**RISK EVALUATION AND MANAGEMENT**
**Department of Engineering and Management**
**Instituto Superior Técnico**

**A - Academic year 2022/2023**
**Map45 test - 29th May 2023**
**18:00 (Lisbon Time)**
**Duration: 45 minutes**

**IST STUDENT NUMBER: _____**

**NAME: _____**

## Important notes

1. The correct answers should be written IN the TABLE below, with a full circle, NOT written in front of each page question.
2. Use a pencil for your answers in the TABLE and only in the end, fill it with a pen.
3. Do not separate the set of sheets of this handout, they should be delivered all.
4. The test is to be done without consultation. Any cheating will cancel the test.
5. Each multiple-choice question is worth **0.8** values; each wrong answer discounts **0.15** values on the exam grade; an unanswered question will have **0**. Answering several options is a wrong answer.
6. Only basic or scientific calculators (without text storage) are allowed.

**OBLIGATORY ANSWERS TABLE**

| Questions | Answers: **fill with a circle** | | | | | Score |
|---|---|---|---|---|---|---|
| 1 | a | b | c | d | e | |
| 2 | a | b | c | d | e | |
| 3 | a | b | c | d | e | |
| 4 | a | b | c | d | e | |
| 5 | a | b | c | d | e | |
| 6 | a | b | c | d | e | |
| 7 | a | b | c | d | e | |
| 8 | a | b | c | d | e | |
| 9 | a | b | c | d | e | |
| 10 | a | b | c | d | e | |
| 11 | a | b | c | d | e | |
| 12 | a | b | c | d | e | |
| 13 | a | b | c | d | e | |
| 14 | a | b | c | d | e | |
| 15 | a | b | c | d | e | |
| 16 | a | b | c | d | e | |
| 17 | a | b | c | d | e | |
| 18 | a | b | c | d | e | |
| 19 | a | b | c | d | e | |
| 20 | a | b | c | d | e | |
| 21 | a | b | c | d | e | |
| 22 | a | b | c | d | e | |
| 23 | a | b | c | d | e | |
| 24 | a | b | c | d | e | |
| 25 | a | b | c | d | e | |

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1. According to ISO 31000 risk definition is:
   a) hazard, a chance of bad consequences, loss or exposure to mischance.
   b) effect of uncertainty on objectives
   c) a probability or threat of damage or any other negative occurrence
   d) the possibility that events will occur and affect the achievement of strategy and business objectives.
   e) the probability scale times the impact scale.

2. A small leak in a gas pipe is a:
   a) A risk
   b) An event
   c) A risk factor
   d) A consequence
   e) An occurrence

3. Idiosyncratic risk:
   a) Is the price risk
   b) Is the market risk
   c) Is the systemic risk
   d) Is possible of mitigation
   e) Is shared between all firms

4. Systemic risk:
   a) Result from microeconomic impacts
   b) Is possible of mitigation
   c) Is the specific risk
   d) Result from macroeconomic impacts
   e) Is shared between a few firms

5. A risk register is:
   a) A template where the risks are identified and monitored
   b) A template where the risks are analyzed in probability and impact
   c) A template where exists a risk mitigation intention
   d) A template where there is a risk level scale
   e) All the answers are correct

6. One of the strategies for risk response is not:
   a) Avoidance
   b) Sharing
   c) Reduction
   d) Acceptance
   e) Protection

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7. The risk response of "sharing" is usually applied for:
   a) High impact – Low probability
   b) Low impact – High probability
   c) High impact – High probability
   d) Low impact – low probability
   e) All answers are correct.

8. "Sharing" the risk means:
   a) Transfer the risk to a third party
   b) Buy an insurance
   c) The probability is low
   d) The risk impact is enormous.
   e) All the answers are correct

9. The risk matrix of a risky seeking company decisions has:
   a) More red cells than green cells
   b) No one of the answers is correct.
   c) More green cells than red cells
   d) The same number as red and green cells

10. The ISO 31000:
    a) Is a regional standard for enterprise risk management
    b) Is specific to each given industry
    c) Provides generic guidelines on risk management
    d) Discusses risk appetite in detail.
    e) Does not separate a framework and a process.

11. SWOT analysis can be applied in which step of the ISO 31000?
    a) External and internal context
    b) Monitor risks
    c) Evaluate risks
    d) Analyze risks
    e) All the options are correct

12. The subadditivity property for two portfolios, A and B, states that:
    a) $VaR\ (A+B) \leq VaR\ (A) + VaR\ (B)$
    b) $VaR\ (A+B) \geq VaR\ (A) + VaR\ (B)$
    c) $CVaR\ (A+B) \leq CVaR\ (A) + CVaR\ (B)$
    d) $\sigma\ (A+B) \geq \sigma\ (A) + \sigma\ (B)$
    e) $CVaR\ (A+B) \geq CVaR\ (A) + CVaR\ (B)$

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13. The CAPM theory predicts that a security with a beta of zero:
    a) will offer a zero expected return.
    b) will offer the risk-free rate of return
    c) will offer the risk of the market
    d) will offer the lowest standard deviation

14. A portfolio has an average return of €2 million and a returns' variance of €0.5 million. What is the Value at Risk for this portfolio with a significance of 5% ($VaR_{5\%}$), knowing that the $Normal^{-1}(0.05)$=-1.64?
    a) 0.36
    b) 0.84
    c) 3.16
    d) 3.23
    e) No one of the others

15. What is the Beta of Ford shares, knowing that the respective average shares return is 8%, the Nasdaq Index presented an average return of 5% and the risk-free rate is 2%?
    a) 0.5
    b) 0.75
    c) 2
    d) 2.5
    e) No one of the others

16. The covariance between IBM stock and Nasdaq index is 2 and the standard deviation of Nasdaq index is 3. What is the Beta of IBM Stock?
    a) 0.22
    b) 0.67
    c) 1.5
    d) 4.5
    e) No answer is correct.

17. You have a Portfolio constituted by 30% of Tesla shares and 70% of General Motors shares, and the shares returns' have a Standard Deviation respectively of 6% and 8%, having a correlation of 0.3. The portfolio Standard deviation is:
    a) Between 0.05 and 0.06
    b) Between 0.06 and 0.07
    c) Between 0.07 and 0.08
    d) Between 0.08 and 0.09
    e) Between 0.09 and 0.10

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18. You generate 500 daily returns for a diversified portfolio and the 10 worst losses are: -22%, -21%, -19%, -17%, -15%, -13%, -11%, -9%, -8%, -7%. Which is the 99% Conditional Value at Risk (i.e. expected Shortfall)?
    a) Between -21% and -22%
    b) Between -20% and -21%
    c) Between -18% and -19%
    d) Between -17% and -18%
    e) No one of the others

19. You have a Portfolio constituted by 30% of Walmart shares and 70% of Mastercard shares, and have the Expected return respectively, 3% and 6%, having a correlation of 0.4. The portfolio Expected return is:
    a) Between 0.05 and 0.06
    b) Between 0.04 and 0.05
    c) Between 0.03 and 0.04
    d) Between 0.02 and 0.03
    e) No one of the others

20. Suppose that the Treasury bill rate is 6%. Assume that the expected return on the market index stays at 9%. The Johnson & Johnson beta is 0.53. Calculate the expected return from Johnson & Johnson shares.
    a) Between 0.08 and 0.09
    b) Between 0.07 and 0.08
    c) Between 0.06 and 0.07
    d) Between 0.05 and 0.06
    e) No answers are correct.

21. The maximum range to have always Portfolio diversification is when:
    a) correlation coefficient is between [-1; 0]
    b) correlation coefficient is between [0; 1[
    c) correlation coefficient is between [-1; 1[
    d) correlation coefficient is between [0; 1]
    e) correlation coefficient is between [-1; 1]

22. Beta:
    a) is a measure of the systematic risk
    b) measures the stock's return sensitivity to changes in the value of the overall market return
    c) is the slope of the line between the market return and the stock return
    d) All answers are correct
    e) Is the ratio of the covariance between the stock and the market returns and the variance of the market return

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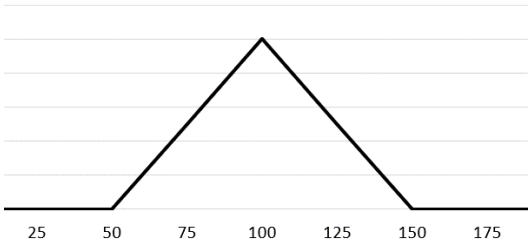
23. You are a farmer worried with the fall in corn price. Which action should you take?
    a) Buy a call option
    b) Sell a call option
    c) Buy a put option
    d) Sell a put option
    e) Buy a call option and sell a put option

24. Your guess is that the share prices of Google corporation will have low volatility, staying somehow around $100 in the next year. You are prepared to build an options strategy to profit from that. What type of strategy should you follow to achieve the final payoff in the figure?




    a) Buy two Calls with exercise price of $50, sell two Calls with exercise price of $100, buy two Calls with exercise price of $150
    b) Sell one Call with exercise price of $50, buy two Calls with exercise price of $100, sell one Call with exercise price of $150
    c) Buy one Call with exercise price of $50, sell two Calls with exercise price of $100, buy one Call with exercise price of $150
    d) Buy one Call with exercise price of $50, sell one Call with exercise price of $100, sell one Call with exercise price of $150
    e) No one of the others

25. It is possible to buy three-month call options and three-month puts on stock XPTO. Both options have an exercise price of $30 and both are worth $5. If the interest rate is 3% a year, what is the stock price?
    a) 4.96
    b) 12.23
    c) 29.78
    d) 32.41
    e) No answer is correct.