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.