

Birla Institute of Technology & Science, Pilani
Work Integrated Learning Programmes Division
Second Semester 2024-2025
Comprehensive Examination
(EC-3 Regular)

Course No. : CSIZG514/SEZG514
Course Title : Introduction to DevOps
Nature of Exam : Open Book
Weightage : 40%
Duration : 2 Hours 30 Mins
Date of Exam : AN

No. of Pages = 2 No. of Questions = 6
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Note to Students:

1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Q.1. Veda Corporation has more than 10,000 employees. Where the IT department for it has about 1,000 employees. The Database Support Group, DSG, has about 30 employees, and there are about 140 application development teams in this organization. And for each of these 140 application development teams, if they require any database related activities, like creating a schema, or creating a table, or adding a column, or any operation related to maintained or managed database; the development team raise the concern to this database support group to do their database work.

Current state of the Database support process is:

3 minutes to submit the ticket, 3 days to wait in the queue, 60 minutes to prioritize. And then, again, another day for it to be in the queue to get the ticket assigned. And then, 30 minutes to actually assign the item for a database administrator to work on. Then, 5 minutes for DBA for requesting additional information, 5 minutes for the developer to provide the required information, then 2 days to wait in the queue, 5 minutes for DBA to set up meeting with the developer, 1 day wait for the developer for this meeting, 15 minutes to meet and finalize requirements, 1 day wait in the queue and finally 20 minutes to finish the work and closed the ticket by assigned DBA.

Express the timeline in minutes (where assume 1 day = 8 hours), and draw the value stream map of the current state of the process. Calculate the value-added time, elapsed time and total cycle time in minutes.

[6 Marks]

Q.2. Answer the following questions:

- a) How does viewing a diff between two versions of a file help you see the bug that was introduced?
[2 Marks]

- b) Adaption of continuous delivery has been challenging in practice. A systematic literature review is conducted to survey the faced problems when adopting continuous delivery. In the following tables, problems and proposed solutions are given. You need to match the problem with the corresponding solution in each table.
[4 Marks]

Table 1

Problem Faced	Proposed Solution
1. Merge conflicts, untestable code, problematic deployment	A. Employ redundancy in production systems to allow seamless upgrades
2. Large commits, database schema changes	B. Build a rollback mechanism to revert updates if critical bugs emerge

3. More deployed bugs	C. Modularize the system to units that can be independently tested and deployed
4. Customer data preservation, deployment downtime	D. Enable incremental development of large features and changes with feature toggles and branch by abstraction

Table 2

Problem Faced	Proposed Solution
1. Broken build, merge conflicts, work blockage	A. Top-management can give a sense of direction for larger groups of people
2. Changing roles , organizational structure	B. Providing help based on the situation at hand
3. Lack of motivation	C. Instead of individual responsibility, the organization as a whole should be responsible for delivery
4. Lack of experience	D. Keeping the build unbroken and removing any blockages is the responsibility and highest priority for whole team

Q.3. John is working on a Full stack retail application with React as Frontend, Node as Backend and MongoDB for Database. All these services are hosted on an on-Prem server. The user base for this application is 850K users. He needs to run some batches every night at 12 AM to generate the EOD reports and he needs to store them. Considering the above scenario, please solve the below problems:

- How can John fix this manual batch run every night? **[2 Marks]**
- What kind of purging strategy does he need to use for Report purging? **[2 Marks]**
- In case of Server failure, what are the issues John will face and how can he rectify that in short term and what should be the long-term strategy John should take? **[4 Marks]**
- What should be done by John to monitor his application 24/7? **[2 Marks]**

Q.4. You are asked by a customer to develop a website. The customer has given clear requirements and GUI mockups. The customer wanted you to follow the traditional Waterfall SDLC process for development.

- Describe the remaining phases of the development and deliverable. **[2 Marks]**
- Due to market conditions, the customer wanted to change some of the requirements. What advice will you provide to the customer explaining the advantages and disadvantages of following the waterfall model in this case? **[2 Marks]**
- Suggest moving towards an alternative development model which can adapt to changes in requirements and justify your answer. **[2 Marks]**
- You being a DevOps consultant suggested transforming the culture for faster time to market. While the organization was asked to list the challenges in monitoring by DevOps & best practices to reduce false positive alerts and alarms. **[2 Marks]**

Q.5. QuickTech organization team is interested in keeping the application in a releasable state. Suggest and justify the possible solutions that QuickTech can implement. **[6 Marks]**

Q.6. XYZ corporation needs to upgrade their environment as a part of hardware refresh for FY 2021. To minimize the impact to the internal and external customers organization is willing to perform upgrade in phased manner. Definitely cost must be considered as a constrain. Suggest and justify a two different deployment strategy they should follow for smooth transition. **[4 Marks]**