1. standard error $=$

$s_c\sqrt{5}$ or $\sqrt{5\cdot\sigma^2}$

$$s_e^2 = \frac{1}{n-1}\sum_{i=1}^{T}(c_i-\bar{c})^2$$

$$2+3+5+3+5+2+4+1+2+3 = \frac{30}{10} = \bar{c} = 3$$

$$\frac{1}{(10-1)}\sum_{1}^{10}(c_i-3)^2 = \frac{1}{9}(1+0+4+0+4+1+1+4+1+0) = 16/9 = s^2$$

$s = 4/3$ $\quad 4/3\sqrt{9} = 4$ $\quad = \boxed{B}$

2.

$\hat{\mu}_c = 2.25$

$\hat{y}_5 = 12 + 2.25 = 14.25$

$\hat{y}_6 = 15 + 2.25 = 17.25$

$\hat{y}_7 = 21 + 2.25 = 23.25$

$$\text{ME} = \frac{(15-14.25)+(21-17.25)+(22-23.25)}{3} = 1.083$$

$$\text{MSE} = \frac{(15-14.25)^2+(21-17.25)^2+(22-23.25)^2}{3} = 5.3958$$

$5.3958 - 1.083 = 4.31$

The answer is B.

3.

For an AR(1) model, it is possible for β_0 to equal 1.

The answer is A, as it is the only false answer.

4.

Since it is a stationary AR(1) model, $|\beta_1| < 1$ is always true.

The answer is E.

5. $\beta_1 = \dfrac{\sum_{t=2}^{T} (y_{t-1}-\bar{y})(y_t-\bar{y})}{\sum_{t=2}^{T} (y_t-\bar{y})^2}$

$\bar{y} = \dfrac{1+3+5+8}{4} = \dfrac{17}{4} = 4.25$

$\dfrac{5.9375}{3.25^2+1.25^2+.75^2} = \dfrac{5.9375}{12.6875} = .46798 = \beta_1$

$\beta_0 = \bar{y}(1-\beta_1) = 4.25(1-.46798) = 2.2611$

$\boxed{\begin{aligned} \beta_0 &= 2.2611 \\ \beta_1 &= .46798 \end{aligned}}$

6.

$\bar{y} = 40$

$$\beta_1 = \frac{\sum_{t=2}^{T}(y_{t-1}-\bar{y})(y_t-\bar{y})}{\sum_{t=2}^{T}(y_t-\bar{y})^2} = \frac{117}{262} = 0.4466$$

$\beta_0 = 40(1-0.4466) = 22.1374$

$e_2 = -0.9806$

$e_3 = -0.767$

$e_4 = 2.3398$

$e_5 = 4.5534$

$e_6 = 8.767$

$\bar{e} = 2.7825$

$$s^2 = \frac{\sum_{t=2}^{6}(e_t-\bar{e})^2}{6-3} = 21.97 = 22$$

The answer is C.

7.

Calculating up to the five step ahead forecast.

$y_t = 0.6t_{t-1} - 5 + \epsilon$

$y_T = 7$

$y_{T+1} = -5 + (0.6 * 7) = -0.8$

$y_{T+2} = -5 + 0.6(-0.8) = -5.48$

$y_{T+3} = -8.288$

$y_{T+4} = -9.9728$

$y_{T+5} = -10.9837$

8.

$$\hat{s}_5 = \frac{13+8}{2} = 10.5$$

$$\hat{y}_{5+1} = \hat{s}_5 = 10.5$$

9. $\hat{s}_t = \hat{s}_{t-1} + (1-w)(y_t - \hat{s}_{t-1})$

$= (1-w)y_t + w\hat{s}_{t-1}$

$\hat{s}_2 = .8(3) + .2(1) = 2.6$

$\hat{s}_3 = .8(5) + .2(2.6) = 4.52$

$\hat{s}_4 = .8(8) + .2(4.52) = 7.304$

$\hat{s}_5 = .8(13) + .2(7.304) = 11.8608$

fore cast $\boxed{y_6 = 11.8608}$

10. $w = 0.8$ $\qquad s(1)^t$

$\hat{s}(1)_{100} = (1-.8)(100.2) + .8(95.1) = 96.1$

$F = 96.1$

$\hat{s}(2)_{99} = (.2)(95.1) + .8(89.9) = 90.9$

$\hat{s}(2)_{100} = (.2)(96.1) + .8(90.9) = 91.9$

Trend $\quad b_1 = \dfrac{(1-.8)}{.8}(96.1 - 91.9) = 1.05$

$\hat{y}_{T+2} = 2(96.1) - 91.9 + 1.05(2) = 102.4 = G$

$|96.1 - 102.4| = 6.3 \qquad \boxed{D}$