

Resolution:

$$\text{Index Ratio}_{\text{Date}} = \text{Ref CPI}_{\text{Date}} / \text{Ref CPI}_{\text{IssueDate}} = 164/164 = 1$$

$$A = [(181 - 181)/181] \times 3.875/2 = 0$$

$$A_{\text{adj}} = 0 \times 1 = 0$$

$$v^n = 1/(1 + i/2)^n = 1/(1 + .03898/2)^{19} = 0.69298457$$

$$a_n = (1 - v^n)/(i/2) = (1 - 0.69298457)/(0.03898/2) = 15.75245921$$

Formula:

$$P = \frac{(C/2) + (C/2)a_n + 100v^n}{1 + (r/s)(i/2)} - [(s-r)/s](C/2)$$

$$P = \frac{(3.875/2) + (3.875/2)(15.75245921) + 100(0.69298457)}{1 + (181/181)(0.03898/2)} - [(181-181)/181](3.875/2)$$

$$P = \frac{1.9375 + 30.52038972 + 69.298457}{1.01949000} - 0$$

$$P = \frac{101.75634672}{1.01949000}$$

$$P = 99.811030$$

$$P = 99.811$$

$$P_{\text{adj}} = P \times \text{Index Ratio}_{\text{Date}}$$

$$P_{\text{adj}} = 99.811 \times 1 = 99.811$$

$$SA = P_{\text{adj}} + A_{\text{adj}}$$

$$SA = 99.811 + 0 = 99.811$$

Note: For the real price (P), we have rounded to three places. These amounts are based on 100 par value.

B. (1) *For inflation-protected securities reopened during a regular interest period where the purchase price includes predetermined accrued interest.*

(2) *For new inflation-protected securities accruing interest from the coupon frequency date immediately preceding the issue date, with the interest rate established in the auction being used to determine the accrued interest payable on the issue date.*

Bidding: The dollar amount of each bid is in terms of the par amount. For example, if the Ref CPI applicable to the issue date of the note is 120, and the reference CPI applicable to the reopening issue date is 132, a bid of \$10,000 will in effect be a bid of \$10,000 × (132/120), or \$11,000.

Formulas:

$$P = \frac{(C/2) + (C/2)a_n + 100v^n}{1 + (r/s)(i/2)} - [(s-r)/s](C/2)$$

$$P_{\text{adj}} = P \times \text{Index Ratio}_{\text{Date}}$$

$$A = [(s-r)/s] \times (C/2)$$

$$A_{\text{adj}} = A \times \text{Index Ratio}_{\text{Date}}$$

$$SA = P_{\text{adj}} + A_{\text{adj}}$$

$$\text{Index Ratio}_{\text{Date}} = \text{Ref CPI}_{\text{Date}} / \text{Ref CPI}_{\text{IssueDate}}$$

Example:

We issued a 3½% 10-year inflation-protected note on January 15, 1998, with interest payments on July 15 and January 15. For

a reopening on October 15, 1998, with inflation compensation accruing from January 15, 1998 to October 15, 1998, and accrued interest accruing from July 15, 1998 to October 15, 1998 (92 days), solve for the price per 100 (P) at a real yield, as determined in the reopening auction, of 3.65%. The base index applicable to the issue date of this note is 161.55484 and the

reference CPI applicable to October 15, 1998, is 163.29032.

Definitions:

$$C = 3.625$$

$$i = 0.0365$$

$$n = 18$$

$$r = 92 \text{ (October 15, 1998 to January 15, 1999)}$$

$$s = 184 \text{ (July 15, 1998 to January 15, 1999)}$$

$$\text{Ref CPI}_{\text{Date}} = 163.29032$$