Assignment - 2

Question 1:-Common data to question (i) to (iv):-

The initial cost of a piece of construction equipment is Rs.30,00,000 having a useful life of 10 years. The estimated salvage value of the equipment at the end of the useful life is Rs.450,000.

[8 marks]

Question (i):-The book value of the construction equipment at the end of 5^{th} year using Straight - line method is:

a) **Rs. 17,25,000**
b) Rs. 11,81,712
c) Rs. 11,45,454
d) None of these

Question (ii):-The book value of the construction equipment at the end of 5^{th} year (BV_5) and depreciation (d_5) for 5^{th} year using Double-declining balance method are:

a) BV_5= Rs. 11,81,712.19;d_5= Rs. 2,78,181.82
b) **BV_5= Rs. 11, 81,712.19; d_5= Rs. 2,42,037.44**
c) BV_5= Rs. 11,45,454.54 ;d_5= Rs. 2,78,181.82
d) BV_5= Rs. 17,25,000.00 ; d_5= Rs. 1,27,341.13

Question (iii):-Determine the book value (BV_5) of the construction equipment at the end of 5^{th} year and depreciation (d_5) for 5^{th} year using Sum-of-the-years-digits method?

a) BV_5= Rs. 11,81,712.19 ;d_5= Rs. 2,78,181.82
b) BV_5= Rs. 11, 81,712.19; d_5= Rs. 2,42,037.44
c) **BV_5= Rs. 11,45,454.54 ; d_5= Rs. 2,78,181.82**
d) BV_5= Rs. 17,25,000.00 ; d_5= Rs. 1,27,341.13

Question (iv):-Determine accumulated depreciation at the end of 5^{th} year using Sinking fund method, if interest rate is 8.2 % per year?

a) **Rs.10,27,341.13**
b) Rs. 13,81,712.12
c) Rs. 13,45,487.18
d) Rs. 12,56,800.00

Solution:

Given: Original cost of equipment (V) = Rs. 30, 00,000

Salvage value of equipment (V_s) = Rs. 4, 50,000

Useful life (n) = 10 years

Calculate:

Annual depreciation and book value of the construction equipment at the end of 5thyear i.e. d_5 and BV_5 respectively.

Ans:

(i) Using straight line method-

As in this method annual depreciation d_1= d_2 =d_3=…=d.

Therefore,

Annual depreciation (d) =d_5= (Original value of equipment (V)-Salvage value of equipment (V_s))/service life (n)

d=$\mathbf{d_5}$= (3000000-450000)/10 = **Rs.2,55,000**

Book Value (V_5) after 5 years =V-d*a = 3000000-255000*5 = **Rs.1,72,5000**

(ii) Using Double-declining balance method

Amount to be depreciated = (V-V_s) = 3000000-450000= Rs.2550000

Using straight line depreciation method

Annual depreciation = 2550000/10= Rs.255000 per year

Annual depreciation (in terms of fraction of original cost) = 255000/3000000 =0.085

Thus for double decline method annual depreciation will be =2*0.085 =0.17

Thus for 1st year depreciation amount will be = 3000000*0.17= Rs. 510000

Book value at the end of 1st year (V_1) = (3000000-510000) = Rs. 2490000

For 2nd year depreciation amount will be= Recent Book value*0.17 =2490000*0.17 = Rs.423300

Book value at the end of 2nd year (V_2) = (2490000-423300) = Rs. 2066700

For 3rd year depreciation amount will be= Recent Book value*0.17 =2066700*0.17= Rs.351339

Book value at the end of 3rd year (V_3) = (2066700-351339) = Rs. 1715361

For 4th year depreciation amount will be= Recent Book value*0.17 =1715361*0.17= Rs.291611.37

Book value at the end of 4th year (V_4) = (1715361-291611.37) = Rs. 1423749.63

For 5th year depreciation amount will be= Recent Book value*0.17 =1423749.63*0.17= **Rs.242037.44**

Book value at the end of 5th year (V_5) = (1423749.63-242037.44) =**Rs. 1181712.19**

Alternate Method

$\mathbf{d_5}$ **=** VB4*f =V*(1-f)^4*f = 3000000(1-0.17)^4*0.17 = Rs.2,42,037.44

VB_5= $V*(1-f)^5 = 3000000*(1-0.17)^5$ = Rs.1181712.19

(iii) Using Sum of years digits method

Depreciable cost = Rs.3000000-Rs.450000=Rs.2550000
Sum of the years' digits for n years = 1 + 2 + 3 + ... + (n-1) + n
= (n+1) x (n / 2) = (10+1)*10/2= 55
or Sum of the years' digits = 1+2+3+…+10 = 55
Depreciation for 1^{st} year = (2550000) x 10/55 = 10*46363.63636=Rs.463636.36
Book value at the end of 1st year= (3000000-463636.36) = Rs. 2536363.64 Depreciation for 2^{nd} year= (2550000) x 9/55 =9*46363.63636=Rs.417272.73
Book value at the end of 2^{nd} year= (2536363.64-417272.73) = Rs. 2119090.91
Depreciation for 3^{rd} year = (2550000) x 8/55 = 8*46363.63636=Rs. 370909.09
Book value at the end of 1st year= (2119090.91-370909.09) = Rs. 1748181.82
Depreciation for 4^{th} year= (2550000) x 7/55 = 7*46363.63636=Rs. 324545.45
Book value at the end of 1st year= (1748181.82-324545.45) = Rs. 1423636.37
Depreciation for 5^{th} year = (2550000) x 6/55 = 6*46363.63636=**Rs. 278181.82**
Book value at the end of 5^{th} year= (1423636.37-278181.82) = **Rs. 1145454.54**

Alternate Method
d_5 = 2*(n-a+1)(V-Vs)/[n*(n+1)]; where a= 5; d_5 = Rs.278181.82
VB_5 = 30,00,000-(10+9+8+7+6)*25,50,000/55 = Rs.1145454.54

(iv)Using Sinking fund method:

Interest rate (i) = 8.2 % per year =0.082
V-Vs= 2550000, is the depreciable cost which should be accumulated at the end of 10th year or it can be called the future value at the end of 10th year which needs to be generated through constant equal installments (R). R is the annual equal amount of depreciation.

$$R = (V - V_s)*[\frac{i}{(1+i)^n - 1}]$$

Annual depreciation=R = 2550000*0.0684 = Rs. 174420
Book value at the end of 1^{st} year = (3000000-174420) = Rs. 2825580
Interest earned at the end of 2^{nd} year = 174420*0.082= Rs.14302.44
Increased in fund value for 2^{nd} year= (174420+14302.44) = Rs. 188722.44
Accumulated depreciation at the end of 2^{nd} year = (174420+188722.44)
= Rs. 363142.44
Book value at the end of 2^{nd} year = (2825580-188722.44) = Rs. 2636857.56
Interest earned at the end of 3^{rd} year =363142.44*.082 =Rs. 29777.68

Increased in fund value for 3rd year= (174420+29777.68) = Rs. 204197.68
Accumulated depreciation at the end of 3rd year = (363142.44+204197.68)
= Rs. 567340.12
Book value at the end of 3rd year = (2636857.56-204197.68) = Rs. 2432659.88
Interest earned at the end of 4th year = 567340.12*.082 = Rs. 46521.89
Increased in fund value for 4th year= (174420+46521.89) = Rs. 220941.89
Accumulated depreciation at the end of 4th year = (567340.12+220941.89)
= Rs. 788282.01
Book value at the end of 4th year = (2432659.88-220941.89) = Rs. 2211717.99
Interest earned at the end of 5th year = 788282.01*.082 = Rs.64639.12
Increased in fund value for 5th year= (174420+64639.12) = Rs. 239059.12
Accumulated depreciation at the end of 5th year = (788282.01+239059.12)
= **Rs. 1027341.13**
Book value at the end of 5th year = (2211717.09-239059.12) = **Rs. 1972657.96**

Year	Annual Dep. Computed(Rs.)	Interest earned (Rs.)	Increase in fund value (Rs.)	Accumulated Depreciation (Rs.)	Book Value (Rs.)
0					3000000
1	174420	-	174420	174420	2825580
2	174420	14302.44	188722.44	363142.44	2636857.56
3	174420	29777.68	204197.68	567340.12	2432659.88
4	174420	46521.89	220941.89	788282.01	2211717.99
5	174420	**64639.12**	**239059.12**	**1027341.13**	**1972657.96**

Question 2:-The original cost of a heat exchanger is Rs.1, 00,000. It has a useful life of 10 years. The estimated salvage value of the heat exchanger at the end of useful life is zero. Calculate the book value at the end of 3rd year, using repair provision method, if the repairs and maintenance charges together were estimated to be Rs. 18,000 during the lifetime of the equipment. And also determine the annual depreciation to be provided?

[2 marks]

a) BV_5= Rs. 81,000 ;d= Rs. 18,000
b) BV_5= Rs. 81,000; d= Rs. 12,000
c) BV_5= Rs. 64,600; d= Rs. 11,800
d) BV_5= Rs. 38,000; d= Rs. 27,300

Ans.

Given:

Original cost of heat exchanger (V) = Rs. 1,00,000

Salvage value of equipment (V_s) = 0
Useful life (n) = 10 years
Estimated total cost of repair= Rs.18000
Calculate:
Annual depreciation and book value of the heat exchanger at the end of 3rd year
Solution:

Annual amount to be provided for depreciation (d):
= [(original cost-salvage value) +Estimated total cost of repair]/expected useful life
= [(100000-0) +18000]/10 = **Rs.11800**
Book value at the end of 3rd year = V-a*d = 100000-3*11800 = **Rs. 64600**

Question 3:-There are two plans for a new godown construction for storage. We can either go in for a new concrete building (Plan-1) or have an extension to the existing building (Plan-2). The new concrete building is estimated to cost Rs. 60,000 with a permanent life. Its annual maintenance, insurance and tax cost is expected to be Rs. 500.The extended building will cost Rs. 20,000 and annual maintenance, insurance, and tax cost being Rs. 800. Both plans have life spans of 20 year. Assuming 10% as an attractive return, and using the annual cost method, choose the correct statement-
[4 marks]

a) We should go for the concrete construction (Plan-1), which has a total annual cost of Rs.3149.19
b) We should go for the extended construction (Plan-2), which has total annual cost Rs.7547.58.
c) **We should go for extended construction (Plan-2), which has total annual cost Rs.3149.19**
d) Both are equally economical.

Solution:

Given:

	Plan-1	**Plan-2**
Capital investment(Rs.)	60000	20000
maintenance, insurance, and tax cost per year(Rs.)	500	800
Useful life (years),n	20	20
Rate of return (%), i	10	10

Annual cost of the capital recovery is the annuity based on time value of money that one has to pay throughout the useful life, which will be equal to the capital investment at the start of the 1st year.
Annual cost of capital recovery = Capital investment*i / $[1-(1+i)^{-n}]$

For Plan-1

Annual cost of Capital recovery $=60000*0.1/[1-(1+0.1)^{-20}]$ = Rs.7047.58

For Plan-2

Annual cost of Capital recovery $=20000*0.1/[1-(1+0.1)^{-20}]$ = Rs.2349.19

	Plan-1	**Plan-2**
Capital investment	Rs.60,000	Rs.20,000
Estimated useful life	20	20
Maintenance, insurance, and tax cost per year	Rs.500	Rs.800
Rate of return	10%	10%
Solution given below		
Annual cost of capital recovery	Rs.7047.58	Rs.2349.19
Total annual cost(annual cost of capital recovery + annual operating cost)	**Rs.7547.58**	**Rs.3149.19**

Decision: We should go in for Plan-2 in comparison to Plan-1 as its total annual cost is low.

Question 4:-A restaurant buys a wood-burning stove for Rs. 20,000. The stove has a lifetime of 4 years and a salvage value of Rs. 1500.What is the accumulated depreciation (D_3) and book value (BV_3) at the end of 3rd year by Sinking fund method, if annual interest rate is 9%?

[4 marks]

a) D_3=Rs.6738.88; BV_3=Rs. 14806.30
b) D_3=Rs. 6378.88, BV_3=Rs. 14608.30
c) D_3=Rs. 14608.30, BV_3=Rs. 6378.88
d) D_3=Rs. 13261.12, BV_3=Rs. 6738.88

Solution:

Given: Original cost of wood burning stove (V) = Rs. 20000

Salvage value of equipment (V_s) = Rs. 1500

Useful life (n) = 4 years

Calculate:

Accumulated Depreciation for 3rd year and asset value of the wood burning stove at the end of 3rd year

Ans:

Interest rate (i) = 9 % per year =0.09

V-Vs=Rs. 18500, is the depreciable cost which should be accumulated at the end of 4th year or it can be called the future value at the end of 4th year which needs to be generated yearly investment of Rs. R. R is the annual equal amount of depreciation.

$$R = (V - V_s) * [\frac{i}{(1+i)^n - 1}]$$

Annual depreciation=R = 18500*0.2187 = Rs. 4045.37

Book value at the end of 1st year = (20000-4045.37) = Rs. 15954.63

Interest earned at the end of 2nd year = 4045.37*0.09= Rs.364.08

Increased in fund value for 2nd year= (4045.37+364.08) = Rs. 4409.45

Accumulated depreciation at the end of 2nd year = (4045.37+4409.45) = Rs. 8454.82

Book value at the end of 2nd year = (15954.63-4409.45) = Rs. 11545.18

Interest earned at the end of 3rd year =8454.82*.09 =Rs. 760.93

Increased in fund value for 3rd year = Rs. 4806.30

Accumulated depreciation at the end of 3rd year = (8454.82+4806.3) = **Rs. 13261.12**

Book value at the end of 3rd year = (11545.18-4806.30) = **Rs.6738.88**

Year	Annual Dep. Computed(Rs.)	Interest earned (Rs.)	Increase in fund value (Rs.)	Accumulated Depreciation (Rs.)	Book Value (Rs.)
0					20000
1	4045.37	-	4045.37	4045.37	15954.63
2	4045.37	364.08	4409.45	8454.82	11545.18
3	4045.37	760.93	4806.30	**13261.12**	**6738.88**
4	4045.37	1193.51	5238.88	18499.99	1500.00

Question 5:-12 years ago M/s Z. Limited purchased a piece of equipment for Rs. 40,000. At the time the equipment was put into use the service life estimated was 20 years and salvage value was zero. On this basis a straight line method was set up. The equipment can now (after 12 years) be sold for Rs. 10,000. The total replacement cost of the equipment is Rs. 55,000. Assuming depreciation fund is available for purchase, compute how much new capital must be made available for the purchase of the equipment?

[3 marks]

a) Rs. 45000
b) Rs. 34000
c) Rs. 26000

d) **None of these**

Solution:

Given: V= Rs. 40,000

n = 20 years; V_s= zero (after 20 years)

Present value of equipment = Rs. 10,000 (according to question after 12 years)

Total replacement cost of equipment= Rs. 55, 000

Straight line method is used for depreciation calculation, therefore

Annual depreciation (d) = (Original value of equipment (V)-Salvage value of equipment (V_s))/service life (n)

d= (40000-0)/20 = **Rs.2000**

Total depreciation accumulated at the end of 12^{th} year =2000*12 = Rs. 24,000

Rs.24, 000 is available as a fund for purchase (according to question)

So total available fund after selling the equipment = (10,000+24,000) = Rs. 34,000

Therefore,

New capital needed for the purchase of the new equipment is = (total cost of new equipment-total available fund after selling the equipment)

= (55,000-34,000) = **Rs. 21,000**

Question6:-Two pumps under consideration for installation at a plant have the following capital investments, salvage values and annual interest.

	Capital investment (Rs.)	Salvage value (Rs.)	Interest rate per annum (%)
Pump A	40,000	3900	10
Pump B	50,000	20,000	10

If annual cost of capital recovery is same for both the pumps. Then determine what should be the common life of the pumps. Maintenance and operational costs are negligible.

[4 marks]

a) 8 years
b) **5 years**
c) 9 years
d) 6 years

Ans.

Given:

	Capital investment (Rs.),P	Salvage value (Rs.) ,SV	Interest rate per annum (%),i
Pump A	40,000	3900	10

Pump B	50,000	20,000	10

Calculate: Common life of pump, if annual cost of capital recovery is same for both the pumps.

Solution:

Method to directly compute annual cost of capital recovery when salvage value is given:

Annual cost of capital recovery = $(P-SV)*i/ [1-(1+i)^{-n}] + SV*i$

Where P= present worth of capital investment

SV- Salvage value at the end of service life

Using the above formula

For Pump A,

Annual cost of capital recovery = $(P-SV)*i/[1-(1+i)^{-n}] + SV*i$

$= (40000 - 3900)*(0.1/ [1-(1+0.1)^{-n}]) +3900*0.1$

$= 36100*(0.1/[1- 1.1^{-n}])+ 390$ ……..(i)

Similarly for Pump B,

Annual cost of capital recovery = $(P-SV)*i/[1-(1+i)^{-n}] + SV*i$

$= (50000 - 20000)*0.1/[1-(1+0.1)^{-n}] +20000*0.1$

$= (30,000)* (0.1/[1- 1.1^{-n}])+ 2000$ ……..(ii)

According to question, equate equation (i) and (ii)-

$36100*(0.1/[1- 1.1^{-n}])+ 390= (30,000)* (0.1/[1- 1.1^{-n}])+ 2000$

$36100*(0.1/[1- 1.1^{-n}]) = (30,000)* (0.1/[1- 1.1^{-n}])+ 1610$

$6100*(0.1/[1- 1.1^{-n}]) = 1610$

$6100*0.1/1610 = [1- 1.1^{-n}]$

$1.1^{-n} = 0.6211$

Taking logarithm both side-

(-n)*log (1.1) =log (0.6211)

n= 4.996 year ≈ 5 years

Question 7:- A choice has to be made by Mr. Abhishek between a new bike and a second-hand bike. The relevant data are:

	New bike	Second-hand bike
Initial investment(Rs.)	15,000	5,000
Salvage value after 10 years of use(Rs.)	5,000	zero
Annual fuel cost for average 10,000 miles run(Rs.)	1,000	1,500
Annual repair cost(Rs.)	1,000	3,000

If Abhishek invest Rs. 15,000 or Rs. 5000 elsewhere, he except a return of 10%. Using the annual cost method, find out whether Abhishek should go for new bike or the second-hand bike?

[5 marks]

a) The New bike with total annual cost of Rs. 5313.72.
b) The Second-hand bike with total annual cost Rs. 5313.72.
c) Data insufficient to make a selection.
d) None of these

Solution:

Given:

	New bike	**Second-hand bike**
Capital investment (Rs.)	15,000	5,000
Estimated useful life, year	10	10
Salvage value (Rs.)	5000	zero
Annual fuel cost for average 10,000 miles run(Rs.)	1,000	1,500
Annual repair cost(Rs.)	1,000	3,000

Solution:

In this problem the salvage value (which is a receipt) is at a different time line than the capital investment. Hence, the Present value of the salvage value is to be calculated and then it should be deducted from the capital investment for calculating annual cost of capital recovery.

Investment at the start of 1st year (for New bike) = Rs.15,000
Salvage value = Rs.5000 (at the end of 10th year)
To bring it to the time line of the investment, the Present worth of Rs.5000 is computed
Present worth of Rs.5000= 5000/ $(1+0.1)^{10}$ = Rs.1927.72
Hence the capital expenditure at the start of 1st year = (Rs.15000-Rs.1927.72)= Rs.13072.28
Annual cost of capital recovery = Capital investment*i/[1-$(1+i)^{-n}$]
For **"new bike"**
Annual cost of Capital recovery =13072.28*0.1/[1-$(1+0.1)^{-10}$] = **Rs.2127.45**
For **"second hand bike"**
Investment at the start of 1st year = Rs.5,000
Salvage value = zero (at the end of 10th year)
Hence the capital expenditure at the start of 1st year = Rs.5000
Annual cost of Capital recovery =5000*0.1/[1-$(1+0.1)^{-10}$] = **Rs.813.72**

	New bike	**Second hand bike**
Capital investment	Rs.15,000	Rs.5,000
Estimated useful life	10	10
Salvage Value, Rs.	Rs.5000	zero
Annual fuel cost for average 10,000 miles run(Rs.)	1,000	1,500
Annual repair cost(Rs.)	1,000	3,000
Rate of return	10%	10%
Solution given below		
Annual cost of capital recovery	Rs. 2127.45	Rs.813.72
Total annual cost(annual cost of capital recovery + annual operating cost+ annual repair cost)	**Rs.4127.45**	**Rs.5313.72**

Decision: He should purchase "new bike" in comparison to "second hand-bike" as its total annual cost is low.

Question 8:- A firm purchased a heat exchanger for Rs. 'V'. The salvage value of the heat exchanger after 9 years of service life is expected to be Rs. 'V_S'. In which year, annual depreciation amount by sum-of-years-digits method will be equal to the annual depreciation by straight line method for the above available information?

[2 marks]

a) 6th year
b) 5th year
c) 9th year
d) Data insufficient.

Solution:

Let “a” be the year when depreciation computed by straight line method and sum-of-years-digits method will be equal.

Annual depreciation cost, by Sum-of-the-Years Digits Method is (d_{aS})-

$$d_{as} = \frac{2*(n-a+1)}{n*(n+1)}(V - V_s)$$

Taking n=9 $$d_{as} = \frac{2*(9-a+1)}{9*(9+1)}(V - V_s)$$

⇨ $d_{as} = \frac{2*(10-a)}{9*(10)}(V - V_s)$ …… (1)

Annual depreciation cost, by straight line method is: $d_{st} = \frac{(V-V_s)}{n}$

⇨ $d_{St} = \frac{(V-V_s)}{9}$ ……. (2)

Equate equation (1) and (2)-

$$\frac{2*(10-a)*(V-V_s)}{9*(10)} = \frac{(V-V_s)}{9}$$

⇨ **a= 5**

After solving the above equation value of ‘a’= 5 years, i.e. in 5th years depreciation calculated by both method will be equal.

Question 9:-A catering company purchased automated packaging equipment for Rs. 30,000. The salvage value of the equipment is anticipated to be Rs. 3,000 at the end of its five year life. Using the following methods determine-

(i) The depreciation for 2nd year and book value at the end of 2nd year using Straight line method (SLM)

(ii) The depreciation for 2nd year and book value at the end of 2nd year from Sum of the-years-digits method and

(iii) If annul repairs and maintenance cost is Rs. 2000, and annual rate of return to be expect is 10%. Then determine the Annual cost of the automated packaging equipment?

If sum of all values (i.e. depreciation as well as book values) calculated above in (i),(ii) and (iii) is **'S'.** Then the value of **S** will be-

[5 marks]

a) **Rs. 55023**
b) Rs. 65245
c) Rs. 53023
d) Rs. 57045

Solution:

Given:
Original cost of automated packaging equipment = Rs.30, 000
Salvage value of equipment (V_s) = Rs. 3000
Useful life (n) = 5 years

(i) Using Straight line method

As in this method annual depreciation $d_1= d_2 =d_3=\ldots=d$.
Therefore,
Annual depreciation (d) =d_2= (Original value of equipment (V)-Salvage value of equipment (V_s))/service life (n)
$d=d_2$= (30000-3000)/5 = **Rs.5400**
Book Value (V_2) after 2 years =V-d*a = 30000-5400*2 = **Rs.19200**

(ii) Using Sum of the years digits method

Depreciable cost = Rs.30000-Rs.3000=Rs.27000
Sum of the years' digits for n years = 1 + 2 + 3 + ... + (n-1) + n
= (n+1) x (n / 2) = (5+1)*5/2= 15
or Sum of the years' digits = 1+2+3+4+5 = 15
Depreciation for 1st year = (27000) x 5/15 = 5*1800=Rs.9000
Book value at the end of 1st year= (30000-9000) = Rs. 21000
Depreciation for 2nd year= (27000) x4/15 =4*1800=**Rs.7200**
Book value at the end of 2nd year= (21000-7200) = **Rs. 13800**

(iii) Given: Initial investment = Rs.30, 000
Salvage value = Rs.3000 (at the end of 5th year)
Annual repairs and maintenance cost = Rs. 2000
Ans:
To bring it to the same time line of the investment, the Present worth of Rs.3000 is computed.
Present worth of Rs.3000= 3000/ $(1+0.1)^5$ = Rs.1862.7

Hence the capital expenditure at the start of 1st year = (Rs.30000-Rs.1862.76) = Rs.28137.24

Annual cost of capital recovery = Capital investment*i/[1-$(1+i)^{-n}$]

Annual cost of Capital recovery =28137.24*0.1/[1-$(1+0.1)^{-5}$] = Rs.7422.53

Hence total annual cost of equipment is = (annual capital recovery+ annual repairs cost=Rs. (7422.53+2000) = **Rs. 9422.53**

Thus, the value of 'S' = (5400+19200+7200+13800+9422.53) = Rs. 55022.53

Question 10:-M/s ABC Ltd. purchased a new brick making machine for Rs. 8,40,000. The salvage value of machine is anticipated to be zero at the end of it's five-year life. Compute the book value of the machine at the end of 4th year, using the Modified accelerated cost recovery system method. Assuming the half-year convention is relevant.

[4 marks]

a) Rs. 2,41,920
b) Rs. 1,72,800
c) Rs. 1,45,152
d) None of these

Solution:

By modified accelerated cost recovery system (MACRS) method:

Year	Depreciation rate (%)		Calculation using formula	Depreciation (Rs.)	Book value(Rs.)
	DDB	SLM			
0	-		-	-	8,40,000
1	20[1]	20	840000x(1/5)x2(200%)x0.5 (Half-year convention)	1,68,000	6,72,000
2	32	17.7	(6,72,000)x(1/5)x(2)	2,68,800	4,03,200
3	19.20	13.7	(4,03,200) x (1/5) x 2	1,61,280	2,41,920
4	11.52	11.52	(2,41,920)x(1/5)x(2)	96,768	**1,45,152**
5	6.912	11.52[2]	(1,45,152)*(1/1.5)	96,768	48384
6	5.76[3]		96,768*0.5	48384	0

[1]The double-declining-balance (DDB) method allows a depreciation of 2(1/5) = 0.4, but due to the half-year convention it reduces to 0.4/2=0.2 or 20%

[2]During computation of depreciation value using MACRS, double declining balance method (DDBM) changes to straight-line method (SLM) when the later method provides greater depreciation than DDBM.. Deductions under 200% declining balance MACRS for 5th year would be Rs.58060.80 whereas depreciation using SLM is Rs.96,768. Thus for 5^{th} year onward depreciation is charged by SLM.

[3] Due to half-year convention, depreciation charged for 6^{th} year is half of the depreciation charged by SLM in 5^{th} year.

Analysis:
The book value for machine at the end of 4^{th} year is equal to Rs. 1, 45, 152.