Sample Exam

Edition 202210

Content

Introduction

This is the EXIN DevOps Master™ (DEVOPSM.EN) sample exam. The Rules and Regulations for EXIN's examinations apply to this exam.

This exam consists of 40 multiple-choice questions. Each multiple-choice question has a number of possible answers, of which only one is correct.

The maximum number of points that can be obtained for this exam is 40. Each correct answer is worth 1 point. You need 26 points or more to pass the exam.

The time allowed for this exam is 90 minutes.

Good luck!

Sample Exam

1 / 40
What is the **most** effective mechanism for migrating data in an automated way?

A) Create smaller datasets to keep migrations manageable
B) Develop a rollback procedure for when the migration fails
C) Ensure proper testing of scripts before migrating the data
D) Set up database versioning and keep strict version control

2 / 40
A team has implemented continuous deployment and everything is version controlled. The team feels this is necessary to find errors quickly or roll back whenever necessary.

However, the team lead argues that it is not recommended to keep binary output in version control as well.

Why does the team lead say this?

A) Because a recompilation must be always be done as a regular part of the normal build process
B) Because binary output are large files that change every build and can be recreated from source code
C) Because multiple team members work on the binary output which makes version control difficult
D) Because the binary output is the input for compilers and cannot be kept in version control properly

3 / 40
A team has been working on creating a deployment pipeline. They have achieved single-piece flow of their process successfully and have some basic automated build and deployment processes, but the unit and acceptance tests are still manual. They currently release every month.

The team discusses what to do next to improve their deployment pipeline.

- **Aki** states: " We should increase the frequency of the releases further first. The other missing elements will follow from the problems that we will run into by doing that."
- **Em** states: "We should automated the rest of the tests. Once we have automated unit tests and acceptance tests, we can start automating releases."
- **Ken** states: "The deployment pipeline is part of the value chain of the organization. Therefore, we should first limit the work-in-progress (WiP) before we do anything else."
- **Mart** states: "It is going well right now and we have achieved single-piece flow. There is no reason to take any action right now, so we should wait for the organization to mature."

Whose suggestion is **best** in this scenario?

A) Aki
B) Em
C) Ken
D) Mart

4 / 40
For a new product, a team needs to develop a deployment pipeline. The team discusses the commit stage of the deployment pipeline. They are working towards continuous integration.

One team member says: "The definition of done (DoD) should be defined during or before the commit stage. When code does not adhere to the DoD when it is committed, the work should be stopped."

Is this true?

A) Yes, because the team member is not doing their work correctly and must be reprimanded immediately.
B) Yes, because work that does not adhere to the DoD does not add value and should not be committed.
C) No, because the DoD is defined during customer meetings and is not ready before the commit stage.
D) No, because work in the deployment pipeline must always flow and work may never be stopped suddenly.

5 / 40
A team experiences many application and hardware failures after deploying application software upgrades. When they were trying to recover a known good state, this took a long time. The failures resulted in extended downtime for critical applications. Management has asked the team to reduce the risk of disruption for the next deployments.

The team discusses how to solve this problem.

What should this team do **first**?

A) Automate all tests and the build, deploy, and release processes fully
B) Ensure that everything is in version control to enable quick recoveries
C) Get the Development team to communicate with the Operations team
D) Train the Development team to understand the deployment process

6 / 40
An organization is planning to implement continuous integration. The organization's development team agrees with this new way of working and has already selected automation tools, which will build software from the command line.

Which other activity is a prerequisite for continuous integration?

A) Absolute paths should be eliminated, because this is necessary for integration with third-party libraries.
B) Infrastructure access should be controlled, because this ensures no one can make unapproved changes.
C) Value streams should be documented, because this helps identify areas that are in need of improvement.
D) Version control should be established, because this makes it clear what was done when, by whom, and why.

7 / 40
A team is discussing their user acceptance tests. Currently they are spending a large amount of time, effort, and money on manual acceptance testing. Management has asked them if there is a better alternative. As a rule, management will favor the solution with the lowest risk to production disruptions.

The team concludes that they have the ability in-house to automate all user acceptance tests. However, this would take some time and increase the costs. One team member remarks that a competitor has replaced all acceptance testing with automated unit and component tests.

Should the team automate the user acceptance tests in this scenario?

A) Yes, because automation will be cheaper than manual testing in the long run and this keeps the risk of production disruptions low.
B) Yes, because this reduces the number of manual acceptance tests to once a month to keep the risk of production disruptions low.
C) No, because manual acceptance tests ensure that all defects are found before releasing to keep the risk of production disruptions low.
D) No, because unit and component tests replace acceptance tests and the competitor proves that this keeps the risk of production disruptions low.

8 / 40
A start-up company created an app for pet owners. The app lets customers find a pet sitter for a day. The company owner is talking to a large customer and expects that the company will grow fast.

Currently, the Development team has a manual process in place for testing. So far, this has worked very well.

What should the Development team do next?

A) Create new tests for the Operations team to automate deployment
B) Keep the manual tests and add new manual tests if necessary
C) Wait until they know how to create value for the new customers
D) Work together with the Operations team to write automated tests

9 / 40
A DevOps team uses the data in their databases during software development testing.

What is the **largest** potential problem for this team?

A) The access to data from locations outside of the testing database
B) The accessibility of production data when working from home
C) The availability of representative test data for automated testing
D) The security of the available security controls on the test data

10 / 40
Kamala is an information security analyst responsible for improving the current software development process of an open finance company. One of her main goals is to increase awareness of information security during coding phases.

Kamala has advised that teams should 'shift left' on information security, which means that it should be integrated into the entire software delivery lifecycle from code to operations.

Her manager Rob disagrees with this proposal and suggests hiring specialists to build information security into the products once they are ready for deployment. He argues that the developers are no security experts and should be able to focus on developing.

Who is correct?

A) Kamala, because an earlier integration ensures compliance with relevant laws and regulations and will make building secure software cheaper in the long run.
B) Kamala, because the team members can get trained to become security experts themselves and this will save the salary costs of a security expert.
C) Rob, because it works best to create a set of policies based on information security best practices and hire an expert to implement them in the products.
D) Rob, because Developers should indeed be able to focus on their core task of developing software and not be burdened with becoming security experts.

11 / 40
What is the **largest** benefit of continuous delivery?

A) It enables conformance and performance of software development in a transparent manner.
B) It ensures that corporate governance processes are enacted in software delivery teams.
C) It focuses on the time to market of deployment and enhanced business performance.
D) It introduces automation to reduce the need for compliance and assurance of software.

12 / 40
A team is working on an application and wants to start working with continuous delivery. During a process improvement session, the team discusses what practice they should use to achieve continuous delivery.

What should the team do?

A) The team should start using Scrum as its management practice along with quarterly release planning to increase agility.
B) The team should start working on improving continuous integration of branches and automated testing of their application.
C) The team should work on cultural change using Agile change management practices and feedback loops for reporting.
D) The team should work on Kanban implementation on the team level while creating a loosely coupled architecture.

13 / 40
A company has radically changed the development process from waterfall to DevOps. The team wants to reduce the time between releases, but is experiencing some problems doing that.

The team has found the following problems during their process analysis:

- A fifth of the sprint time is spent on porting code, because everyone works on separate code branches.
- Whenever issues are found that break the build, the production environment must be rolled back.
- The team has a version control system in place, but does not monitor key performance indicators (KPIs).
- With the increased number of releases more customer feedback, including complaints, comes in.

What will help this team **most** to reduce the time between releases?

A) Adopt trunk-based development to make porting code unnecessary
B) Reproduce test failures to prevent rolling back the live environment
C) Use canary releases to reduce the number of customer complaints
D) Use more telemetry to monitor KPIs that show the business value

14 / 40
What is **not** a benefit of a loosely coupled architecture?

A) Developers can work independently on software changes.
B) Systems can be changed and validated independently.
C) There is a minimum of project management oversight.
D) Unit and integration tests are run automatically.

15 / 40
Tina is responsible for improving a products' architecture and application environments. During her first assessment of the applications, she notices the following:

- Deploys could be run at any time by the team as long they notify the service owners of affected services.
- The applications could be deployed using independent components.
- Even though all team members could deploy the applications, only one developer has the access and permission to do it.
- The team needs to run a handful of scripts to connect with the adjacent services that the applications depend on.

How can Tina **best** help her team to prepare a better infrastructure environment?

A) Help the team to create a loosely coupled architecture so they deploy code or release the application independently of other services it depends on.
B) Organize a hackathon with all tech leaders and senior developers to innovate and replace the current infrastructure with a new tightly coupled architecture.
C) Recreate the adjacent applications to remove dependencies so the team can run scripts faster and deploy their applications independently of other applications.
D) Train the team members on deploying the applications safely, give them the appropriate privileges, and make them a part of the change advisory board (CAB).

16 / 40
A deployment pipeline typically consists of multiple feedback loops.

What is the **main** benefit of using feedback loops?

A) Communication between the Development and Operations teams is improved.
B) High-quality software gets delivered to users more frequently and more reliably.
C) The customers are involved at multiple steps during the development process.
D) User acceptance testing (UAT) is performed regularly to gather stakeholder opinions.

17 / 40
A software development team has been criticized for deploying features which do not meet customer expectations.

What is the **best** way for this team to improve this situation?

A) Creating a standalone user acceptance testing cycle prior to deployment
B) Lowering the priority of other stakeholder requirements or fully removing them
C) Making requirements static or fixed at the start of each development project
D) Seeking stakeholder insights actively throughout the development lifecycle

18 / 40
DevOps, Agile, Scrum, Lean and Kanban can all add value to an organization in their own way.

What **unique** value does DevOps bring to an organization?

A) DevOps allows regular feedback loops from customers by setting a sustainable development cadence.
B) DevOps ensures the Development and Operations teams use the same task board to coordinate tasks.
C) DevOps focuses on releasing continuously to deliver value to the customer quickly in an efficient process.
D) DevOps provides the new services just-in-time while focusing on efficiency by eliminating wasteful work.

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DevOps aims at increasing customer satisfaction and the customer experience by focusing on adding value.

How is this **primarily** done?

A) By automating testing and deployment
B) By delivering products more frequently
C) By developing well-functioning products
D) By using highly skilled developers

20 / 40
Many DevOps teams use visualization, such as card walls, to steer their development process. Card walls increase the team's visual control.

How does visualization facilitate DevOps practices?

A) By brightening up the office environment to stimulate productivity and employee happiness
B) By giving leaders a way to hold the team accountable for their activities and divide work
C) By helping management to gain control over the team and the work that must be done
D) By positively impacting team culture and performance by making work progress clearer

21 / 40
The Development team can build new features within the requested time, but they are not often delivered on time. An investigation shows the following problems:

- Regression bugs keep recurring.
- Although time is spent on fixing bugs, customers keep complaining about bugs in the live environment.
- The Development team gets really stressed if a new feature is requested.

The underlying problem is that the team's testing strategy is not effective.

What should the team do to solve this?

A) The team should automate all tests and the commit stage, and increase the team members' understanding of the continuous integration process through training.
B) The team should automate all unit tests, component tests, and integration tests, and increase collaboration between testers and the Development team.
C) The team should automate testing and the deployment process, and if necessary upgrade hardware or update the system's configuration management.
D) The team should increase the collaboration between the Development and Operations teams, by increasing monitoring and logging, and by using virtualization.
E) The team should make sure the Development team understands the deployment process, and increase the collaboration with the Operations team.

22 / 40
Part of DevOps is making sure relevant information is visually displayed for the Developers.

What is the **main** type of data that should be displayed for the Developers?

A) Customer feedback of the day, including complaints and feature requests, to allow developers to fail fast
B) Individual developer productivity, including number of hours worked, to allow developers to compete
C) Overall project progress, including budget information, to allow developers to make strategic decisions
D) Product quality data, including failures and defect rates, to allow developers to make informed decisions

23 / 40
A company has agreed to work in a DevOps way. They are searching for a way to manage the entire scope of their projects that fits with that way of working.

What is the **best** way to manage the scope of a DevOps project?

A) Complete an iteration planning to agree on the items to work at every iteration's start
B) Create a full release plan for features, forecasting to customers what will be released
C) Define what the minimum viable product (MVP) is and review as often as necessary
D) Set the work priorities before each iteration to help the team members pick work

24 / 40
Single-piece flow in software development means that the focus is on a single feature that is continuously worked on until it is done.

Why is single-piece flow important for DevOps?

A) It allows the team to work at a sustainable and predictable pace with a constant velocity.
B) It helps the team to add value by delivering high-priority features when they are relevant.
C) It increases the shared responsibility of picking up tasks among all team members.
D) It reduces bottlenecks by limiting the number of team members that work on a feature.

25 / 40
The Tool Company is busy developing an e-commerce site, and this project is a high-stakes project. Customers are dissatisfied and complain about the e-commerce site not working as expected.

Senior managers on the business side argue that working in an Agile way will only increase the risk, while the IT senior managers argue that it is the only way to deliver value fast. The IT managers want to combine Agile with DevOps: releasing often and asking for input.

The Tool Company hires a consultant to make sure they do the right thing.

What advice should the consultant give?

A) Do not work in an Agile way or change to a DevOps way of working because customers are already complaining about the e-commerce site not working as expected.
B) Work in an Agile way, add DevOps practices, give developers the freedom to deploy without external approval and as soon as they can, and gather constant customer feedback.
C) Use Agile and DevOps ways of working to create the e-commerce site but add manual user acceptance testing and a change approval board (CAB) process before releasing.
D) Use Agile and DevOps ways of working within software development but only release finished products to customers to prevent complaints and dissatisfaction from the customers.

26 / 40
A team has been working well together, but customers are still complaining. The team would like to experiment more and introduce DevOps.

Management will allow the team to experiment and change their way of working, but only if the risks are acceptable. The company policy is to minimize risks as much as possible. The team discusses this problem.

- **Hichem** states that the team should not experiment or change its way of working right now, because this may lead to more dissatisfaction with the customers. Instead, the team should build a customer feedback form.
- **Kira** states that it is always good to bundle changes into large releases to minimize disruptions and outages in the operations environment. Larger releases should keep the quality of the live product higher.
- **Nazim** states that they cannot change to a DevOps way of working until they are performing well and have reduced customer complaints. Additional manual tests should be able to help reduce the complaints.
- **Rose** states that it may sound counterintuitive but working in a DevOps way and experimenting will reduce the risks most. If the team has automated the tests and version control well, this is the best way to go.

Whose suggestion would work best in this scenario?

A) Hichem
B) Kira
C) Nazim
D) Rose

27 / 40
A web shop specializes in 70's and 80's clothing. The web shop is doing well. Their current customer base consists of people that seek period costumes, and clothing rental companies. The company wants to expand.

A team discusses how to expand, and they decide to use hypothesis-driven development. An example of a possible hypothesis for this web shop is that more customers will be attracted to the web shop if its content is presented in a mobile app instead of just on the website.

What should be done?

A) - The customer defines a hypothesis, and the team determines what test or experiment should be done.
- Then the team builds an MVP that supports the formulated hypothesis and tests the customers' response.
- The MVP is reworked after a short feedback round with the customers to ensure the most customer value.

B) - The customer develops a hypothesis based on their needs and the team talks to the customers.
- Then the team builds and tests a prototype and determines the final minimal viable product (MVP).
- The prototype is redeveloped as an MVP and the customer is presented with it to test the hypothesis.

C) - The team gathers information from customers and formulates a hypothesis based on that information.
- Then the team determines which experiment or test can be done to prove or disprove the hypothesis.
- The experiment is conducted and analyzed, and the customer is informed and asked for more feedback.

D) - The team gathers information from stakeholders and formulates alternative hypotheses from this.
- Then the team builds and tests an MVP and presents it to the organization's upper management.
- The final hypothesis is formed based on the results from acceptance tests and the manager's reaction.

28 / 40
What is **not** a likely effect of Lean management practices?

A) The organization gets a more generative culture.
B) The software delivery performance is increased.
C) The team members are less likely to burn out.
D) The managers will pay more attention to profits.

29 / 40
A team has challenges identifying issues and troubleshooting applications that are deployed into their infrastructure. This is a problem because there are many incidents and outages. Customers call the service desk often with complaints and the service desk must reroute many questions to the team, which puts them under time pressure.

The team has no idea what the root cause of the issues is, even though they have mapped their workflow and follow these processes. The team is working with a Kanban board and seems to have achieved flow.

In the long term, which solution will help **most** to reduce the number of issues?

A) Hire a consultant to remap the workflow and set up new processes on the team's Kanban board
B) Free up valuable work time by instructing the service desk to stop rerouting questions to the team
C) Measure the team members' individual numbers of issues and set up a competition to improve
D) Set up a monitoring strategy by storing data, creating a dashboard, and setting up notifications

30 / 40
A team is struggling to get work done on time. They struggle to get the products to the customers on time.

How does imposing work-in-progress limits (WIP-limits) help this team to establish flow?

A) By changing the roles of all stakeholders and team members involved with the team
B) By helping to identify bottlenecks that help the team to improve and optimize the work
C) By improving the lifecycle management of applications and communication tools
D) By limiting the number of tools and applications that the team needs to use to work

31 / 40
A team works on several projects and management puts the same priority on all their projects. This leads to pressure on the team to do work on all projects daily and report progress on each project weekly.

The team needs a way to ensure maximum team efficiency and high-quality deliverables. They want to deliver the highest customer value and business value.

What should the team do?

A) Appoint one team member as a liaison to stop managers from directly talking to the team. The disadvantage is that the team no longer receives direct customer feedback.
B) Keep working in the current way for as long as they can manage to keep everyone satisfied. The disadvantage is that some team members are switching tasks often.
C) Limit the work in progress (WIP) and introduce a visual management technique to the team. The disadvantage is that the team needs to adapt to the new way of working.
D) Split up into smaller teams of two or three team members to work on each project separately. The disadvantage is that not all teams possess the skills to do the work within the team.

32 / 40
BigBlue Software is a small company that creates software for other businesses. The company has a Development team and an Operations team. These teams both have their own managers, but they work well together. Because the company is small, and the CEO is ambitious, the teams sometimes experience time pressure.

Under time pressure, both teams make errors that have led to bugs in the software and outages. The teams have pulled together on these occasions to solve the outages, or to swarm on a problem to solve it as quickly as possible. The managers are proud of the team members for openly sharing mistakes they made, cooperating to solve it, and delivering customer value.

Would this organization benefit from a change in its Westrum organizational culture typology?

A) Yes, the organizational culture is bureaucratic as can be seen from the team structures with a manager and should be changed.
B) Yes, the organizational culture is pathological as can be seen from the mistakes made under pressure and should be changed.
C) No, the organizational culture is generative as can be seen from the cooperation and sharing mistakes and should not be changed.
D) No, the organizational culture is market oriented as can be seen from the call for customer value and should not be changed.

33 / 40
A team member states that the organization needs organizational learning, sometimes called a generative culture, because it enables helping the customers, ensures quality, and creates competitive advantage and a committed workforce.

Why is this true?

A) Because organizational learning means identifying mistakes and holding individual team members accountable to learn from them
B) Because organizational learning means keeping the team educated on the latest Agile and Lean methods to increase the flow
C) Because organizational learning requires a mindset that makes employees feel supported, and values their judgments
D) Because organizational learning requires a research culture that automatically creates hypotheses to make informed decisions

34 / 40
A human resource team is asked to write a new policy for hiring DevOps team members.

What is the **best** policy for hiring DevOps team members?

A) Allowing applicants to apply without a name on their resume and preferring applicants that bring diversity to the team, because this leads to better team results
B) Allowing managers to research which employee performs best at another company and trying to buy them away, because this makes the best people part of the team
C) Allowing only those applicants who do not fully feel that they fit in with the organization or with the other team members, because this fosters diversity the most
D) Allowing the team members to select the team member that they identify with most, because this brings more harmony and equality to the entire team

35 / 40
An organization has changed its management practices to Lean leadership. This is a big change from the old way of doing things, when management would regularly publicly shame coworkers for mistakes they made.

One of the teams is a distributed team. Although the team is much happier with the new leadership style, their communication is not optimal. The team members are not discussing bugs that they create or cooperating to solve problems quickly.

The team manager has introduced a business version of the chat tool that most team members were already using privately, but this does not seem to have the desired result.

What is happening in this team and how should the manager solve this?

A) - The team members are not skilled enough with the chat tool yet.
- The manager should facilitate internal or external training to solve this.

B) - The team members are still adjusting from the former leadership style.
- The manager does not need to intervene in this temporary process.

C) - The team members do not trust the new leadership style yet.
- The manager must be thoughtful and express his pride in the team.

36 / 40
What is the **largest** direct benefit of making sure team members have meaningful work?

A) It helps to decrease burnout and increases employee loyalty and engagement.
B) It helps to deliver all DevOps projects from the team on time and within budget.
C) It helps to increase the confidence of the team that they can accomplish DevOps work.
D) It helps to retain the team members because no one wants to leave their job.

37 / 40
A company has grown exponentially in the last two years. As a consequence, the Development team is experiencing time pressure. Every team member feels like they could use a vacation and some team members are even thinking about quitting their jobs. The team has been calling in sick more than in other years.

The team manager has hired several new team members, but the workload is still perceived as high, although all deadlines seem to be made just in time. To solve the problem, the team manager wants to address the burnout complaints and stress more directly.

Which actions **best** address burnout complaints and stress?

A) - Contract subcontractors for managing the increased workload during peak periods of the year
- Give the team members access to professional mental help programs paid for by the company

B) - Give all team members a month-long vacation to ensure a fresh start when they return to work
- Ask the managers to identify all factors that might be contributing to burnout before the team returns

C) - Have the team members discuss all tasks in the process to discover which tasks are meaningful
- Remove tasks that are not meaningful and ensure the team can make most decisions on their own

D) - Hire a more competent manager who knows how to create work-life balance for the team members
- Allow more time for the team members to settle into the new environment and find a new balance

38 / 40
Transformational leadership is said to be one of the most overlooked aspects of DevOps.

Why is transformational leadership essential for DevOps success across the organization?

A) Because commitment from upper management allows them to change processes to counteract resistance
B) Because DevOps will fail if not all employees, including upper management, understand DevOps well
C) Because the changes that are necessary for continuous delivery must be mandated by upper management
D) Because upper management must trust employees and encourage them to experiment without punishment

39 / 40
Continuous monitoring of the maturity of DevOps in an organization is a critical capability. It enables collaboration across IT specialties, and reduces or eliminates unproductive behaviors that all too frequently appear in organizations with operational silos. Continuous monitoring is different from conventional monitoring.

What is the **main** requirement of continuous monitoring?

A) Bringing a component to the desired status in a fully automated way
B) Getting Development and Operations to work together in each value stream
C) Having organizational alignment and a focus on the production environment
D) Taking a holistic view of the organization's complex application environment

40 / 40
When looking at an organization's DevOps maturity, it is important to have a multidimensional perspective of the organization, its capabilities, and its maturity in each of these dimensions. The DevOps continuous assessment architecture can be represented as a cube.

What is represented on the sides of the DevOps cube?

A) Flow, feedback, learning and experimentation, governance, deployment, and quality assurance
B) Monitoring, information, communication, assessment, control, and activities
C) People, process, partners, technology, quality assurance, and culture
D) Requirements, processes, resources, organization, maturity, and capability

Answer Key

1 / 40
What is the **most** effective mechanism for migrating data in an automated way?

A) Create smaller datasets to keep migrations manageable
B) Develop a rollback procedure for when the migration fails
C) Ensure proper testing of scripts before migrating the data
D) Set up database versioning and keep strict version control

A) Incorrect. Implementing version control is more important for automation. The size of the dataset should not matter.
B) Incorrect. This is focused on recovery actions to take if the migration fails. Implementing version control is more important for automation because it prevents migration fails.
C) Incorrect. Although testing is important, implementing version control is more important for automation.
D) Correct. Versioning the database is the best mechanism to migrate data in an automated fashion. (Literature: B, Chapter 12)

2 / 40
A team has implemented continuous deployment and everything is version controlled. The team feels this is necessary to find errors quickly or roll back whenever necessary.

However, the team lead argues that it is not recommended to keep binary output in version control as well.

Why does the team lead say this?

A) Because a recompilation must be always be done as a regular part of the normal build process
B) Because binary output are large files that change every build and can be recreated from source code
C) Because multiple team members work on the binary output which makes version control difficult
D) Because the binary output is the input for compilers and cannot be kept in version control properly

A) Incorrect. Although recompilation would create binary output, it is not advisable to do recompilation as a regular part of the normal build process.
B) Correct.The binary output are large files and recreated for every check-in that is compiled and passes the automated tests. They can be recreated from source code by rerunning the build script which is kept in version control, so there is no need to keep these large files as well. (Literature: B, Chapter 2)
C) Incorrect. Version control for the binary output is not difficult, just impractical.
D) Incorrect. Binary output is the output of compilers, not the input. It could be kept in version control, but that is unnecessary.

3 / 40
A team has been working on creating a deployment pipeline. They have achieved single-piece flow of their process successfully and have some basic automated build and deployment processes, but the unit and acceptance tests are still manual. They currently release every month.

The team discusses what to do next to improve their deployment pipeline.

- **Aki** states: " We should increase the frequency of the releases further first. The other missing elements will follow from the problems that we will run into by doing that."
- **Em** states: "We should automated the rest of the tests. Once we have automated unit tests and acceptance tests, we can start automating releases."
- **Ken** states: "The deployment pipeline is part of the value chain of the organization. Therefore, we should first limit the work-in-progress (WiP) before we do anything else."
- **Mart** states: "It is going well right now and we have achieved single-piece flow. There is no reason to take any action right now, so we should wait for the organization to mature."

Whose suggestion is **best** in this scenario?

A) Aki
B) Em
C) Ken
D) Mart

A) Incorrect. It does not make sense to increase the number of releases before the release process is automated or single-piece flow is achieved.
B) Correct. The first priority should be getting the single-piece flow of the pipeline in place. Once that is done, as it is in this scenario, automation should be implemented until releases are fully automated. (Literature: B, Chapter 5)
C) Incorrect. Since the team is working with a single-piece flow it is very likely that they are already limiting WiP, or there is no need to do that. Automation will move the deployment pipeline forward.
D) Incorrect. Not changing anything and waiting for the rest of the organization to mature is not very helpful. Automation will move the deployment pipeline forward.

4 / 40
For a new product, a team needs to develop a deployment pipeline. The team discusses the commit stage of the deployment pipeline. They are working towards continuous integration.

One team member says: "The definition of done (DoD) should be defined during or before the commit stage. When code does not adhere to the DoD when it is committed, the work should be stopped."

Is this true?

A) Yes, because the team member is not doing their work correctly and must be reprimanded immediately.
B) Yes, because work that does not adhere to the DoD does not add value and should not be committed.
C) No, because the DoD is defined during customer meetings and is not ready before the commit stage.
D) No, because work in the deployment pipeline must always flow and work may never be stopped suddenly.

A) Incorrect. The work should be stopped because the work adds no value and should not be committed. However, this does not always mean that the team member is not doing their work properly or that the team member must be reprimanded.
B) Correct. When work does not adhere to the DoD, there is not enough value for the customer to put it in the deployment pipeline. Considering single-piece flow, this would delay the flow of more valuable work. (Literature: B, Chapter 3)
C) Incorrect. The DoD is one of the first things that is agreed upon in a project. It is not defined during customer meetings. When coding starts, the DoD should be ready.
D) Incorrect. Stopping the deployment pipeline is reasonable when there is something wrong with the committed code. Work that does not adhere to the DoD does not add value and should not be in the pipeline.

5 / 40
A team experiences many application and hardware failures after deploying application software upgrades. When they were trying to recover a known good state, this took a long time. The failures resulted in extended downtime for critical applications. Management has asked the team to reduce the risk of disruption for the next deployments.

The team discusses how to solve this problem.

What should this team do **first**?

A) Automate all tests and the build, deploy, and release processes fully
B) Ensure that everything is in version control to enable quick recoveries
C) Get the Development team to communicate with the Operations team
D) Train the Development team to understand the deployment process

A) Incorrect. Although this is a good idea in general, the problem is to reduce risk of disruption. Getting everything in version control will solve the problem with rolling back to a known good state, even if the rest of the work is manual.
B) Correct. Getting everything in version control will solve the problem with rolling back to a known good state. (Literature: B, Chapter 1)
C) Incorrect. Although this is a good idea in general, the problem is to reduce the risk of disruption. Getting everything in version control will solve the problem with rolling back to a known good state, even if the teams are not talking to each other.
D) Incorrect. Even though training may help the team reduce the number of failures, it will not reduce the risk of disruption when a failure occurs. Version control is key in this scenario.

6 / 40
An organization is planning to implement continuous integration. The organization's development team agrees with this new way of working and has already selected automation tools, which will build software from the command line.

Which other activity is a prerequisite for continuous integration?

A) Absolute paths should be eliminated, because this is necessary for integration with third-party libraries.
B) Infrastructure access should be controlled, because this ensures no one can make unapproved changes.
C) Value streams should be documented, because this helps identify areas that are in need of improvement.
D) Version control should be established, because this makes it clear what was done when, by whom, and why.

A) Incorrect. This is not a specific prerequisite for starting continuous integration. In addition, although absolute paths are not desirable, they are sometimes needed, for example, when integrating with third-party libraries that rely on hard-coded paths.
B) Incorrect. This is an important DevOps activity, but it is not a specific prerequisite for starting continuous integration.
C) Incorrect. Value streams should be modeled, but this is not a specific prerequisite for starting continuous integration.
D) Correct. There are three things that must be in place: version control, an automated build, and agreement of the team. Version control was missing from the scenario. (Literature: B, Chapter 3)

7 / 40
A team is discussing their user acceptance tests. Currently they are spending a large amount of time, effort, and money on manual acceptance testing. Management has asked them if there is a better alternative. As a rule, management will favor the solution with the lowest risk to production disruptions.

The team concludes that they have the ability in-house to automate all user acceptance tests. However, this would take some time and increase the costs. One team member remarks that a competitor has replaced all acceptance testing with automated unit and component tests.

Should the team automate the user acceptance tests in this scenario?

A) Yes, because automation will be cheaper than manual testing in the long run and this keeps the risk of production disruptions low.
B) Yes, because this reduces the number of manual acceptance tests to once a month to keep the risk of production disruptions low.
C) No, because manual acceptance tests ensure that all defects are found before releasing to keep the risk of production disruptions low.
D) No, because unit and component tests replace acceptance tests and the competitor proves that this keeps the risk of production disruptions low.

A) Correct. If the team can automate the acceptance testing stage, this will take pressure off the end of the projects, while still finding the defects that show up in user scenarios. This keeps the risk to production disruptions low and in the long run, automation is always cheaper than manual labor. (Literature: B, Chapter 8)
B) Incorrect. Although the team should automate, this is not to reduce the number of manual tests, but to replace them completely.
C) Incorrect. In the long run, automation is always cheaper than manual labor and no less accurate if the tests are implemented well.
D) Incorrect. Unit and component testing do not accurately capture the entire user scenario experience. This heightens the risk to production disruptions, no matter what the competitor does.

8 / 40
A start-up company created an app for pet owners. The app lets customers find a pet sitter for a day. The company owner is talking to a large customer and expects that the company will grow fast.

Currently, the Development team has a manual process in place for testing. So far, this has worked very well.

What should the Development team do next?

A) Create new tests for the Operations team to automate deployment
B) Keep the manual tests and add new manual tests if necessary
C) Wait until they know how to create value for the new customers
D) Work together with the Operations team to write automated tests

A) Incorrect. The teams should work together to write tests. Development should not write tests for Operations.
B) Incorrect. Keeping manual tests is a large risk when growing. Doing anything manual is error prone and does not scale well.
C) Incorrect. There is no need to wait for the new customers. Many of the standardized, automated tests should be doable even without a customer.
D) Correct. The teams should work together to write automated tests. This will help keep the performance of testing high even when growing fast, because automated testing is scalable. (Literature: B, Chapter 8)

9 / 40
A DevOps team uses the data in their databases during software development testing.

What is the **largest** potential problem for this team?

A) The access to data from locations outside of the testing database
B) The accessibility of production data when working from home
C) The availability of representative test data for automated testing
D) The security of the available security controls on the test data

A) Incorrect. Data in databases can always be accessed concurrently.
B) Incorrect. Production data is never used during development testing.
C) Correct. Test data needs to be representative of the production data. (Literature: A, Chapter 4)
D) Incorrect. During testing, security controls on test data are not usually required.

10 / 40
Kamala is an information security analyst responsible for improving the current software development process of an open finance company. One of her main goals is to increase awareness of information security during coding phases.

Kamala has advised that teams should 'shift left' on information security, which means that it should be integrated into the entire software delivery lifecycle from code to operations.

Her manager Rob disagrees with this proposal and suggests hiring specialists to build information security into the products once they are ready for deployment. He argues that the developers are no security experts and should be able to focus on developing.

Who is correct?

A) Kamala, because an earlier integration ensures compliance with relevant laws and regulations and will make building secure software cheaper in the long run.
B) Kamala, because the team members can get trained to become security experts themselves and this will save the salary costs of a security expert.
C) Rob, because it works best to create a set of policies based on information security best practices and hire an expert to implement them in the products.
D) Rob, because Developers should indeed be able to focus on their core task of developing software and not be burdened with becoming security experts.

A) Correct. Information security is a mandatory subject for DevOps and should be a part of the company's culture. In addition, developing with security in mind will be cheaper than building security in once it has been developed. (Literature: A, Chapter 4 and 6)
B) Incorrect. A training can help teams to understand the subject, but it is not enough to change the entire environment. The savings are not in the salary costs of a security expert, but in more rugged software that complies with laws and regulations and does not need rework.
C) Incorrect. A top-down approach might have little effect on teams that need to address information security on a cultural level. In addition, creating rugged software that complies with laws and regulations and does not need rework will be cheaper and better.
D) Incorrect. Information security is a mandatory subject for DevOps and should be a part of the company's culture. Creating rugged software that complies with laws and regulations and does not need rework will be cheaper and better.

11 / 40
What is the **largest** benefit of continuous delivery?

A) It enables conformance and performance of software development in a transparent manner.
B) It ensures that corporate governance processes are enacted in software delivery teams.
C) It focuses on the time to market of deployment and enhanced business performance.
D) It introduces automation to reduce the need for compliance and assurance of software.

A) Correct. The principle of achieving both conformance and performance is at the heart of continuous delivery. (Literature: B, Chapter 15)
B) Incorrect. Continuous delivery balances corporate governance with business governance and does not focus on only one type of governance.
C) Incorrect. Time to market is important, and may be achieved using continuous delivery, but the largest benefit is achieving conformance and performance.
D) Incorrect. Automation does not make corporate governance or compliance unnecessary.

12 / 40
A team is working on an application and wants to start working with continuous delivery. During a process improvement session, the team discusses what practice they should use to achieve continuous delivery.

What should the team do?

A) The team should start using Scrum as its management practice along with quarterly release planning to increase agility.
B) The team should start working on improving continuous integration of branches and automated testing of their application.
C) The team should work on cultural change using Agile change management practices and feedback loops for reporting.
D) The team should work on Kanban implementation on the team level while creating a loosely coupled architecture.

A) Incorrect. Even though Scrum can help teams to increase agility, it is not necessary when working in a DevOps way. Instead, the team should focus on continuous integration and automation.
B) Correct. Continuous integrations, version control and test routines are practices that help teams to discover better ways to improve delivery rate and quality. (Literature: B, Chapter 3 and 5)
C) Incorrect. These practices are related to organizational change management, not to continuous delivery. Instead, the team should focus on continuous integration and automation.
D) Incorrect. Loosely coupled architectures are useful, but it is not necessarily connected with DevOps. Instead, the team should focus on continuous integration and automation.

13 / 40
A company has radically changed the development process from waterfall to DevOps. The team wants to reduce the time between releases, but is experiencing some problems doing that.

The team has found the following problems during their process analysis:

- A fifth of the sprint time is spent on porting code, because everyone works on separate code branches.
- Whenever issues are found that break the build, the production environment must be rolled back.
- The team has a version control system in place, but does not monitor key performance indicators (KPIs).
- With the increased number of releases more customer feedback, including complaints, comes in.

What will help this team **most** to reduce the time between releases?

A) Adopt trunk-based development to make porting code unnecessary
B) Reproduce test failures to prevent rolling back the live environment
C) Use canary releases to reduce the number of customer complaints
D) Use more telemetry to monitor KPIs that show the business value

A) Correct. Trunk-based development means no branching is allowed and, therefore, the merging of separate trunks is eliminated. This will save time and help reduce the time between releases. (Literature: A, Chapter 4)
B) Incorrect. The problem is the branching, which causes problems while merging. Testing does not solve this.
C) Incorrect. Although canary releases could have a positive impact from the continuous deployment perspective, the largest problem is the time spent on porting code.
D) Incorrect. Although introducing telemetry is a good idea, the largest problem is the time spent on porting code.

14 / 40
What is **not** a benefit of a loosely coupled architecture?

A) Developers can work independently on software changes.
B) Systems can be changed and validated independently.
C) There is a minimum of project management oversight.
D) Unit and integration tests are run automatically.

A) Incorrect. This is a result of a loosely coupled architecture and a benefit because it speeds up the work.
B) Incorrect. This is the definition of a loosely coupled architecture and has many benefits.
C) Correct. This is an aspect of Agile working and unrelated to loosely coupled architectures. (Literature: A, Chapter 5)
D) Incorrect. This is a result of a loosely coupled architecture and a benefit because it saves work and helps to achieve continuous integration and continuous development.

15 / 40
Tina is responsible for improving a products' architecture and application environments. During her first assessment of the applications, she notices the following:

- Deploys could be run at any time by the team as long they notify the service owners of affected services.
- The applications could be deployed using independent components.
- Even though all team members could deploy the applications, only one developer has the access and permission to do it.
- The team needs to run a handful of scripts to connect with the adjacent services that the applications depend on.

How can Tina **best** help her team to prepare a better infrastructure environment?

A) Help the team to create a loosely coupled architecture so they deploy code or release the application independently of other services it depends on.
B) Organize a hackathon with all tech leaders and senior developers to innovate and replace the current infrastructure with a new tightly coupled architecture.
C) Recreate the adjacent applications to remove dependencies so the team can run scripts faster and deploy their applications independently of other applications.
D) Train the team members on deploying the applications safely, give them the appropriate privileges, and make them a part of the change advisory board (CAB).

A) Correct. A loosely coupled architecture enables high performance and testability. (Literature: A, Chapter 5)
B) Incorrect. Hackathons are useful to bring people together or solve a specific problem, not to create a better infrastructure environment. In addition, the architecture should not be tightly coupled.
C) Incorrect. Recreating the adjacent applications would take too much time and increase the overall application cost.
D) Incorrect. CAB meetings might go in the opposite direction of continuous delivery. The CAB should be abolished and replaced by robust testing and automation as much as possible.

16 / 40
A deployment pipeline typically consists of multiple feedback loops.

What is the **main** benefit of using feedback loops?

A) Communication between the Development and Operations teams is improved.
B) High-quality software gets delivered to users more frequently and more reliably.
C) The customers are involved at multiple steps during the development process.
D) User acceptance testing (UAT) is performed regularly to gather stakeholder opinions.

A) Incorrect. Team communication is independent of using feedback loops.
B) Correct. Feedback loops are used to deliver software more frequently and reliably. (Literature: A, Chapter 4)
C) Incorrect. Customer involvement is good, but not the main benefit of using feedback loops.
D) Incorrect. UAT is a form of feedback; not a core benefit of feedback loops.

17 / 40
A software development team has been criticized for deploying features which do not meet customer expectations.

What is the **best** way for this team to improve this situation?

A) Creating a standalone user acceptance testing cycle prior to deployment
B) Lowering the priority of other stakeholder requirements or fully removing them
C) Making requirements static or fixed at the start of each development project
D) Seeking stakeholder insights actively throughout the development lifecycle

A) Incorrect. This activity is too late and segregated to improve the alignment between the development team and the customers' expectations.
B) Incorrect. Requirements should be prioritized based on a variety of criteria, not on which stakeholder group has made recent complaints.
C) Incorrect. By fixing the requirements, there would not be any opportunity to respond to changing customer or business situations.
D) Correct. If feedback does not come to the team automatically, the team should actively seek that input to increase the quality of the product. (Literature: A, Chapter 8)

18 / 40
DevOps, Agile, Scrum, Lean and Kanban can all add value to an organization in their own way.

What **unique** value does DevOps bring to an organization?

A) DevOps allows regular feedback loops from customers by setting a sustainable development cadence.
B) DevOps ensures the Development and Operations teams use the same task board to coordinate tasks.
C) DevOps focuses on releasing continuously to deliver value to the customer quickly in an efficient process.
D) DevOps provides the new services just-in-time while focusing on efficiency by eliminating wasteful work.

A) Incorrect. Feedback cycles are more frequent when development speed is higher, but this is usually due to Scrum or another Agile methodology, and is not unique to DevOps.
B) Incorrect. Working on a single task board is what Kanban would add. DevOps would require the teams to cooperate, not just use the same task board.
C) Correct. Adding value and optimizing processes are the keys to improving business continuity and the Agility of the company. By optimizing processes, allowing experimentation, and introducing continuous delivery, more value can be released to the customer more quickly. (Literature: A, Chapter 1)
D) Incorrect. Delivering just-in-time and eliminating waste are great, but they are mostly due to introducing Lean and are not unique to DevOps.

19 / 40
DevOps aims at increasing customer satisfaction and the customer experience by focusing on adding value.

How is this **primarily** done?

A) By automating testing and deployment
B) By delivering products more frequently
C) By developing well-functioning products
D) By using highly skilled developers

A) Incorrect. The customer is not affected by automation practices.
B) Correct. The aim of DevOps is to deliver high-quality software more frequently and as such improving the customer experience. (Literature: A, Chapter 2)
C) Incorrect. Customers assume the product works well, so this would not increase the customer experience beyond a basic level.
D) Incorrect. Developer skills are not noticed by the customer.

20 / 40
Many DevOps teams use visualization, such as card walls, to steer their development process. Card walls increase the team's visual control.

How does visualization facilitate DevOps practices?

A) By brightening up the office environment to stimulate productivity and employee happiness
B) By giving leaders a way to hold the team accountable for their activities and divide work
C) By helping management to gain control over the team and the work that must be done
D) By positively impacting team culture and performance by making work progress clearer

A) Incorrect. Even though visualizations can look good in the office, they do not stimulate productivity or happiness just by looking good.
B) Incorrect. Work assignment and accountability are not influenced by visualization.
C) Incorrect. Management control is not the aim of visualization and it does not facilitate DevOps practices.
D) Correct. Visualization increases productivity by making the work progress clearer. (Literature: A, Chapter 7)

21 / 40
The Development team can build new features within the requested time, but they are not often delivered on time. An investigation shows the following problems:

- Regression bugs keep recurring.
- Although time is spent on fixing bugs, customers keep complaining about bugs in the live environment.
- The Development team gets really stressed if a new feature is requested.

The underlying problem is that the team's testing strategy is not effective.

What should the team do to solve this?

A) The team should automate all tests and the commit stage, and increase the team members' understanding of the continuous integration process through training.
B) The team should automate all unit tests, component tests, and integration tests, and increase collaboration between testers and the Development team.
C) The team should automate testing and the deployment process, and if necessary upgrade hardware or update the system's configuration management.
D) The team should increase the collaboration between the Development and Operations teams, by increasing monitoring and logging, and by using virtualization.
E) The team should make sure the Development team understands the deployment process, and increase the collaboration with the Operations team.

A) Incorrect. Not managing the continuous integration process properly specifically leads to fewer than once-a-day deployments, broken commit stage, and long integration phase between releases.
B) Correct. A non-effective testing strategy leads to recurring bugs, much time spent fixing bugs, many complaints from customers, a low quality product, and stressed developers. This can be solved by test automation and collaboration with testers. (Literature: B, Chapter 15)
C) Incorrect. Not deploying enough leads to long deployment times, low velocity, skepticism about release dates, loss of trust in the continuous integration environment, and long turnaround time to fix bugs. Automation and upgrades can help solve this problem.
D) Incorrect. This is the way to solve poor configuration management. Poor configuration management specifically leads to unexplained failures in production, unmanageable deployment events, more time for environment configuration, and a long recovery time in the event of failure.
E) Incorrect. Deploying buggy code or not deploying enough leads to long deployment times, low velocity, skepticism about release dates, loss of trust in the continuous integration environment, extended time to fix bugs, finding bugs that developers fixed a long time ago, and few demonstrations and showcases.

22 / 40
Part of DevOps is making sure relevant information is visually displayed for the Developers.

What is the **main** type of data that should be displayed for the Developers?

A) Customer feedback of the day, including complaints and feature requests, to allow developers to fail fast
B) Individual developer productivity, including number of hours worked, to allow developers to compete
C) Overall project progress, including budget information, to allow developers to make strategic decisions
D) Product quality data, including failures and defect rates, to allow developers to make informed decisions

A) Incorrect. Customer feedback is received continually during development and does not need to be publicly displayed.
B) Incorrect. Individual productivity data should not be displayed publicly, and competition is not the DevOps way.
C) Incorrect. This type of data is not essential for the developers. It is management data and does not need to be publicly displayed.
D) Correct. Quality data, including failures and defect rates, are relevant for the developers to have visually displayed. (Literature: A, Chapter 7).

23 / 40
A company has agreed to work in a DevOps way. They are searching for a way to manage the entire scope of their projects that fits with that way of working.

What is the **best** way to manage the scope of a DevOps project?

A) Complete an iteration planning to agree on the items to work at every iteration's start
B) Create a full release plan for features, forecasting to customers what will be released
C) Define what the minimum viable product (MVP) is and review as often as necessary
D) Set the work priorities before each iteration to help the team members pick work

A) Incorrect. Iteration planning defines the work for a coming iteration, not for the entire scope of a project.
B) Incorrect. Release plans are mostly used to forecast what will be released, not to manage the scope of the entire project.
C) Correct. MVP management is used to manage the scope. This fits with DevOps because it is very customer focused. (Literature: A, Chapter 8)
D) Incorrect. Priorities may be helpful with planning, but the minimum viable product is more important. In addition, the work priorities are mostly used to define the work for the coming iteration.

24 / 40
Single-piece flow in software development means that the focus is on a single feature that is continuously worked on until it is done.

Why is single-piece flow important for DevOps?

A) It allows the team to work at a sustainable and predictable pace with a constant velocity.
B) It helps the team to add value by delivering high-priority features when they are relevant.
C) It increases the shared responsibility of picking up tasks among all team members.
D) It reduces bottlenecks by limiting the number of team members that work on a feature.

A) Incorrect. This is what rhythm does. Single-piece flow allows features with the highest priority to get done as quickly as possible.
B) Correct. Single-piece flow allows features with the highest priority to get done as quickly as possible. (Literature: A, Chapter 2)
C) Incorrect. DevOps teams do share responsibility. However, single-piece flow is important because it allows features with the highest priority to get done as quickly as possible.
D) Incorrect. Single-piece flow allows features with the highest priority to get done as quickly as possible. It does not limit the number of people that can work on that feature.

25 / 40
The Tool Company is busy developing an e-commerce site, and this project is a high-stakes project. Customers are dissatisfied and complain about the e-commerce site not working as expected.

Senior managers on the business side argue that working in an Agile way will only increase the risk, while the IT senior managers argue that it is the only way to deliver value fast. The IT managers want to combine Agile with DevOps: releasing often and asking for input.

The Tool Company hires a consultant to make sure they do the right thing.

What advice should the consultant give?

A) Do not work in an Agile way or change to a DevOps way of working because customers are already complaining about the e-commerce site not working as expected.
B) Work in an Agile way, add DevOps practices, give developers the freedom to deploy without external approval and as soon as they can, and gather constant customer feedback.
C) Use Agile and DevOps ways of working to create the e-commerce site but add manual user acceptance testing and a change approval board (CAB) process before releasing.
D) Use Agile and DevOps ways of working within software development but only release finished products to customers to prevent complaints and dissatisfaction from the customers.

A) Incorrect. Although this may seem safe because customers are already complaining, it will make the problem worse. Failing soon and often is the only way to make quick progress and give the customers the value they want.
B) Correct. Although this seems to invite more dissatisfaction and complaints, gathering feedback and quickly resolving these pain points is the fastest way to satisfied customers. (Literature: A, Chapter 8)
C) Incorrect. Agile and DevOps ways of working should not be counteracted by slowing down releases with manual testing and CAB processes.
D) Incorrect. Agile and DevOps ways of working should not be counteracted by releasing only finished products and slowing down the rate of customer value and feedback.

26 / 40
A team has been working well together, but customers are still complaining. The team would like to experiment more and introduce DevOps.

Management will allow the team to experiment and change their way of working, but only if the risks are acceptable. The company policy is to minimize risks as much as possible. The team discusses this problem.

- **Hichem** states that the team should not experiment or change its way of working right now, because this may lead to more dissatisfaction with the customers. Instead, the team should build a customer feedback form.
- **Kira** states that it is always good to bundle changes into large releases to minimize disruptions and outages in the operations environment. Larger releases should keep the quality of the live product higher.
- **Nazim** states that they cannot change to a DevOps way of working until they are performing well and have reduced customer complaints. Additional manual tests should be able to help reduce the complaints.
- **Rose** states that it may sound counterintuitive but working in a DevOps way and experimenting will reduce the risks most. If the team has automated the tests and version control well, this is the best way to go.

Whose suggestion would work best in this scenario?

A) Hichem
B) Kira
C) Nazim
D) Rose

A) Incorrect. Not changing anything and not experimenting would be a mistake in this scenario. Experimentation is necessary to ensure customers get the chance to see something different that they might like.
B) Incorrect. Although this sounds like a logical approach, large releases are riskier than releasing small experiments and gathering quick feedback. If releases and tests are automated well and can be rolled back easily, they should be less risky than large releases.
C) Incorrect. Although experimentation sounds risky, it should help increase customer satisfaction by allowing them to give feedback to small, less risky changes. Waiting for customer satisfaction to increase would be the wrong solution here.
D) Correct. Not every change will introduce more risks. Releases are risky when they are large, not documented well, or tests are not automated, and human error is introduced. Frequent, small changes are less risky, especially if they are easy to roll back. (Literature: A, Chapter 4)

27 / 40
A web shop specializes in 70's and 80's clothing. The web shop is doing well. Their current customer base consists of people that seek period costumes, and clothing rental companies. The company wants to expand.

A team discusses how to expand, and they decide to use hypothesis-driven development. An example of a possible hypothesis for this web shop is that more customers will be attracted to the web shop if its content is presented in a mobile app instead of just on the website.

What should be done?

A) - The customer defines a hypothesis, and the team determines what test or experiment should be done.
- Then the team builds an MVP that supports the formulated hypothesis and tests the customers' response.
- The MVP is reworked after a short feedback round with the customers to ensure the most customer value.

B) - The customer develops a hypothesis based on their needs and the team talks to the customers.
- Then the team builds and tests a prototype and determines the final minimal viable product (MVP).
- The prototype is redeveloped as an MVP and the customer is presented with it to test the hypothesis.

C) - The team gathers information from customers and formulates a hypothesis based on that information.
- Then the team determines which experiment or test can be done to prove or disprove the hypothesis.
- The experiment is conducted and analyzed, and the customer is informed and asked for more feedback.

D) - The team gathers information from stakeholders and formulates alternative hypotheses from this.
- Then the team builds and tests an MVP and presents it to the organization's upper management.
- The final hypothesis is formed based on the results from acceptance tests and the manager's reaction.

A) Incorrect. The same entity should develop hypothesis and test together. Customers generally do not create the hypothesis. If there is a basis, the team could work from that. MVPs should not be built before a hypothesis has been proven true.

B) Incorrect. Customers generally do not create the hypothesis. If there is a basis, the team could work from that. MVPs should not be built before a hypothesis has been proven true.

C) Correct. The team should understand the customer needs and test their hypothesis. An MVP should not be built. (Literature: A, Chapter 4 and 8)

D) Incorrect. This option excludes the customers almost completely, even though the customer feedback is the most valuable.

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What is **not** a likely effect of Lean management practices?

A) The organization gets a more generative culture.
B) The software delivery performance is increased.
C) The team members are less likely to burn out.
D) The managers will pay more attention to profits.

A) Incorrect. Lean management practices focus on creating flow and improvements, which is a more generative culture.
B) Incorrect. Lean management practices focus on creating flow and reducing errors, which usually increases software delivery performance.
C) Incorrect. Lean management practices focus on creating a sustainable place and removing obstacles, which usually means team members are less likely to experience burnouts.
D) Correct. Lean management should not focus on profits. Instead, they focus on creating flow, which is likely to increase customer satisfaction. That last part may lead to increased profits, but is not the management's focus. (Literature: A, Chapter 7)

29 / 40
A team has challenges identifying issues and troubleshooting applications that are deployed into their infrastructure. This is a problem because there are many incidents and outages. Customers call the service desk often with complaints and the service desk must reroute many questions to the team, which puts them under time pressure.

The team has no idea what the root cause of the issues is, even though they have mapped their workflow and follow these processes. The team is working with a Kanban board and seems to have achieved flow.

In the long term, which solution will help **most** to reduce the number of issues?

A) Hire a consultant to remap the workflow and set up new processes on the team's Kanban board
B) Free up valuable work time by instructing the service desk to stop rerouting questions to the team
C) Measure the team members' individual numbers of issues and set up a competition to improve
D) Set up a monitoring strategy by storing data, creating a dashboard, and setting up notifications

A) Incorrect. The team already works with a Kanban board and has achieved flow. There is no clear reason to change the processes or to remap the workflow. The problem is likely outside of the direct processes of the team and should be made visible by a good monitoring strategy.
B) Incorrect. Although this might solve problems in the short run for the team, the problem is likely outside of the direct processes of the team and should be made visible by a good monitoring strategy.
C) Incorrect. Competition is never the DevOps way. The team should work together and not be scared to make mistakes. The problem is likely outside of the direct processes of the team and should be made visible by a good monitoring strategy.
D) Correct. Setting up a solid monitoring strategy, helps the team identify the root causes of the problems, because it gives insight in what goes wrong and how often it goes wrong. This is the solution that helps most in the long term. (Literature: B, Chapter 11)

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A team is struggling to get work done on time. They struggle to get the products to the customers on time.

How does imposing work-in-progress limits (WIP-limits) help this team to establish flow?

A) By changing the roles of all stakeholders and team members involved with the team
B) By helping to identify bottlenecks that help the team to improve and optimize the work
C) By improving the lifecycle management of applications and communication tools
D) By limiting the number of tools and applications that the team needs to use to work

A) Incorrect. Although the team may find that they need to change a role because they are a bottleneck, imposing WIP-limits does not directly or always change the role of stakeholders or team members.
B) Correct. Imposing WIP-limits will always help show bottlenecks and, consequently, help the team improve their flow. (Literature: A, Chapter 7)
C) Incorrect. Although the team may find that they should change the lifecycle management of their applications and communication tools because they are a bottleneck, imposing WIP-limits does not directly or always change this.
D) Incorrect. Although the team may find that they want to limit the number of tools and applications they work with because they are a bottleneck, imposing WIP-limits does not directly or always change this.

31 / 40
A team works on several projects and management puts the same priority on all their projects. This leads to pressure on the team to do work on all projects daily and report progress on each project weekly.

The team needs a way to ensure maximum team efficiency and high-quality deliverables. They want to deliver the highest customer value and business value.

What should the team do?

A) Appoint one team member as a liaison to stop managers from directly talking to the team. The disadvantage is that the team no longer receives direct customer feedback.
B) Keep working in the current way for as long as they can manage to keep everyone satisfied. The disadvantage is that some team members are switching tasks often.
C) Limit the work in progress (WIP) and introduce a visual management technique to the team. The disadvantage is that the team needs to adapt to the new way of working.
D) Split up into smaller teams of two or three team members to work on each project separately. The disadvantage is that not all teams possess the skills to do the work within the team.

A) Incorrect. This seems like a logical solution, but research has shown that creating greater distance between DevOps teams and customers decreases quality and increases project development time.
B) Incorrect. Customers are already unhappy. Keeping to this method of working will not solve anything.
C) Correct. Managing the work and creating flow by introducing WIP-limits and a visual management technique such as a Kanban board will help the team most. It will ensure the highest value delivery. (Literature: A, Chapter 7)
D) Incorrect. Solving one problem and creating another is not the best solution. Although customers may feel that resources are dedicated to their work, dependencies make it hard to deliver quality at a reasonable speed.

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BigBlue Software is a small company that creates software for other businesses. The company has a Development team and an Operations team. These teams both have their own managers, but they work well together. Because the company is small, and the CEO is ambitious, the teams sometimes experience time pressure.

Under time pressure, both teams make errors that have led to bugs in the software and outages. The teams have pulled together on these occasions to solve the outages, or to swarm on a problem to solve it as quickly as possible. The managers are proud of the team members for openly sharing mistakes they made, cooperating to solve it, and delivering customer value.

Would this organization benefit from a change in its Westrum organizational culture typology?

A) Yes, the organizational culture is bureaucratic as can be seen from the team structures with a manager and should be changed.
B) Yes, the organizational culture is pathological as can be seen from the mistakes made under pressure and should be changed.
C) No, the organizational culture is generative as can be seen from the cooperation and sharing mistakes and should not be changed.
D) No, the organizational culture is market oriented as can be seen from the call for customer value and should not be changed.

A) Incorrect. Although the teams have managers, that in itself is not a sign of a bureaucratic culture. The team members are not afraid of sharing the mistakes and cooperating. These are all signs of a generative culture where all teams and team members work together to deliver customer value.
B) Incorrect. Although the teams make many mistakes and are under some time pressure, they are not afraid of sharing the mistakes and are cooperating to solve them. These are all signs of a generative culture where all teams and team members work together to deliver customer value.
C) Correct. The teams show that they make mistakes, but are not afraid of sharing them and they are cooperating to solve them, even across teams. The managers encourage this behavior. These are all signs of a generative culture where all teams and team members work together to deliver customer value. (Literature: A, Chapter 3)
D) Incorrect. It is not clear if the organization is market oriented or not because this is not a part of the Westrum organizational typology. The team members are not afraid of sharing the mistakes and cooperating. These are all signs of a generative culture where all teams and team members work together to deliver customer value.

33 / 40
A team member states that the organization needs organizational learning, sometimes called a generative culture, because it enables helping the customers, ensures quality, and creates competitive advantage and a committed workforce.

Why is this true?

A) Because organizational learning means identifying mistakes and holding individual team members accountable to learn from them
B) Because organizational learning means keeping the team educated on the latest Agile and Lean methods to increase the flow
C) Because organizational learning requires a mindset that makes employees feel supported, and values their judgments
D) Because organizational learning requires a research culture that automatically creates hypotheses to make informed decisions

A) Incorrect. Although learning organizations could identify mistakes to learn from them, a generative culture does not have the goal of holding team members accountable for mistakes.
B) Incorrect. A learning organization means that the organization has a culture that allows experimentation and learning, which reduces burnout and results in continued progress. Simple education in Agile and Lean does not achieve this.
C) Correct. People who feel supported by their employers, who have the tools and resources to do their work, and who feel their judgment is valued, deliver higher quality work. Better work results in higher software delivery performance, which results in a higher level of organizational performance. (Literature: A, Chapter 10)
D) Incorrect. Learning organization does not always mean that scientific research is done, although that could be a part of it. It does not require a research culture and the culture does not create the hypotheses automatically.

34 / 40
A human resource team is asked to write a new policy for hiring DevOps team members.

What is the **best** policy for hiring DevOps team members?

A) Allowing applicants to apply without a name on their resume and preferring applicants that bring diversity to the team, because this leads to better team results
B) Allowing managers to research which employee performs best at another company and trying to buy them away, because this makes the best people part of the team
C) Allowing only those applicants who do not fully feel that they fit in with the organization or with the other team members, because this fosters diversity the most
D) Allowing the team members to select the team member that they identify with most, because this brings more harmony and equality to the entire team

A) Correct. Making sure bias is removed from hiring as much as possible and actively preferring diversity helps the DevOps team to be smarter and perform better. (Literature: A, Chapter 10)
B) Incorrect. DevOps teams thrive on diversity and help the teams to be smarter and perform better. Buying away people from other companies may buy you skills, but not diversity or a sense of belonging.
C) Incorrect. DevOps teams thrive on diversity and help the teams to be smarter and perform better. But diversity alone is not enough; people need to feel a sense of belonging to make DevOps succeed. Hiring people that feel they do not belong achieves the opposite.
D) Incorrect. DevOps teams thrive on diversity and help the teams to be smarter and perform better. Hiring very similar team members is the opposite from diversity.

35 / 40
An organization has changed its management practices to Lean leadership. This is a big change from the old way of doing things, when management would regularly publicly shame coworkers for mistakes they made.

One of the teams is a distributed team. Although the team is much happier with the new leadership style, their communication is not optimal. The team members are not discussing bugs that they create or cooperating to solve problems quickly.

The team manager has introduced a business version of the chat tool that most team members were already using privately, but this does not seem to have the desired result.

What is happening in this team and how should the manager solve this?

A) - The team members are not skilled enough with the chat tool yet.
- The manager should facilitate internal or external training to solve this.

B) - The team members are still adjusting from the former leadership style.
- The manager does not need to intervene in this temporary process.

C) - The team members do not trust the new leadership style yet.
- The manager must be thoughtful and express his pride in the team.

A) Incorrect. The team is using the same tool for private use. It is unlikely that this is the cause for the lack of communication. Since they are not discussing bugs and problems, it is more likely that they do not trust the new leadership style yet.

B) Incorrect. The team is happier with the new type of leadership. It is unlikely that this is the cause for the lack of communication. Since they are not discussing bugs and problems, it is more likely that they do not trust the new leadership style yet.

C) Correct. Since the team is not discussing bugs and problems, it is most likely that they do not trust the new leadership style yet. The manager should show supportive leadership and inspirational communication to solve this. (Literature: A, Chapter 11)

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What is the **largest** direct benefit of making sure team members have meaningful work?

A) It helps to decrease burnout and increases employee loyalty and engagement.

B) It helps to deliver all DevOps projects from the team on time and within budget.

C) It helps to increase the confidence of the team that they can accomplish DevOps work.

D) It helps to retain the team members because no one wants to leave their job.

A) Correct. The largest benefit is in reducing burnout and increasing engagement. (Literature: A, Chapter 10)

B) Incorrect. This is not a direct benefit of providing meaningful work but can be an indirect effect. The largest benefit is in reducing burnout and increasing engagement.

C) Incorrect. Even though the team may feel competent, that does not mean they have the competence to do something. In addition, meaningful work does not necessarily increase confidence. The largest benefit is in reducing burnout and increasing engagement.

D) Incorrect. Although there may be an increase in loyalty, it is overly optimistic that no one wants to leave their job. The largest benefit is in reducing burnout and increasing engagement.

37 / 40
A company has grown exponentially in the last two years. As a consequence, the Development team is experiencing time pressure. Every team member feels like they could use a vacation and some team members are even thinking about quitting their jobs. The team has been calling in sick more than in other years.

The team manager has hired several new team members, but the workload is still perceived as high, although all deadlines seem to be made just in time. To solve the problem, the team manager wants to address the burnout complaints and stress more directly.

Which actions **best** address burnout complaints and stress?

A) - Contract subcontractors for managing the increased workload during peak periods of the year
- Give the team members access to professional mental help programs paid for by the company

B) - Give all team members a month-long vacation to ensure a fresh start when they return to work
- Ask the managers to identify all factors that might be contributing to burnout before the team returns

C) - Have the team members discuss all tasks in the process to discover which tasks are meaningful
- Remove tasks that are not meaningful and ensure the team can make most decisions on their own

D) - Hire a more competent manager who knows how to create work-life balance for the team members
- Allow more time for the team members to settle into the new environment and find a new balance

A) Incorrect. Although this seems to solve the problems of the team, this solution does not address the stress or burnout complaints directly. It just creates a temporary relief and does not address the root cause.

B) Incorrect. Although all team members would undoubtedly be happy with a month-long vacation, this would be very disruptive for the company. In addition, the managers are not the best placed people to solve this problem.

C) Correct. Ensuring that the team members have enough room to exercise their own judgement while doing their jobs and are mostly doing meaningful or at least necessary tasks is the best long-term solution for the burnout complaints and stress. Both these things increase employee engagement and satisfaction. (Literature: A, Chapter 11 and Appendix A)

D) Incorrect. The team manager has picked up on the problem correctly and does not seem incompetent. Hiring a new manager and just giving the team time is not a solution that addresses the team's problems.

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Transformational leadership is said to be one of the most overlooked aspects of DevOps.

Why is transformational leadership essential for DevOps success across the organization?

A) Because commitment from upper management allows them to change processes to counteract resistance
B) Because DevOps will fail if not all employees, including upper management, understand DevOps well
C) Because the changes that are necessary for continuous delivery must be mandated by upper management
D) Because upper management must trust employees and encourage them to experiment without punishment

A) Incorrect. Although commitment by leadership is good, they should not change processes. Instead, leadership should create a generative culture in which the employees can make necessary changes.
B) Incorrect. Although understanding DevOps is important, leadership only needs to create a generative culture in which employees are allowed to make changes for DevOps to work.
C) Incorrect. Although leaders can mandate that changes must be made, this is not an effective way to transform the organization or to ensure buy-in into changes. Instead, leadership should create a generative culture in which the employees can make necessary changes.
D) Correct. Transformational leaders create a generative and high-trust culture in which DevOps can thrive. (Literature: A, Chapter 11)

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Continuous monitoring of the maturity of DevOps in an organization is a critical capability. It enables collaboration across IT specialties, and reduces or eliminates unproductive behaviors that all too frequently appear in organizations with operational silos. Continuous monitoring is different from conventional monitoring.

What is the **main** requirement of continuous monitoring?

A) Bringing a component to the desired status in a fully automated way
B) Getting Development and Operations to work together in each value stream
C) Having organizational alignment and a focus on the production environment
D) Taking a holistic view of the organization's complex application environment

A) Incorrect. Continuous deployment requires that a component can always be fully automatically brought to the desired status, regardless of the component's initial state and regardless of the number of times the component is configured.
B) Incorrect. Delivering value to the customer requires that Development and Operations are working together in value streams and have shared goals and practices.
C) Incorrect. Conventional monitoring requires organizational alignment and limits its focus to the production environment.
D) Correct. Continuous monitoring requires taking a holistic view of the complex application environment of the entire organization. (Literature: C, Chapter 3)

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When looking at an organization's DevOps maturity, it is important to have a multidimensional perspective of the organization, its capabilities, and its maturity in each of these dimensions. The DevOps continuous assessment architecture can be represented as a cube.

What is represented on the sides of the DevOps cube?

A) Flow, feedback, learning and experimentation, governance, deployment, and quality assurance
B) Monitoring, information, communication, assessment, control, and activities
C) People, process, partners, technology, quality assurance, and culture
D) Requirements, processes, resources, organization, maturity, and capability

A) Correct. The DevOps cube represents six dimensions that must be continuously assessed to course-correct the organization's DevOps efforts. The first three represent the three DevOps ways, followed by continuous end-to-end deployment, quality assurance, and proper governance. (Literature: C, Chapter 5)
B) Incorrect. The dimensions shown here are from one of the first examples of using cube models to represent multi-dimensional aspects of assessment and control frameworks. The Committee of Sponsoring Organizations (COSO) was the starting point for many frameworks using cube models.
C) Incorrect. The people, process, partners, and technology dimensions that formed key parts of the Microsoft Operations Framework (MOF) and Microsoft Solutions Framework (MSF) frameworks are often used to ensure a balanced approach to managing technological environments.
D) Incorrect. (Business) requirements, processes, and resources are the three domains of another famous cube. These are the three main domains used in older COBIT (Control Objectives for Information and Related Technologies) versions to ensure a balanced governance approach. Although COBIT did address organizational design/roles, and capability maturity, these dimensions were not represented on the COBIT cube.

Evaluation

The table below shows the correct answers to the questions in this sample exam.

Question	Answer	Question	Answer
1	D	21	B
2	B	22	D
3	B	23	C
4	B	24	B
5	B	25	B
6	D	26	D
7	A	27	C
8	D	28	D
9	C	29	D
10	A	30	B
11	A	31	C
12	B	32	C
13	A	33	C
14	C	34	A
15	A	35	C
16	B	36	A
17	D	37	C
18	C	38	D
19	B	39	D
20	D	40	A

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