1. **UPS is an American shipping and supply chain management company that intends to use digital tools to synchronize its operations and logistics strategy to better meet customer needs. They ran interviews with a portion of their customers and concluded that there are two major customer experience challenges UPS need to deal with: 1) fast delivery and 2) real-time package tracking. As a chief Innovation Officer (CIO) at UPS:**

a) ***Can you propose a solution that can significantly improve the customer and stakeholder experiences and enhance efficiencies of the company operations?***
First, I would optimize the delivery route that the trucks run every day, then invest in more trucks so there is less packages pr. truck, ergo faster delivery. In big cities and communities, we can use all electric vehicles that is smaller than a truck so they can fit into narrow streets where a truck would get stuck. Since the vehicles is all electric it would also be more sustainable. Another thing I would consider is package boxes placed over a big area. UPS will deliver the package to this box, then the customer will get a message that the package is ready for pickup. The package box is open 24/7, so the customer can collect the package when they have time.

For tracking I would use a GPS tracking device in the trucks that can show the customers real-time tracking of the package. When the package is loaded on to the truck the customer will get a notification that the package is on route, then they can open the UPS app and get real-time tracking of the truck that carries the package.

b) Describe what emerging technology you will use to implement that solution?
For this I would use Ai and IoT as main emerging technology.

c) ***Define your role as a CIO within UPS?***

As a Chief information Officer, I have responsibility to maintain and see to that the sourcing, infrastructure, applications and the business operations etc. are running smoothly.

d) ***If your business has a gap in the skills required to implement your innovative solution, how would you help your business to bridge that gap?***

Either hire a new employee who has the relevant education for the job or send my other employees on all the essential courses to get all the information they need to do the job.

e) ***Which SDGs your digital transformation solution will positively impact and how?***

My solution will impact:

Decent work and economic growth: by getting more vehicles to transport packages we create more jobs for people. This will have a big impact on the workload to the employees, and the economic growth, not just for the company but also for the state because of the taxes the employee is paying.

Industry, innovation, and infrastructure: by implementing emerging technology like Ai and IoT we can create a more sustainable infrastructure and be recognized as a good example of the industry who chooses to be innovative.

Sustainable cities and communities: by having a focus on mainly all electric cars we increase the sustainability in the cities and communities. Also, when the driver delivers the packages to the package box he doesn't need to drive that much as if he was delivering the packages to the houses.

Climate action: The idea of using all electrical vehicles indicates that we are for climate action and are willing to work for bettering the climate by driving more echo friendly.

2. The COVID-19 pandemic has affected the education industry and nearly all institutions have been adopted to digital education approaches that make it safer for both students and teachers to meet social distancing constraints while keeping the academic standard unaffected. Major problems with remote learning are the limited access to labs and lab equipment and inability to monitor suspicious activities such as opening tabs, chat boxing in the background, picture exchange and more while students are taking home exams.

a) ***Propose a digital solution to help students to collaboratively run lab experiments from their own locations while enhancing the real feeling of objects and their learning experience?***

I would consider using remote desktop combined with VR (virtual reality) to help the students run lab experiments from their own locations. By using remote desktop, the student can access programs and application that the schools' labs have, and by using VR we are giving the students a real feeling of being in the classroom/lab.

b) ***Propose a solution that can monitor students' activities during home exams such that it can provide real-time feedback to prohibit suspicious actions and enhance credibility and fairness of such exams in the future?***

Since we are using Inspera to take the exams, the creators behind Inspera can build in a function that tracks the activity on the computer when the exam is taken. This requires that the students consent to giving this information to Inspera while doing the exam. In this way Inspera can monitor what tabs the student using and to see if the student has active calls on discord, skype etc. Another way is to make the students use web-camera so they can see in real-time if the students are

collaborating with each other.

c) ***Describe the emerging technologies you will use to develop these solutions?***

I would use Ai for facial recognition of the student if they were using a webcam and IoT to track the students' tabs and activity on the internet while taking the exam.

d) ***What are the challenges that might impact online learning?***

The challenges of online learning vs offline learning are that the students don't get the feeling of being in the classroom. This can affect the motivation to the student, making them slack on lectures, assignments etc. Also, a lot of students struggle with anxiety, making it hard for them to ask questions to the professor during a zoom lecture. This can result in the student not understanding what the professor is talking about and struggles to keep up with the rest of the lecture.

e) ***Refer to 1e), which SDGs your digital transformation solution will positively impact and how?***

This would impact:

Quality education: By making the same rules for every student we are giving them a fair shot at the exams to get a good grade. This means that the students must work for their grade, instead of cheating their way to a good grade. By making the student work harder preparing for exams the quality of the education goes up.

Peace, justice, and strong institutions: By doing this we are building a strong institution built on justice. When the students can´t cheat their way to a good grade they will put in the work to pass the exam. By doing this we will contain the peace within the students, because nothing upsets a student more than seeing someone who cheated get a better grade than you when you worked "your ass off" for the grade.

3. As hospitals strive to provide the right care to the right patient at the right time, healthcare providers need to do two things: evaluate patients' needs accurately and manage hospital resources effectively. Shortage in healthcare staff can lead to overworking, crowding and hence more medical errors, and patients feel neglected.

a) ***Propose a digital transformation strategy to mitigate healthcare personnel staffing shortages in hospitals to lower operating costs and enhance services?***

Thinking big, we could use robots to medicate the patients. This can be done by storing all the information of the patient in the robot, then connecting the robot to the equipment used on the patient for monitoring. When the monitor shows that the patient need medicine, the robot will provide the medicine in the exact dose the patient need. By doing this the healthcare staff can focus on the patient by giving them the right diagnose so the robot can take over, then they will have more time to spend with the patients talking and caring for them. This will decrease the hard workload on the staff and will result in less sick days and sick leave, which will impact the operations costs positively and enhance the service.

b) ***What emerging technologies you will use to accelerate the proposed transformation?***

In the robot I would use emerging technologies like deep learning algorithms and quantum computing to make the robot more independent so the robot can think and make their own decisions based on human interaction.

c) ***State advantages and disadvantages of implementing this solution on the cloud. State the four different cloud models?***

The four cloud models are: private cloud, public cloud, hybrid cloud and community cloud. The model I would use with my technology is a hybrid cloud. The reason behind this is because the information we are storing about the patients are confidential, and therefore we must use a cloud that has a strict data

privacy regulation.

The advantages of using the cloud to store information is that the information is that the information is always available within the hospital. So, when a patient is transferred to another unit in the hospital, they still have access to the patients' medical files so they can set up the robot.

The disadvantage of using the cloud to store information can be if the power blacks out so the robots can't access the medical files that they need to do their job, or if someone hacks the cloud and steals private information about the patients.

d) ***Hospitals and healthcare providers as non-profit/public organizations does not have the skills and resources to finance, develop and run such projects. Can you propose a way to accelerate and complete this solution so expected services are delivered to the public on the right time?***

They can collaborate with a tech company that wants to develop this kind of technology, making it a hybrid project in the first run. By doing this the state can see if the costs to getting the robots is greater than the costs, they pay in operations costs etc. Say the state must pay 500 000 dollars for the robot and technology around it, but the operations costs for the hospital alone is 2 million dollars because the hospital has many employees on sick leave because they are overworked. Then the state should investigate if they can use this technology to decrease the sick leave and overworked staff, and if this can give the hospital green numbers in the accounting in the long run.

Another way is to have fundraisers for the hospital so they can collect money to get the technology and the training the employees need to use the robots.

e) ***Refer to 1e), which SDGs your digital transformation solution will positively impact and how?***

This will impact:

Good health and well-being: By using this technology we are ensuring healthy lives and promoting the well-being of our patients no matter their age.

Decent work and economic growth: By using this technology we will decrease the staff´s workload, making the workplace better and hopefully this will result in less sick leave and overworked staff. This could also have a positive impact on the economic growth within the hospital.

Industry, innovation, and infrastructure: By taking on this technology we are fostering innovation and building a resilient infrastructure that also other hospitals can use.

4. Industrial digital transformation can be defined as the minimum effort to stay in business.

a) ***In the commercial sector, industrial digital transformation is driven by two kinds of strategies: defensive and offensive strategies. Define and compare between the two strategies with examples?***

Saying we are running the bank DNB, and we are now seeing other banks like Sparebank 1, Husbanken etc. is evolving and getting more customers, we would like to compete better to get the customers over to our bank instead. To do this we can use two strategies:

Defensive strategy is when we "attack" the problem as it comes, meaning if Sparebank 1 creates a mobile app for paying bills with a monthly fee, we can also create a mobile app for paying bills, but does not take a monthly fee. By doing this we are constantly competing with other banks by giving the customer what they want to a lower price.

Offensive strategy is when we think long ahead and come up with new technologies and apps that can improve out customer service, without it being a direct response to other banks improvement. This can be like the developing of Vipps, when it first came you could only send money to people you knew, then you could use Vipps to pay bills, pay to organizations and now Vipps is implemented as a payment solution in online and physical stores.

b) ***Crisis has always helped industries to identify an opportunity for transformation. A new survey finds that responses to COVID-19 have speeded up the adoption of digital technologies by several years ahead. Explain that with examples?***

Some examples of this are local stores making an online store so the customers still can buy products from them, but without visiting the store. Also, we can see a change in the healthcare sector where you now can book online appointments with

doctors and get prescriptions online. But the change that most of us have experienced out self during the pandemic in the increase of working from home. Many businesses have experienced that their company moves 40 times as quickly after implementing remote working and most of them are saying that they will keep on doing this after the pandemic.

c) ***Define technical debit?***

I´m assuming you're referring to technical debt which is describing the results when the development teams are speeding up the process of a functionality or project because it´s needed asap. When this happens it´s common that they deliver a functionality or project that needs to be refactored later.

d) ***What are some of the leading indicators of failure in an industrial digital transformation?***

Regression: This is when the business think that they are transforming, but they are taking use of old technology etc. that they should have used years ago.

Underperformance: This is when the business is underutilizing the digital transformation, not giving it their full focus and investments to make progress.

New Digital Initiatives: This is when the business tries to make a new digital product, but the product fails to meet the requirements, so they must shut down the project.

e) ***What is lights-out manufacturing? How is industrial digital transformation driving lights-out manufacturing?***

Lights-out manufacturing is when the manufacturing is based on automated systems, so it does not require human presence to turn off and on light, controlling ventilation etc.

The way industrial digital transformation is using this is by making automated systems and solutions for businesses so their operation can drive more efficiently, saving time and money so the employees can focus on other areas on their work.

One example of this can be self-service checkouts in stores. When customers are using this the employees can use their time on the floor doing other tasks that require human presence.