Risk-based Testing, according to the ISTQB foundation syllabus:
You should be able to

• identify the key elements of risk analysis and risk management.
• recognize hazards that would be used to inform testing about potential project risk.
• describe a risk as a possible problem that would threaten the achievement of one or more stakeholders’ project objectives.
• remember that risks are described in terms of likelihood (to happen) and impact (damage, harm resulting if it does happen).
• distinguish between the project and product risks.
• describe using examples how risk analysis and risk management may be used for test planning.
• describe how testing may be used in risk analysis and risk management.
Risks in the project which give dangers to test managers (from exercise)

1. Someone takes your people away to do programming instead of testing
2. Delay in development, priority ???
3. Test environment: restricted, wrong, shared, partly outside, not available, corrupt, ...
4. Data basis is not real, not updated, ...
5. Electricity, network, coffee, ...
6. Demotivation
7. Lack of understanding, communication
8. Borrow outsiders, they are not motivated, under my value, other stuff to do, ...
9. Corrupt test (not independent)
10. People do not take responsibility (Throw over the wall syndrome)
11. Test cases: not up to date, bad because of inaccurate reqs
12. Changes, scope creep, feature creep
13. Performance killing test late, security, usability, ...ility
14. People risks (sick, disappear, dead, no qualification, conflicts with other jobs)
15. Severe problems, bad to develop: blocking faults
16. Bad specs, unstable
17. Regression tests, there are no, etc.
18. Budget trouble
19. Time cut (deadline)
20. Bad release reqs, sudden changes in priority, order, etc., corrupt, no control
21. No support for test, lack of understanding, communication, ...
22. No involvement
Contents

The Objectives of Testing
Risk Management: The Process
Risk Planning for Testing
Statistical Test and Risk
Test Coverage and Risk
Fault Correction and Risk
Summary
What is risk?

The product of the probability, that something negative, a failure, will happen, and the cost, (damage) of the consequences which will then happen.

\[
\text{Risk} = \text{Loss} \times \text{Probability}
\]

Mathematically speaking, risk is the long term rate of loss. I.e. in the short term, the bad event may not happen and no loss may occur. But in the long run, there will be a statistical average loss. Risk based testing concentrates the test effort around the areas of the product where the risk is perceived as being highest, i.e. where the loss or the probability of problems, or both are highest. To start with, such risks must be identified. The risks are then used to prioritize the test effort.

High risk areas are then tested earlier than low risk areas, and more comprehensive test techniques and coverage may be used for such areas. However, analyzing risks may be difficult, as probabilities are not often exactly known. Product structure may also be so complicated that it is difficult to assess the contribution of the individual components. Thus, risk based testing can only be one strategy out of several in solving the testing problem.

The main approach looks at the system from the outside and uses the damage potential and the usage frequency of system functions or services. As far as there are data about how the system was developed, there can also be made an assessment of how defect prone the different areas will be. For example, areas with high complexity, many changes, many defects found earlier, and developed by personnel with lower qualification may have a higher probability to fail.
The regions of risk

- Probability:
  - Frequent
  - Probable
  - Occasional
  - Remote
  - Improbable
  - Incredible

- Severity:
  - Cosmetic
  - Marginal
  - Critical
  - Catastrophic
  - Intolerable

Intolerable risk
As low as reasonably possible (ALARP)
Broadly acceptable risk
Risk based testing is the prioritization, guidance and focusing of the testing activities and effort based on an assessment of the risks to the particular project and product.

Shortly, if there is a high risk, then there will be serious testing, if there is no risk, then there will be very little testing.

Prioritization is an old concept. The new focus is risk. Focusing on risk helps communication with the stakeholders.

However, it should be noted that not all risks might be identified. Thus there should be a minimum level of testing to cover the whole application.
Why do we use risk?

- Because there is never enough time to test everything.
- Test is at the end of the project („caboose effect“).
- There are always compromises about testing.
- The task of testing is to measure and fight risk.

Test shall find IMPORTANT defects.
   It means important enough to fix them, i.e. they must belong to important risks.
Our point of view?

Potential and real problems
What could be wrong?
What could generate problems?
Which problems are the most expensive ones?

Risk based testing draws on the collective knowledge and insight of the project stakeholders to determine the risks and the levels of testing to address those risks. To ensure that the chance of a product failure is minimized, risk management activities provide a disciplined approach to
1. continuously assess what can go wrong (risks).
2. determine what risks are important to deal with.
3. implement strategies to deal with those risks.

(ISTQB foundation level syllabus).
How risks are handled

Initial System Risk
- Unacceptable
- Acceptable / Assumed
- Accepted / Waived
- Reduced / Transferred
- Eliminated / Avoided

Residual System Risk
- Undiscovered / Unknowingly Accepted
- Acceptable / Assumed

Source: Lars Wahlberg, OM, Stockholm, Sweden
Which problems are most expensive?

Martin Ystenes, Professor, Norwegian Technical University:

“Most dangerous errors occur because one does not even know one could be wrong, and therefore one does not think about checking facts.”

What can help? - A new look at the problem or product by people with a different viewpoint.