Chapter 3: Modern portfolio theory

Answers to self test questions

1. Correct answers are:
   (a) It ignores higher moments (e.g. skewness) — True
   (b) It gives equal weight to upward and downward deviations from the expectation — True
   (c) It can be used in a forward and backward looking way — False
   Answer (c) is true by itself, but it is not a disavantage.

2. (b) The weighted average of the expected asset returns

3. (c) The weighted sum of the asset variances and covariances

4. (a) The risk that disappears through diversification

5. (b) Market risk

6. (c) The total risk of that portfolio

7. Correct answers are:
   (a) The total risk of a portfolio — True
   (b) The systematic risk of a portfolio — False
   (c) The unsystematic risk of a portfolio — True

8. (c) The number of covariances increases faster than the number of variances

9. Correct answers are:
   (a) The risk that disappears through diversification — False
   (b) Market risk — True
   (c) The total risk of a portfolio — False

10. Correct answers are:
    (a) The asset's contribution to portfolio variance — True
    (b) The asset's sensitivity for changes in portfolio returns — True
    (c) The asset's systematic risk — True
    (d) The ratio of the asset's covariance with the portfolio to the portfolio variance — True

11. Correct answers are:
    (a) Assets in a portfolio — False
    (b) Projects and activities in a company — False
    (c) Debt and equity in a company — False

12. Correct answers are:
    (a) Assets in a portfolio — True
    (b) Projects and activities in a company — True
    (c) Debt and equity in a company — True

13. (a) Their correlation coefficient is -1

14. (b) The company's systematic risk is larger than that of the marked as a whole

15. (b) If the marked goes down by 1% the company's shares will go down by 1.7%

16. Correct answers are:

(a)	Offer a higher expected return for the same risk	True
(b)	Offer a higher expected return for a higher risk	False
(c)	Offer a lower expected return for a lower risk	False
(d)	Offer a lower risk for the same expected return	True
(e)	Offer a lower expected return for the same risk	False

17. (b) $\beta = 0$

18. Correct answers are:

(a)	All assets are held	True
(b)	Demand equals supply	True
(c)	There is no excess demand or supply	True
(d)	There may be investors who want to invest more at market prices	False
(e)	There may be assets that remain unsold at market prices	False
(f)	Everybody who invests in risky assets holds a fraction of the market portfolio	True
(g)	Two fund separation obtains	True

19. Correct answers are:

(a)	It gives the highest possible expected return per additional unit of risk	True
(b)	It expresses the average risk aversion in the market	False
(c)	It contains all assets in the risky investment universe	False
(d)	The Capital Market Line has the steepest possible slope	True

The locus is chosen as the tangency point with the steepest slope; in other loci (e.g. with different r_f) M also contains all risky assets.

20. (b) Invests a fraction of his money in the risk free asset and the rest in risky assets

21. (a) Borrows money risk free to invest more than his own money in risky assets

22. (b) Efficient portfolios as a function of portfolio standard deviation

23. (c) Any investment as a function of its β

24. (c) Both the Capital Market Line and the Security Market Line

25. Correct answers are:

(a)	Uses total risk (σ)	True
(b)	Uses systematic risk (β)	False
(c)	Is better suited to evaluate an investor's total portfolio	True
(d)	Is better suited to evaluate sub-portfolios	False

26. Correct answers are:

(a)	Uses total risk (σ)	False
(b)	Uses systematic risk (β)	True
(c)	Is better suited to evaluate an investor's total portfolio	False
(d)	Is better suited to evaluate sub-portfolios	True

27. Correct answers are:

(a)	Uses total risk (σ)	False
(b)	Uses systematic risk (β)	True
(c)	Is better suited to evaluate an investor's total portfolio	False
(d)	Is better suited to evaluate sub-portfolios	True

28. (c) 10.82% Use the CAPM: $E[r_e] = r_f + \beta_e(E[r_m] - r_f) = 3 + 1.7 \times (7.6 - 3) = 10.82$

29. Correct answers are:

(a)	Asset returns are jointly normally distributed	True
(b)	Investors are risk neutral	False
(c)	Investors have quadratic utility functions	True
(d)	Investors have logarithmic utility functions	False

30. Correct answers are:

(a)	Smaller firms have higher returns than large firms	True
(b)	Risky firms have higher returns than safe firms	False
(c)	Value stocks have higher returns than growth stocks	True
(d)	The relation between β and return is linear	False
(e)	The estimated return when $\beta = 0$ is higher than the risk free interest rate	True
(f)	The estimated risk premium ($r_m - r_f$) is close to zero	True

31. Correct answers are:

(a)	Is always riskless	True
(b)	Costs nothing today and gives either a positive or zero payoff later	True
(c)	Gives a payoff today and no net obligations later	True
(d)	Can be very profitable but also involves high risk	False
(e)	Profits from mispricing	True

Arbitrage is a riskless strategy to profit from mispricing.

32. Correct answers are:

(a)	Assumes that the market portfolio is efficient	False
(b)	Includes size and book-to-market as additional risk factors besides the market risk	False
(c)	Only prices systematic risk, not unsystematic risk	True
(d)	Allows for other risk factors than the market as a whole	True
(d)	Does not specify what, or even how many, risk factors there are	True

The Fama-French three factor model is an empirical application of APT and contains three risk factors: size, book-to-market and the risk premium on the market portfolio. APT itself does not specify the nature or the number of risk factors.