**Solution:**

(1)

The proceeds from the issuance of the bonds will require us to calculate the present value.

To do so, let us break the calculation into two parts:

* Payments Part:

The bonds provide a payment of $20 x 3% = $0.6 million every semi-annual period, till 10 periods.

Thus, to find the present value, the situation is like an annuity with 5% interest rate and the above payments and cycle.

By using annuity tables, the present value of the annuity comes out to be $0.6 x 7.7217 = $4.633 million.

* Lump-sum Part:

The bonds also provide a lumpsum payment of $20 million after 10 periods, compounded at 5% interest.

Thus, by using the future value tables, we see that the present value of the lumpsum comes out to be $20 x 0.6139 = $12.278 million.

Thus, based on the above we conclude that the current valuation of the bond is $4.633 + $12.278 = $16.911 million, which shows that the bond is sold at a discount of $3.089 million.

We now proceed to do the accounting for the same.

(2)

The analysis for the same is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| EFFECT ON BALANCE SHEET EQUATION  (Amounts are in millions of $) | | | |
| Scenario | Assets = | Liabilities + | Stockholders’ Equity |
| Issuance of debentures | +$16.91  (cash) | +$20  (bonds payable)  -$3.09  (bonds discount) |  |
| First Semi-annual payments | -$0.6  (cash) | +$0.24  (bond discount) | -$0.84  (interest expense) |
| Maturity payment | -$20  (cash) | -$20  (bonds payable) |  |

(3)

The journal entries for the above are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| JOURNAL ENTRIES FOR THE BOND TRANSACTIONS  (Amounts are in millions of $) | | | |
| Scenario | Particulars | Debit | Credit |
| Issuance of debentures | Cash  Bonds Discount  To Bonds Payable | 16.91  3.09 | 20.00 |
| First semi-annual payments | Interest Expense  To Cash  To Bonds Discount | 0.84 | 0.60  0.24 |
| Maturity Payment | Bonds Payable  To Cash | 20.00 | 20.00 |

(4)

The bond related accounts are already discussed in the above.