SECURITY ANALYSIS

Chapter 4

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CONTENTS

Chapter 4

Security Analysis

Investment decision depends on securities to be bought, held or sold. Buying security is based on highest return per unit of risk or lowest risk per unit of return. Selling security does not depend on any such requirement. A security considered for buying today may not be attractive tomorrow due to management policy changes in the company or economic policy changes adopted by the government. The reverse is also true. Therefore, analysis of the security on a continuous basis is a must.

Two approaches viz. fundamental analysis and technical analysis are in vogue for carrying out Security Analysis. In fundamental analysis, factors affecting risk-return characteristics of securities are looked into while in technical analysis, demand/ supply position of the securities along with prevalent share price trends are examined.

Q1. Write short note on fundamental analysis.

Answer:

1. Fundamental analysis is based on the assumption that the share prices depend upon the future dividends expected by the shareholders.
2. The present value of the future dividends can be calculated by discounting the cash flows at an appropriate discount rate and is known as the 'intrinsic *value of the share*'.
3. The intrinsic value of a share, according to a fundamental analyst, depicts the true value of a share.
4. A share that is priced below the intrinsic value must be bought, while a share quoting above the intrinsic value must be sold.
5. There are two methods to discuss to analyze the price of the security under fundamental analysis

1. Dividend Growth Model
2. PE Multiple Approach

6. The key variables that an investor must monitor in order to carry out his fundamental analysis are
    1. Economy Wide Factors
    2. Industry Wide Factors
    3. Company Wide Factors

Q2. Write short note on Dividend Growth Model.

Answer:

1. It can be said that the price the shareholders are prepared to pay for a share is nothing but the present value of the dividends they expect to receive on the share and this is the price at which they expect to sell it in the future.
2. Formula-

$$P(0) = \frac{D}{(1+k)} + \frac{D}{(1+k)^2} + \frac{D}{(1+k)^3} + \ldots + \ldots$$

3. But it is unrealistic to assume that dividends remain constant over time.
4. In case of most shares, the dividends per share (DPS) grow because of the growth in the earnings of the firm. Most companies, as they identify new investment opportunities for growth, tend to increase their DPS over a period of time.
5. Let us assume that on an average the DPS of the company grows at the compounded rate of g per annum.

$$\mathbf{P(0)} = \frac{\mathbf{D(1)}}{\mathbf{(1+k)}} + \frac{\mathbf{D(1)(1+g)}}{\mathbf{(1+k)^2}} + \frac{\mathbf{D(1)(1+g)^2}}{\mathbf{(1+k)^2}} + \cdots +$$

6. If growth rate in dividends, *g*, is less than the desired rate of return on share, *k*, we must have:

$$\mathbf{P(0)} = \frac{\mathbf{D(1)}}{\mathbf{(k-g)}}$$

or

$$\mathbf{P(0)} = \frac{\mathbf{D_0(1+g)}}{\mathbf{(k-g)}}$$

7. Since *D* (1) may be approximated as *D*(0) (1+*g*), *D*(0) being the DPS in the current period (0).
   - ✓ When growth rate in dividends, *g*, is equal to or greater than the desired rate of return on share, *k*, and the above model is not valid, since the geometric series leads to an infinite price.
   - ✓ The condition that *g* be less than *k* is not very restrictive, since the long-term growth in dividends is unlikely to exceed the rate of return expected by the market on the share.
   - ✓ The above result is also known as Gordon's dividend growth model for stock valuation, named after the model's originator, Myron J. Gordon. This is one of the most well-known models in the genre of fundamental analysis.

Q3. Write short note on PE Multiple Approach.

Answer:

1. Financial analysts tend to relate price to earnings via the P/E multiples (the ratio between the market price and earnings per share).
2. If a company is assumed to pay out a fraction *b* of its earnings as dividends on an average (i.e. the Dividend Payout Ratio = b), D(1) may be expressed as *b* E(1), where E(1) is the earning per share (EPS) of the company at the end of the first period. Then the equation in Dividend Growth Model above, becomes
3. Formula

$$\mathbf{P(0) = \frac{bE(1)}{(k - g)}}$$

or

$$\mathbf{P(0) = \frac{bE_0(1 + g)}{(k - g)}}$$

4. The fundamental analysts use the above models or some of their variations, for estimating the fundamental or intrinsic price or the fundamental price-earnings multiple of a security.

   - ✓ Towards this end, they devote considerable effort in assessing the impact of various kinds of information on a company's future profitability and the expected return of the shareholders.

- ✓ If the prevailing price or the P/E multiple of a security is higher than the estimated fundamental value (i.e. if the security appears to be overpriced), they recommend a selling stance with respect to that security, since once the information becomes common knowledge, the price of the security may be expected to fall.
- ✓ On the other hand, if the security is underpriced in the market, the prevailing price (or the P/E multiple) of the security being lower than the estimated fundamental value, they recommend buying the security, counting upon a price rise.

Q4. Write Short Note on economic analysis & factors affecting economic analysis.

Answer:

Macro- economic factors e. g. historical performance of the economy in the past/ present and expectations in future, growth of different sectors of the economy in future with signs of stagnation/degradation at present to be assessed while analyzing the overall economy.

Trends in peoples' income and expenditure reflect the growth of a particular industry/company in future. Consumption affects corporate profits, dividends and share prices in the market.

Factors affecting Economic Analysis

1. Growth Rates of National Income and Related Measures
2. Growth Rates of Industrial Sector
3. Inflation
4. Monsoon

Q5. What are the different techniques used in Economic Analysis?

Answer:

(a) Anticipatory Surveys

(b) Barometer/Indicator Approach

(c) Economic Model Building Approach

Q6. Write short note on Anticipatory Surveys.

Answer:

- ✓ They help investors to form an opinion about the future state of the economy.
- ✓ It incorporates expert opinion on construction activities, expenditure on plant and machinery, levels of inventory – all having a definite bearing on economic activities.
- ✓ Also future spending habits of consumers are taken into account.
- ✓ In spite of valuable inputs available through this method, it has certain drawbacks:

  1) Survey results do not guarantee that intentions surveyed would materialize.

  2) They are not regarded as forecasts per se, as there can be a consensus approach by the investor for exercising his opinion.

- ✓ Continuous monitoring of this practice is called for to make this technique popular

Q7. Write short note on Barometer/Indicator Approach.

Answer:

✓ Various indicators are used to find out how the economy shall perform in the future. The indicators have been classified as under:

1. *Leading Indicators*: They lead the economic activity in terms of their outcome. They relate to the time series data of the variables that reach high/low points in advance of economic activity.
2. *Roughly Coincidental Indicators:* They reach their peaks and troughs at approximately the same in the economy.
3. *Lagging Indicators:* They are time series data of variables that lag behind in their consequences Vis-a-vis the economy. They reach their turning points after the economy has reached its own already.

✓ All these approaches suggest direction of change in the aggregate economic activity but nothing about its magnitude.

✓ The various measures obtained form such indicators may give conflicting signals about the future direction of the economy.

✓ To avoid this limitation, use of diffusion/composite index is suggested whereby combining several indicators into one index to measure the strength/weaknesses in the movement of a particular set of indicators.

✓ Computation of diffusion indices is no doubt difficult notwithstanding the fact it does not eliminate irregular movements.

✓ Money supply in the economy also affects investment decisions.

✓ Rate of change in money supply in the economy affects GNP, corporate profits, interest rates and stock prices. Increase in money supply fuels inflation.

✓ As investment in stocks is considered as a hedge against inflation, stock prices go up during inflationary period.

Q8. Write short note on Economic Model Building Approach.

Answer:

In this approach, a precise and clear relationship between dependent and independent variables is determined. GNP model building or sectoral analysis is used in practice through the use of national accounting framework. The steps used are as follows:

(i) Hypothesize total economic demand by measuring total income (GNP) based on political stability, rate of inflation, changes in economic levels.

(ii) Forecasting the GNP by estimating levels of various components viz. consumption expenditure, gross private domestic investment, government purchases of goods/services, net exports.

(iii) After forecasting individual components of GNP, add them up to obtain the forecasted GNP.

(iv) Comparison is made of total GNP thus arrived at with that from an independent agency for the forecast of GNP and then the overall forecast is tested for consistency. This is carried out for ensuring that both the total forecast and the component wise forecast fit together in a reasonable manner.

Q9. Write Short notes on Industry Analysis and factors affecting industry analysis.

Answer:

- ✓ When an economy grows, it is very unlikely that all industries in the economy would grow at the same rate.
- ✓ So it is necessary to examine industry specific factors, in addition to economy-wide factors.
- ✓ First of all, an assessment has to be made regarding all the conditions and factors relating to demand of the particular product, cost structure of the industry and other economic and Government constraints on the same.
- ✓ Since the basic profitability of any company depends upon the economic prospects of the industry to which it belongs, an appraisal of the particular industry's prospects is essential.

Factors Affecting Industry Analysis

1. Product Life Cycle
2. Demand Supply Gap
3. Barriers to entry for new players
4. Government Attitude
5. State of competition in the industry
6. Cost Conditions and Profitability
7. Technology and research

Q10. What are the techniques used in Industry Analysis?

Answer:

1. **Regression Analysis -** Investor diagnoses the factors determining the demand for output of the industry through product demand analysis. Factors to be considered are GNP, disposable income, per capita consumption / income, price elasticity of demand. For identifying factors affecting demand, statistical techniques like regression analysis and correlation are used.

2. **Input Output Analysis-** It reflects the flow of goods and services through the economy, intermediate steps in production process as goods proceed from raw material stage through final consumption. This is carried out to detect changing patterns/trends indicating growth/decline of industries.

Q11. Write Short notes on Company Analysis & factors affecting company analysis.

Answer:

Economic and industry framework provides the investor with proper background against which shares of a particular company are purchased. This requires careful examination of the company's quantitative and qualitative fundamentals.

Factors affecting the company analysis

1. Net Worth and Book Value
2. Sources and Uses of Funds
3. Cross- Sectional and Time Series Analysis
4. Size and Ranking of the company

5. Growth Record
6. Financial Analysis
7. Competitive Advantage
8. Quality of Management
9. Corporate Governance
10. Regulations
11. Location and Labour Management Relations
12. Pattern of Existing Stock Holding
13. Marketability of the Shares

Q12. What are the techniques used in Company Analysis?

Answer:

1. Correlation and Regression Analysis
2. Trend Analysis
3. Decision Tree Analysis

[Detail about each analysis is not covered in our syllabus]

Q13. Write short notes on Technical Analysis.

Answer:

1. Technical Analysis is a method of share price movements based on a study of price graphs or charts on the assumption that share price trends are repetitive, that since investor psychology follows a certain pattern, what is seen to have happened before is likely to be repeated.

2. The technical analyst is concerned with the fundamental strength or weakness of a company or an industry; he studies investor and price behaviour.

3. A technical analyst attempts precisely that. The two basic questions that he seeks to answer are:

    1. Is there a discernible trend in the prices?

    2. If there is, then are there indications that the trend would reverse?

    The methods used to answer these questions are visual and statistical.

Q14. Technical Analysis is based on the following assumptions. Explain.

Answer:

(i) The market value of stock is actually depending on the supply and demand for a stock.

(ii) The supply and demand is actually governed by several factors. For instance, recent initiatives taken by the Government to reduce the Non-Performing Assets (NPA) burden of banks may actually increase the demand for banking stocks.

(iii) Stock prices generally move in trends which continue for a substantial period of time. Therefore, if there is a bull market going on, there is every possibility that there will soon be a substantial correction which will provide an opportunity to the investors to buy shares at that time.

(iv) Technical analysis relies upon chart analysis which shows the past trends in stock prices rather than the information in the financial statements like balance sheet or profit and loss account.

Q15. Technical analysis is based on which of the three principals?

Answer:

a. The market discounts everything

✓ Many experts criticize technical analysis because it only considers price movements and ignores fundamental factors.

✓ The argument against such criticism is based on the Efficient Market Hypothesis, which states that a company's share price already reflects everything that has or could affect a company. And it includes fundamental factors.

✓ So, technical analysts generally have the view that a company's share price includes everything including the fundamentals of a company

b. Price moves in trends

✓ Technical analysts believe that prices move in trends. In other words, a stock price is more likely to continue a past trend than move in a different direction.

c. History tends to repeat itself

✓ Technical analysts believe that history tends to repeat itself.

✓ Technical analysis uses chart patterns to analyze subsequent market movements to understand trends. While many form of technical analysis have been used for many years, they are still are considered

to **be significant because they illustrate patterns in price movements that** often repeat themselves.

Q16. Name some of the most famous theories in Technical Analysis.

Answer:

1. The Dow Theory
2. Elliot Wave Theory
3. Random Walk Theory

Q17. Write Short Notes on Dow Theory.

Answer:

- ✓ The Dow Theory is one of the oldest and most famous technical theories.
- ✓ It was originated by Charles Dow, the founder of Dow Jones Company in late nineteenth century.
- ✓ It is a helpful tool for determining the relative strength of the stock market. It can also be used as a barometer of business.
- ✓ The Dow Theory is based upon the movements of two indices, constructed by Charles Dow, Dow Jones Industrial Average (DJIA) and Dow Jones Transportation Average (DJTA).
- ✓ The movements of the market are divided into three classifications, all going at the same time; the primary movement, the secondary movement, and the daily fluctuations.
  - **i. The primary movement** is the main trend of the market, which lasts from one year to 36 months or longer. This trend is commonly called bear or bull market.

ii. **The secondary movement** of the market is shorter in duration than the primary movement, and is opposite in direction. It lasts from two weeks to a month or more.

iii. **The daily fluctuations** are the narrow movements from day-to-day. These fluctuations are not part of the Dow Theory interpretation of the stock market. However, daily movements must be carefully studied, along with primary and secondary movements, as they go to make up the longer movement in the market.

✓ Thus, the Dow Theory's purpose is to determine where the market is and where is it going, although not how far or high.

✓ Charles Dow proposed that the primary uptrend would have three moves up,

i. the first one being caused by accumulation of shares by the far-sighted, knowledgeable investors,

ii. the second move would be caused by the arrival of the first reports of good earnings by corporations, and the last move up would be caused by widespread report of financial well-being of corporations.

iii. The third stage would also see rampant speculation in the market.

Figure 1 - Types of Trends

✓ Towards the end of the third stage, the far-sighted investors, realizing that the high earnings levels may not be sustained, would start selling, starting the first move down of a downtrend, and as the non-sustainability of high earnings is confirmed, the second move down would be initiated and then the third move down would result from distress selling in the market

Q18. State the principles of Dow Theory.

Answer:

1. Market discounts everything
2. The 3-trend market
3. Uptrend
4. Sideways Trend
5. Downtrend
6. The 3-Phases of primary trend
    a) Accumulation Phase
    b) Public Participation Phase
    c) Panic Phase (Excess Phase)
7. Market indexes must confirm each other
8. Volume must confirm trend
9. Trend remains in effect until clear reversal occurs.

Q19. Write short notes on Elliot Wave Theory.

Answer:

✓ Inspired by the Dow Theory and by observations found throughout nature, Ralph Elliot formulated Elliot Wave Theory in 1934.

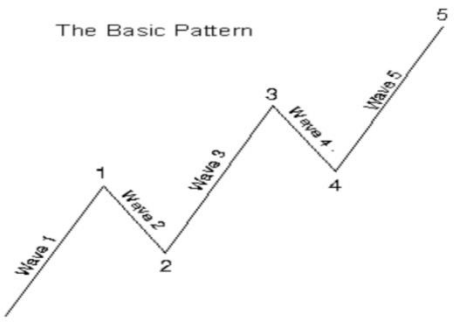
✓ This theory was based on analysis of 75 years stock price movements and charts.

✓ From his studies, he defined price movements in terms of waves. Accordingly, this theory was named Elliot Wave Theory.

✓ Elliot found that the markets exhibited certain repeated patterns or waves. As per this theory wave is a movement of the market price from one change in the direction to the next change in the same direction.

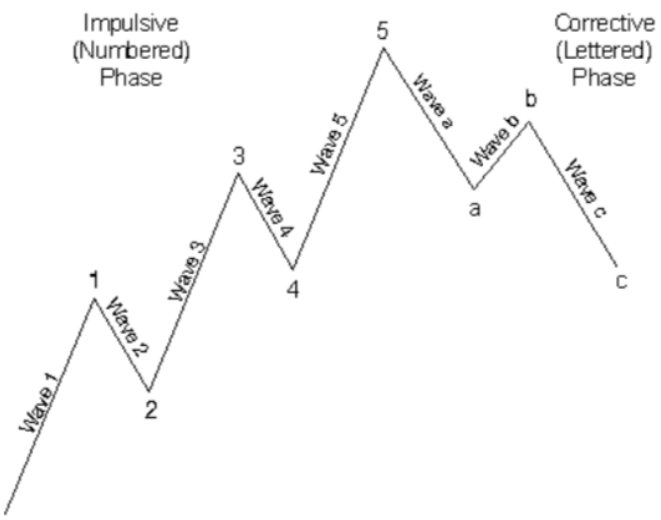
- ✓ These waves are resulted from buying and selling impulses emerging from the demand and supply pressures on the market.
- ✓ Depending on the demand and supply pressures, waves are generated in the prices
- ✓ As per this theory, waves can be classified into two parts:-
  - Impulsive patterns
  - Corrective patters

Impulsive Patterns-(Basic Waves) - In this pattern there will be 3 or 5 waves in a given direction (going upward or downward). These waves shall move in the direction of the basic movement. This movement can indicate bull phase or bear phase.



Source: http://elliotwave.net/

Corrective Patterns- (**Reaction Waves) -** These 3 waves are against the basic direction of the basic movement. Correction involves correcting the earlier rise in case of bull market and fall in case of bear market. As shown in the following diagram waves 1, 3 and 5 are directional movements, which are separated or corrected by wave 2 & 4, termed as corrective movements.



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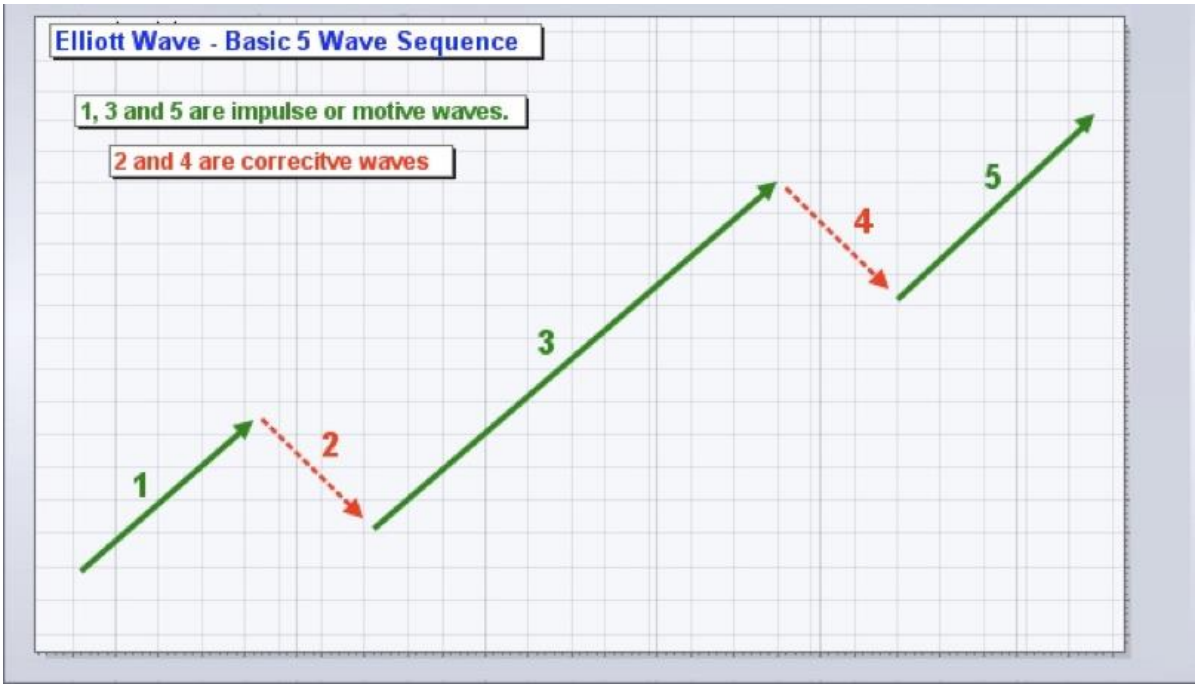
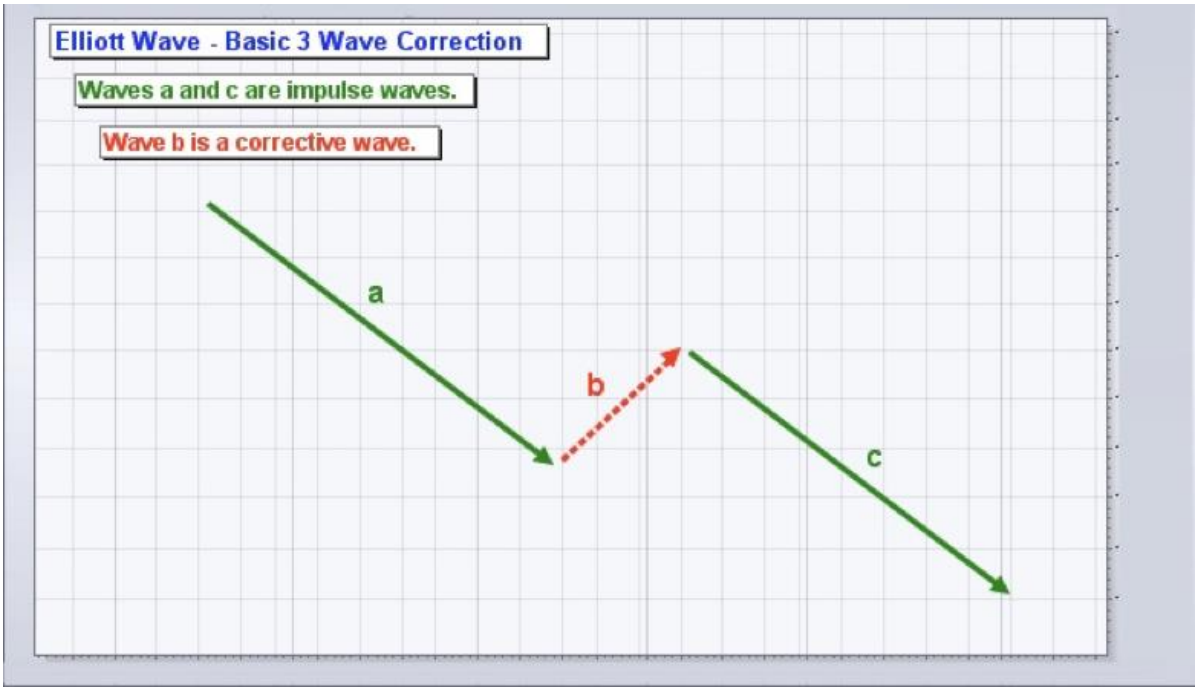
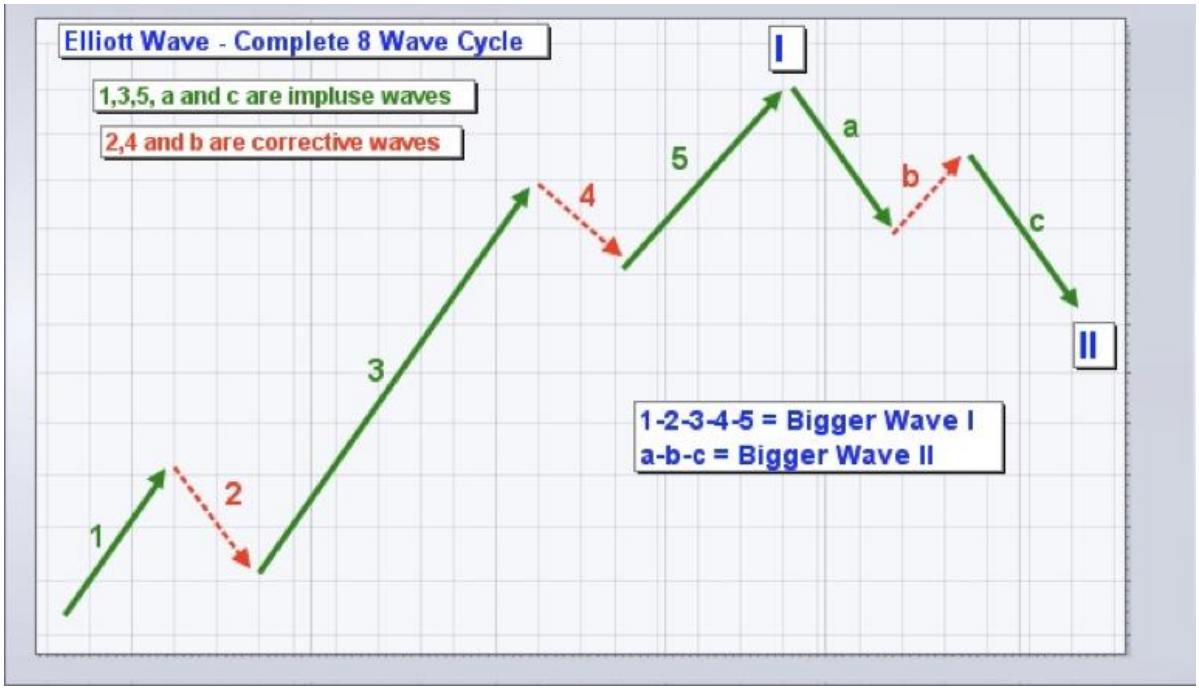
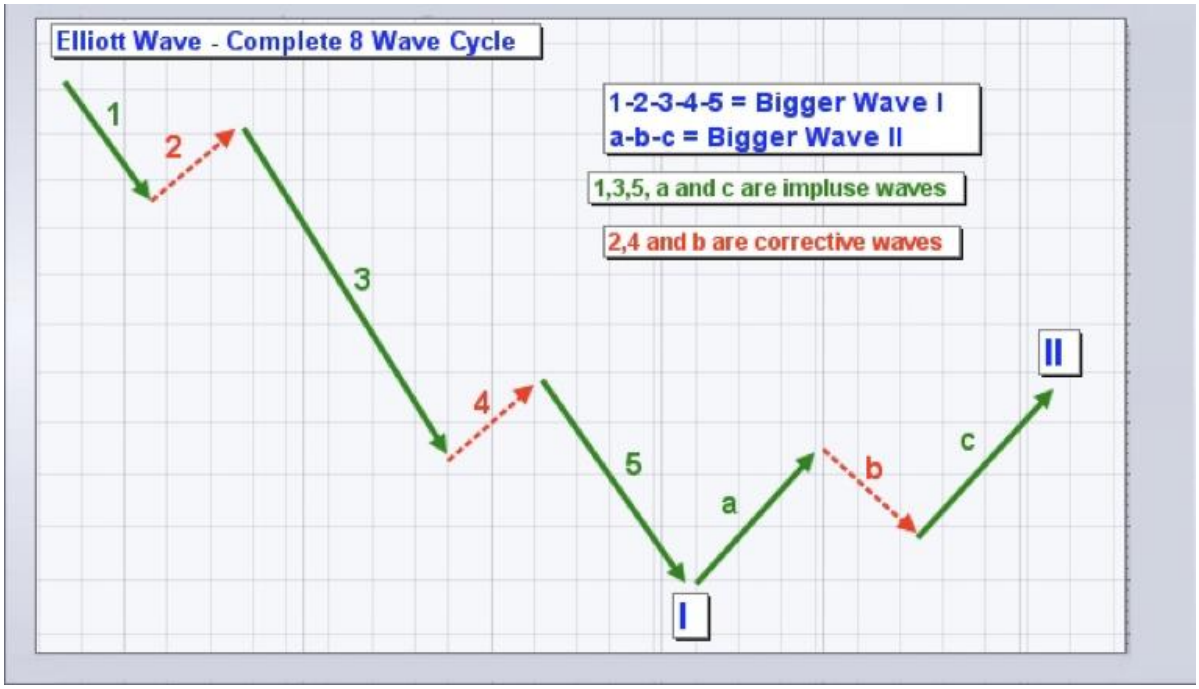



Elliott Wave - Basic 3 Wave Correction
Waves a and c are impulse waves.
Wave b is a corrective wave.
a
b
c


Elliott Wave - Complete 8 Wave Cycle
1,3,5, a and c are impluse waves
2,4 and b are corrective waves
1
2
3
4
5
I
a
b
c
II
1-2-3-4-5 = Bigger Wave I
a-b-c = Bigger Wave II


Elliott Wave - Complete 8 Wave Cycle
1-2-3-4-5 = Bigger Wave I
a-b-c = Bigger Wave II
1,3,5, a and c are impluse waves
2,4 and b are corrective waves
1
2
3
4
5
a
b
c
I
II

Q20. What are the three rules of Elliot Wave Theory?

Answer:

Three Rules

Believe it or not, there are only three rules when it comes to interpreting Elliott Wave. There are many guidelines, but only three HARD rules. These are unbreakable. Guidelines, on the other hand, are bendable and subject to interpretation. Furthermore, these rules only apply to a 5-wave impulse sequence. Correction, which are much more complicated, are given more leeway when it comes to interpretation.

Rule 1: Wave 2 cannot retrace more than 100% of Wave 1.

Rule 2: Wave 3 can never be the shortest of the three impulse waves.

Rule 3: Wave 4 can never overlap Wave 1.

Q21. What are the guidelines under Elliot Wave Theory?

Answer:

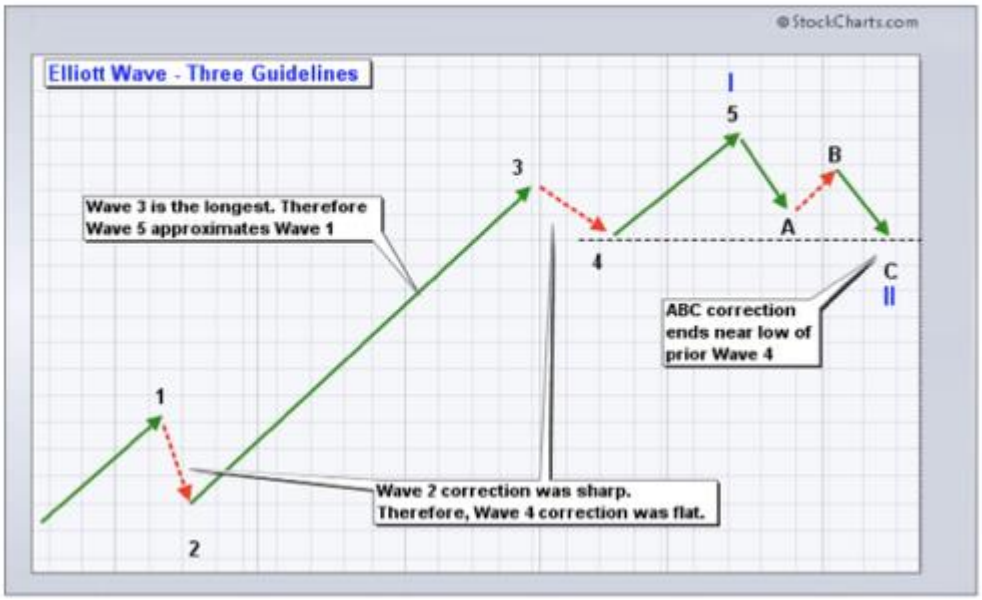
Three Guidelines

There are numerous guidelines, but this article will focus on three key guidelines. In contrast to rules, guidelines should hold true most of the time, not necessarily all of the time.

Guideline 1: When Wave 3 is the longest impulse wave, Wave 5 will approximately equal Wave 1.

Guideline 2: The forms for Wave 2 and Wave 4 will alternate. If Wave 2 is a sharp correction, Wave 4 will be a flat correction. If Wave 2 is flat, Wave 4 will be sharp.

Guideline 3: After a 5-wave impulse advance, corrections (abc) usually end in the area of prior Wave 4 low.



Q22. Write Short Notes on Random Walk Theory.

Answer:

Stock market prices cannot be predicted. For many years economists and statisticians have been interested in developing and testing models of stock price behaviour. One important model that has evolved is the Random Walk Theory.

Stocks follow random walk if the price of the stocks does not reflect any pattern.
Logic behind Random Walk Theory

- ✓ We consider that stock prices tend to change according to the information.
- ✓ That means stock prices should change when the market gets new information related to that stock.
- ✓ Since such kind of information arrives in an unpredictable and random manner we can say that the stock prices should change in random and unpredictable manner.

In short, it may be said that prices on the stock exchange behave in a similar manner a drunk behave while walking down the streets.

The supporters of this theory put out a simple argument. It follows that:

(a) Prices of shares in stock market can never be predicted.

(b) The reason is that the price trends are not the result of any underlying factors, but that they represent a statistical expression of past data.

(c) There may be periodical ups or downs in share prices, but no connection can be established between two successive peaks (high price of stocks) and troughs (low price of stocks)

Q23. What conclusions were drawn from the Random Walk Theory that led to the evolution of Efficient Market Hypothesis

Answer:

When empirical evidence in favour of Random walk hypothesis seemed overwhelming, researchers wanted to know about the Economic processes that produced a Random walk. They concluded that randomness of stock price was a result of efficient market that led to the following view points:

1. Information is freely and instantaneously available to all market participants.
2. Keen competition among the market participants more or less ensures that market will reflect intrinsic values. This means that they will fully impound all available information.
3. Price change only response to new information that is unrelated to previous information and therefore unpredictable.

Q24. Write short note on Efficient Market Hypothesis.

Answer:

This theory states that it is impossible for an investor to outperform the market as the available price sensitive information are already included in the market price of the securities. And thus investor cannot purchase the securities which are undervalued and sell it at inflated price.

This theory explains that market price of the share is fair price and investor can earn higher returns only by having riskier assets in her (his) portfolio.

Three forms of market efficiency

1. **Weak form efficiency**: Current market price captures all information contained in past stock price & volume data.
2. **Semi-strong form efficiency**: Current market price captures all publicly available information.
3. **Strong form efficiency**: Current market price captures all information both public and private.

Lessons of Market Efficiency

1. **Markets have no memory**: Price changes tomorrow are independent of price changes today.
2. **Fair Market Prices**: As the current market price captures all information the price quoted in the market is considered as fair market price.
3. **Read the entrails**: If the market is efficient it can suggest a great deal about the company's future prospects.

Q25. What are the misconception about efficient market theory?

Answer:

1. **Not possible to earn consistent long terms returns:** Efficient Market Theory implies that market prices factor in all available information and as such it is not possible for any investor to earn consistent long term returns from market operations.

2. **Stock price does not reflect fair value:** Although price tends to fluctuate they cannot reflect fair value. This is because the future is uncertain. The market springs surprises continually and as prices reflect the surprises they fluctuate.
3. **Portfolio Managers lack competence in an efficient market:** Inability of institutional portfolio managers to achieve superior investment performance implies that they lack competence in an efficient market. It is not possible to achieve superior investment performance since market efficiency exists due to portfolio managers doing this job well in a competitive setting.
4. **Stock Market is irrational:** The random movement of stock prices suggests that stock market is irrational. Randomness and irrationality are two different things, if investors are rational and competitive, price changes are bound to be random.

Q26. What are the three levels or three forms of Efficient Market Theory?

Answer:

1) Weak form efficiency: Current market price captures all information contained in past stock price & volume data.

2) Semi-strong form efficiency: Current market price captures all publicly available information.

3) Strong form efficiency: Current market price captures all information both public and private.

Q27. What kinds of test are applied to verify the weak form of market efficiency? Or Write a short note on "Empirical Evidence on Weak form of Efficient Market Theory"

Answer:

Three types of tests have been employed to empirically verify the weak form of Efficient Market Theory- Serial Correlation Test, Run Test and Filter Rule Test.

(a) Serial Correlation Test:

- ✓ To test for randomness in stock price changes, one has to look at serial correlation. For this purpose, price change in one period has to be correlated with price change in some other period.
- ✓ Price changes are considered to be serially independent. Serial correlation studies employing different stocks, different time lags and different time period have been conducted to detect serial correlation but no significant serial correlation could be discovered.
- ✓ These studies were carried on short term trends viz. daily, weekly, fortnightly and monthly and not in long term trends in stock prices as in such cases. Stock prices tend to move upwards.

(b) Run Test:

- ✓ Given a series of stock price changes each price change is designated + if it represents an increase and – if it represents a decrease. The resulting series may be -,+, - , -, - , +, +.
- ✓ A run occurs when there is no difference between the sign of two changes. When the sign of change differs, the run ends and new run begins.

- ✓ To test a series of price change for independence, the number of runs in that series is compared with a number of runs in a purely random series of the size and in the process determines whether it is statistically different. By and large, the result of these studies strongly supports the Random Walk Model.

(c) Filter Rules Test:

- ✓ If the price of stock increases by at least N% buy and hold it until its price decreases by at least N% from a subsequent high.
- ✓ When the price decreases at least N% or more, sell it. If the behaviour of stock price changes is random, filter rules should not apply in such a buy and hold strategy.
- ✓ By and large, studies suggest that filter rules do not out perform a single buy and hold strategy particular after considering commission on transaction.

Q28. Write a short note on "Empirical Evidence on Semi Strong form of Efficient Market Theory"

Answer:

- ✓ Semi-strong form efficient market theory holds that stock prices adjust rapidly to all publicly available information.
- ✓ By using publicly available information, investors will not be able to earn above normal rates of return after considering the risk factor.
- ✓ To test semi-strong form efficient market theory, a number of studies was conducted which lead to the following queries:
  - Whether it was possible to earn on the above normal rate of return after adjustment for risk, using only publicly available information and

- how rapidly prices adjust to public announcement with regard to earnings, dividends, mergers, acquisitions, stock-splits?

✓ Fama, Fisher, Jensen and Roll in their adjustment of stock prices to new information examined the effect of stock split on return of 940 stock splits in New York Stock Exchange during the period 1957-1959 They found that prior to the split, stock earns higher returns than predicted by any market model.

✓ Boll and Brown in an empirical evaluation of accounting income numbers studied the effect of annual earnings announcements. They divided the firms into two groups.

- First group consisted of firms whose earnings increased in relation to the average corporate earnings while second group consists of firms whose earnings decreased in relation to the average corporate earnings.
- They found that before the announcement of earnings, stock in the first group earned positive abnormal returns while stock in the second group earned negative abnormal returns after the announcement of earnings. Stock in both the groups earned normal returns.

✓ There have been studies which have been empirically documented showing the following inefficiencies and anomalies:

- Stock price adjust gradually not rapidly to announcements of unanticipated changes in quarterly earnings.
- Small firms' portfolio seemed to outperform large firms' portfolio.
- Low price earning multiple stock tend to outperform large price earning multiple stock.

- Monday's return is lower than return for the other days of the week.

Q29. Write a short note on "Empirical Evidence on Strong form of Efficient Market Theory"

Answer:

- ✓ According to the Efficient Market Theory, all available information, public or private, is reflected in the stock prices. This represents an extreme hypothesis.
- ✓ To test this theory, the researcher analysed returns earned by certain groups viz. corporate insiders, specialists on stock exchanges, mutual fund managers who have access to internal information (not publicly available), or posses greater resource or ability to intensively analyse information in the public domain.
- ✓ They suggested that corporate insiders (having access to internal information) and stock exchange specialists (having monopolistic exposure) earn superior rate of return after adjustment of risk.
- ✓ Mutual Fund managers do not on an average earn a superior rate of return.
- ✓ No scientific evidence has been formulated to indicate that investment performance of professionally managed portfolios as a group has been any better than that of randomly selected portfolios. This was the finding of Burton Malkiel in his Random Walk Down Wall Street, New York.

Q30. What are the challenges faced by Efficient Market Hypothesis?

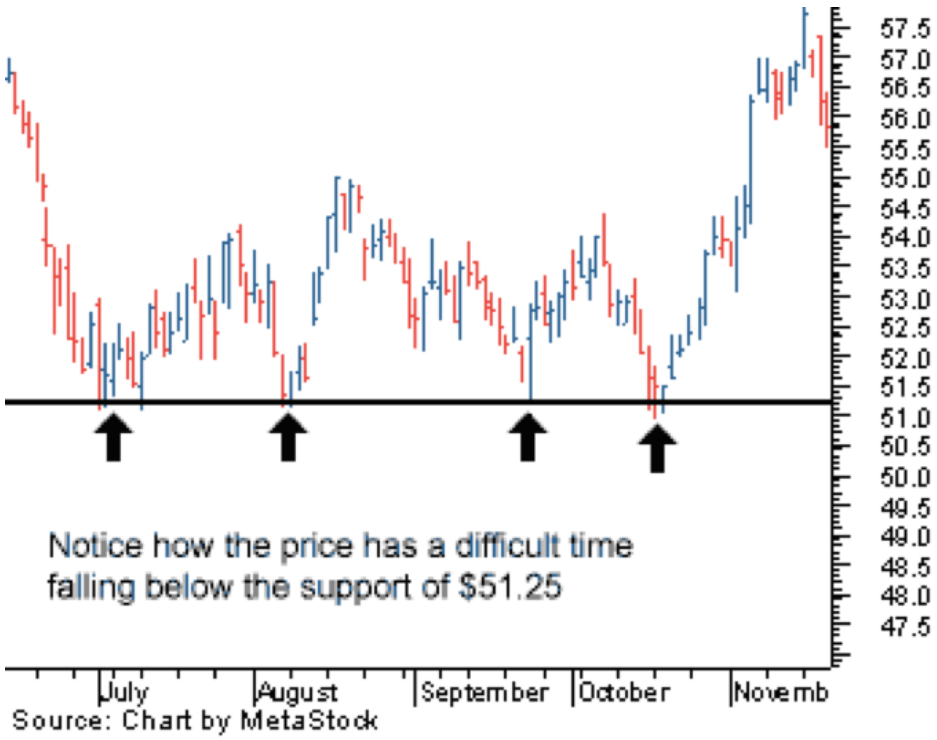
Answer:

- ✓ **Limited information processing capabilities:** Human information processing capabilities are sharply limited. According to Herbert Simon every human organism lives in an environment which generates millions of new bits of information every second but the bottle necks of the perceptual apparatus does not admit more than thousand bits per seconds and possibly much less.
- ✓ **Irrational Behaviour:** It is generally believed that investors' rationality will ensure a close correspondence between market prices and intrinsic values. But in practice this is not true. L. C. Gupta who found that the market evaluation processes work haphazardly almost like a blind man firing a gun. The market seems to function largely on hit or miss tactics rather than on the basis of informed beliefs about the long term prospects of individual enterprises
- ✓ **Monopolistic Influence:** A market is regarded as highly competitive. No single buyer or seller is supposed to have undue influence over prices. In practice, powerful institutions and big operators wield grate influence over the market. The monopolistic power enjoyed by them diminishes the competitiveness of the market.

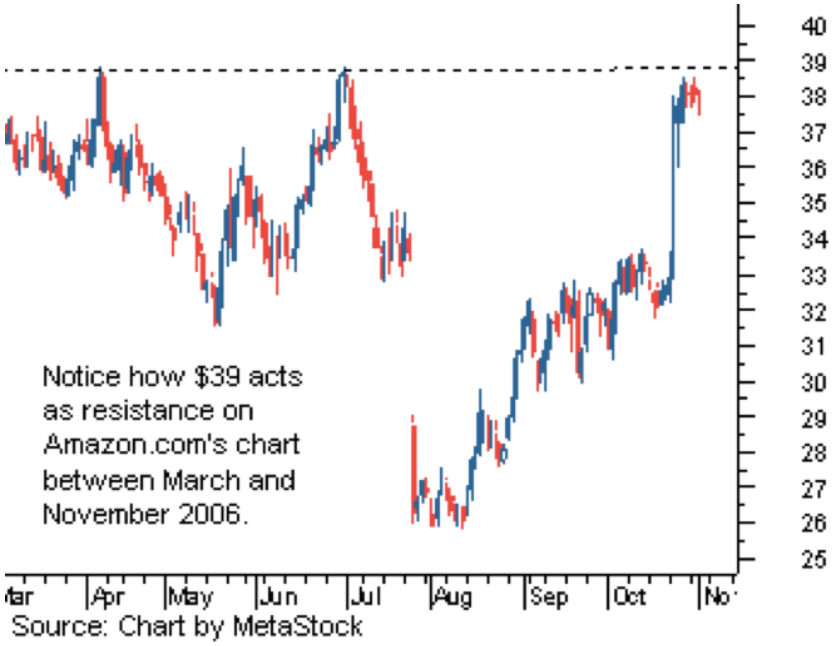
Q31. Explain in brief "Support and Resistance" level.

Answer:

A **support level** is a level where the price tends to find support as it falls. This means that the price is more likely to "bounce" off this level rather than break through it. However, once the price has breached this level, by an amount exceeding some noise, it is likely to continue falling until meeting another support level.



A **resistance level** is the opposite of a support level. It is where the price tends to find resistance as it rises. Again, this means that the price is more likely to "bounce" off this level rather than break through it. However, once the price has breached this level, by an amount exceeding some noise, it is likely to continue rising until meeting another resistance level.


Notice how $39 acts as resistance on Amazon.com's chart between March and November 2006.
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
Apr
May
Jun
Jul
Aug
Sep
Oct
Source: Chart by MetaStock


Support & Resistance Level
Paychex Inc (PAYX), 5 Year, 1 Day Interval Price Chart
34.45
43.27
41.76
40.24
38.73
37.21
35.70
34.18
32.67
31.15
29.64
28.12
26.61
25.09
23.58
22.06
20.55
Resistance Level
Support Level
Support Level
© Sensatus
Aug-2001 Jan-2002 Jun-2002 Dec-2002 May-2003 Oct-2003 Mar-2004 Sep-2004 Feb-2005 Jul-2005 Dec-2005

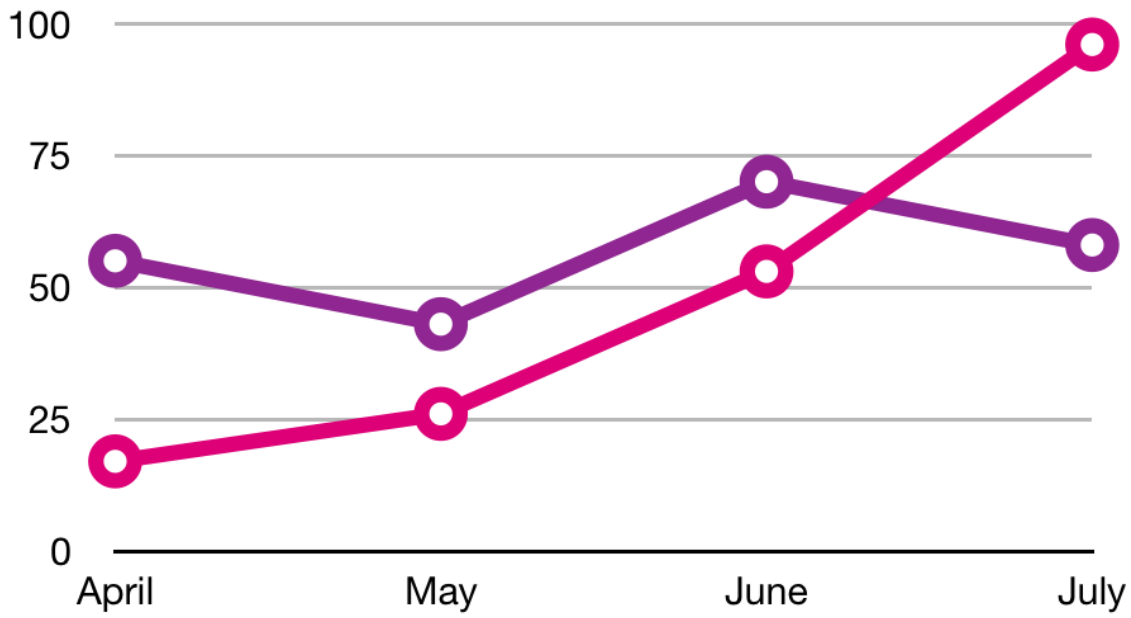
Q32. State the different types of charts used by technical analyst.

Answer:

1. Line Chart
2. Bar Chart
3. Candlestick Chart
4. Point and Figure Chart

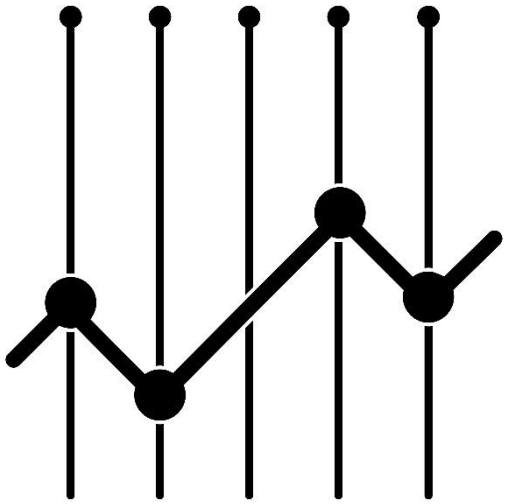
Q33. Explain "Line Chart".

Answer:



A style of chart that is created by connecting a series of data points together with a line.

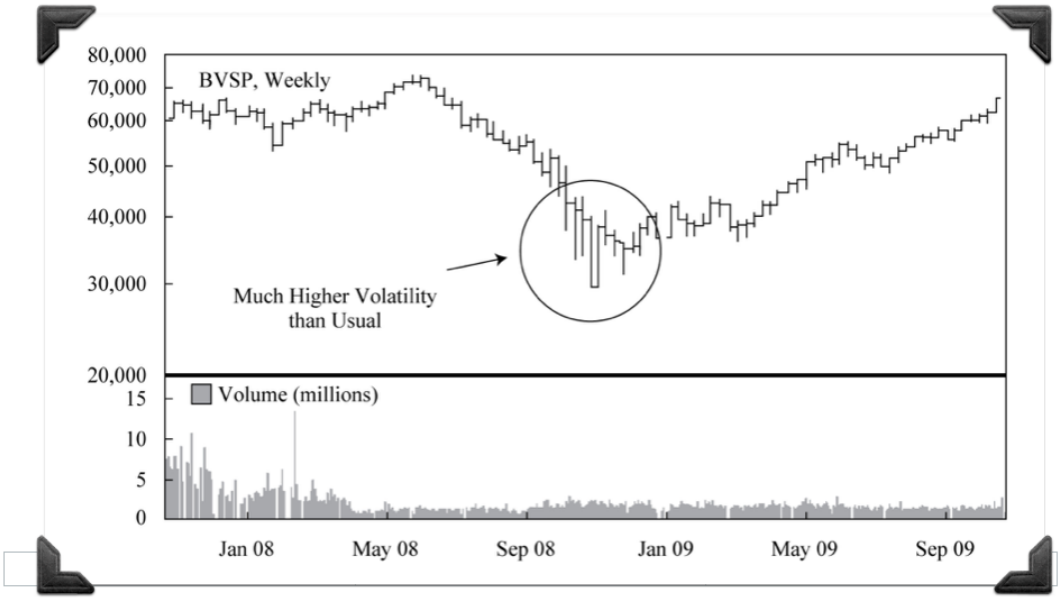
This is the most basic type of chart used in finance and it is generally created by connecting a series of past prices together with a line.

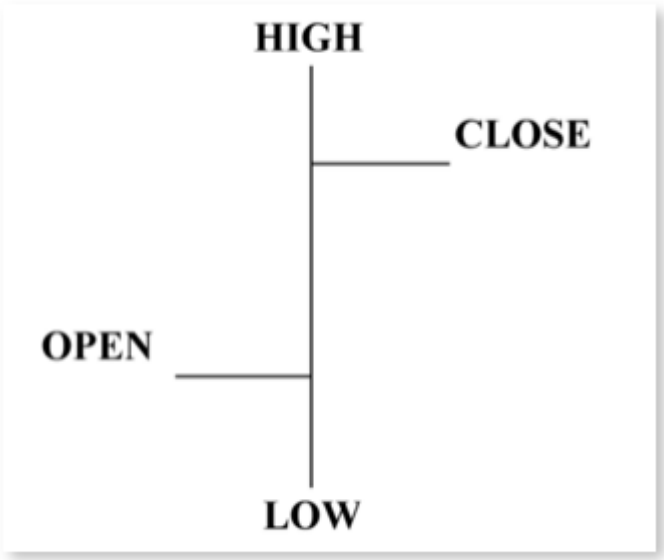


Q34. Explain "Bar Chart".

Answer:

- ✓ A bar chart is a style of chart used by some technical analysts on which the top of the vertical line indicates the highest price a security is traded at during the day, and the bottom represents the lowest price.
- ✓ The closing price is displayed on the right side of the bar, and the opening price is shown on the left side of the bar.

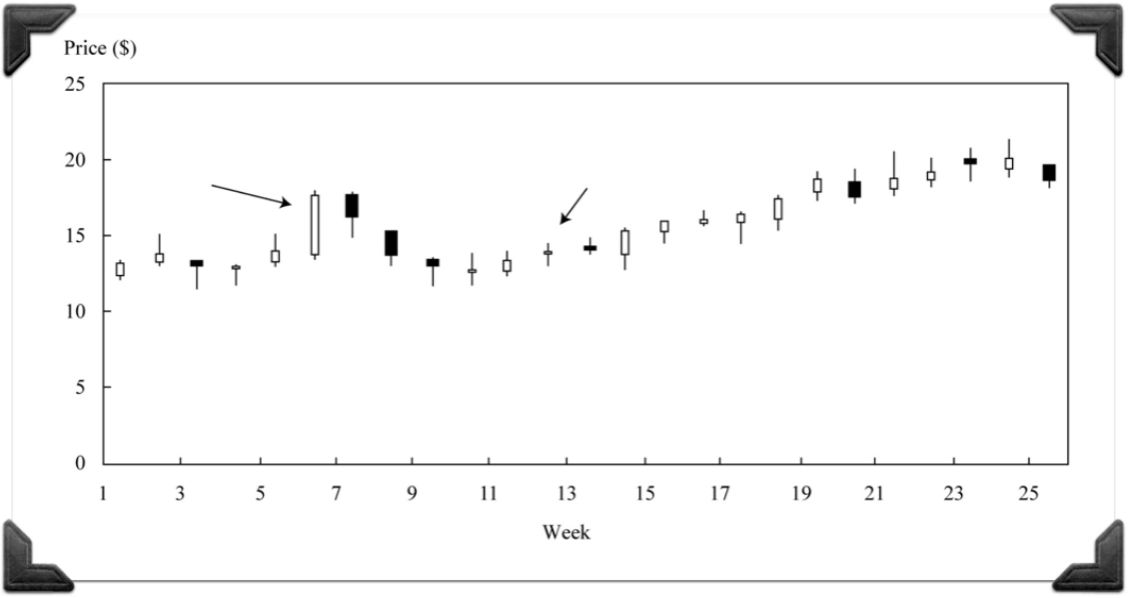

80,000
70,000
60,000
50,000
40,000
30,000
20,000
BVSP, Weekly
Much Higher Volatility than Usual
15
10
5
0
Volume (millions)
Jan 08
May 08
Sep 08
Jan 09
May 09
Sep 09

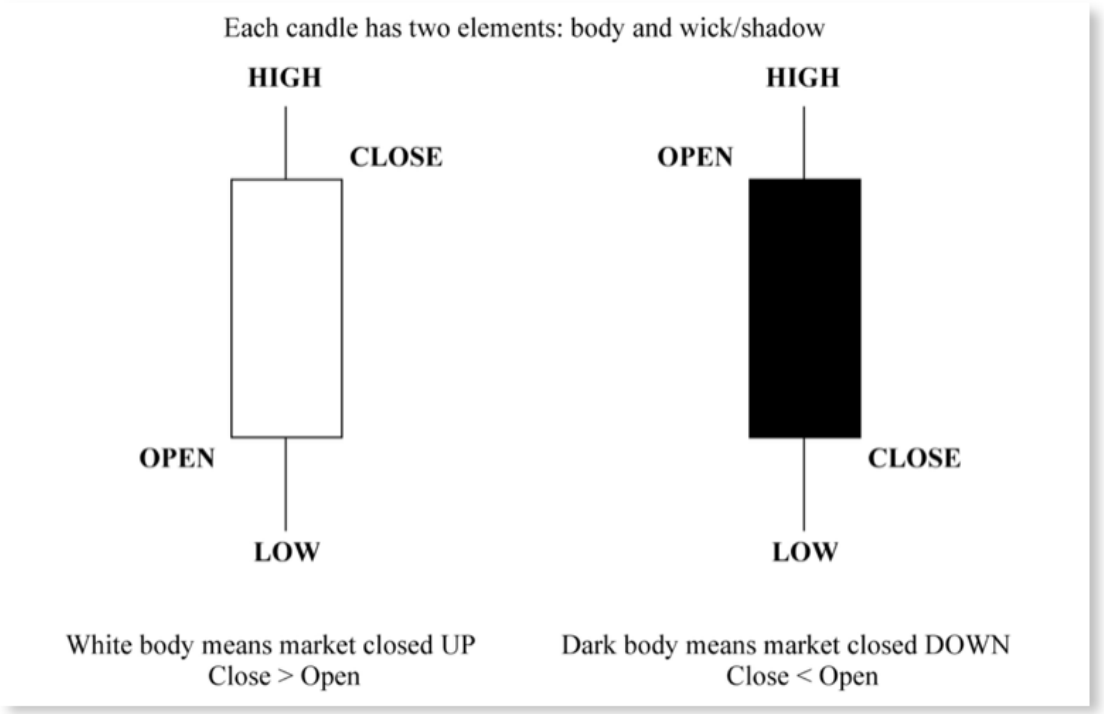

HIGH
CLOSE
OPEN
LOW

Q35. Explain "Candlestick Chart"

Answer:

- ✓ When first looking at a candlestick chart, the student of the more common bar charts may be confused;
- ✓ However, just like a bar chart, the daily candlestick line contains the market's open, high, low and close of a specific day.
- ✓ Now this is where the system takes on a whole new look: the candlestick has a wide part, which is called the "real body".
- ✓ This real body represents the range between the open and close of that day's trading.
- ✓ When the real body is filled in or black, it means the close was lower than the open. If the real body is empty, it means the opposite: the close was higher than the open.

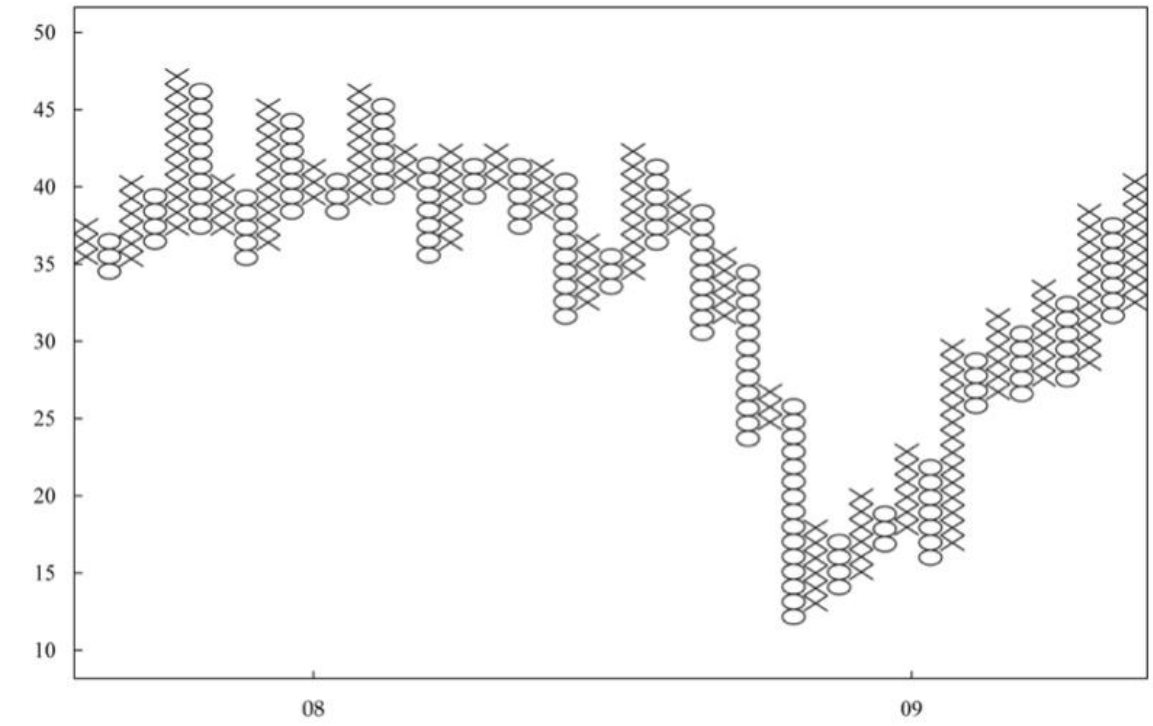

Price ($)
25
20
15
10
5
0
1
3
5
7
9
11
13
15
17
19
21
23
25
Week


Each candle has two elements: body and wick/shadow
HIGH
CLOSE
OPEN
LOW
HIGH
OPEN
CLOSE
LOW
White body means market closed UP
Close > Open
Dark body means market closed DOWN
Close < Open

Q36. Explain "Point and Figure" Chart.

Answer:

- ✓ A point & figure chart is a chart that plots day-to-day price movements without taking into consideration the passage of time.
- ✓ Point and figure charts are composed of a number of columns that either consist of a series of stacked X's or O's.
- ✓ A column of X's is used to illustrate a rising price, while O's represent a falling price.
- ✓ Traders will place orders when the price moves beyond identified support/resistance levels



Note: The box size is HK$1, and the reversal size is three.

Procedure

- ✓ To construct a point and figure chart, the analyst must determine both the box size and the reversal size.
- ✓ Box size refers to the change in price represented by the height of each box (boxes are generally square, but the width has no meaning).
- ✓ The reversal size is used to determine when to create a new column.
- ✓ Although a point and figure chart can be constructed in several ways, these charts are always drawn on graph paper to facilitate seeing the "columns and rows" nature of the data.
- ✓ The vertical axis measures discrete increments of price. For example, an analyst in Europe might draw a €1 chart, a €2 chart, or any other increment. In a €1 chart, boxes would be €1 apart (e.g. €40, €41, €42), whereas in a €2 chart they would be €2 apart (€40, €42, €44). The most commonly used box size is 1 unit of currency, which is used when prices range from 20 to 100 per share of the currency.
- ✓ The next decision the technician needs to make is the reversal size. The most common size is three, meaning a reversal in price of three or more boxes (€3 in the case of a box size of €1). This use of a multibox reversal helps eliminate "noise" in the price data. (Noise refers to short-term trading volatility that does not alter the long-term trend of the security.)
- ✓ In a point and figure chart, X represents an increase in price and O represents a decline in price.
- ✓ In constructing a chart, the technician draws an X in a column of boxes every time the security price closes up by the amount of the box size. (Ideally, all security prices are considered on an intraday basis, but this practice has given way to using closing prices only.) If the price increases by twice the box size, the technician draws two X's to fill in two boxes, one

on top of the other. The technician fills in more boxes for larger price moves.

- ✓ The resulting column starts at the opening price level and extends to the closing price level. As long as the security keeps closing at higher prices, the technician keeps filling in boxes with X's, which makes the column higher and higher.
- ✓ If the price does not increase by at least the box size, no indication is made on the chart. Thus, in some cases, the chart is not updated for long periods, but no indication of this passage of time is made on the chart.
- ✓ The reversal size determines when to create a new column. In the case of a €1 box size, and three-box reversal size, a decline of €3 or more would result in the technician shifting to the next column over and beginning a column of O's.
- ✓ The first box to be filled in is to the right and below the highest X in the prior column.(Refer diagram above). The technician then fills in an O to bring the column down to the price level at the close.
- ✓ Again, each filled-in box (if the box size is €1) represents a €1 decline in the security price. As long as the downtrend continues, without a €3 increase in price, the technician continues adding O's to the column below the prior O's.
- ✓ A reversal in the downtrend by at least the amount of the reversal size prompts the technician to move to the next column and begin drawing a series of X's again.
- ✓ Computer technology makes the process easy, but many technicians prefer to keep point and figure charts on their wall and update them manually because doing so provides a vivid reminder of the market trend.

Point and figure charts are particularly useful for making trading decisions because they clearly illustrate price levels that may signal the end of a decline or advance. They also clearly show price levels at which a security may frequently trade. In using the point size and reversal size to make trading decisions, for uptrends, or columns of X's, the practitioner would maintain long positions. The reversal size could be considered the amount of loss that would prompt the closing of a long position and the establishment of a new short position. The larger the reversal size, the fewer columns in the chart and the longer uptrends and downtrends will run.

The box size can be varied in relation to the security price. For a security with a very low price—say, below €5—a €1 box size might mean few or no updates on the chart because the price would only rarely change by this amount. Thus, the technician could reduce the box size to cents. For highly priced securities, much larger box sizes could be used. The reversal size is a multiple of the box size, so if the box size is changed, the reversal size changes. Practitioners who want fewer columns or trade signals can use a large reversal size.

Analysis of a point and figure chart is relatively straightforward as long as the technician understands its construction and limitations. The chart is relatively simple, and repeated high and low prices are evident. Congestion areas, where a security trades up and down in a narrow range, are evidenced by a series of short columns of X's and O's spanning roughly the same price range. Major, sustained price moves are represented by long columns of X's (when prices are moving up) or O's (when prices are moving down).

Q37. Write Short Note on Market Indicators.

Answer:

(i) Breadth Index:

- ✓ It is an index that covers all securities traded.
- ✓ It is computed by dividing the net advances or declines in the market by the number of issues traded.
- ✓ The breadth index either supports or contradicts the movement of the Dow Jones Averages.
- ✓ If it supports the movement of the Dow Jones Averages, this is considered sign of technical strength and if it does not support the averages, it is a sign of technical weakness i.e. a sign that the market will move in a direction opposite to the Dow Jones Averages.
- ✓ Let us consider for example a stock market where 450 shares are listed. In one session, the prices of 290 shares rose and the prices of 160 shares fell. The ABI would thus result as : |290-160|/450 = 0.29 or 29%. In another session, 130 shares rose and 320 shares fell. The ABI for that session is : |130-320|/450 = 0.42 or 42%.

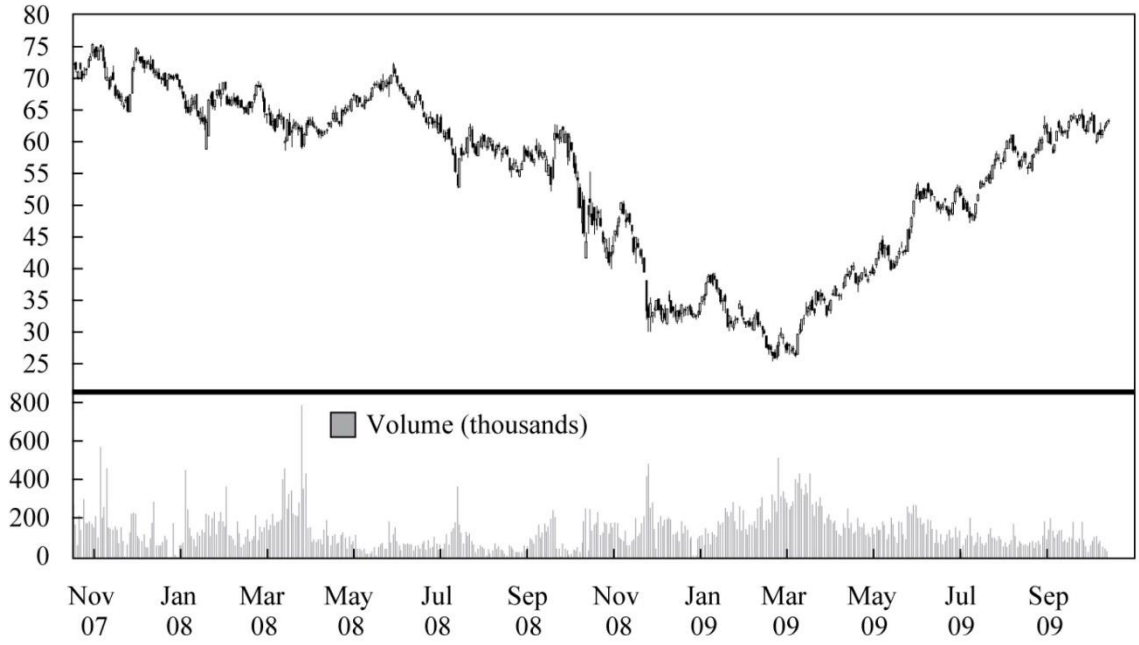
$$\textbf{ABI} = \frac{(\textbf{No. of Advancing Stocks} - \textbf{No. of Declining Stocks})}{\textbf{Total Issues Traded}}$$

Total Issues Traded= Advancing Stocks + Declining Stocks + Stocks

(ii) Volume of Transactions:

- ✓ The volume of shares traded in the market provides useful clues on how the market would behave in the near future.
- ✓ Volume is an important characteristic that is included at the bottom of many charts; Volume is used to assess the strength or conviction of buyers and sellers in determining a security's price. For example, on a daily price chart, below the price section would be a column chart showing the volume traded for that day.

Exhibit 9. Daily Candlestick Price Chart and Volume Bar Chart: TD Bank, November 2007–November 2009 (Price in Canadian Dollars)



- ✓ Some technicians consider volume information to be crucial. If volume increases during a time frame in which price is also increasing, that combination is considered positive and the two indicators are said to "confirm" each other. The signal would be interpreted to mean that over time, more and more investors are buying the financial instrument and they are doing so at higher and higher prices. This pattern is considered a positive technical development.

- ✓ Conversely, if volume and price diverge—for example, if a stock's price rises while its volume declines—the implication is that fewer and fewer market participants are willing to buy that stock at the new price. If this trend in volume continues, the price rally will soon end because demand for the security at higher prices will cease.
- ✓ Thus, the volume concept is best used with another market indicator, such as the Dow Theory.

(iii) Confidence Index*:*

- ✓ The Barron's Confidence Index is a ratio to calculate investors desire to assume additional risk during investment.
- ✓ The ratio is the average yield-to-maturity of Barron's Best Grade bond list to average yield-to-maturity of its Intermediate Grade bond list.

$$\textbf{Confidence Index} = \frac{\textbf{Avg YTM (Best Grade Bonds)}}{\textbf{Avg YTM (Intermediate Grade Bonds)}}$$

- ✓ To arrive at the value, Barron's will divide average yield-to-maturity (YTM) of Barron's Best Grade bond list by the average yield-to-maturity of its Intermediate Grade bond list.
- ✓ The basis of the Barron's Confidence Index is on the theory that if investors are optimistic they are more likely to invest in riskier bonds, driving yields downwards and the index upwards.
- ✓ A rising confidence index is expected to precede a rising stock market, and a fall in the index is expected to precede a drop in stock prices.
- ✓ For example, if the average yield of the ten high-grade bonds is 4.5 percent and the average yield of the intermediate-grade bonds is

5 percent, the Barron's Confidence Index is 90 percent (4.5 percent divided by 5 percent and multiplied by 100).

- ✓ When investors are confident about the economy's future, they are willing to take more risk and buy more speculative bonds. The price of higher-quality bonds then goes down, which increases their yield. This dynamic indicates investors need lower premiums in returns to take on increased risk.
- ✓ An index around 80 percent is considered a bearish outlook for the stock market. When confidence in the economy is low, investors seek higher quality debt, which increases bond prices and lowers yields.
- ✓ While the raw index number is meaningful, it's also useful to track its direction. A falling confidence number indicates decreasing confidence in the market; a rising value, of course, means increasing confidence.
- ✓ The confidence index is usually, but not always a leading indicator of the market. Therefore, it should be used in conjunction with other market indicators.

(iv) Relative Strength Analysis:

- ✓ Relative strength creates a point of comparison regarding the performance of a particular security (e.g. Reliance Industres Limited Stock) against the performance of a selected benchmark, such as a market index (e.g. Sensex, Nifty) as well as to other similar securities.
- ✓ The relative strength concept suggests that the prices of some securities rise relatively faster in a bull market or decline more

slowly in a bear market than other securities i.e. some securities exhibit relative strength.

- ✓ Investors will earn higher returns by investing in securities which have demonstrated relative strength in the past because the relative strength of a security tends to remain undiminished over time.
- ✓ Further, investors can apply relative strength trading to more than stocks and mutual funds, but also asset classes, ETFs, fixed income, commodities, sectors and other areas of the market.
- ✓ **Calculating Relative Strength**

  There is more than one way to calculate an investment's relative strength.

  1. One method is to rank all investments within the same investment universe, such as tech stocks or mutual funds, and purchase the top performers.
  2. Another is to take the rate of change in a stock's price, recorded over a specified period of time, and divide it by the rate of change in a relevant index over the same time period. The stock's rate of change is divided by the benchmark's rate of change to get a relative strength value. If the value is greater than one, the investment is relatively strong; if the value is less than one, the investment is relatively weak.

$$\textbf{RSI} = \frac{\%\ \textbf{Change in Stock price}}{\%\ \textbf{Change in Index}}$$

  3. For mutual funds, the rate of change within the NAV of a specified fund is calculated over a specified time period and

compared to that of other mutual funds. For example, if a fund has a current NAV of ₹110, up from a previous six-month NAV of ₹100, the rate of change is 10%. If a second mutual fund has a current NAV of ₹92, up from a previous six-month NAV of ₹80, the rate of change is 15%. By comparing the two rates, the second mutual fund would be seen as having a higher relative strength when compared to the first.

Note: Relative strength, as a performance indicator, does not take into account the risk associated with a particular investment.

***(v)* Odd - Lot Theory:**

- ✓ Odd lot trades are trade orders made by investors that include less than 100 shares in the transaction or are not a multiple of 100. These trade orders generally encompass individual investors which the theory believes are less educated and influential in the market overall.
- ✓ The odd lot theory uses the analysis of odd lot trades as its basis. It primarily focuses on trade orders of less than 100 shares (100 shares is called a round lot). Its premise is built on the notion that odd lot trades can be counterintuitive to market trends. Therefore, believers in the odd lot theory seek to trade against the direction of odd lot trades. Thus, when odd lotters are buying shares the theory would indicate a signal to sell shares and vice versa.
- ✓ Analysis of the odd lot theory, culminating in the 1990s, generally disproved its effectiveness. Discovering that individual investors are not generally prone to making bad investing decisions. Overall, the theory is no longer valid as many researchers and academics

including Burton Malkiel have stated that the individual investor, also known as the odd lotter, is generally not as uninformed or as incorrect as the theory has stated.

Q38. Write the names of the different price patterns.

Answer:

There are numerous price patterns documented by technical analysts but only a few and important of them have been discussed here

1. Channel
2. Wedge
3. Head and Shoulder
4. Triangle or coil
5. Flags and Pennants
6. Double Top
7. Double Bottom
8. Gap

Q39. Write short notes on "Channel" Price pattern

Answer:

Channel Line: The line drawn parallel to the main trend line is called the channel line. Ideally, the channel line will be based off of two reaction highs or reaction lows. However, after the main trend line has been established, some analysts draw the parallel channel line using only one reaction high or low. The channel line marks support in a bearish price channel and resistance in a bullish price channel.

Bullish Price Channel: As long as prices advance and trade within the channel, the trend is considered bullish. The first warning of a trend change occurs when prices fall short of channel line resistance. A subsequent break below main trend line support would provide further indication of a trend change. A break above channel line resistance would be bullish and indicate an acceleration of the advance.

Bearish Price Channel: As long as prices decline and trade within the channel, the trend is considered bearish. The first warning of a trend change occurs when prices fail to reach channel line support. A subsequent break above main trend line resistance would provide further indication of a trend change. A break below channel line support would be bearish and indicate an acceleration of the decline.

Q40. Write short notes on "Wedge" pattern

Answer:

Wedges are a multiple price wave reversal pattern. Wedges form when the waves of an asset move within a narrowing range, angled either up or down. Whereas triangles are formed by the price moving sideways, wedges can make significant progress either up or down.

When the pattern completes, and the price breaks out of wedge, it is usually in the opposite direction the wedge was pointed. This is why it is called a reversal pattern. For example, if a wedge is angled downward—called a "falling wedge"—the price will often break above the top of the pattern and rally. In the case of a wedge angled upwards—a "rising wedge"—the breakout is typically to the downside, indicating lower prices to come.

a. Rising Wedge

For a rising wedge, consider a short trade when the price breaks below the lower trendline. Also consider exiting any long positions.

b. Falling Wedge

During a falling wedge, watch for the price to move above the upper trendline. This is a breakout and completes the pattern. Consider taking a long trade, and shy away from short trades.

If trading a rising wedge, place a stop loss just above the most recent high within the wedge. When trading a falling wedge, place a stop loss just below the most recent swing low within the wedge.

Q41. Write short notes on "Head and Shoulder" pattern

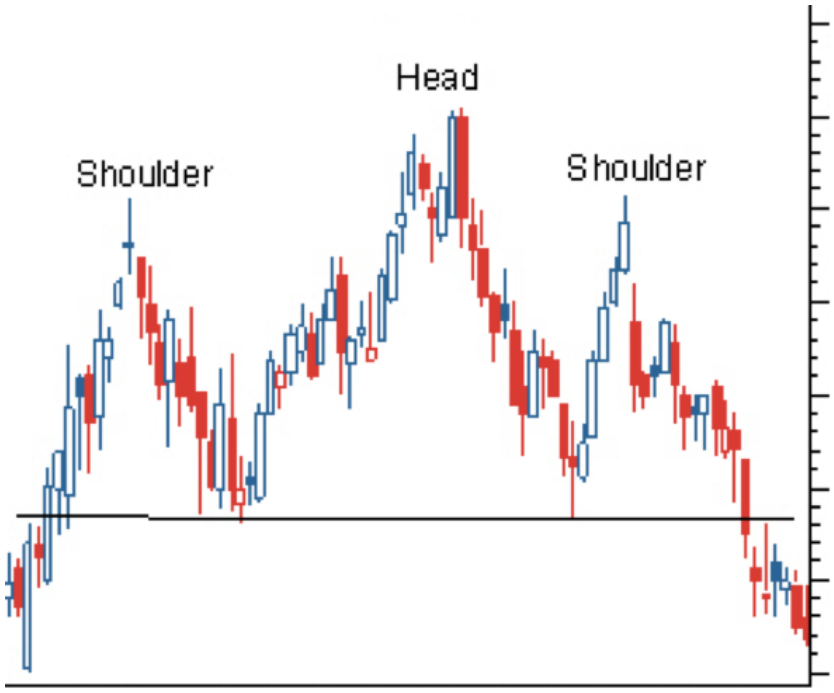
Answer:

A HS top is formed when the price makes a high, pulls back, makes a higher high, pulls back, and then makes a lower swing high. This creates three peaks, with the one in the middle being the highest. The topping pattern is typically only relevant if seen after a substantial advance.

Connect the two lows within the pattern with a trendline. This is the "neckline."

The price movement after the formation of the second shoulder is crucial. If the price goes below the neckline, then a drop in price is indicated, with the drop expected to be equal to the distance between the top of the head and the neckline.

Head and Shoulder Top Pattern



Source: Chart by MetaStock

Head and Shoulder Reverse Pattern

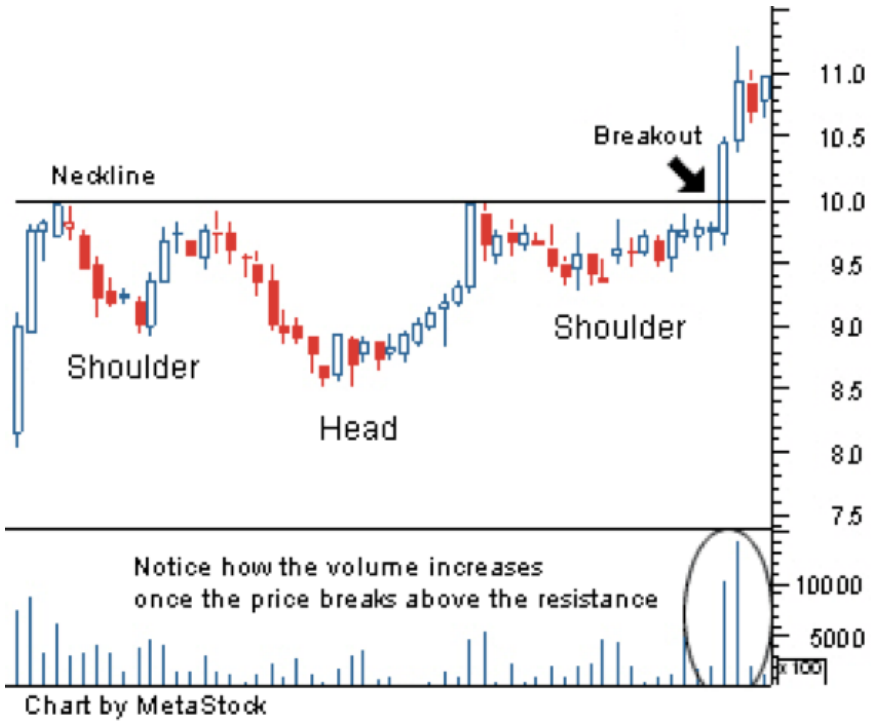
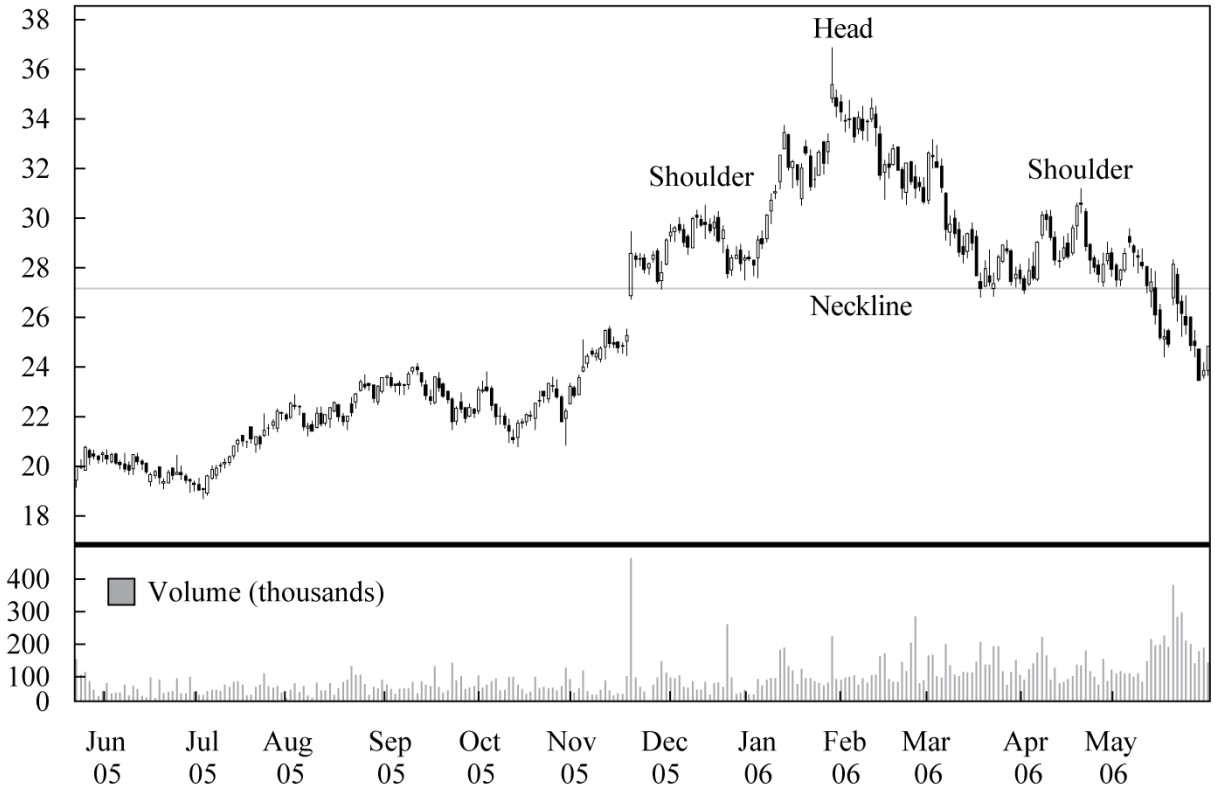


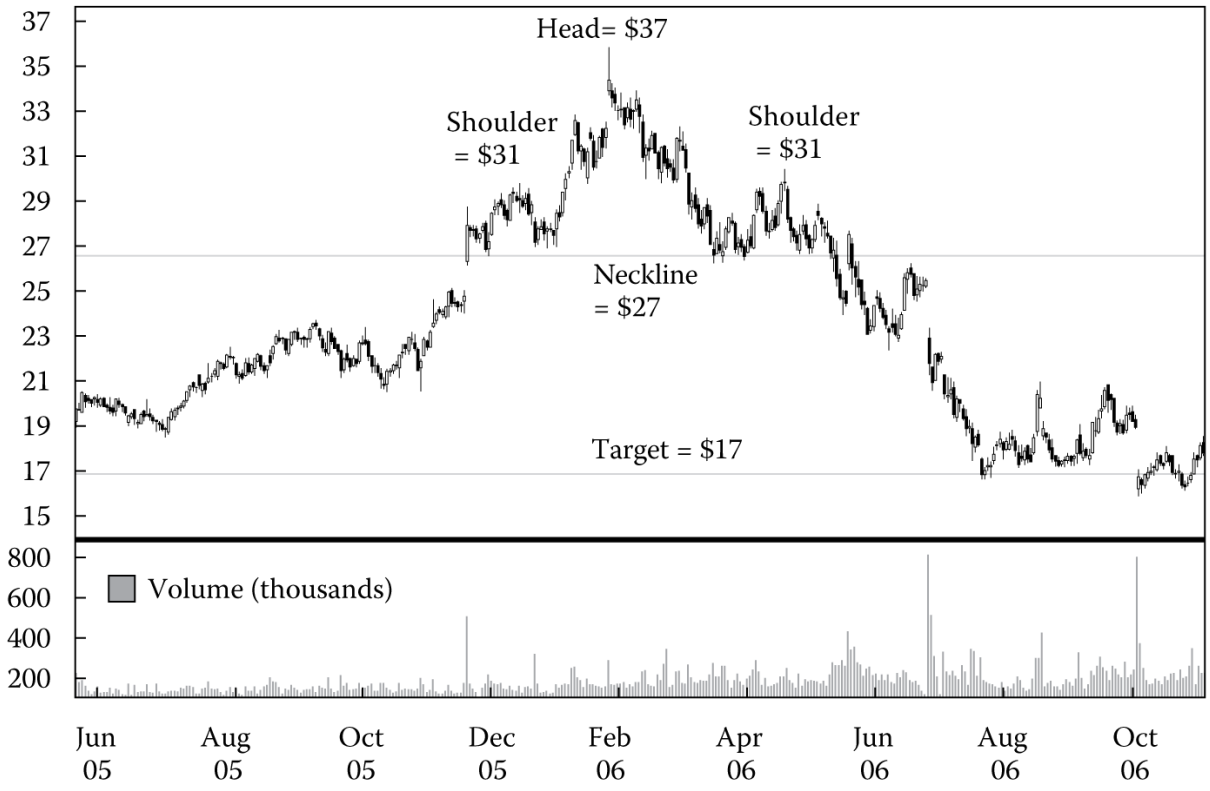
Chart by MetaStock



Price Target

Price Target (Top Pattern) = Neckline – (Head – Neckline)

Price Target (Reverse Pattern) = Neckline + (Neckline - Head)



Conclusion

- The Head and Shoulders pattern is one of the most reliable chart patterns in Forex.
- It forms during a bullish trend and has the potential to reverse the uptrend.
- The name of the Head and Shoulders pattern comes from its visual structure – two tops with a higher top in between.
- The H&S pattern consists of three tops:
    1. The first top should be found in the context of a bullish trend.
    2. The second top should be higher than the first top.
    3. The third top should be lower than the second top and should be approximately on the same level as the first top.

To trade the Head and Shoulders chart pattern you should apply the following rules:

- Identify a valid H&S pattern and draw each of the three tops that form the pattern.
- Apply a neck line through the two bottoms at the base of the head.
- Identify a Head and Shoulders breakout. Open a short trade when the price action breaks the neck line downwards.
- Put a stop loss above the second shoulder – the top prior the neck line breakout.
- Stay in the trade for a minimum price move equal to the size of the pattern – the distance between the tip of the head and the neck line.
- You can stay in your trade longer and use price action clues to exit, if you expect additional gains from your H&S trade.

The Head and Shoulders chart pattern has its opposite equivalent – the inverse Head and Shoulders pattern.

- The inverted H&S pattern could be found during a bearish trend and it is expected to reverse the downtrend.
- The Inverse H&S pattern requires analyzing bottoms to confirm the formation.
- Identify a Head and Shoulders breakout. Open a long trade when the price action breaks the neck line upwards.
- Put a stop loss below the second shoulder – the bottom prior the neck line breakout.
- Stay in the trade for a minimum price move equal to the size of the pattern – the distance between the tip of the head and the neck line.

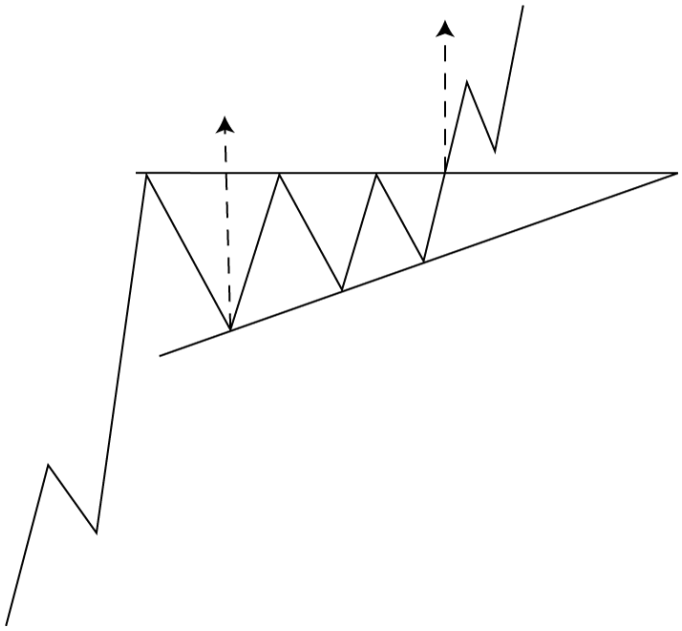
Q42. Write short notes on "Triangles or Coils or Springs" pattern

Answer:

- Triangle patterns are a type of continuation pattern.
- They come in three forms, symmetrical triangles, ascending triangles, and descending triangles.
- A triangle pattern forms as the range between high and low prices narrows, visually forming a triangle.
- In old terminology, triangles were referred to as "coils" (which was also synonymous with "springs") because a triangle was considered analogous to a spring being wound up tighter and tighter and storing energy that would at some point be released.
- In a triangle, a trendline connects the highs and a trendline connects the lows. As the distance between the highs and lows narrows, the trendlines meet, forming a triangle. In a daily price chart, a triangle pattern usually forms over a period of several weeks.

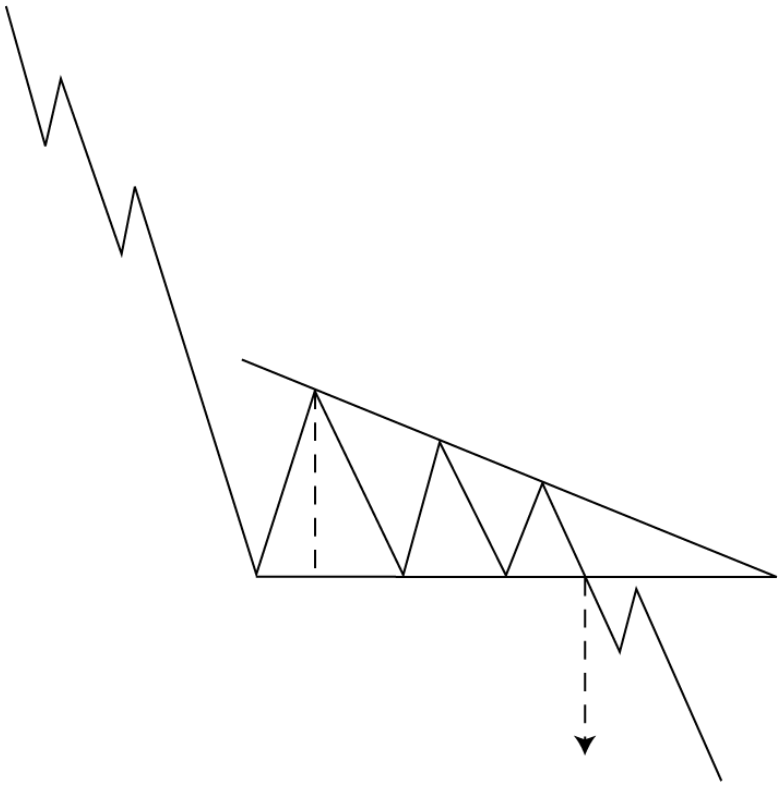
A. Ascending Triangle

- In an ascending triangle, as shown in the following diagram, the trendline connecting the high prices is horizontal and the trendline connecting the low prices forms an uptrend.
- What this pattern means is that
  - market participants are selling the stock at the same price level over a period of time, putting a halt to rallies at the same price point,
  - but that buyers are getting more and more bullish and stepping in at increasingly higher prices to halt sell-offs instead of waiting for further price declines.
- An ascending triangle typically forms in an uptrend



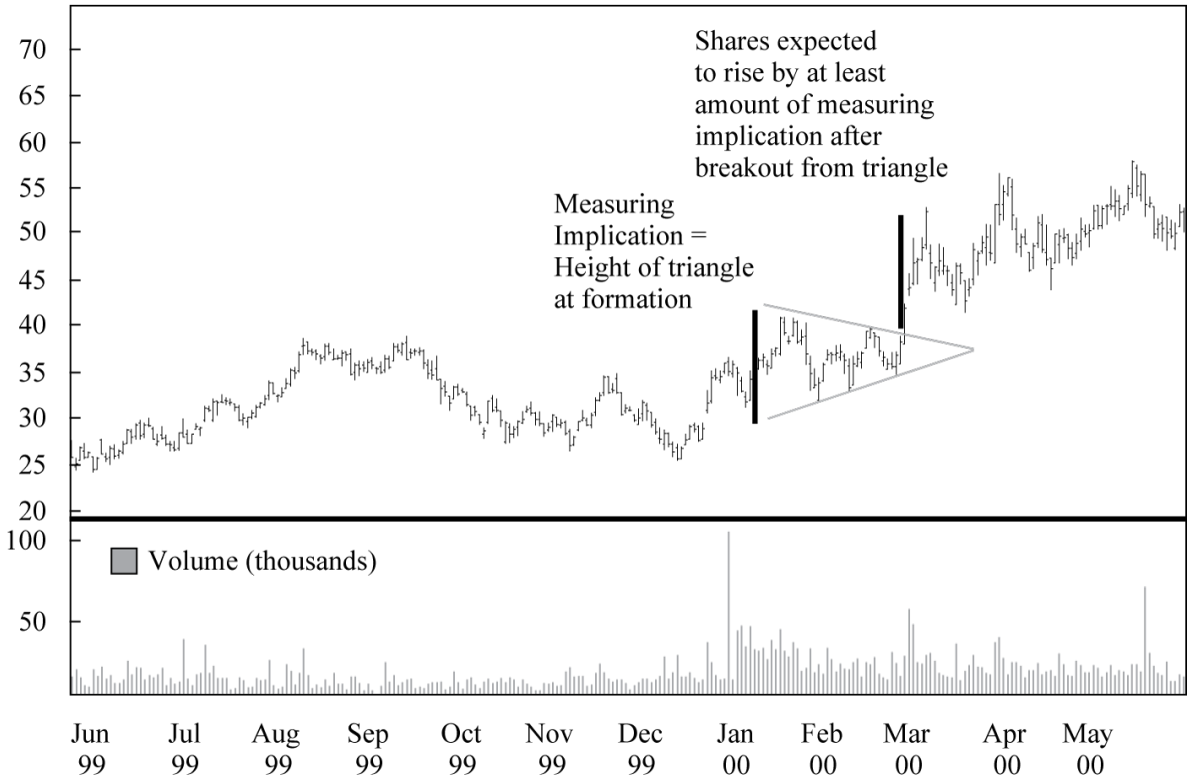
B. Descending Triangle

- In the descending triangle, shown the following diagram, the low prices form a horizontal trendline and the high prices form a series of lower and lower highs.
- Typically, a descending triangle will form in a downtrend.
- At some point in the sell-offs, buyers appear with enough demand to halt sell-offs each time they occur, at around the same price.
- Again, this phenomenon may be the result of fundamental analysts believing that the security has reached a price where it represents a significant discount to its intrinsic value and these analysts step in and buy.
- As the triangle forms, each rally ceases at a lower and lower high price point, suggesting the selling demand is exerting greater price influence than buying demand.



C. Symmertrical Triangle

- In a symmetrical triangle, the trendline formed by the highs angles down and the trendline formed by the lows angles up, both at roughly the same angle, forming a symmetrical pattern. Following diagram contains a symmetrical triangle formed by the price for Transocean in early 2000.
- What this triangle indicates is that buyers are becoming more bullish while, simultaneously, sellers are becoming more bearish, so they are moving toward a point of consensus.
- Because the sellers are often dominated by long investors exiting positions (as opposed to short sellers creating new short positions), the pressure to sell diminishes once the sellers have sold the security.
- Thus, the pattern ends in the same direction as the trend that preceded it, either uptrend or downtrend.



Q43. Write short notes on "Flags and Pennants" pattern

Answer:

- Flags and pennants are continuation patterns. They are traded in the same way, but each has a slightly different shape.
- The terms flag and pennant are often used interchangeably.
- A flag or pennant pattern forms when the price rallies sharply, then moves sideways or slightly to the downside.
- This sideways movement typically takes the form or a rectangle (flag) or a small triangle (pennant), hence their names.
- Draw trendlines along the highs and lows of the sideways price action.
- The sharp price rise preceding the flag or pennant is called the flag pole

The sideways period is often followed by another sharp rise. This is where the trading opportunity comes in. Once the flag pole and a flag or pennant have

formed, traders watch for the price to breakout above the upper flag/pennant trendline. When this occurs, enter a long trade.

The above pattern is bullish, because the pattern started with a sharp rally. There are also bearish patterns, where the price drops sharply then forms the flag or pennant. With this pattern, watch for the price to break below the flag/pennant.

If a short trade is taken on the downside breakout, place a stop loss above the high of the flag/pennant (not the flag pole).

If a long trade is initiated on an upside breakout, place a stop loss below the low of the flag or pennant (not the flag pole).

Price Target

The concept behind the flag and pennant patterns is that the momentum seen during the flag pole phase could continue once the pattern completes. Therefore, measure the size of the flag pole, then add that length to the bottom of the flag/pennant for bullish patterns.

For bearish patterns, subtract the length of the flag pole from the top of the flag/pennant.

Q44. Write short notes on "Double Top and Double Bottom" pattern

Answer:

A. Double Top

A double top forms when the price makes a high within an uptrend, and then pulls back. On the next rally the price peaks near the prior high, and then falls below the pullback low. It's called a double top because the price peaked in the same area twice, unable to move above that resistance area.

The pattern is complete—traders may take short positions or exit long positions—when the price drops below the pullback low. For example, if the price hits a high of $50, pulls back to $47, rallies to $50.05, and then drops back below $47, the pattern is complete and that could indicate that the price will continue to drop.

For trading purposes, short positions may be initiated when the pattern completes. It's also advisable to avoid longs, since the price could decline further. A stop loss on short positions is placed above the latest peak, or above a recent swing high within the pattern.

Price Target

The estimated decline is equal to the height of the pattern subtracted from the breakout point. If the pattern high is $50.05 and the pullback low is $47, when the price breaks below $47, subtract $3.05 from $47 to get a target of $43.95.

The rationale for the double top pattern is that uptrends make higher swing highs and higher swing lows. Once the pattern completes the price failed to make a substantially higher swing high, and then proceeded to make a new low by dropping below the prior pullback low. This draws the uptrend into question, and there is evidence of a downtrend beginning.

B. Double Bottom

A double bottom forms when the price makes a low within a downtrend, and then pulls back to the upside. On the next decline the price stalls near the prior low, then rallies above the pullback high. It's called a double bottom because the price stalled in the same area twice, unable to drop below that support area.

The pattern is complete, and traders may take long positions, when the price rallies back above the pullback high. For example, if the price drops to $47, pulls back to $50, drops to $46.75, then a rally back above $50 signals that the price will continue to head higher.

For trading purposes, long positions may be initiated when the pattern completes. It's also advisable to avoid short, since the price could advance further. A stop loss on long positions is placed below the latest bottom, or below a recent swing low within the pattern.

Price Target

Patterns may cover a large price or time area, or they may be small, occurring quickly. The price target adjusts to the size of the pattern. Smaller patterns have smaller price targets than big patterns. The price target for the double bottom is similar to the double top, except with the double bottom we add the height of the pattern of the breakout point. If the height of the pattern is $3, add $3 to the breakout point.

Note: The price target is only an approximation of how far the price could move after a breakout. The price may not reach the target level, which is why a stop loss is used, or the price could fall well below the target.

Q45. Write short notes on "Gaps" pattern

Answer:

A gap is the difference between the opening price on a trading day and the closing price of the previous trading day.

A gap is empty space between one price bar and the next. Gaps occur when the price significantly changes from the close of one price bar to the next, with no trading taking place in the empty space between the bars.

The wider the gap the stronger the signal for a continuation of the observed trend.

On a rising market, if the opening price is considerably higher than the previous closing price, it indicates that investors are willing to pay a much higher price to acquire the scrip. Similarly, a gap in a falling market is an indicator of extreme selling pressure

There are four types of gaps:

a. common,

b. breakaway,

c. runaway, and

d. exhaustion,

as well as a gap pattern called an **island reversal.**

A. Common Gaps

Common gaps provide no significant analytical insight, and are regular occurrences. Common gaps are small, meaning the price difference between the two gapping bars is not significant. Common gaps occur frequently in stocks from one day to the next, and in currency markets over the weekend.

Common gaps are typically, but not always, "filled." For example, if a stock closes at $50 on Monday, and then opens at $50.25 on Tuesday, the price will often move back to $50 within the next few days. If the price goes back to where the gap started, technicians consider the empty space filled.

B. Breakaway Gaps

Assets prices move in ranges or trends. Ranges are when then the price is moving up and down, but little progress is made in either direction. Trends occur when the price is making progress either up or down over multiple price swings. When a price moves from ranging to trending, it will sometimes start that trend with a breakaway gap.

A breakaway gap shows decisive movement out of a range or other chart pattern. These types of gaps are commonly associated with heavy volume, showing the strong conviction of the breakaway. These types of gaps are most commonly associated with major news events, or earnings announcements in individual stocks, which rapidly change investor sentiment.

Breakaway gaps don't tend to fill, or at least not for a long time. Instead, the price tends to run in the same direction as the breakway for some time after. The times when breakaway gaps do fill, the breakout direction usually prevails. The price may move back to where the gap started, fooling traders into thinking the gap was a false breakout, but then the price usually keeps moving in the breakaway direction.

C. Runaway Gaps

Once a trend starts and has been underway for a while, more traders start hearing about it. Any positive news or catalyst brings in traders who have been waiting to get in. This causes a runaway gap, or a gap within the middle of the trend, indicating that the trend is still strong and picking up steam.

These types of gaps are also typically associated with a volume increase, but lots of volume isn't as important here as it is with breakaway gaps.

Runaway gaps signal a continuation of the trend. Traders already in positions will view the event as a sign to hold the trade longer. Those on the sidelines may want to get in as there is likely more room for the price to run. While this can be a favorable entry, it is not as favorable as entering after a breakaway gap.

D. Exhaustion Gaps

An exhaustion gap occurs at the end of a trend, often after a significant price increase. The gap higher after a strong advance shows euphoria, where the last remnants of those on the sidelines enter into the trade. With no one left to keep pushing the price up, there is a gap higher followed by a gap lower or a strong selloff.

Volume will either be lower than on prior runaway gaps, or it may be significantly higher. The lower volume shows that fewer people are participating in this latest gap, signaling the trend's exhaustion. On the other hand, a significant volume spike of two or three times the volume on prior spikes also indicates a reversal because with that many people getting in it is questionable how many traders will be left to keeping pushing the price in that direction.

Exhaustion gaps only signal the trend is near an end, and may not mark the exact turn point in the other direction. The price may continue to move in the trending direction for a few more days (or price bars), often with extreme volatility.

It is sometimes only clear after the fact, once the reversal has started, as to whether it is a breakaway gap or an exhaustion gap. The pattern still provides insight though, because following an exhaustion gap the price will rarely revisit those extreme price levels for a long time. In other words, when the price reverses it typically trends in that direction for a long time.

Island Reversal

An island reversal is a pattern composed of a gap in the trending direction, a mostly sideways period for the price, then a gap in the other direction. The price does not return to where the sideways period occurred, making it look like an island on the chart. The "sideways" period can be as little as one price bar, or multiple price bars.

The island is a strong reversal pattern, because it leaves many traders trapped in trades at poor prices (the island). When the price gaps the other way, they are forced to get their trades, fuelling the trend in the other direction.

The island is often not tested again for some time because a new trend unfolds in the reversal direction.

Q46. Write short notes on Data Analysis Method. or

Q47. Explain the term Moving Averages. or Explain the term Exponential Moving Averages

Answer:

Decision using Data Analysis

Technical analysts have developed rules based on simple statistical analysis of price data. Moving Averages is one of the more popular methods of data analysis for decision making.

Explain Moving Averages

Moving averages are frequently plotted with prices to make buy and sell decisions. The two types of moving averages used by chartists are:

1. Arithmetic Moving Average(AMA)
2. Exponential Moving Average(EMA)

1. **Arithmetic (Simple) Moving Average (AMA):** An n period AMA at period t is nothing but the simple average of the last n period prices.

$$\mathbf{AMA_{n,t}} = \frac{\mathbf{1}}{\mathbf{n}}[\mathbf{P_t} + \mathbf{P_{t-1}} + \cdots + \mathbf{P_{t-(n-1)}}$$

$\boldsymbol{i.e.}$

$$\mathrm{AMA_{n,t}} = \frac{\text{Total of the closing prices in a data}}{\text{number of observation}}$$

Example

Daily Closing Prices: 11,12,13,14,15,16,17

1. First day of 5-day SMA: (11 + 12 + 13 + 14 + 15) / 5 = 13
2. Second day of 5-day SMA: (12 + 13 + 14 + 15 + 16) / 5 = 14
3. Third day of 5-day SMA: (13 + 14 + 15 + 16 + 17) / 5 = 15

4. **Exponential (Weighted) Moving Average (EMA):** Unlike AMA, which assigns equal weight of 1/n to each of the n prices used for computing the average, the Exponential Moving Average (EMA) assigns decreasing weights, with the highest weight being assigned to the latest price. The weights decrease exponentially, according to a scheme specified by exponential smoothing constant, also known as the exponent,

$$\text{EMA} = [\text{CP x e}] + [\text{Previous EMA x } (1 - \text{e})]$$

CP= Current Closing Price, $\text{e} = \text{exponent in decimals} = \frac{2}{\text{n+1}}$

Understanding the Formula : Ever Heard about the weighted average concept? If you have invested Rs. 10000 in two securities , Rs.4000 in Tata Motors and Rs.6000 in Reliance then weight of first security becomes 40% and another security becomes 60%. Suppose returns given by both security are 15% and 20% respectively. Then what is the weighted average return of both the securities (Portfolio)

Portfolio Weighted Average Return =

= ($\text{Return}_{\text{Tata Motors}}$ x $\text{Weight}_{\text{Tata Motors}}$) + ($\text{Return}_{\text{Reliance}}$ x $\text{Weight}_{\text{Reliance}}$)

= (15 x 0.40) + (20 x 0.60) = 6+12 = 18%

In the similar way we are doing the calculations in EMA or WMA.

Here you are giving one part of the weight to current price and balance to previous EMA which also includes previous prices. The only difference or we can say better part of this method is more weight is given to current price and less weight to past prices.

Lets take an example

We want to calculate 50 days EMA, with Current Price is Rs.15000 and previous EMA being Rs.12000.

Here the weight can be calculated by calculating Exponent = 2/(n+1) = 2/(50+1) = 2/51 = 3.92%

According to EMA Formula

$$\text{EMA} = [\text{CP x e}] + [\text{Previous EMA x } (1 - \text{e})]$$

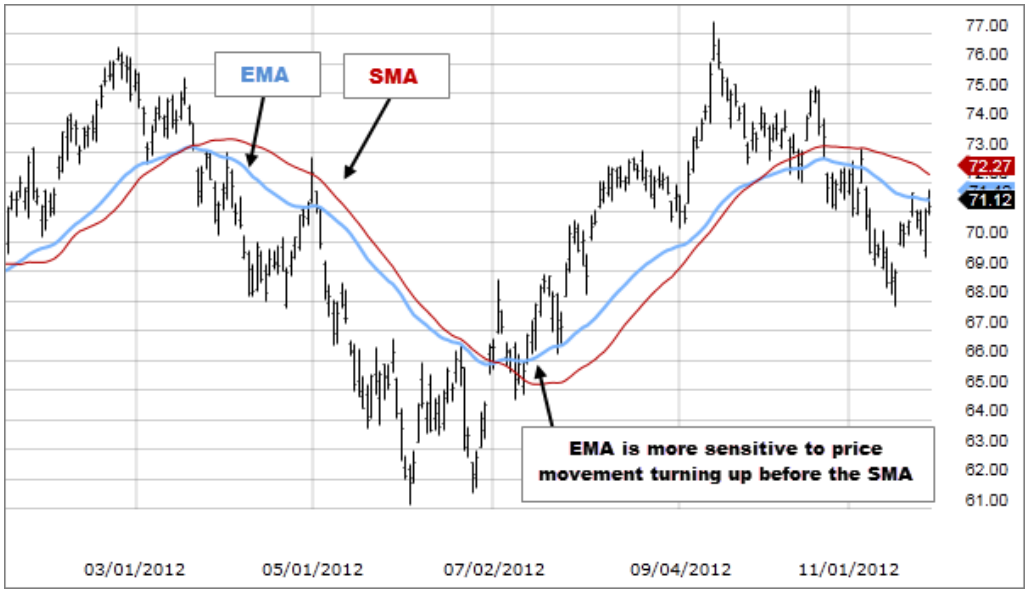
$$\text{EMA} = [15000 \text{ x } 0.0392] + [12000 \text{ x } (1 - 0.0392)]$$

Understand the fact that 15000 being the current price has been given more weight of 3.92% whereas 12000 which is average of past 50 prices has been given total weight of (100-3.92) = 96.08%.

You may think that 96.08% is higher than 3.92% but don't get confused as 3.92% weight is given to one price and 96.08% is given to last 50 prices (means 1.92% (96.08/50) on an average to each of the previous price)

Conclusion:

EMA is more effective than SMA, as it gives more weight to current prices where equal weights are assigned to each prices in SMA. Otherwise both the methods are same.



- ✓ Traders often use several different EMA days, for instance, 20-day, 30-day, 90-day, and 200-day moving averages.
- ✓ Use the same rules that apply to SMA when interpreting EMA. Keep in mind that EMA is generally more sensitive to price movement.

- ✓ Notice how the red line (EMA) seems to be closer price than the blue line(SMA). This means that it more accurately represents recent price action.
- ✓ It's because the exponential moving average places more emphasis on what has been happening lately.
- ✓

Q48. Find out the Arithmetic Moving Average and Exponential Moving Average from the following Data

Closing Values of BSE Sensex from 1th to 30th day of the November month of of the year 2014 were as follows:

Date	Day	Sensex
04-11-2019	Monday	27860
05-11-2019	Tuesday	27890
06-11-2019	Wednesday	27916
07-11-2019	Thursday	27869
08-11-2019	Friday	27875
11-11-2019	Monday	27910
12-11-2019	Tuesday	28009
13-11-2019	Wednesday	27941
14-11-2019	Thursday	28047
15-11-2019	Friday	28178
18-11-2019	Monday	28163
19-11-2019	Tuesday	28033
20-11-2019	Wednesday	28068
21-11-2019	Thursday	28335
24-11-2019	Sunday	28500
25-11-2019	Monday	28338
26-11-2019	Tuesday	28386
27-11-2019	Wednesday	28439
28-11-2019	Thursday	28694

Solution:

Arithmatic Moving Average

$$AMA_{n,t} = 1/n[P_t + P_{t-1} + \cdots + P_{t-(n-1)}$$

$$AMA_{n,t} = \frac{\text{Total of the closing price in data}}{\text{number of observation}}$$

$$\mathbf{AMA} = \frac{\mathbf{534451}}{\mathbf{19}} = \mathbf{28129}$$

Exponential Moving Average:

$$\mathbf{EMA} = [\mathbf{CP\ x\ e}] + [\mathbf{Previous\ EMA\ x\ (1 - e)}]$$

Here we have current prices given but we don't have 'e' values and Previous EMA. Thus we first calculate these two and then proceed further to calculate EMA

$$e = \frac{2}{n+1} = \frac{2}{19+1} = 0.10 \text{ or } 10\%$$

Previous EMA: The start of the calculation is handled in one of two ways. Traders handle it both ways.

1) You can either begin by creating a simple average of the data and use that value to seed the EMA calculation. If you go this way, your Previous EMA will be 28129 as calculated in Arithmetic Moving Average.

2) or you can use the first data point (typically the closing price) as the seed and then calculate the EMA from that point forward. If you go this way, your first closing price will be the Previous EMA itself. i.e 27860

Consider the first option and take the simple average of the November closing prices [28192] as Previous EMA.

Date	CP	CP x e	Previous EMA	P(EMA) x (1-e)	EMA
A	b	c	d	e	c + e
04-11-2019	27860	2786	28129	25316	28102
05-11-2019	27890	2789	28102	25292	28081
06-11-2019	27916	2792	28081	25273	28064
07-11-2019	27869	2787	28064	25258	28045
08-11-2019	27875	2788	28045	25240	28028
11-11-2019	27910	2791	28028	25225	28016
12-11-2019	28009	2801	28016	25214	28015
13-11-2019	27941	2794	28015	25214	28008
14-11-2019	28047	2805	28008	25207	28012
15-11-2019	28178	2818	28012	25211	28028
18-11-2019	28163	2816	28028	25226	28042
19-11-2019	28033	2803	28042	25238	28041
20-11-2019	28068	2807	28041	25237	28044
21-11-2019	28335	2834	28044	25239	28073
24-11-2019	28500	2850	28073	25266	28116
25-11-2019	28338	2834	28116	25304	28138
26-11-2019	28386	2839	28138	25324	28163
27-11-2019	28439	2844	28163	25346	28190
28-11-2019	28694	2869	28190	25371	28241

Alternative Solution:

$$\mathbf{EMA = Previous\ EMA + (CP - Previous\ EMA)\ e}$$

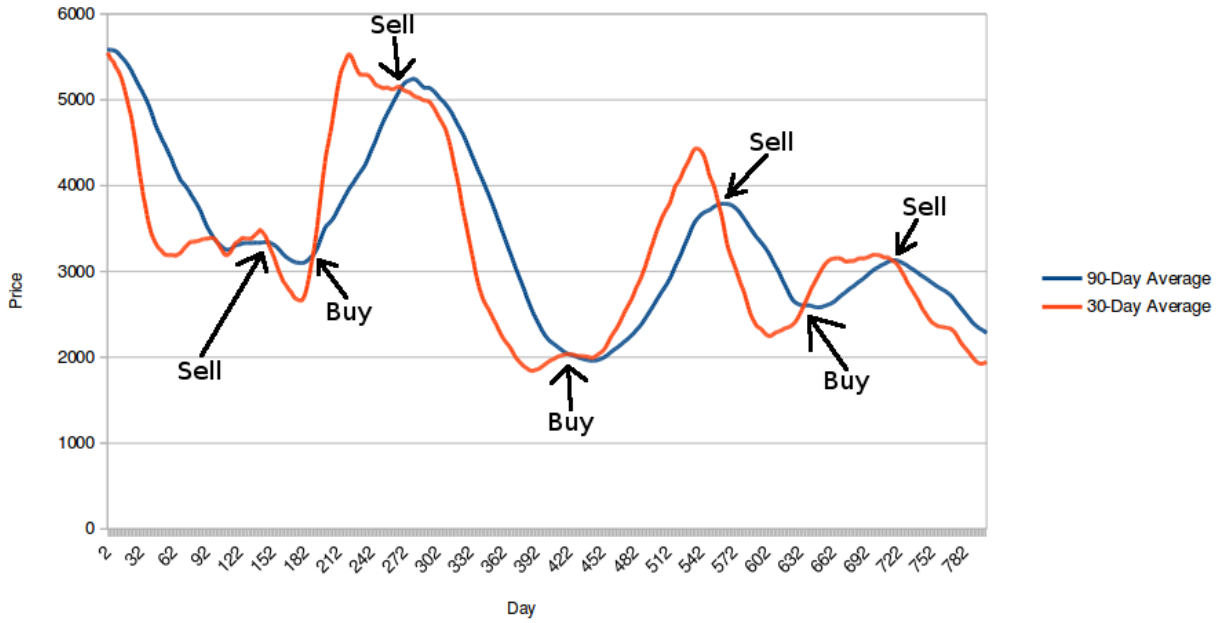
Date	Current Price	Previous EMA	CP – P(EMA)	[CP-P(EMA)]e	EMA
A	b	c	d = b-c	e= d x 0.10	f= c+e
04-11-2019	27860	28129	-269	-27	28102
05-11-2019	27890	28102	-212	-21	28081
06-11-2019	27916	28081	-165	-16	28064
07-11-2019	27869	28064	-195	-20	28045
08-11-2019	27875	28045	-170	-17	28028
11-11-2019	27910	28028	-118	-12	28016
12-11-2019	28009	28016	-7	-1	28015
13-11-2019	27941	28015	-74	-7	28008
14-11-2019	28047	28008	39	4	28012
15-11-2019	28178	28012	166	17	28028
18-11-2019	28163	28028	135	13	28042
19-11-2019	28033	28042	-9	-1	28041
20-11-2019	28068	28041	27	3	28044
21-11-2019	28335	28044	291	29	28073
24-11-2019	28500	28073	427	43	28116
25-11-2019	28338	28116	222	22	28138
26-11-2019	28386	28138	248	25	28163
27-11-2019	28439	28163	276	28	28190
28-11-2019	28694	28190	504	50	28241

Q49. Explain Buy and Sell Signals Provided by Moving Average Analysis

Answer:

Buy Signal	Sell Signal
Stock price line rise through the moving average line when graph of the moving average line is flattering out.	Stock price line falls through moving average line when graph of the moving average line is flattering out.
Stock price line falls below moving average line which is rising.	Stock price line rises above moving average line which is falling.
Stock price line which is above moving average line falls but begins to rise again before reaching the moving average line	Stock price line which is slow moving average line rises but begins to fall again before reaching the moving average line.


UK FTSE All Share - Daily Candlestick Chart
Mov Avg - Simple [20, Close]
SELL
SELL
SELL
SELL
BUY
BUY
BUY
BUY
BUY
BUY
www.stock-trading-infocentre.com
December
2013
February
March
April
May


Sell
Sell
Sell
Sell
Buy
Buy
Buy
Price
Day
90-Day Average
30-Day Average

Q50. Explain "Run Test"

Answer:

Hypothesis testing:

While studying the efficient market hypothesis, hypothesis testing has been taken into account.

The hypothesis which is tested under the assumption that it is true is called null hypothesis and is denoted by H0.

The hypothesis which differs from a given null hypothesis, H0 and is accepted when H0 is rejected is called an alternative hypothesis and is denoted by H1. Thus, in context of our discussion we have,

H0: Past prices are not reflected on the present prices.

H1: Past prices are reflected on the present prices.

Data Analysis method:

- ✓ The study seeks to test the efficient market hypothesis, by employing **Runs Test**. Runs Test is a non-parametric test, which is used to test the randomness of the series which auto correlation fails to do.

- ✓ Runs Test is a traditional method used in the random walk model and ignores the properties of distribution. It has been used to judge the randomness in the behaviour of Indian Stock market.
- ✓ In runs test we consider a series of price changes over a certain period of time and each price change is either designated as a plus (+) if it is an increase in price or a minus(-) if it is a decrease in price. A run exist when two consecutive changes are the same (i.e., ++or--). When price changes in a different direction, such as +-or-+ the run ends and a new run may begin.
- ✓ To test for independence, the number of runs for a given series of price changes are compared with the number in a table of expected values for the number of runs that should occur in a random series.

To test the independence of the prices, we require:

1. Total Number of Runs: (r)
2. Number of Positive Price Changes: (n1)
3. Number of Negative Price Changes: (n2)

Once we have the data, the mean and the standard deviation of the mean are calculated by using the formula given below:

4. $\text{Mean } \mu(r) = \frac{2n1n2}{n1+n2} + 1$

5. $\text{Standard Deviation } \sigma(r) = \sqrt{\frac{2n1n2(2n1n2 - n1 - n2)}{(n1+n2)^2(n1+n2-1)}}$

Level of Significance

To test the weak form of efficiency of the stock market ,the Runs Test is applied at 5% significance level where t=1.96

Calculating lower limit and upper limit:

Here,

6. Lower limit : [μ-t(σ)] ,

7. Upper limit : [μ+t(σ)]

Where μ=mean , σ=standard deviation

t= value from t table at the confidence level (5%) for given degrees of freedom (between 5.76596)

Data Analysis

Company's Name	n1	n2	μ	σ	Upper Limit	Lower Limit	Observed Runs	Inference
Ashok Leyland	28	30	30.49	3.81	37.96	23.02	29	H0 Accepted

Analysis of Ashok Leyland (refer data on next page)

Total Number of Runs: (r) =29

Number of Positive Price Changes: (n1) =28

Number of Negative Price Changes: (n2) =30

$$\text{Mean } \mu(r) = \frac{2n1n2}{n1+n2} + 1 = \frac{2\,(28)(30)}{28+30} + 1 = 29.97$$

$$\text{Standard Deviation } \sigma(r)$$

$$= \sqrt{\frac{2n1n2(2n1n2 - n1 - n2)}{(n1+n2)^2(n1+n2-1)}}$$

$$= \sqrt{\frac{2 \text{ x } 28 \text{ x } 30(2 \text{ x } 28 \text{ x } 30 - 28 - 30)}{(28+30)^2(28+30-1)}}$$

$$= \sqrt{\frac{2724960}{191748}}$$

$$= 3.77$$

Lower limit : [μ-1.96(σ)] = [29.97-1.96(3.77)] = 22.58

Upper limit : [μ+1.96(σ)] = [29.97+1.96(3.77)] = 37.36

Ashok Leyland

Run Test Analysis

Date	Closing Price	Price Change	Date	Closing Price	Price Change
01-Jan-14	17.20		14-Feb-14	15.60	+
02-Jan-14	17.75	+	17-Feb-14	15.35	-
03-Jan-14	18.90	+	18-Feb-14	15.45	+
06-Jan-14	18.70	-	19-Feb-14	15.65	+
07-Jan-14	18.35	-	20-Feb-14	15.65	
08-Jan-14	18.25	-	21-Feb-14	15.70	+
09-Jan-14	17.90	-	24-Feb-14	15.50	-
10-Jan-14	17.20	-	25-Feb-14	15.50	
13-Jan-14	17.10	-	26-Feb-14	15.70	+
14-Jan-14	17.40	+	28-Feb-14	15.65	-
15-Jan-14	17.25	-	03-Mar-14	15.55	-
16-Jan-14	17.00	-	04-Mar-14	16.60	+
17-Jan-14	16.85	-	05-Mar-14	16.15	-
20-Jan-14	16.80	-	06-Mar-14	16.00	-
21-Jan-14	16.85	+	07-Mar-14	17.15	+
22-Jan-14	17.25	+	10-Mar-14	18.10	+
23-Jan-14	17.70	+	11-Mar-14	17.55	-
24-Jan-14	17.05	-	12-Mar-14	17.75	+
27-Jan-14	16.50	-	13-Mar-14	17.45	-
28-Jan-14	16.35	-	14-Mar-14	17.45	
29-Jan-14	16.30	-	18-Mar-14	17.50	+
30-Jan-14	16.15	-	19-Mar-14	17.65	+
31-Jan-14	16.45	+	20-Mar-14	17.70	+
03-Feb-14	15.90	-	21-Mar-14	18.50	+
04-Feb-14	16.45	+	22-Mar-14	18.50	
05-Feb-14	16.00	-	24-Mar-14	19.35	+
06-Feb-14	15.95	-	25-Mar-14	20.30	+
07-Feb-14	16.10	+	26-Mar-14	22.60	+
10-Feb-14	15.65	-	27-Mar-14	22.10	-
11-Feb-14	15.70	+	28-Mar-14	22.85	+
12-Feb-14	15.60	-	31-Mar-14	23.65	+
13-Feb-14	15.50	-			

Evaluation of Ashok Leyland

Total Runs (r)	No. of +ve changes (n1)	No. of -ve changes (n2)	Mean (μ)	Standard Deviation (σ)	Upper Limit	Lower Limit
29	28	30	29.97	3.77	37.36	22.58

Inference:

Since the Observed number of runs falls within the upper and the lower limit, we can conclude that that the prices are independent at 5% level of significance (H0 is accepted).

Thus, the market is weakly efficient.

Practical Questions

1. **Closing values of BSE Sensex from 6th to 17th day of the month of January of the year 200X were as follows:**

Days	Date	Day	Sensex
1	6	THU	14522
2	7	FRI	14925
3	8	SAT	No Trading
4	9	SUN	No Trading
5	10	MON	15222
6	11	TUE	16000
7	12	WED	16400
8	13	THU	17000
9	14	FRI	No Trading
10	15	SAT	No Trading
11	16	SUN	No Trading
12	17	MON	18000

Calculate Exponential Moving Average (EMA) of Sensex during the above period. The 30 days simple moving average of Sensex can be assumed as 15,000. The value of exponent for 30 days EMA is 0.062.

Give detailed analysis on the basis of your calculations.

2. **Closing values of BSE Sensex from 6th to 17th day of the month of January of the year 200 X were as follows:**

Days	Date	Day	Sensex
1	6	THU	29522
2	7	FRI	29925
3	8	SAT	No Trading
4	9	SUN	No Trading
5	10	MON	30222
6	11	TUE	31000
7	12	WED	31400
8	13	THU	32000
9	14	FRI	No Trading
10	15	SAT	No Trading
11	16	SUN	No Trading
12	17	MON	33000

Compute Exponential Moving Average (EMA) of Sensex during the above period. The 30 days simple moving average of Sensex can be assumed as 30,000. The value of exponent for 30 days EMA is 0.062.

Provide detailed analysis on the basis of your calculations.

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3. The closing value of Sensex for the month of October, 2007 is given below:

Date Closing	Sensex value	Date Closing	Sensex value
1.10.07	2800	17.10.07	3450
3.10.07	2780	19.10.07	3360
4.10.07	2795	22.10.07	3290
5.10.07	2830	23.10.07	3360
8.10.07	2760	24.10.07	3340
9.10.07	2790	25.10.07	3290
10.10.07	2880	29.10.07	3240
11.10.07	2960	30.10.07	3140
12.10.07	2990	31.10.07	3260
15.10.07	3200		
16.10.07	3300		

You are required to test the weak form of efficient market hypothesis by applying the run test at 5% and 10% level of significance.

Following value can be used :
Value of t at 5% is 2.101 at 18 degrees of freedom
Value of t at 10% is 1.734 at 18 degrees of freedom
Value of t at 5% is 2.086 at 20 degrees of freedom.
Value of t at 10% is 1.725 at 20 degrees of freedom.

4. From the following data of Mahindra and Mahindra Stock, test the weak form of market efficiency using Run Test Analysis.

Mahindra and Mahindra

Run Test Analysis

Date	Closing Price	Price Change	Date	Closing Price	Price Change
01-Jan-14	948.00		14-Feb-14	904.40	
02-Jan-14	936.10		17-Feb-14	928.10	
03-Jan-14	900.25		18-Feb-14	935.15	
06-Jan-14	895.40		19-Feb-14	943.20	
07-Jan-14	903.10		20-Feb-14	929.95	
08-Jan-14	908.60		21-Feb-14	930.00	
09-Jan-14	894.35		24-Feb-14	944.10	
10-Jan-14	874.55		25-Feb-14	943.90	
13-Jan-14	888.25		26-Feb-14	964.70	
14-Jan-14	891.05		28-Feb-14	974.50	
15-Jan-14	904.90		03-Mar-14	952.25	
16-Jan-14	892.65		04-Mar-14	955.80	
17-Jan-14	899.55		05-Mar-14	948.55	
20-Jan-14	906.75		06-Mar-14	955.35	
21-Jan-14	903.60		07-Mar-14	983.55	
22-Jan-14	916.45		10-Mar-14	1015.85	
23-Jan-14	890.10		11-Mar-14	994.50	
24-Jan-14	884.80		12-Mar-14	991.25	
27-Jan-14	866.85		13-Mar-14	1016.05	
28-Jan-14	875.10		14-Mar-14	1027.00	
29-Jan-14	861.94		18-Mar-14	1009.60	
30-Jan-14	867.90		19-Mar-14	980.45	
31-Jan-14	890.20		20-Mar-14	978.30	
03-Feb-14	884.85		21-Mar-14	970.45	
04-Feb-14	853.75		22-Mar-14	973.90	
05-Feb-14	878.35		24-Mar-14	987.80	
06-Feb-14	896.95		25-Mar-14	973.40	
07-Feb-14	895.56		26-Mar-14	958.95	
10-Feb-14	894.20		27-Mar-14	964.85	
11-Feb-14	897.05		28-Mar-14	968.25	
12-Feb-14	895.50		31-Mar-14	980.70	
13-Feb-14	906.65				

Evaluation of Mahindra and Mahindra

Total Runs (r)	No. of +ve changes (n1)	No. of -ve changes (n2)	Mean (μ)	Standard Deviation (σ)	Upper Limit	Lower Limit

Value of t at 5% is 2.086 at 20 degrees of freedom.

5. From the following data of Tata Motors Stock, test the weak form of market efficiency using Run Test Analysis.

Tata Motors

Run Test Analysis

Date	Closing Price	Price Change	Date	Closing Price	Price Change
01-Jan-14	192.20		14-Feb-14	195.15	
02-Jan-14	189.70		17-Feb-14	194.50	
03-Jan-14	188.00		18-Feb-14	195.80	
06-Jan-14	187.80		19-Feb-14	195.00	
07-Jan-14	188.15		20-Feb-14	194.05	
08-Jan-14	190.90		21-Feb-14	196.05	
09-Jan-14	188.60		24-Feb-14	196.40	
10-Jan-14	189.85		25-Feb-14	194.70	
13-Jan-14	195.15		26-Feb-14	195.90	
14-Jan-14	195.10		28-Feb-14	204.15	
15-Jan-14	196.20		03-Mar-14	199.45	
16-Jan-14	194.10		04-Mar-14	198.80	
17-Jan-14	192.45		05-Mar-14	195.85	
20-Jan-14	193.95		06-Mar-14	197.30	
21-Jan-14	197.25		07-Mar-14	202.25	
22-Jan-14	198.20		10-Mar-14	196.50	
23-Jan-14	195.10		11-Mar-14	197.60	
24-Jan-14	186.85		12-Mar-14	192.50	
27-Jan-14	177.70		13-Mar-14	191.70	
28-Jan-14	181.10		14-Mar-14	194.70	
29-Jan-14	177.00		18-Mar-14	190.10	
30-Jan-14	177.80		19-Mar-14	191.00	
31-Jan-14	174.90		20-Mar-14	188.20	
03-Feb-14	170.05		21-Mar-14	190.60	
04-Feb-14	173.30		22-Mar-14	190.70	
05-Feb-14	177.90		24-Mar-14	190.25	
06-Feb-14	175.45		25-Mar-14	190.35	
07-Feb-14	179.00		26-Mar-14	194.50	
10-Feb-14	182.05		27-Mar-14	194.20	
11-Feb-14	187.75		28-Mar-14	196.30	
12-Feb-14	191.05		31-Mar-14	202.40	
13-Feb-14	191.85				

Evaluation of Tata Motors

Total Runs (r)	No. of +ve changes (n1)	No. of -ve changes (n2)	Mean (μ)	Standard Deviation (σ)	Upper Limit	Lower Limit

Value of t at 10% is 1.734 at 18 degrees of freedom

6. From the following data of Tata Consultancy Services (TCS) Stock, test the weak form of market efficiency using Run Test Analysis.

Tata Consultancy Services

Run Test Analysis

Date	Closing Price	Price Change	Date	Closing Price	Price Change
01-Jan-14	2153.30		14-Feb-14	2167.90	
02-Jan-14	2153.30		17-Feb-14	2165.40	
03-Jan-14	2222.20		18-Feb-14	2166.00	
06-Jan-14	2239.60		19-Feb-14	2197.95	
07-Jan-14	2206.15		20-Feb-14	2189.35	
08-Jan-14	2232.65		21-Feb-14	2205.70	
09-Jan-14	2241.95		24-Feb-14	2177.90	
10-Jan-14	2280.90		25-Feb-14	2188.90	
13-Jan-14	2368.75		26-Feb-14	2182.15	
14-Jan-14	2326.75		28-Feb-14	2275.75	
15-Jan-14	2353.60		03-Mar-14	2240.05	
16-Jan-14	2350.30		04-Mar-14	2240.65	
17-Jan-14	2213.05		05-Mar-14	2251.90	
20-Jan-14	2338.20		06-Mar-14	2240.75	
21-Jan-14	2280.30		07-Mar-14	2228.50	
22-Jan-14	2274.05		10-Mar-14	2142.65	
23-Jan-14	2252.45		11-Mar-14	2151.65	
24-Jan-14	2248.70		12-Mar-14	2179.45	
27-Jan-14	2229.60		13-Mar-14	2149.55	
28-Jan-14	2212.35		14-Mar-14	2139.55	
29-Jan-14	2209.80		18-Mar-14	2122.00	
30-Jan-14	2217.60		19-Mar-14	2039.40	
31-Jan-14	2241.05		20-Mar-14	2108.20	
03-Feb-14	2194.45		21-Mar-14	2127.00	
04-Feb-14	2151.35		22-Mar-14	2128.25	
05-Feb-14	2194.40		24-Mar-14	2152.60	
06-Feb-14	2175.25		25-Mar-14	2146.65	
07-Feb-14	2144.40		26-Mar-14	2093.50	
10-Feb-14	2093.55		27-Mar-14	2094.25	
11-Feb-14	2101.70		28-Mar-14	2102.10	
12-Feb-14	2105.45		31-Mar-14	2133.15	
13-Feb-14	2133.75				

Evaluation of Tata Consultancy Services

Total Runs (r)	No. of +ve changes (n1)	No. of -ve changes (n2)	Mean (μ)	Standard Deviation (σ)	Upper Limit	Lower Limit

Value of t at 10% is 1.734 at 18 degrees of freedom

7. From the following data of Tech Mahindra Stock, test the weak form of market efficiency using Run Test Analysis.

Tech Mahindra

Run Test Analysis

Date	Closing Price	Price Change	Date	Closing Price	Price Change
01-Jan-14	1828.10		14-Feb-14	1831.85	
02-Jan-14	1816.10		17-Feb-14	1823.75	
03-Jan-14	1835.50		18-Feb-14	1822.05	
06-Jan-14	1815.85		19-Feb-14	1842.85	
07-Jan-14	1804.05		20-Feb-14	1832.25	
08-Jan-14	1840.60		21-Feb-14	1848.20	
09-Jan-14	1829.05		24-Feb-14	1831.45	
10-Jan-14	1878.90		25-Feb-14	1839.60	
13-Jan-14	1884.50		26-Feb-14	1820.95	
14-Jan-14	1893.25		28-Feb-14	1867.25	
15-Jan-14	1884.05		03-Mar-14	1906.45	
16-Jan-14	1866.25		04-Mar-14	1900.00	
17-Jan-14	1775.25		05-Mar-14	1903.85	
20-Jan-14	1828.70		06-Mar-14	1923.20	
21-Jan-14	1828.65		07-Mar-14	1836.00	
22-Jan-14	1842.15		10-Mar-14	1799.60	
23-Jan-14	1830.65		11-Mar-14	1781.75	
24-Jan-14	1793.55		12-Mar-14	1802.75	
27-Jan-14	1760.25		13-Mar-14	1780.55	
28-Jan-14	1738.75		14-Mar-14	1785.25	
29-Jan-14	1749.55		18-Mar-14	1794.35	
30-Jan-14	1718.30		19-Mar-14	1777.50	
31-Jan-14	1786.95		20-Mar-14	1822.15	
03-Feb-14	1763.10		21-Mar-14	1808.95	
04-Feb-14	1770.85		22-Mar-14	1819.65	
05-Feb-14	1839.85		24-Mar-14	1844.30	
06-Feb-14	1845.50		25-Mar-14	1828.80	
07-Feb-14	1823.15		26-Mar-14	1815.35	
10-Feb-14	1832.15		27-Mar-14	1833.45	
11-Feb-14	1861.70		28-Mar-14	1836.75	
12-Feb-14	1875.65		31-Mar-14	1795.35	
13-Feb-14	1813.80				

Evaluation of Tech Mahindra

Total Runs (r)	No. of +ve changes (n1)	No. of -ve changes (n2)	Mean (μ)	Standard Deviation (σ)	Upper Limit	Lower Limit

Value of t at 10% is 1.734 at 18 degrees of freedom

8. From the following data of Infosys Stock, test the weak form of market efficiency using Run Test Analysis.

Infosys

Run Test Analysis

Date	Closing Price	Price Change	Date	Closing Price	Price Change
01-Jan-14	3468.00		14-Feb-14	3644.30	
02-Jan-14	3480.55		17-Feb-14	3658.15	
03-Jan-14	3565.15		18-Feb-14	3682.00	
06-Jan-14	3517.90		19-Feb-14	3753.40	
07-Jan-14	3457.15		20-Feb-14	3711.25	
08-Jan-14	3428.10		21-Feb-14	3750.70	
09-Jan-14	3450.80		24-Feb-14	3749.90	
10-Jan-14	3551.25		25-Feb-14	3782.90	
13-Jan-14	3665.00		26-Feb-14	3807.50	
14-Jan-14	3686.75		28-Feb-14	3824.85	
15-Jan-14	3712.05		03-Mar-14	3798.25	
16-Jan-14	3725.05		04-Mar-14	3799.55	
17-Jan-14	3729.75		05-Mar-14	3821.70	
20-Jan-14	3749.30		06-Mar-14	3831.90	
21-Jan-14	3758.35		07-Mar-14	3740.30	
22-Jan-14	3765.90		10-Mar-14	3671.60	
23-Jan-14	3792.50		11-Mar-14	3675.35	
24-Jan-14	3758.15		12-Mar-14	3671.30	
27-Jan-14	3732.20		13-Mar-14	3357.60	
28-Jan-14	3675.10		14-Mar-14	3394.15	
29-Jan-14	3717.80		18-Mar-14	3350.55	
30-Jan-14	3704.25		19-Mar-14	3271.75	
31-Jan-14	3701.10		20-Mar-14	3303.05	
03-Feb-14	3629.15		21-Mar-14	3305.65	
04-Feb-14	3561.10		22-Mar-14	3296.05	
05-Feb-14	3581.25		24-Mar-14	3275.80	
06-Feb-14	3563.70		25-Mar-14	3254.40	
07-Feb-14	3566.55		26-Mar-14	3248.90	
10-Feb-14	3573.80		27-Mar-14	3231.05	
11-Feb-14	3596.25		28-Mar-14	3262.60	
12-Feb-14	3600.10		31-Mar-14	3282.80	
13-Feb-14	3585.80				

Evaluation of Infosys

Total Runs (r)	No. of +ve changes (n1)	No. of -ve changes (n2)	Mean (μ)	Standard Deviation (σ)	Upper Limit	Lower Limit

Value of t at 10% is 1.725 at 20 degrees of freedom.

T-Distribution Table (One Tail and Two-Tails)

T-Distribution Table (One Tail)

DF	A = 0.1	0.05	0.025	0.01	0.005	0.001	0.0005
∞	t_a = 1.282	1.645	1.960	2.326	2.576	3.091	3.291
1	3.078	6.314	12.706	31.821	63.656	318.289	636.578
2	1.886	2.920	4.303	6.965	9.925	22.328	31.600
3	1.638	2.353	3.182	4.541	5.841	10.214	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.894	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.689
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.660
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
1000	1.282	1.646	1.962	2.330	2.581	3.098	3.300

Two Tails T Distribution Table

DF	A = 0.2	0.10	0.05	0.02	0.01	0.002	0.001
∞	t_a = 1.282	1.645	1.960	2.326	2.576	3.091	3.291
1	3.078	6.314	12.706	31.821	63.656	318.289	636.578
2	1.886	2.920	4.303	6.965	9.925	22.328	31.600
3	1.638	2.353	3.182	4.541	5.841	10.214	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.894	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.689
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.660
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
1000	1.282	1.645	1.960	2.326	2.576	3.091	3.291