Student name:\_\_\_\_\_\_\_\_\_\_

**1)** The error-correction form of the simple exponential smoothing model states that if the current forecast

A) understated the actual level, the forecast of the level next period will be revised upward.   
 B) overstated the actual level, the forecast of the level next period will be revised downward.  
 C) error was zero, the current forecast could be used to forecast next period's level.  
 D) All of the options are correct.

**2)** Time-series smoothing techniques attempt to

A) All of the options are correct.   
 B) suppress data noise while extracting trend.  
 C) identify long-term trends or cycles in the data.  
 D) suppress short-term variability in the data.  
 E) remove seasonality in the data.

**3)** Holt Winters exponential smoothing model uses three smoothing constants. Which of the following is not one of those constants?

A) secular smoothing constant   
 B) trend smoothing constant  
 C) level smoothing constant  
 D) seasonal smoothing constant

**4)** If the smoothing constant were chosen to be unity, the exponential smoothing model would equal

A) Winter's exponential smoothing.   
 B) the simple naïve model.  
 C) moving average smoothing with a one-year lag.  
 D) Holt's exponential smoothing.  
 E) moving average smoothing.

**5)** The level smoothing constant (α) of the simple exponential smoothing model

A) should have a value close to one if the underlying data is relatively erratic.   
 B) should have a value closer to zero, the greater the revision in the current forecast given the current forecast error.  
 C) should have a value closer to one, the greater the revision in the current forecast given the current forecast error.  
 D) should have a value close to zero if the underlying data is relatively smooth.

**6)** The term 'exponential' in the exponential smoothing method refers to

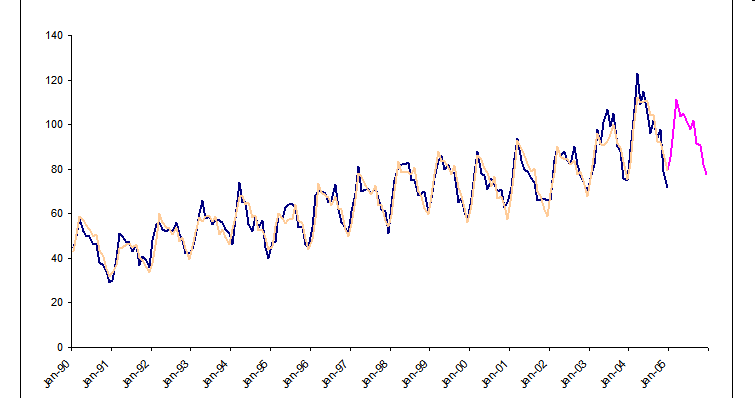
A) weights on past data that decrease exponentially into the past.   
 B) using a non-weighted polynomial on past data.  
 C) weights on past data that increase exponentially into the past.  
 D) calculation uses a weighted average.  
 E) None of the options are correct.

**7)** Which of the following is not a problem with moving-average forecasting?

A) It produces serially correlated forecasts.   
 B) It removes short-term variability by averaging nearby data.  
 C) All of the options are correct.  
 D) It cannot predict reversals in trends.

**8)** Which of the following is not correct concerning choosing the appropriate size of the level smoothing constant (α or alpha) in the simple exponential smoothing model?

A) All of the options are correct.   
 B) Select values close to one if you wish the forecast values to depend strongly on recent changes in the actual values.  
 C) Select a value that maximizes mean-squared error.  
 D) Select values close to zero if the series has a great deal of random variation.  
 E) Select a value that minimizes RMSE.

**9)** Consider the smoothing model results shown in the following graph of actual and predicted sales:The darker line above is the actual data, and the lighter line is the fitted data.Which of the following would be a likely set of parameters to see in this exponential smoothing estimate?

A) Level = 0.37, Trend = 0.01   
 B) Level = 0.44  
 C) Level = 0.05, Seasonal = 0.00, Trend = 0.37  
 D) Level = 0.37, Seasonal = 0.22, Trend = 0.01

**10)** Which of the following is not a major problem with exponential smoothing?

A) All of the options are correct.   
 B) It employs only past data in making forecasts of the future.  
 C) It produces forecasts that are serially correlated.  
 D) It requires a large amount of data and time to generate forecasts.  
 E) It requires that the forecaster choose, on some basis, the smoothing constant.

**11)** Smoothing 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy Measures** | **Value** |  |  | **Forecast Statistics** | **Value** |
| AIC | 530.76 |  |  | Durbin Watson (4) | 1.22 |
| BIC | 534.30 |  |  | Mean | 305,409.83 |
| MAPE | 4.25 | % |  | Standard Deviation | 133,459.10 |
| R-Square | 98.93 | % |  | Root Mean Square | 130,649.12 |
| Adjusted R-Square | 98.82 | % |  | Ljung-Box | 5.77 |
| Root Mean Square Error | 13,543.13 |  |  |  |  |
|  |  |  |  |  |  |
| **Method Statistics** | **Value** |  |  |  |  |
| Method Selected | Holt Winters |  |  |  |  |
| Level | 0.63 |  |  |  |  |
| Seasonal | 0.48 |  |  |  |  |
| Trend | 0.07 |  |  |  |  |
| Decomposition type | Multiplicative |  |  |  |  |
|  |  |  |  |  |  |
| **Seasonal Indexes** | **Value** |  |  |  |  |
| Index 1 | 0.91 |  |  |  |  |
| Index 2 | 0.84 |  |  |  |  |
| Index 3 | 0.99 |  |  |  |  |
| Index 4 | 1.27 |  |  |  |  |
|  |

In running an exponential smoothing model, the following results were obtained:The Seasonal value listed above (in Smoothing 3) indicates that the model

A) is probably unreliable for forecasting.   
 B) exhibits a rather high degree of seasonality.  
 C) has a very high level smoothing constant.  
 D) exhibits a rather high degree of trend.  
 E) None of the options are correct.

**12)** Simple Smoothing

|  |  |  |  |
| --- | --- | --- | --- |
| Time Period | Actual Series | Forecast Series | Forecast Error |
| 1 |  | 100 |  |  | 100 |  |  | 0 |  |
| 2 |  | 110 |  |  |  |  |  |  |  |
| 3 |  | 115 |  |  |  |  |  |  |  |
|  |

If a smoothing constant of .3 is used, what is the exponentially smoothed forecast for period 4?

A) 103.0.   
 B) 115.0.  
 C) 106.6.  
 D) 104.4.  
 E) 112.6.

**13)** Which forecasting model assumes that the pattern exhibited by historical data can best be represented by an arithmetic average of nearby observations?

A) Moving average smoothing.   
 B) Naïve methods.  
 C) None of the options are correct.  
 D) Holt's smoothing.  
 E) Simple exponential smoothing.

**14)** As an example of how Winter's smoothing model deals with seasonality, how would actual quarter-four sales of a retail firm be deseasonalized?

A) It would be divided by a seasonal factor.   
 B) None of the options are correct.  
 C) It would be subtracted from a seasonal factor.  
 D) It would be multiplied by a seasonal factor.  
 E) It would be added with a seasonal factor.

**15)** In using moving-average smoothing to generate forecasts, a three-month moving average will be preferred to a six-month moving average

A) if we have very little data to work with.   
 B) if it has a lower RMSE.  
 C) if the true data cycle is three months.  
 D) if it has a lower mean-squared error.  
 E) All of the options are correct.

**16)** The simple exponential smoothing model can be expressed as

A) an expression combining the most recent forecast and actual data value.   
 B) None of the options are correct.  
 C) a weighted average, where the weights sum to the sample size.  
 D) a simple average of past values of the data.  
 E) a weighted average, where the weights sum to zero.

**17)** Winters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy Measures** | **Value** |  |  | **Forecast Statistics** | **Value** |
| AIC | 613.59 |  |  | Durbin Watson (12) | 1.76 |
| BIC | 617.48 |  |  | Mean | 351,007.33 |
| MAPE | 2.83 | % |  | Standard Deviation | 80,306.64 |
| R-Square | 94.41 | % |  | Root Mean Square | 78,805.45 |
| Adjusted R-Square | 93.94 | % |  | Ljung-Box | 2.74 |
| Root Mean Square Error | 18,634.24 |  |  |  |  |
|  |  |  |  |  |  |
| **Method Statistics** | **Value** |  |  |  |  |
| Method Selected | Holt Winters |  |  |  |  |
| Level | 0.08 |  |  |  |  |
| Seasonal | 1.00 |  |  |  |  |
| Trend | 0.00 |  |  |  |  |
| Decomposition type | Multiplicative |  |  |  |  |
|  |  |  |  |  |  |
| **Seasonal Indexes** | **Value** |  |  |  |  |
| Index 1 | 1.00 |  |  |  |  |
| Index 2 | 1.32 |  |  |  |  |
| Index 3 | 1.31 |  |  |  |  |
| Index 4 | 1.45 |  |  |  |  |
| Index 5 | 1.01 |  |  |  |  |
| Index 6 | 0.99 |  |  |  |  |
| Index 7 | 0.83 |  |  |  |  |
| Index 8 | 0.78 |  |  |  |  |
| Index 9 | 0.86 |  |  |  |  |
| Index 10 | 0.87 |  |  |  |  |
| Index 11 | 0.74 |  |  |  |  |
| Index 12 | 0.83 |  |  |  |  |
|  |

The Winters model above

A) could reasonably be used to forecast 4 months into the future.   
 B) is considered a long-range forecasting model.  
 C) is quite inaccurate and probably should not be used for forecasting.  
 D) should only be used to forecast one month into the future.

**18)** Which of the following statements about any moving-averagesseries is correct?

A) Such a series will anticipate or prolong changes in the original data and, thus, show a different timing of turning points.   
 B) A moving-averages series can lie consistently above or below the original data, namely, when they are growing or declining exponentially.  
 C) Such a series will be extremely sensitive to unusually large or small values in the time series, as any average is bound to be.  
 D) All are correct.

**19)** A simple-centered 3-point moving average of the time-series variable Xt is given by:

A) None of the options are correct.   
 B) (Xt-1 +Xt-2 + Xt-3)/3.  
 C) (Xt+1 +Xt + Xt-1)/3.  
 D) (Xt +Xt-1 + Xt-2)/3.

**20)** With which type of time-series data should moving-average smoothing methods produce the best forecasts?

A) Trending.   
 B) Seasonal.  
 C) Stationary.  
 D) All of the options are correct.  
 E) Cyclical.

**21)** Simple-exponential smoothing models are useful for data which have

A) All of the options are correct.   
 B) neither an upward or downward time trend.  
 C) an upward time trend.  
 D) a downward time trend.  
 E) pronounced seasonality.

**22)** Winters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy Measures** | **Value** |  |  | **Forecast Statistics** | **Value** |
| AIC | 613.59 |  |  | Durbin Watson (12) | 1.76 |
| BIC | 617.48 |  |  | Mean | 351,007.33 |
| MAPE | 2.83 | % |  | Standard Deviation | 80,306.64 |
| R-Square | 94.41 | % |  | Root Mean Square | 78,805.45 |
| Adjusted R-Square | 93.94 | % |  | Ljung-Box | 2.74 |
| Root Mean Square Error | 18,634.24 |  |  |  |  |
|  |  |  |  |  |  |
| **Method Statistics** | **Value** |  |  |  |  |
| Method Selected | Holt Winters |  |  |  |  |
| Level | 0.08 |  |  |  |  |
| Seasonal | 1.00 |  |  |  |  |
| Trend | 0.00 |  |  |  |  |
| Decomposition type | Multiplicative |  |  |  |  |
|  |  |  |  |  |  |
| **Seasonal Indexes** | **Value** |  |  |  |  |
| Index 1 | 1.00 |  |  |  |  |
| Index 2 | 1.32 |  |  |  |  |
| Index 3 | 1.31 |  |  |  |  |
| Index 4 | 1.45 |  |  |  |  |
| Index 5 | 1.01 |  |  |  |  |
| Index 6 | 0.99 |  |  |  |  |
| Index 7 | 0.83 |  |  |  |  |
| Index 8 | 0.78 |  |  |  |  |
| Index 9 | 0.86 |  |  |  |  |
| Index 10 | 0.87 |  |  |  |  |
| Index 11 | 0.74 |  |  |  |  |
| Index 12 | 0.83 |  |  |  |  |
|  |

In the Winters model above, "Decomposition Type"

A) refers to the type of seasonality calculation used in the model.   
 B) refers to the calculation method used to estimate the Level factor.  
 C) refers to the type of trend calculation used in the model.  
 D) refers to the calculation method used to estimate the MAPE.

**23)** Some drawbacks to using centered moving-average smoothing models include

A) All of the options are correct.   
 B) introduction of autocorrelation into the forecasts.  
 C) loss of data at each end of the original time series.  
 D) inability to forecast turning points in the data.

**24)** Smoothing 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy Measures** | **Value** |  |  | **Forecast Statistics** | **Value** |
| AIC | 530.76 |  |  | Durbin Watson (4) | 1.22 |
| BIC | 534.30 |  |  | Mean | 305,409.83 |
| MAPE | 4.25 | % |  | Standard Deviation | 133,459.10 |
| R-Square | 98.93 | % |  | Root Mean Square | 130,649.12 |
| Adjusted R-Square | 98.82 | % |  | Ljung-Box | 5.77 |
| Root Mean Square Error | 13,543.13 |  |  |  |  |
|  |  |  |  |  |  |
| **Method Statistics** | **Value** |  |  |  |  |
| Method Selected | Holt Winters |  |  |  |  |
| Level | 0.63 |  |  |  |  |
| Seasonal | 0.48 |  |  |  |  |
| Trend | 0.07 |  |  |  |  |
| Decomposition type | Multiplicative |  |  |  |  |
|  |  |  |  |  |  |
| **Seasonal Indexes** | **Value** |  |  |  |  |
| Index 1 | 0.91 |  |  |  |  |
| Index 2 | 0.84 |  |  |  |  |
| Index 3 | 0.99 |  |  |  |  |
| Index 4 | 1.27 |  |  |  |  |
|  |

In running an exponential smoothing model, the following results were obtained:The Seasonal value listed above (in Smoothing 3) indicates that the model

A) exhibits a rather high degree of trend.   
 B) has a very high level smoothing constant.  
 C) exhibits a rather high degree of seasonality.  
 D) is probably unreliable for forecasting.  
 E) None of the options are correct.

**25)** Which of the following is not an aspect of the Winter's exponential smoothing model?

A) All of the options are correct.   
 B) Holt's model extended to deseasonalized data  
 C) Trend estimates that are themselves smoothed  
 D) Seasonality estimates that are themselves smoothed  
 E) Simple exponential smoothing applied to nonstationary data

**26)** What do moving-average smoothing and exponential smoothing have in common?

A) They both require only a limited amount of data.   
 B) All of the options are correct.  
 C) They both are simple to use.  
 D) They both have no ability to adjust for trend in the data.  
 E) They both are simple to understand.

**27)** Which of the following is not true regarding simple exponential smoothing?

A) It has no ability to account for secular trend.   
 B) It has no ability to predict "turning points" in the data.  
 C) It has no ability to adjust for seasonal variation.  
 D) It requires a large amount of data (i.e., many variables).

**28)** Which of the following is not correct? Winter's exponential smoothing model adjusts for data seasonality by

A) use of a smoothing constant applied to seasonality estimates.   
 B) deseasonalizing the data in an additive fashion.  
 C) deseasonalizing the data in a multiplicative fashion.  
 D) All of the options are correct.  
 E) linear smoothing of seasonality estimates.

**29)** Winters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy Measures** | **Value** |  |  | **Forecast Statistics** | **Value** |
| AIC | 613.59 |  |  | Durbin Watson (12) | 1.76 |
| BIC | 617.48 |  |  | Mean | 351,007.33 |
| MAPE | 2.83 | % |  | Standard Deviation | 80,306.64 |
| R-Square | 94.41 | % |  | Root Mean Square | 78,805.45 |
| Adjusted R-Square | 93.94 | % |  | Ljung-Box | 2.74 |
| Root Mean Square Error | 18,634.24 |  |  |  |  |
|  |  |  |  |  |  |
| **Method Statistics** | **Value** |  |  |  |  |
| Method Selected | Holt Winters |  |  |  |  |
| Level | 0.08 |  |  |  |  |
| Seasonal | 1.00 |  |  |  |  |
| Trend | 0.00 |  |  |  |  |
| Decomposition type | Multiplicative |  |  |  |  |
|  |  |  |  |  |  |
| **Seasonal Indexes** | **Value** |  |  |  |  |
| Index 1 | 1.00 |  |  |  |  |
| Index 2 | 1.32 |  |  |  |  |
| Index 3 | 1.31 |  |  |  |  |
| Index 4 | 1.45 |  |  |  |  |
| Index 5 | 1.01 |  |  |  |  |
| Index 6 | 0.99 |  |  |  |  |
| Index 7 | 0.83 |  |  |  |  |
| Index 8 | 0.78 |  |  |  |  |
| Index 9 | 0.86 |  |  |  |  |
| Index 10 | 0.87 |  |  |  |  |
| Index 11 | 0.74 |  |  |  |  |
| Index 12 | 0.83 |  |  |  |  |
|  |

In the Winters smoothing model above,

A) the Seasonal value of 1.00 indicates a high degree of seasonality is present.   
 B) the Seasonal value of 1.00 indicates a low degree of seasonality is present.  
 C) the Seasonal value of 1.00 indicates that the trend is positive.  
 D) None of the options are true.

**30)** Moving-average smoothing may lead to misleading inference when applied to

A) forecasting trend reversal in the stock market.   
 B) small and limited data sets.  
 C) stationary data.  
 D) None of the options are correct.  
 E) large and plentiful data sets.

**31)** Which of the following is a factor in the decision to use exponential smoothing rather than moving-average smoothing to forecast a given time series?

A) Forecast horizon.   
 B) Expertise of the forecast manager.  
 C) Amount of data available.  
 D) Importance of recent past versus distant past.  
 E) None of the options are correct.

**32)** Time series smoothing techniques work best for applications where

A) only periodic forecasts for untimely events are required.   
 B) there is a large amount of historical data available.  
 C) the forecast horizon is the distant future.  
 D) little historical data are available to the forecaster.  
 E) All of the options are correct.

**33)** In the Holt's two-parameter smoothing model, the trend smoothing parameter Gamma

A) should be close to zero when the data has a relatively smooth trend.   
 B) should be close to one when α is one.  
 C) should be close to one when the data has a relatively smooth trend.  
 D) should be close to one whenα is close to one.

**34)** Winter's exponential smoothing

A) models may account for seasonality in a multiplicative manner.   
 B) models have three smoothing parameters.  
 C) is appropriate for data with both trend and seasonal components.  
 D) All of the options are correct.  
 E) models use only past observations of a time series.

**35)** The simple moving average technique

A) works better for long-range forecasts than short-range forecasts.   
 B) reacts well to random variations.  
 C) reacts well to variations that occur for a reason.  
 D) requires minimal amount of data.

**36)** The error-correction representation of Holt's algorithm shows

A) that no adjustment is made to this period's forecasts when the current forecast error is zero.   
 B) how seasonality estimates are revised for current forecast errors.  
 C) All of the options are correct.  
 D) how both the level and slope forecasts are revised for current forecast errors.

**37)** What factors do the data smoothing techniques presented in Chapter Three have in common?

A) They all fail to forecast cyclical reversals in the data.   
 B) They all use only past observations of the data.  
 C) They all produce serially correlated forecasts.  
 D) They all smooth short-term noise by averaging data.  
 E) All of the options are correct.

**38)** If the time series of interest is highly random, the seasonal smoothing constant (Beta) of the Winter's model should be set

A) at a small positive value.   
 B) equal to zero.  
 C) at unity.  
 D) None of the options are correct.  
 E) at a large positive value but less than unity.

**39)** Holt's smoothing is best applied to data that are

A) nonstationary.   
 B) nonstationary and nonseasonal.  
 C) deseasonalized with a trend.  
 D) nonseasonal.  
 E) All of the options are correct.

**40)** Which method is used to develop a simple model that assumes that weighted averages of past periods are the best predictors of the future?

A) Exponential smoothing.   
 B) Naïve.  
 C) Moving averages.  
 D) Naïve model squared.  
 E) None of the options are correct.

**41)** Which method uses an arithmetic mean to forecast the next period?

A) Naïve.   
 B) Moving averages.  
 C) Exponential smoothing.  
 D) None of the options are correct.  
 E) Adaptive filtering.

**42)** The simple moving average technique

A) reacts well to random variations.   
 B) reacts well to variations that occur for a reason.  
 C) works better for long-range forecasts than short-range forecasts.  
 D) requires minimal amount of data.

**43)** Simple-exponential smoothing models differ from moving average models in that

A) simple exponential smoothing models use weighted averages of the data whereas moving average models use simple averages.   
 B) moving average models use weighted averages of the data whereas simple exponential smoothing models use simple averages.

**44)** Which of the following is the best general definition of exponential smoothing?

A) None of the options are correct.   
 B) It is a forecasting procedure that produces self-correcting forecasts by means of a built-in adjustment mechanism that corrects for earlier forecasting errors: The technique produces a weighted average of all past time-series values with weights decreasing exponentially as one goes back in time, and the average so constructed serves as a forecast for the next period.  
 C) It is a procedure that produces artificial (and, therefore, misleading) waves in a moving- averages series, even when there are no waves in the original time series.  
 D) It is a procedure that constructs a series of numbers by successively averaging overlapping groups of two or more consecutive values in a time series and replacing the central value in each group by the group's average.

**45)** How many parameters must the forecaster (or the software) set using Winter's exponential smoothing?

A) 3.   
 B) 0.  
 C) 2.  
 D) 1.  
 E) None of the options are correct.

**46)** Which of the following is true concerning the smoothing parameter (α) used in exponential smoothing?

A) The higher the value of α, the less the effect of smoothing.   
 B) The higher the value of α, the more the effect of smoothing.  
 C) If α = 0, the forecast is equivalent to the naïve forecast.  
 D) α = 0.4 means the forecast for the next period is based on 40% older data and 60% recent data.

**47)** The smoothing constant in the exponential smoothing model

A) completely determines the weight structure in exponential smoothing.   
 B) All of the options are correct.  
 C) can be interpreted as the revision of this period's forecast to today's forecast error.  
 D) must lie between 0 and 1.  
 E) cannot be equal to 0 or 1.

**48)** Holt's forecasted values

A) are superior when the underlying data has pronounced seasonality.   
 B) are simple centered moving averages.  
 C) for periods into the future lie along a straight line.  
 D) contain no estimate of trend in the underlying series.  
 E) None of the options are correct.

**49)** Choosing the appropriate size of the level smoothing constant (α) in the simple exponential smoothing model

A) is simple if the data are stationary since α should be zero.   
 B) is simple if the data are nonstationary since α should be one.  
 C) is equivalent to asking, "How much weight should be given in revising our forecast for next period to this period's forecast error?"  
 D) can best be determined by subjective means.

**50)** When the level smoothing constant of an estimated simple exponential smoothing model is close to one,

A) there are too few data points to use the technique.   
 B) the model is weighting every observation equally.  
 C) the model is weighting the most distant (in terms of time) observations the heaviest.  
 D) the model is quite similar to a naïve model.

**51)** The same benefits/criticisms apply to moving average and exponential smoothing with the exception of

A) ability to forecast cyclical reversals.   
 B) ease of calculation.  
 C) amount of data required.  
 D) None of the options are correct.  
 E) ability to model trend.

**52)** The Holt’s forecasting model uses

A) adaptive filtering.   
 B) None of the options are correct.  
 C) moving averages.  
 D) exponential smoothing.  
 E) naïve methods.

**53)** Winters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy Measures** | **Value** |  |  | **Forecast Statistics** | **Value** |
| AIC | 613.59 |  |  | Durbin Watson (12) | 1.76 |
| BIC | 617.48 |  |  | Mean | 351,007.33 |
| MAPE | 2.83 | % |  | Standard Deviation | 80,306.64 |
| R-Square | 94.41 | % |  | Root Mean Square | 78,805.45 |
| Adjusted R-Square | 93.94 | % |  | Ljung-Box | 2.74 |
| Root Mean Square Error | 18,634.24 |  |  |  |  |
|  |  |  |  |  |  |
| **Method Statistics** | **Value** |  |  |  |  |
| Method Selected | Holt Winters |  |  |  |  |
| Level | 0.08 |  |  |  |  |
| Seasonal | 1.00 |  |  |  |  |
| Trend | 0.00 |  |  |  |  |
| Decomposition type | Multiplicative |  |  |  |  |
|  |  |  |  |  |  |
| **Seasonal Indexes** | **Value** |  |  |  |  |
| Index 1 | 1.00 |  |  |  |  |
| Index 2 | 1.32 |  |  |  |  |
| Index 3 | 1.31 |  |  |  |  |
| Index 4 | 1.45 |  |  |  |  |
| Index 5 | 1.01 |  |  |  |  |
| Index 6 | 0.99 |  |  |  |  |
| Index 7 | 0.83 |  |  |  |  |
| Index 8 | 0.78 |  |  |  |  |
| Index 9 | 0.86 |  |  |  |  |
| Index 10 | 0.87 |  |  |  |  |
| Index 11 | 0.74 |  |  |  |  |
| Index 12 | 0.83 |  |  |  |  |
|  |

In the Winters model shown above, index 1 refers to calendar month 1 in the data.

A) Thus, calendar month 3 is an average month.   
 B) Thus, calendar month 3 is an above average month.  
 C) Nothing can be deduced about calendar month 3.  
 D) Thus, calendar month 3 is a below average month.

**54)** An exponential smoothing technique that adds a trend smoothing constant to the single-parameter exponential smoothing technique is known as

A) two-parameter (or double) exponential smoothing.   
 B) three-parameter (or triple) exponential smoothing.  
 C) the ratio-to-moving-average method.  
 D) the easiest way to produce a seasonally adjusted time series.

**55)** Simple Smoothing

|  |  |  |  |
| --- | --- | --- | --- |
| Time Period | Actual Series | Forecast Series | Forecast Error |
| 1 |  | 100 |  |  | 100 |  |  | 0 |  |
| 2 |  | 110 |  |  |  |  |  |  |  |
| 3 |  | 115 |  |  |  |  |  |  |  |
|  |

If a three-month moving-average model is used, what is the forecast for period 4?

A) 104.4.   
 B) 108.3.  
 C) 110.2.  
 D) 106.6.  
 E) 107.1.

**56)** Holt's model accounts for any growth factor present in a time series by

A) using simple exponential smoothing to estimate a trend factor that is then combined in a linear fashion with the level forecast.   
 B) All of the options are correct.  
 C) adding trend estimates to level forecasts.  
 D) smoothing the most recent trend by last period's smoothed trend.  
 E) use of a linear trend.