Q1.

Ans. Infrastructure as a service, Platform as a service and Software as a service are the 3 main types of cloud services.

In IAAS, physical servers, storage, networking and virtualization are provided as service, this helps you with saving the cost of setting up the hardware that is required. You would still require a platform of your own to build applications and run them on. E.g., Any locally built company require Physical servers in other countries to reduce latency so that they are able to build their customer base and retain them.

In PAAS, all that IAAS provides plus the Operating System that is required to build applications and the runtime required to compile the code written to create that application is also offered with any middleware necessary. E.g., A startup would not have the budget to setup a platform to build their applications that has the power to visualise their idea. Hence, they opt for platforms that help them build applications but do not require the actually buying the hardware or the software that the particular hardware uses.

In SAAS, in addition to what PAAS as to offer, the application as whole is given as a service. Thus, any data that the application collects through its functionality is provided. E.g., A banking company would require a software to analyse their huge volume of data.

Q2.

Ans. Private cloud, public cloud and Hybrid cloud are the three different cloud deployment models.

When an organisation handles highly sensitive data and do not want the hassle of data leak usually deploy a private cloud. These usually are build with a firewall that only the particular organisation can use. The problem though is the cost that it requires since everything from hardware to the software is owned and maintained by the organisation. E.g., Defence department and Defence development organisations have this type of cloud deployment as they handle very sensitive data which when leaked would cause the country a lot of problems.

IT enthusiasts and developers, basically startups, require a public cloud as they require scalability and a service that can handle huge amount of data. Public clouds have low cost and management issues. Since management is taken care by the service provider, these are great options to companies and startups. But potential risks are security and sometimes lack of performance in the name of availability and optimisation. Public servers are a shared resource hence performance when required may not be available due to high demand and as it is a shared resource, they have a security concern as well, this can be due to lack of knowledge of the user of how their data is being stored and maintained.

The last model is the hybrid model where in the benefits of private and public are employed appropriately. These are essential when it comes to handling huge amounts of data and when they have to be analysed. But the main problem with hybrid model is that integration could be challenging in certain scenarios.

Q3.

Ans. Machine Learning is used to perform statistical analysis. Analysis basically can only be done when there is an understanding of what the data is and what are the methods that can be used to analyse the data. This can be done when the machine is trained on how to handle certain data and situations. To train the machine, a model is built based on the existing data. This can involve a huge volume of data.

Q4.

Ans. Data Migration: Migrating data is not a simple task. This may involve platform not matching to infrastructure not being capable. Migration of data may also involve integration. Data being stored on the client server may be stored in a format, this data when migrated has to be made suitable to the storage format of the server that’s providing the service. But the main problem with migration is the cost. To migrate data certain investments are required ranging from hardware to software.

Security: Sensitive data, when it exists within the premises lacks the threat of being stolen or hacked into as the organisation/ company would have a firewall preventing this. But when the data is migrated to a shared server, it has the potential to be hacked or unavailability or loss of data. All this could be serious issues when it involves important stakeholders or if the data stored was sensitive such as health records or bank details.

Change in management: Some data/ functionality of the software requires proprietary hardware. This needs to be provided by the service provider which may involve changing the hardware owned or reconfiguring it. This would bear additional cost and time.

Q5.

Ans. Mining has taken a huge advantage of both the cloud and AI technology. Since Mining locations are not suitable to have costly hardware that also require high power, the introduction of cloud technology solves this problem.

Mining may involve powerful analysis of data that can be handled by cloud hardware/ infrastructure. This analysis could involve knowing the best route for trucks to take to reduce fuel consumption or how the mining load should be transported that it does not cause a delay.

To solve these problems not only is cloud important but also AI. These problems when analysed by a man can take a lot of time to solve and also may produce only a limited number of solutions. But when a machine that was trained on a huge amount of data make this prediction, it results in a much better solution.

For predictions to be made, data is required, this is the place where IOT shines. IOT can help which collecting data through sensors and transmit this data to machines that predict based on this data. Also, a lot of mines have driverless trucks that follow a certain path and load/unload based on the situation. This is achieved by the combination of sensors and the data collected from the sensors that AI uses to predict and take actions.

Employing cloud, IOT and AI practices in the field of mining has not only reduced the cost/ time but also human lives. Treading dangerous terrain or collecting data/ materials from places that are surrounded by hazardous gas/ liquids are now being done with the help of automated machines.