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

**1)** Deseasonalizing the data using moving averages

A) removes the seasonal component of a time series.   
 B) preserves the cyclical component of a time series.  
 C) All of the options are correct.  
 D) preserves the trend component of a time series.  
 E) removes the irregular component of a time series.

**2)** Which of the following is not a similarity between seasonal and cycle factors?

A) They both sum to the number of data points in the averaging process.   
 B) All of the options are correct.  
 C) They both use the actual data series in their calculation.  
 D) They both model variability in the dependent variable.  
 E) They are both calculated as ratios.

**3)** Time series decomposition models seasonality

A) similar to Winter's smoothing.   
 B) in an exponential manner.  
 C) using dummy variables.  
 D) in an additive fashion.  
 E) None of the options are correct.

**4)** The sum of seasonal index numbers should equal

A) sample size/2.   
 B) 12.  
 C) number of seasons.  
 D) one.  
 E) None of the options are correct.

**5)** Which of the following is not a part of the index of lagging economic indicators?

A) Ratio of consumer installment credit to personal income   
 B) Outstanding commercial loans  
 C) Index of unit labor costs  
 D) Average prime rate of interest  
 E) None of the options are correct.

**6)** People's BankSeasonal Indexes of sales revenue of People's Bank are:

|  |  |
| --- | --- |
|  |  |
| January |  | 1.20 |  |
| February |  | 0.90 |  |
| March |  | 1.00 |  |
| April |  | 1.08 |  |
| May |  | 1.02 |  |
| June |  | 1.10 |  |
| July |  | 1.05 |  |
| August |  | 0.90 |  |
| September |  | 0.85 |  |
| October |  | 1.00 |  |
| November |  | 1.10 |  |
| December |  | 0.80 |  |
|  |

Total revenue for People's Bank in 1999 is forecasted to be $60,000. Based on the seasonal indexes above, sales in the first three months of 1999 should be

A) None of the options are correct.   
 B) $13,500.  
 C) $4,800.  
 D) $14,723.  
 E) $15,500.

**7)** Which of the following statements about the cyclical component of a classical time series decomposition model is false?

A) The cyclical component of a time series, denoted by C, is a relatively smooth, progressively upward or downward movement of a variable, Y, over an extended period of time.   
 B) All of the options are correct.  
 C) The cyclical component is typically computed from data that cover a minimum of 2 years.  
 D) The cyclical component is viewed as the consequence of long-range gradual changes in such factors as population size or composition, technology, or consumer preferences.

**8)** Over a long period of time, if measured correctly, cycle factors should average

A) four.   
 B) twelve.  
 C) two.  
 D) one.  
 E) zero.

**9)** In time-series decomposition analysis, "decomposition" refers to rev: 11\_05\_2018\_QC\_CS-146429

A) isolating the cyclical component of a time series.   
 B) deseasonalizing the data.  
 C) converting an annual trend line into a monthly trend line.  
 D) separating a time series into component parts.  
 E) None of the options are correct.

**10)** Which statement is not correct?

A) Time series decomposition tends to fit the data very well.   
 B) Time series decomposition tends to be well understood by forecast consumers.  
 C) All of the options are correct.  
 D) The better the forecast of the cycle factors, the better the out-of-sample fit of time-series decomposition.  
 E) Time series decomposition accuracy is usually overstated by model fit statistics.

**11)** A seasonal index number of .80 for quarter one in a time series decomposition model of an automobile parts manufacturer suggests

A) quarter one sales are 1.80% below the norm.   
 B) quarter one sales are 80% below the norm.  
 C) None of the options are correct.  
 D) quarter one sales are 20% below the norm.  
 E) quarter one sales are 80% above the norm.

**12)** Which of the following is not helpful in generating forecasts of cycle factors?

A) The prime rate of interest   
 B) A time-series plot of the data  
 C) All the above are helpful.  
 D) Length of previous cycles  
 E) Amplitude of previous cycles

**13)** Which of the following is not correct about using moving averages to deseasonalize a time series?

A) The number of periods in the average should reflect the number of seasons.   
 B) The moving average is interpreted as the typical level of a variable in a given year.  
 C) The number of periods for quarterly data should be 4.  
 D) All of the options are correct.  
 E) The number of periods for annual data should be 12.

**14)** Suppose Nike sales are expected to be 1.2 billion dollars for the year 2005. If the January seasonal index for Nike is 0.98, what is a reasonable estimate for January 2005 sales revenue?

A) 0.1 billion   
 B) 0.098 billion  
 C) 1.176 billion  
 D) 2.18 billion

**15)** A company has computed a seasonal index for its quarterly sales. Which of the following statements is not correct?

A) The sum of the four quarterly seasonal index numbers is 4.   
 B) An index of 0.75 for quarter-one sales indicates that sales were 25 percent lower than average sales.  
 C) An index of 1.10 indicates sales 10% above the norm.  
 D) The average index is 1.  
 E) The index for any quarter must be between 0 and 2.

**16)** Audit Trail - Statistics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Accuracy Measures | Value |  | Forecast Statistics | Value |
| AIC | 309.51 |  | Durbin Watson(4) | 1.01 |
| BIC | 313.82 |  | Mean | 61.54 |
| Mean Absolute Percentage Error (MAPE) | 3.11 | % | Standard Deviation | 12.70 |
| R-Square | 95.64 | % | Variance | 161.41 |
| Adjusted R-Square | 95.57 | % | Ljung-Box | 58.17 |
| Root Mean Square Error | 2.63 |  |  |  |
| Theil | 0.29 |  |  |  |
|  |
| Method Statistics | Value |
| Method Selected | Decomposition |
| Basic Method | Trend (Linear) Regression |
| Decomposition Type | Multiplicative |
|  |

Components of Decomposition

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | Original  Data | Forecasted  Data | Centered  Moving Average | CMA  Trend | Seasonal  Indices | Cycle  Factors |
| Sep-1998 | 56.60 |  |  |  | 0.90 |  |
| Oct-1998 | 49.10 |  |  |  | 1.09 |  |
| Nov-1998 | 58.50 | 58.93 | 55.21 | 62.51 | 1.07 | 0.88 |
| Dec-1998 | 57.50 | 54.10 | 57.63 | 62.45 | 0.94 | 0.92 |
| Jan-1999 | 54.90 | 55.26 | 61.16 | 62.40 | 0.90 | 0.98 |
| Feb-1999 | 70.10 | 66.69 | 61.16 | 62.35 | 1.09 | 0.98 |
| Mar-1999 | 65.80 | 64.10 | 60.05 | 62.29 | 1.07 | 0.96 |
| Apr-1999 | 50.20 | 55.93 | 59.58 | 62.24 | 0.94 | 0.96 |
| May-1999 | 53.30 | 53.27 | 58.96 | 62.19 | 0.90 | 0.95 |
| Jun-1999 | 67.90 | 64.62 | 59.26 | 62.13 | 1.09 | 0.95 |
| Jul-1999 | 63.10 | 65.27 | 61.15 | 62.08 | 1.07 | 0.99 |
| Aug-1999 | 55.30 | 60.18 | 64.10 | 62.03 | 0.94 | 1.03 |
| Sep-1999 | 63.30 | 61.55 | 68.13 | 61.97 | 0.90 | 1.10 |
| Oct-1999 | 81.50 | 78.71 | 72.19 | 61.92 | 1.09 | 1.17 |
| Nov-1999 | 81.70 | 79.51 | 74.49 | 61.87 | 1.07 | 1.20 |
| Dec-1999 | 69.20 | 70.60 | 75.20 | 61.82 | 0.94 | 1.22 |
| Jan-2000 | 67.80 | 67.77 | 75.01 | 61.76 | 0.90 | 1.21 |
| Feb-2000 | 82.70 | 81.01 | 74.30 | 61.71 | 1.09 | 1.20 |
| Mar-2000 | 79.00 | 78.17 | 73.24 | 61.66 | 1.07 | 1.19 |
| Apr-2000 | 66.20 | 67.71 | 72.13 | 61.60 | 0.94 | 1.17 |
| May-2000 | 62.30 | 64.50 | 71.39 | 61.55 | 0.90 | 1.16 |
| Jun-2000 | 79.30 | 77.40 | 70.99 | 61.50 | 1.09 | 1.15 |
| Jul-2000 | 76.50 | 75.12 | 70.38 | 61.44 | 1.07 | 1.15 |
| Aug-2000 | 65.50 | 64.11 | 68.29 | 61.39 | 0.94 | 1.11 |
| Sep-2000 | 58.10 | 58.80 | 65.09 | 61.34 | 0.90 | 1.06 |
| Oct-2000 | 66.80 | 67.90 | 62.28 | 61.28 | 1.09 | 1.02 |
| Nov-2000 | 63.40 | 64.39 | 60.33 | 61.23 | 1.07 | 0.99 |
| Dec-2000 | 56.10 | 56.10 | 59.05 | 61.18 | 0.94 | 0.97 |
|  |

Consider the time series decomposition output for Mobile Home Sales above. This decomposition model

A) explained about 0.27% of the variation in mobile home shipments.   
 B) None of the options are correct.  
 C) explained about 96% of the variation in mobile home shipments.  
 D) explained about 3% of the variation in mobile home shipments.

**17)** When using moving-average smoothing to generate forecasts of cycle factors, the researcher should be wary of

A) bias caused by heteroscedasticity.   
 B) spurious cycles caused by heteroscedasticity.  
 C) spurious cycles caused by serial correlation.  
 D) All of the options are correct.  
 E) bias in trend estimates caused by serial correlation.

**18)** Which of the following is not a reason why time-series decomposition has gained favor with forecasters and their managers?

A) Forecast accuracy   
 B) Time-series decomposition resembles the way many managers analyze the future.  
 C) Very little computation is required.  
 D) Ease in understanding  
 E) None of the options are correct.

**19)** If business cycles were pure cycles, they

A) would have constant periodicity.   
 B) would have constant amplitude.  
 C) would be easy to forecast.  
 D) would have predictable trend reversals.  
 E) All of the options are correct.

**20)** When calculating centered moving-averages using a 4-period moving average, how many data points are lost at the beginning of the original series?

A) None of the options are correct.   
 B) 4  
 C) 3  
 D) 1  
 E) 2

**21)** The time-series decomposition model is best described as a

A) ratio-to-moving average technique.   
 B) multiplicative moving average technique.  
 C) moving average factorization technique.  
 D) ratio-to-exponential smoothing technique.  
 E) None of the options are correct.

**22)** Which data series is not used in the calculation of cycle factors?

A) TIME   
 B) CMAT  
 C) SF  
 D) All of the options are correct.  
 E) CMA

**23)** Quarter one sales for a tire manufacturer were $120,000,000. If the quarter one seasonal index was 1.20 in a time series decomposition model, what is an estimate of annual sales for this firm?

A) $400,000,000   
 B) $144,000,000  
 C) $576,000,000  
 D) None of the options are correct.  
 E) $100,000,000

**24)** The sum of seasonal index numbers for monthly data should equal

A) sample size/2.   
 B) 12.  
 C) one.  
 D) None of the options are correct.  
 E) 4.

**25)** The following specific seasonal factors were estimated for the month of October:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 65.4 | 76.8 | 66.9 | 72.6 | 70.0 |

If the adjustment is 0.98 and the modified mean is used, and if the expected trend for October is $800, what is the seasonally adjusted forecast?

A) $561.00   
 B) $1,168.8  
 C) $570.00  
 D) None of the options are correct.  
 E) $551.20

**26)** Which of the following is not part of the index of leading economic indicators?

A) Index of stock prices   
 B) Index of industrial production  
 C) M2 Money Supply  
 D) All of the options are correct.  
 E) Index of new private housing starts

**27)** A company has computed a seasonal index for its quarterly sales. Which of the following statements is not correct?

A) The sum of the four quarterly seasonal index numbers is 4.   
 B) An index of 0.75 for quarter-one sales indicates that sales were 25 percent lower than average sales.  
 C) The index for any quarter must be between 0 and 2.  
 D) The average index is 1.  
 E) An index of 1.10 indicates sales 10% above the norm.

**28)** The difference between cyclical and seasonal factors is best described as

A) they are both calculated as ratios.   
 B) amplitude.  
 C) wavelike random patterns.  
 D) None of the options are correct.  
 E) periodicity.

**29)** Which of the following statements regarding time series decomposition is not correct?

A) If the original data are valued in dollars, the values of the cycle factors must also be in dollars.   
 B) Short-term forecasts are more accurate than long term.  
 C) All of the options are correct.  
 D) Seasonal index numbers for monthly data average 1 and total 12.  
 E) The fluctuating components of a time series are cyclical, seasonal, and irregular.

**30)** The long-term trend of a time series in the decomposition model is estimated using

A) the actual unsmoothed data.   
 B) All of the options are correct.  
 C) the series of seasonal factors.  
 D) the centered moving average data.  
 E) a nonlinear time trend.

**31)** In computing a seasonal index, specific seasonals were tabulated for each month. The averages over time for the twelve months were obtained and summed. If the mean seasonal factor for June was 96.9, and the sum for all twelve months is 1195, the adjusted seasonal index for June is

A) 97.7.   
 B) 96.9.  
 C) 96.4.  
 D) None of the options are correct.  
 E) 102.7.

**32)** Which of the following best describes the general approach to forecasting when actually applying time-series decomposition?

A) Y = T × S × C   
 B) Y = (T + C) × S  
 C) Y = T × S × C × I  
 D) None of the options are correct.  
 E) Y = T + S + C + I

**33)** The cyclical component of a time series is measured by

A) Yt/SIt.   
 B) None of the options are correct.  
 C) Yt/CMAt.  
 D) CMA/CMAT.  
 E) CMAt/CMAt−1.

**34)** In time-series decomposition, seasonal factors are calculated by

A) (CMAt) × (SFt) = Yt.   
 B) SFt = Yt − CMAt.  
 C) SFt = (Yt) × (CMAt).  
 D) SFt = Yt/CMAt.  
 E) None of the options are correct.

**35)** In time-series decomposition, seasonal factors are calculated by

A) SFt = (Yt) × (CMAt).   
 B) SFt = Yt − CMAt.  
 C) SFt = Yt/CMAt.  
 D) (CMAt) × (SFt) = Yt.  
 E) None of the options are correct.

**36)** Which forecasting model identifies and forecasts component factors that influence the level of a time series?

A) Exponential smoothing   
 B) Moving average smoothing  
 C) Winter's smoothing  
 D) Time series decomposition  
 E) Exponential smoothing

**37)** Which of the following is not a technique used to generate forecasts with time series decomposition?

A) Moving averages   
 B) Dummy variables  
 C) Multiplicative seasonality  
 D) Trend projection  
 E) All of the options are correct.

**38)** The range of economic activity from the beginning trough of an expansion to the peak of the expansion is called

A) the recession phase.   
 B) the periodicity.  
 C) None of the options are correct.  
 D) the expansion phase.  
 E) the contraction phase.

**39)** A researcher mistakenly uses deseasonalized data in calculating the seasonal factors. If she found apparent seasonal behavior, this is best attributed to

A) random noise.   
 B) trend.  
 C) None of the options are correct.  
 D) the business cycle.  
 E) seasonality.

**40)** When calculating centered moving averages, how many data points are lost for a given time series when a n-period moving average is used?

A) n points on both ends   
 B) None of the options are correct.  
 C) sample size − n points at the beginning  
 D) n points at the beginning  
 E) n points at the end

**41)** When calculating centered moving-averages using a 4-period moving average, how many data points are lost at both ends of the original series?

A) 3   
 B) 4  
 C) None of the options are correct.  
 D) 1  
 E) 2

**42)** What is the major problem when using time-series smoothing techniques to forecast the cyclical component of a time series?

A) It takes too much computer time and effort.   
 B) All of the options are correct.  
 C) Trend reversals cannot be forecasted.  
 D) It takes too much data.  
 E) Holt's smoothing estimates a linear trend.

**43)** The time-series decomposition model is best described as a

A) multiplicative moving average technique.   
 B) None of the options are correct.  
 C) moving average factorization technique.  
 D) ratio-to-exponential smoothing technique.  
 E) ratio-to-moving average technique.

**44)** Which of the following is not a component in the time series decomposition model?

A) Seasonal variation   
 B) Cyclical variation  
 C) Trend  
 D) Irregular variation  
 E) Business indicators

**45)** Audit Trail - Statistics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Accuracy Measures | Value |  | Forecast Statistics | Value |
| AIC | 309.51 |  | Durbin Watson(4) | 1.01 |
| BIC | 313.82 |  | Mean | 61.54 |
| Mean Absolute Percentage Error (MAPE) | 3.11 | % | Standard Deviation | 12.70 |
| R-Square | 95.64 | % | Variance | 161.41 |
| Adjusted R-Square | 95.57 | % | Ljung-Box | 58.17 |
| Root Mean Square Error | 2.63 |  |  |  |
| Theil | 0.29 |  |  |  |
|  |
| Method Statistics | Value |
| Method Selected | Decomposition |
| Basic Method | Trend (Linear) Regression |
| Decomposition Type | Multiplicative |
|  |

Components of Decomposition

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | Original  Data | Forecasted  Data | Centered  Moving Average | CMA  Trend | Seasonal  Indices | Cycle  Factors |
| Sep-1998 | 56.60 |  |  |  | 0.90 |  |
| Oct-1998 | 49.10 |  |  |  | 1.09 |  |
| Nov-1998 | 58.50 | 58.93 | 55.21 | 62.51 | 1.07 | 0.88 |
| Dec-1998 | 57.50 | 54.10 | 57.63 | 62.45 | 0.94 | 0.92 |
| Jan-1999 | 54.90 | 55.26 | 61.16 | 62.40 | 0.90 | 0.98 |
| Feb-1999 | 70.10 | 66.69 | 61.16 | 62.35 | 1.09 | 0.98 |
| Mar-1999 | 65.80 | 64.10 | 60.05 | 62.29 | 1.07 | 0.96 |
| Apr-1999 | 50.20 | 55.93 | 59.58 | 62.24 | 0.94 | 0.96 |
| May-1999 | 53.30 | 53.27 | 58.96 | 62.19 | 0.90 | 0.95 |
| Jun-1999 | 67.90 | 64.62 | 59.26 | 62.13 | 1.09 | 0.95 |
| Jul-1999 | 63.10 | 65.27 | 61.15 | 62.08 | 1.07 | 0.99 |
| Aug-1999 | 55.30 | 60.18 | 64.10 | 62.03 | 0.94 | 1.03 |
| Sep-1999 | 63.30 | 61.55 | 68.13 | 61.97 | 0.90 | 1.10 |
| Oct-1999 | 81.50 | 78.71 | 72.19 | 61.92 | 1.09 | 1.17 |
| Nov-1999 | 81.70 | 79.51 | 74.49 | 61.87 | 1.07 | 1.20 |
| Dec-1999 | 69.20 | 70.60 | 75.20 | 61.82 | 0.94 | 1.22 |
| Jan-2000 | 67.80 | 67.77 | 75.01 | 61.76 | 0.90 | 1.21 |
| Feb-2000 | 82.70 | 81.01 | 74.30 | 61.71 | 1.09 | 1.20 |
| Mar-2000 | 79.00 | 78.17 | 73.24 | 61.66 | 1.07 | 1.19 |
| Apr-2000 | 66.20 | 67.71 | 72.13 | 61.60 | 0.94 | 1.17 |
| May-2000 | 62.30 | 64.50 | 71.39 | 61.55 | 0.90 | 1.16 |
| Jun-2000 | 79.30 | 77.40 | 70.99 | 61.50 | 1.09 | 1.15 |
| Jul-2000 | 76.50 | 75.12 | 70.38 | 61.44 | 1.07 | 1.15 |
| Aug-2000 | 65.50 | 64.11 | 68.29 | 61.39 | 0.94 | 1.11 |
| Sep-2000 | 58.10 | 58.80 | 65.09 | 61.34 | 0.90 | 1.06 |
| Oct-2000 | 66.80 | 67.90 | 62.28 | 61.28 | 1.09 | 1.02 |
| Nov-2000 | 63.40 | 64.39 | 60.33 | 61.23 | 1.07 | 0.99 |
| Dec-2000 | 56.10 | 56.10 | 59.05 | 61.18 | 0.94 | 0.97 |
|  |

Consider the time series decomposition output for Mobile Home Sales above. The seasonality of mobile home shipments

A) varies from 10% below average to 9% above the average.   
 B) varies 3.11% from the average.  
 C) is negligible in this model.  
 D) varies from 9% below average to 10% above the average.