Fixed Income

1. On January 1st of the year, an investor purchases $100,000 in par value of a new Treasury Inflation Protection Security (TIPS) issue that has a 2.5% coupon rate. The annual rate of inflation over the first six months of the year is 4.0% and the annual rate of inflation for the second six months of the year is 3.0%. The amount of coupon interest paid to the investor after the second six months of the year is *closest* to:

A. $1,275.
B. $1,294.
C. $1,339.

Answer: B

B is correct because the inflation-adjusted principal after the second six month period is $100,000 × (1.02) × (1.015) = $103,530 and $103,530 × (2.5%/2) = $1,294.

2. When interest rates fall, the price of a callable bond will:

A. fall less than an option-free bond.
B. rise less than an option-free bond.
C. rise more than an option-free bond.

Answer: B

B is correct because when interest rates fall, the price of the embedded call option increases. Since, price of a callable bond = price of option-free bond – price of embedded call option, the price of the callable bond will not increase as much as an option-free bond since the price of the call option is increasing. As interest rates fall, the bond is more likely to be called, limiting the upside price increase potential.

3. Compared to a term repurchase agreement, an overnight repurchase agreement is *most likely* to have a:

A. lower repo rate and higher repo margin.
B. higher repo rate and repo margin
C. lower repo rate and repo margin.

Answer = C

Both the repo rate and the repo margin tend to be higher for longer repo terms. Therefore an overnight repo should have a lower repo rate and a lower repo margin than a term (i.e., longer than overnight) repo.

4. An analyst has gathered the following information provided in the table below:

Periods	Years	U.S. Treasury Spot Rate (%)	Credit Spread (%)

1	1	3.00	0.20
2	2	3.50	0.30
3	3	4.00	0.40
4	4	4.50	0.50
5	5	5.00	0.60

Based on the information provided in the table, the current market price of a $1,000 par value, option-free, 0 percent coupon corporate bond maturing in 5 years is closest to:

A. $758.70.

B. $781.20.

C. $804.44.

Answer: A

The appropriate discount rate is 5.6% = 5% + 0.6%. The semiannual discount rate is 2.8%. The price of

the bond using semiannual discounting is:

5. The bond-equivalent yield (BEY) spot rates for U.S. Treasury yields are provided below.

Period	Years	Spot Rate
1	0.5	1.20%
2	1.0	2.10%
3	1.5	2.80%
4	2.0	3.30%

On a BEY basis, the 6-month forward rate one year from now is *closest* to:

A. 2.10%.

B. 3.64%.

C. 4.21%.

Answer: C

C is correct because, the x-year forward rate y-years from now.

All spot rates are given on a BEY basis and must be divided by 2 in this calculation, or

On a BEY basis, the forward rate is 0.021036×2=4.21**%**

6. The option adjusted spread (OAS) is *best* described as the:

A. Z-spread minus the option cost.

B. Z-spread plus the cost of the option.

C. value of the security's embedded option.

Answer: A
The Z-spread is the sum of the OAS and the option cost.

7. An 8 percent coupon bond with a par value of $100 matures in 2 years and is selling at $98.24 to yield 9 percent. Exactly one year ago this bond sold at a price of $95.03 to yield 10 percent. The bond pays annual interest. The change in price attributable to the change in maturity is *closest* to:
A. $1.50.
B. $3.21.
C. $4.97.

Answer = A
The price of the bond one year ago was $95.03 to yield 10%.
If the yield stays at 10%, the price of the bond today is:

The change in price attributable to moving to maturity = $96.53 – $95.03 = $1.50.

8. The duration of a fixed-income portfolio is *best* interpreted as the:
A. first derivative of the price function for the bonds in the portfolio.
B. percentage change in the portfolio's value if interest rates change by 100 basis points.
C. weighted average number of years to receive the present value of the portfolio's cash flows.

Answer = B
Users of this interest rate risk measure are interested in what it tells them about the price sensitivity of a bond or a portfolio to change in interest rates, therefore B is correct.

9. An analyst gathered the following information about a portfolio comprised of three bonds:

Bond	Price ($)	Par Amount Owned	Duration
A	102.000	$7 million	1.89
B	94.356	$5 million	7.70

C	88.688	$3 million	11.55

Assuming there is no accrued interest, then the portfolio duration is *closest* to:
A. 5.55 years.
B. 5.76 years.
C. 6.82 years.

Answer = A
Portfolio value = (1.02 × 7 mil) + (0.94356 × 5 mil) + (0.88688 × 3 mil) = 14,518,440
Weight, Bond A = 7,140,000 / 14,518,440 = 0.492
Weight, Bond B = 4,717,800 / 14,518,440 = 0.325
Weight, Bond C = 2,660,640 / 14,518,440 = 0.183
Portfolio duration = (0.492 × 1.89) + (0.325 × 7.70) + (0.183 × 11.55) = 5.55

10. A bond has a modified duration of 6.5 and convexity of -42.4. If interest rates decrease by 1.0 percent, the percentage change in the value of the bond will be *closest* to:
A. -6.92%.
B. +2.76%.
C. +6.08%.

Answer = C
The percentage change in the bond's value is equal to:
(-Duration × Δy* × 100%) + (C × $(\Delta y^*)^2$ × 100%) = (-6.5 × -0.01 × 100%) + (-42.4 × $(-0.01)^2$ × 100%) = +6.5% - 0.424% = +6.08.