Unit I

1. The_____ domain approach views the investigation of lagged relationships as most important.
   (a) Time (b) Spatial (c) Temporal (d) Frequency

2. The _____domain approach views the investigation of cycles as most important.
   (a) Time (b) Spatial (c) Temporal **(d) Frequency**

3. Which type time series is Johnson & Johnson's earning?
   (a) Annual (b) Bi-monthly **(c) Quarterly** (d) Half-yearly

4. _____ analysis can be used to produce a signature of this phrase that can be compared with signatures of various library syllables to look for a match.
   (a) Spectral (b) Numerical (c) temporal (d) Frequency

5. Which type of model is used for financial data analysis for Dow Jones' Average Data?
   (a) ARMA (b) SARIMA (c) ARIMA **(d) GARCH**

6. _____function modeling can be applied for El-Nino and Fish Population.
   (a) Affine (b) Binary (c) unary **(d) Transfer**

7. The observed values of a stochastic process are referred to as a _____of the stochastic process.
   (a) realization (b) rationalization (c) reaction (d) regression

8. The insufficient sample rate leads to distortion is called as _____.
   (a) anti-aliasing (b) aberration **(c) aliasing** (d) subsampling

9. The noise model that time series generated from uncorrelated variables is called _____ noise.
   (a) speckle **(b) white** (c) salt & pepper (d) impulse

10. If the stochastic behavior of all time series could be explained in terms of the _____ model.
    (a) white noise (b) Moving Average
    (c) Autoregression (d) random walk with drift

11. A linear combination of values in a time series is referred to as a _____series.
    (a) Regression (b) Mean (c) variance **(d) filtered**

12. The moving average _____ the time series.
    (a) sharpens (b) speckles **(c) smooths** (d) straightens

13. The constant δ is called the drift, and when δ = _____ is called simply a random walk.

(a) 1 **(b) 0** (c) -1 (d) 2

14. The ratio of the amplitude of the signal to σ_w is sometimes called the _____.
(a) signal-to-noise ratio (b) signal-to-amplitude ratio
(c) signal-to-peak ratio (d) signal-to-signal ratio

15. The _____ the SNR, the easier it is to detect the signal.
(a) smaller (b) tiny (c) moderate **(d) larger**

16. An informative marginal descriptive measure is the _____function.
(a) median (b) mode **(c) mean** (d) maximum

17. A realization of a random walk with drift can be compared to its _____function.
(a) median (b) mode **(c) mean** (d) maximum

18. The lack of independence between two adjacent values x_s and x_t can be assessed using _____.
(a) Covariance, Mean (b) Correlation, Mean
(c) Correlation, Covariance (d) Mean, Median

19. The _____measures the linear dependence between two points on the same series observed at different times.
(a) autocovariance (b) autocorrelation (c) mean (d) median

20. The measure of association is between _____ and _____.
(a) -2,2 **(b) -1,1** (c) -1,0 (d) 0,1

21. The ACF measures the _____of the series at time t.
(a) linear predictability (b) linear probability
(c) non-linear predictability (d) non-linear probability

22. A _____process with drift is not strictly stationary because its mean function changes with time
(a) white noise **(b) random walk** (c) signal noise (d) impulse noise

23. If the white noise variates are also normally distributed or Gaussian, the series is also _____stationary.
(a) Weak **(b) strictly** (c) not strictly (d) jointly

24. The ACF is symmetric about _____.
(a) lag zero (b) log zero (c) lag one (d) log one

25. A _____is not stationary because its autocovariance function, $\gamma(s, t) = \min\{s, t\}\sigma_w^2$, depends on time.
(a) white noise **(b) random walk** (c) signal noise (d) impulse noise

26. Two time series are said to be _____ stationary if they are each stationary, and the cross-covariance function.
    (a) Weak (b) strictly (c) not strictly **(d) jointly**

27. _____ over detrending is used to remove trend.
    (a) differencing (b) differentiate (c) integration (d) linearization

28. The first difference eliminates a _____trend.
    (a) linear (b) quad (c) triple (d) quadratic

29. A second difference can eliminate a _____trend.
    (a) linear (b) quad (c) triple **(d) quadratic**

30. _____smoothing is a moving average smoother that uses a weight function, or kernel, to average the observations.
    (a) Lowess **(b) Kernel** (c) MA (d) Spline

Unit -II

1. The _____method for identifying ARIMA models along with techniques for parameter estimation and forecasting for these models.
   (a) Box-Cox **(b) Box–Jenkins** (c) Cox–Jenkins (d) AIC

2. ARMA stands for _____.
   (a) autoregressive moving average (b) Autoregressive Model Average
   (c) autoreceessive moving average (d) autoregressive method average

3. In autoregression models, the current value is a particular _____function of past values.
   (a) binary (b) Quadratic **(c) linear** (d) non linear

4. The autoregressive operator is defined to be _____
   (a) $\boldsymbol{\phi(B) = 1 - \phi_1 B - \phi_2 B^2 - \cdots - \phi_p B^p}$ (b) $\phi(B) = 1 + \phi_1 B + \phi_2 B^2 + \cdots + \phi_p B^p$
   (c) $\phi(B) = 1 - \phi_1 B + \phi_2 B^2 - \cdots + \phi_p B^p$ (d)) $\phi(B) = \phi_1 B + \phi_2 B^2 + \cdots + \phi_p B^p$

5. When a process does not depend on the future, such as the AR(1) when |φ| < 1, then the process is called _____.
   (a) Invertible (b) Invisible **(c) causal** (d) colt

6. The sample path of AR(2) process is very _____.
   (a) strip **(b) choppy** (c) peak (d) low

7. When the values of the time series quickly become large in magnitude, the processes are called _____.
   (a) **Explosive** (b) Exponential (c) Expensive (d) Extensive

8. φ(B) = _____
   (a) 1+ φB **(b) 1- φB** (c) φB – 1 (d) φB +1

9. The moving average process is _____for any values of the parameters $\theta_1, \ldots, \theta_q$.
   (a) Invertible **(b) stationary** (c) causal (d) explosion

10. |ρ(1)| ≤ _____for all values of θ.
    (a) +1 (b) -1 **(c) ½** (d) -½

11. In MA(1) Process, x_t is correlated with _____
    (a) $\boldsymbol{x_{t-1}}$ (b) x_{t-2} (c) $x_{t-1} + x_{t-2}$ (d) $x_{t-1} - x_{t-2}$

12. In ARMA(p,q), when q = 0, the model is called an/a _____ model of order p.
    (a) Moving Average (b) Autocovariance (c) Autocorrelation **(d) Autoregressive**

13. In ARMA(p,q), when p = 0, the model is called an/a _____ model of order q.

(a) Moving Average (b) Autocovariance (c) Autocorrelation (d) Autoregressive

14. x_t is white noise because of the _____redundancy.
(a) time series (b) data (c) average **(d) parameter**

15. The parameter redundancy is otherwise called _____.
(a) **over-parameterization** (b) under-parameterization
(c) extra-parameterization (d) normal-parameterization

16. If the ARMA model is parameter redundancy, then _____ and _____ have a common factor.
(a) α(z)β(z) (b) ε(z)λ(z) (c) ξ(z)ς(z) **(d) φ(z) θ(z)**

17. Which concept is addressed the problem of future dependent models?
(a) Invertible (b) stationary **(c) causality** (d) explosion

18. ρ(h) dampens to_____ exponentially fast as $h \to \infty$.
(a) 0 (b) 1 (c) -1 (d) ∞

19. An ARMA process is causal only when the roots of φ(z) lie _____the unit circle.
(a) outside (b) inside (c) boundary (d) center

20. γ(q) cannot be zero because _____.
(a) θq ≠ 0 (b) θq ≥ 0 (c) θq ≤ 0 (d) θq = 0

21. If all the roots are _____, then ρ(h) dampens exponentially fast to zero as $h \to \infty$.
(a) real or complex (b) complex **(c) real** (d) imaginary

22. In the case of complex roots, the time series will appear to be _____.
(a) acyclic (b) wave (c) linear **(d) cyclic**

23. An ARMA process is invertible only when the roots of θ(z) lie _____ the unit circle.
(a) outside (b) inside (c) boundary (d) center

24. the ACF of an AR(1) process is a sequence, ρ(h), satisfying _____.
(a) ρ(h) − φρ(h − 1) = 0, h = 1, 2, . . . (b) ρ(h) − φρ(h + 1) = 0, h = 1, 2, . . .
(c) ρ(h+1) − φρ(h − 1) = 0, h = 1, 2, . . . (d) ρ(h) − αρ(h − 1) = 0, h = 1, 2, . . .

25. γ(h) = _____.
(a) γ(−h) (b) γ(2h) (c) γ(±h) (d) γ(−2h)

26. For a causal ARMA(p, q) model, $\varphi(B)x_t$ = _____.
(a) $\theta(B)w_t$ (b) $\theta(B)x_t$ (c) $-\varphi(B)x_t$ (d) $\varphi(B)w_t$

27. The m-step-ahead predictor and its _____based on the innovations algorithm.

(a) Entropy **(b) MSE** (c) RMSE (d) SSE

28. When n is large, _____ predictor is applied.
(a) innovations (b) m-step **(c) truncated** (d) long-range

29. To assess the precision of the forecasts, _____intervals are typically calculated along with the forecasts.
(a) prediction (b) frequency (c) class (d) forecast

30. _____ measures the correlation between X and Y with the linear effect of Z removed.
(a) $\rho_{YZ|X}$ (b) $\rho_{XZ|Y}$ (c) $\rho_{XY|X}$ **(d) $\rho_{XY|Z}$**

Unit III

1. ARIMA model is a broadening of the class of ARMA models to include_____.
   (a) augmenting (b) differencing (c) Multiplying (d) Fractioning
2. The ARIMA(0,1,1), or IMA(1,1) model is best for _____ time series
   (a) Economic (b) Health (c) Earthquake (d) Fish Population
3. The new _____ is a linear combination of the old forecast and the new observation.
   (a) backcast **(b) forecast** (c) prediction (d) regression
4. In EWMA, the parameter _____ is called the smoothing parameter
   (a) $1 - \lambda$ (b) $1 + \lambda$ (c) $\lambda + 1$ (d) $\lambda - 1$
5. _____values of λ lead to smoother forecasts.
   (a) meager (b) smaller (c) Moderate **(d) Larger**
6. _____ is called the return or growth rate.
   (a) $\nabla \log(x_t)$ (b) $\nabla \sin(x_t)$ (c) $\nabla \cos(x_t)$ (d) $\nabla \exp(x_t)$
7. _____ can help in indicating whether differencing is needed.
   (a) AIC (b) BIC (c) BICc **(d) ACF**
8. A _____decay in ρ(h) is an indication that differencing may be needed.
   (a) Fast (b) Quick (c) Moderate **(d) Slow**
9. The ACF is cutting off at lag 2 and the PACF is _____off.
   (a) ahead (b) leading **(c) tailing** (d) behind
10. The ACF is tailing off and the PACF is cutting off at_____.
    (a) lag 0 (b) lag 1 (c) lag 2 (d) lag 3
11. Which step is involved in the analysis of the residuals and model comparisons?
    (a) parameter estimation **(b) diagnostics**
    (c) model selection (d) Data Plotting
12. _____ can help in identifying departures from normality.
    (a) Box Plot (b) Scatter Plot **(c) Q-Q plot** (d) Q-A plot
13. Which test is applied on residuals?
    (a) t-test (b) z-test (c) f-test **(d) Run Test**
14. _____ leads to less-precise estimators.
    (a) Overfitting (b) underfitting (c) Estimation (d) Regression
15. The final step of model fitting is _____.
    (a) parameter estimation (b) diagnostics
    (c) model selection (d) Data Plotting
16. The AIC and AICc both prefer the _____ fit.
    (a) AR(1) (b) AR(2) (c) MA(1) **(d) MA(2)**
17. _____prefers the simpler AR(1) model
    (a) AIC (b) AICc **(c) BIC** (d) BICc
18. The pure seasonal ARMA(P, Q)s is _____only when the roots of $\Phi P(z^s)$ lie outside the unit circle.
    (a) Casual (b) Invertible (c) Redundancy (d) Formal
19. Seasonal persistence occurs when the process is nearly _____in the season.
    (a) Constant (b) Consistent **(c) periodic** (d) non periodic

20. The ACF of stationary MA(1)12, and its will have a peak only at lag _____.
(a) 12 (b) 10 (c) 3 (d) 1

Unit IV

1. _____is a frequency based measure of the correlation between two series at a given frequency.
   (a) Couple **(b) Coherency** (c) decouple (d) inheritance
2. What is the amplitude?
   (a) $\boldsymbol{A = \sqrt{U_1^2 + U_2^2}}$ (b) $A = U_1 + U_2$ (c) $A = U_1^2 + U_2^2$ (d) $A = \sqrt[3]{U_1 + U_2}$
3. _____ is the determining the start point of the cosine function.
   (a) Frequency (b) Coherency **(c) Phase** (d) pass
4. The phase is φ =_____.
   (a) $\boldsymbol{\tan^{-1}(-U_2/U_1)}$ (b) $\sin^{-1}(-U_2/U_1)$ (c) $\cos^{-1}(-U_2/U_1)$ (d) $\tan^{-1}(U_2/U_1)$
5. The autocovariance function is the_____ of periodic components with weights proportional to the variances σ_k^2.
   (a) sum (b) minus (c) product (d) log
6. The _____ process is an essential tool, it is worthwhile investigating the spectrum of such a process.
   (a) non-linear **(b) linear** (c) log (d) stochastic
7. _____ is a complex-valued weighted average of the data d(j/n).
   (a) FFT (b) DCT (c) DWT **(d) DFT**
8. In star time series data, he periodogram for frequencies less than _____.
   (a) 0.8 (b) 8 **(c) 0.08** (d) 0.008
9. This spectral density is the analogue of the _____density function.
   (a) Normal (b) joint **(c) probability** (d) conditional
10. The sinusoid oscillating at a frequencies are called _____ frequencies.
    (a) fast (b) forward (c) folding **(d) Fourier**
11. In spectral density, the sum of squares associated with the residuals (SSE) is _____.
    (a) -1 (b) 1 **(c) 0** (d) <1
12. The scaled _____is simply the sample variance at each frequency component
    (a) Frequency (b) Coherency (c) Phase **(d) periodogram**
13. The predominant period of the Johnson & Johnson series is _____quarters per cycle.
    (a) 2 **(b) 4** (c) 6 (d) 8
14. _____is one complete period of a sine or cosine function defined over a unit time interval.
    (a) Frequency (b) Coherency (c) Phase **(d) pass**
15. _____index, defined in cycles per unit time with amplitude.
    (a) Frequency (b) Coherency (c) Phase (d) pass
16. _____of a time series, is the number of points in a cycle.
    (a) Coherence (b) acyclic (c) cyclic **(d) period**
17. _____ frequency defines the highest frequency that can be seen in discrete sampling.
    (a) fast (b) forward **(c) folding** (d) footing
18. Under absolute _____of γ(h), the spectral density is the long-term average of the periodogram.
    (a) summability (b) productability (c) asymptotic (d) linearity
19. A/an _____ filter can isolate the variance in certain frequency intervals or bands.

(a) non-linear **(b) linear** (c) median (d) min

20. The spectral distribution expresses the same information in terms of_____.

(a) Frequency (b) Coherency (c) Phases **(d) cycles**

Unit V

1. The Convergence rate of the EM algorithm compared with the _____procedure is slow.
   (a) Jarque-Bera **(b) Newton-Rapson** (c)Whitney R (d) Shapiro–Wilk
2. If the state process is _____, the state equation as a 2p-dimensional process.
   (a) VAR(2) (b) VAR(1) (c) VAR(0) (d) VAR(3)
3. The state process is otherwise called _____ process.
   (a) latent (b) lent (c) gaussian (d) impulse
4. The autocorrelation structure of y_t is identical to the autocorrelation structure of an _____ process.
   (a) ARMA(1,1) (b) ARMA(1,0) (c) ARMA(0,1) (d) ARMA(0,0)
5. Which is the score vector?
   (a) ∂ ln LY(Θ)/∂Θ (b) ln LY(Θ)/∂Θ (c) −ln LY(Θ)/∂Θ **(d) −∂ ln LY(Θ)/∂Θ**
6. When_____, the problem is called smoothing.
   (a) s < t (b) s = t **(c) s > t** (d) s <= t
7. _____ algorithm gives us an iterative method for finding the MLEs of Θ based on the incomplete data, $y_{1:n}$.
   (a) EM (b) Maximization (c) Minimization (d) Expectation
8. The filtered estimator depends on the _____ and _____.
   (a) present, past (b) present, future (c) past, future (d) future, current
9. Newton–Raphson algorithm can be used successively to update the_____ values.
   (a) lags **(b) parameters** (c) x_t (d) y_t
10. The objective of log likelihood is _____
    (a) stabilized (b) increased (c) Maximized **(d) minimized**
11. The _____rate of the EM algorithm compared with the Newton–Raphson procedure is slow.
    (a) convergence (b) growth (c) contrast (d) divergence
12. _____models is a good example of the model flexibility.
    (a) Gaussian (b) binary (c) Cosine **(d) Structural**
13. When s = t, the problem is called _____.
    (a) filtering (b) smoothing (c) forecasting (d) prediction
14. The filtered estimator depends on the _____.
    (a) present (b) future (c) past **(d)past, future, present**
15. The likelihood is computed using the _____.
    (a) lags **(b) innovations** (c) returns (d) processes
16. The convergence rate of the EM algorithm compared with the Newton–Raphson procedure is _____.
    (a) fast (b) moderate (c) very fast **(d) slow**
17. The w_t are _____independent and identically distributed, zero-mean normal vectors with covariance matrix Q.
    (a) p × 1 (b) 1 × 1 (c) 1 × p (d) p × p
18. When_____, the problem is called forecasting or prediction.
    (a) s < t (b) s = t (c) s > t (d) s <= t
19. K_t is called Kalman_____.
    (a) filter (b) smoother **(c) gain** (d) predictor

20. The forecast depends only on the_____.
    (a) past (b) present (c) future (d) current