1. standard error $=$ $s_c\sqrt{5}$ or $\sqrt{5\cdot\sigma^2}$

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

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

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

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

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

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

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

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

$\boxed{\begin{array}{l} \beta_0 = 2.2611 \\ \beta_i = .46798 \end{array}}$

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.

$$\hat{s}_2 = 0.2(3) + 0.8(1) = 1.4$$

$$\hat{s}_3 = 0.2(5) + 0.8(1.4) = 2.12$$

$$\hat{s}_4 = 0.2(8) + 0.8(2.12) = 3.296$$

$$\hat{s}_5 = 0.2(13) + 0.8(3.296) = 5.2368$$

$$\hat{y}_{5+1} = \hat{s}_5 = 5.2368$$

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

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

$$F = 96.1$$

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

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

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

$$\hat{y}_{T+1} = 2(96.1) - 91.9 + 1.05(2) = 102.4 = G$$

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