Cost of asset (V) = Rs.2,00,000

Scrap Value (V_s) = Rs.40,000

Useful life of asset (n) = 5 years

Using sum of years digits method

$$d_a = \text{depreciation for year } a = \frac{n - a + 1}{\sum_1^n n} \times (V - V_s)$$

$$\text{sum of years digits} = \sum_1^n n = \frac{n(n + 1)}{2} = \frac{5(5 + 1)}{2} = 15$$

The total depreciable value at the start of the service life (V-V_s)

$$= 2,00,000 - 40,000 = \text{Rs.1,60,000}$$

	Year 1	Year 2	Year 3	Year 4	Year 5
Un-depreciated useful life (years)	5	4	3	2	1

end of year	Depreciation expenses $d_a = \frac{n - a + 1}{\sum_1^n n} \times (V - V_s)$	Book value _i = (Book value _(i-1) - depreciation at the end of year i) = (BV _{i-1} - d _i)
1	$d_1 = \frac{5}{15} \times (1,60,000) = \text{Rs. } 53,333$	$BV_1 = (200000 - 53333) = \text{Rs. } 1,46,667$
2	$d_1 = \frac{4}{15} \times (1,60,000) = \text{Rs. } 42,667$	$BV_1 = (146667 - 42667) = \text{Rs. } 1,04,000$
3	$d_1 = \frac{3}{15} \times (1,60,000) = \text{Rs. } 32,000$	$BV_1 = (104000 - 32000) = \text{Rs. } 72,000$
4	$d_1 = \frac{2}{15} \times (1,60,000) = \text{Rs. } 21,333$	$BV_1 = (72000 - 21333) = \text{Rs. } 50,667$
5	$d_1 = \frac{1}{15} \times (1,60,000) = \text{Rs. } 10,667$	$BV_1 = (50,667 - 10,667) = \text{Rs. } 40,000$

Question 9:- On January 1, 2006, M/s ABD Corporation purchased a machine at a cost of Rs.55,000. The machine was expected to have a service life of 10 years and no salvage value. In 2008 the estimate of salvage value was revised from zero to Rs.6,000. What is the depreciation for 2008? If straight-line depreciation method is used.

[2 marks]

- a) Rs.3,800
- b) Rs.4,400
- c) Rs.4,750**
- d) Rs.5,500

Sol. Given:-

Original cost of machine (V) = Rs.55,000

Salvage value (V_s) = Rs.0

Useful life = 10 years

Using straight-line method-

Depreciation for year 2006:-

$$\text{Depreciation (d)} = \frac{(\text{Original cost} - \text{Salvage value})}{\text{service life}} = \frac{(V - V_s)}{n}$$

$$\text{Depreciation (d)} = \frac{(55000 - 0)}{10} = \text{Rs. } 5500$$

Depreciation using straight line method is equal for all years. So, depreciation for year 2007 is also Rs.5500.

Now, salvage value is revised (say from 1st Jan., 2008) and it became Rs.6000 at the end of service life. We calculate the depreciation for remaining years(10-2=8) based on the book value at the end of 2nd year and salvage value taking Rs.6000. Book value at the end of 2nd year is Rs.44,000 (55,000-5500-5500). So, remaining service life is 8 years (10-2=8).

Depreciation for year 2008.

$$\text{Depreciation (d)} = \frac{(55000 - 5500 - 5500 - 6000)}{8} = \text{Rs. } 4750$$

Question 10:- In question 9, assume that instead of revising salvage value, in the year 2008 the company switched to sum of years digits method (SYD). Then depreciation for the year 2008 should be:

[2 marks]

- a) Rs.5,500
- b) Rs.9,778**
- c) Rs.8,444
- d) Rs.11,000

Sol. Given:-

Original cost of machine (V) = Rs.55,000

Salvage value (V_s) = Rs.0

Useful life = 10 years

Using straight-line method-

Depreciation for year 2006:-

$$\text{Depreciation (d)} = \frac{(\text{Original cost} - \text{Salvage value})}{\text{service life}} = \frac{(V - V_s)}{n}$$

$$\text{Depreciation (d)} = \frac{(55000 - 0)}{10} = \text{Rs. } 5500$$

Depreciation using straight line method is equal for all years. So, depreciation for year 2007 is also Rs.5500 as from 2008 the depreciation method is changed to sum-of-the-years-digit method.

We calculate the depreciation for remaining years(10-2=8) based on the book value at the end of 2nd year but switching to sum-of-the-years-digit method. Book value at the end of 2nd year is Rs.44,000 (55,000-5500-5500) and remaining service life is 8 years (10-2=8).

Depreciation for year 2008 using SYD method keeping salvage value zero-

$$d_a = \text{depreciation for year } a = \frac{n - a + 1}{\sum_1^n n} \times (V - V_s)$$

$$\text{sum of years digits} = \sum_1^n n = \frac{n(n+1)}{2} = \frac{8(8+1)}{2} = 36$$

$$\text{Depreciation for year 2008} = \frac{8}{36} \times (55000 - 5500 - 5500 - 0) = \text{Rs. 9,778}$$