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Practical no-1

* Creating EC2 instance using AWS

Step by step process to create on EC2 instance

Step 1 : Search EC2

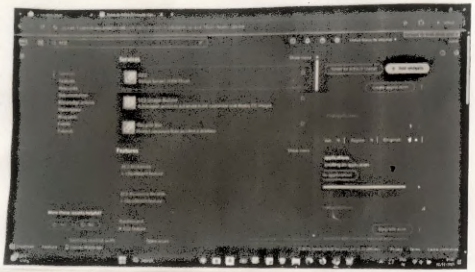
- Log in to your AWS Management Console
- In the search bar at the top, type EC2
- Click on EC2 from the search result to open the EC2

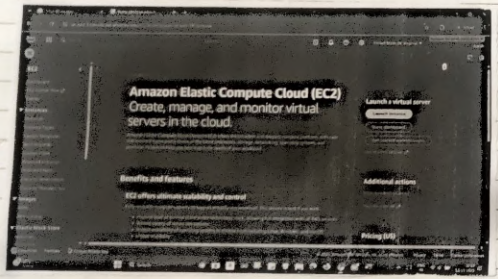
Step 2 : Launching Instance

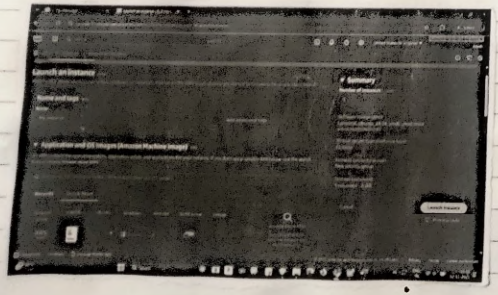
- In the EC2 Dashboard Click on the "Launch Instance" button
- This start process to create a new virtual machine

Step 3 :- Configure Instance Detail

- Enter name
  Give your instance descriptive name
- Choose on AMI
- Choose instance type
- Create key pair
- Set security group
- Click launch Instance







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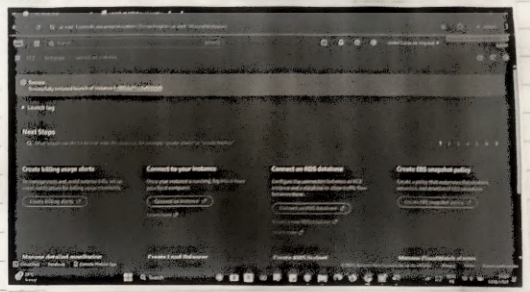

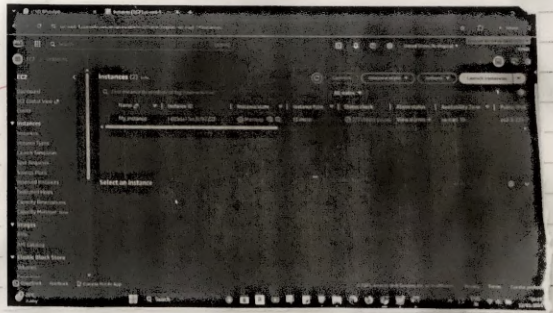

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Practical No- 2 (Lambda)

1] Overview :
Lambda allows you to run code without provisio
or managing server. It automatically sales based
on incoming events.

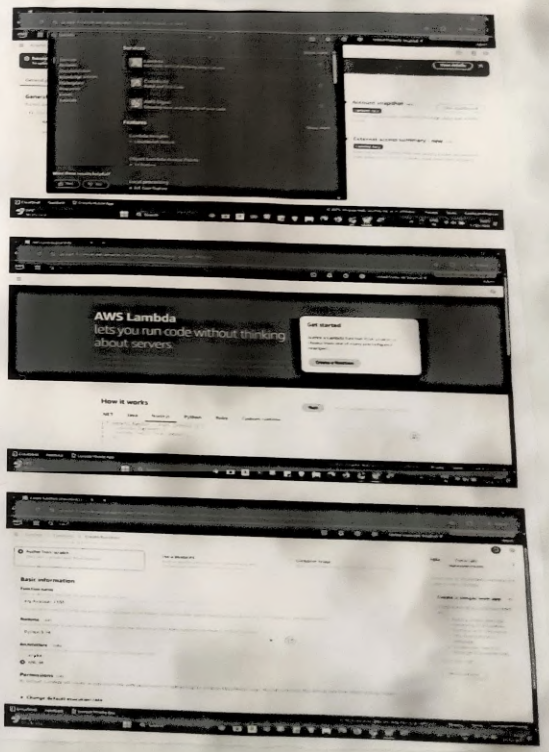
2] Use cases :- - Serverless backend
- Cloud watch
- API Gateway
- File processing

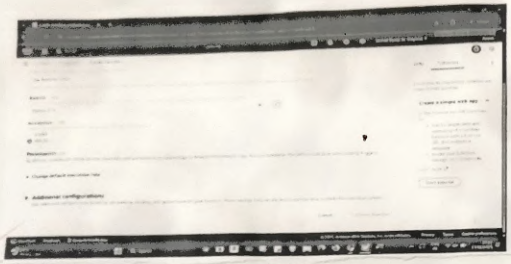
3] Benefits :- - No server maintenance
- Automatic scaling
- very cost efficient

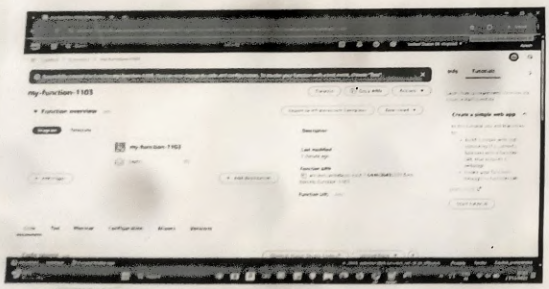
4] Advantages :- - Easy to delay small function
- Integrates with many AWS server.
- High availablity by default

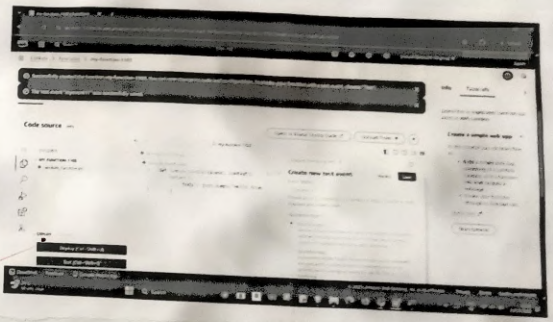
5] Disadvantages :- 15 min execution limit
- Cold start delay
- Not good for heavy computatio

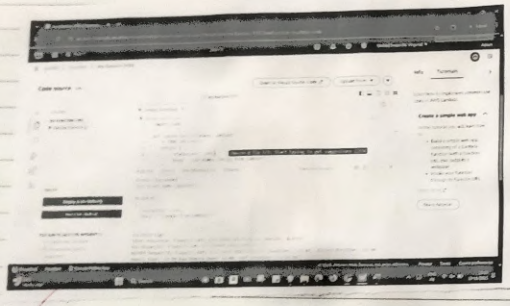
6] Steps :- 1 Go to AWS console → Lambda
2 Click create function
3 Choose Author from scratch
4 Select Runtime
5 Assign Execution Role
6 Write or upload code
7 Configure Trigger
8 Save & test with sample event






my-function-1103


Code source



Practical No - 3 (Amazon S3)

① Overview :-
S3 is an object storage service used for storing files backups logs. image, videos & static website.

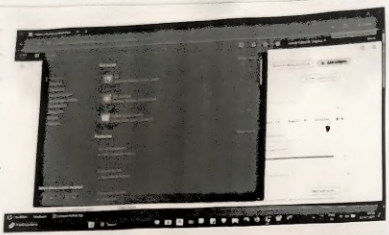
② Use Case :-
- Backup & restore
- Static website hosting
- Data lake storage
- file sharing

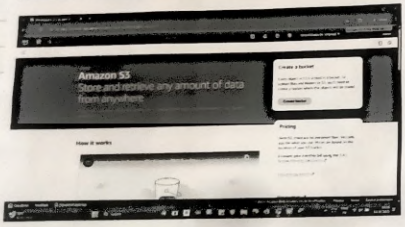
③ Benefits :-
- 99.999999 % durability
- Infinite storage.
- very cost effective.

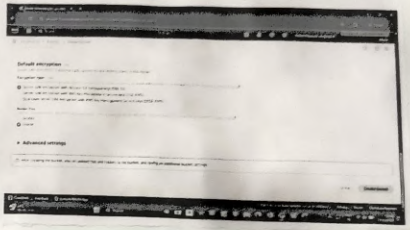
④ Advantages :-
- lifecycle rules
- cross - region replication
- versioning support.
-

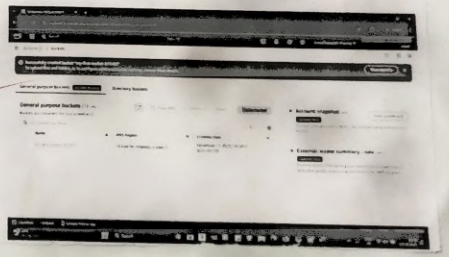
⑤ Disadvantages :-
- Not for databases
- Data transfer out is costly.

⑥ Steps :-
① Go to S3
② Click Create bucket
③ Enter bucket Name
④ Choose region
⑤ Enable | Disable versioning
⑥ Create & upload object




Amazon S3
Store and retrieve any amount of data from anywhere
Create a bucket
How it works
Pricing


Default encryption
Advanced settings


General purpose buckets
Directory buckets
General purpose buckets

21/11/25

Practical : 4 (IAM)

① ~~IAM~~ Overview :-
IAm manager users, group, roles & permissions to secure access to aws resources

② Use cases :- - Adding users to AWS account
- Giving permission using policies.
- Creating roles for EC2 / Lambda
- Enforcing security best practice.

③ Benefits :- - Highly secure
- Free of cost
- Centralized access control

④ Advantages :- - follows least privilege principle
- MFA support
- policy - based management

⑤ Disadvantages :- - Policies can be complex
- One misconfiguration : security risk

⑦ Steps :- ① Open IAM
② Go to users
③ Add username
④ Choose access type
⑤ Attach policies
⑥ Download credentials
⑦ Assign MFA if needed

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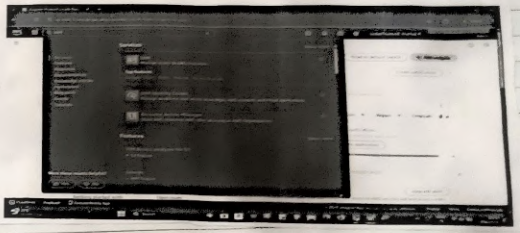

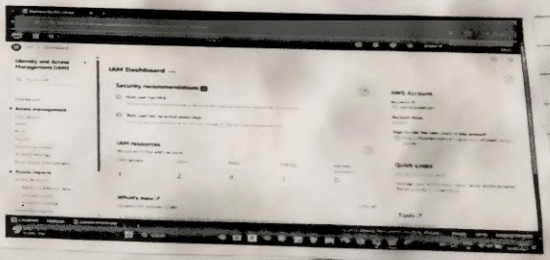

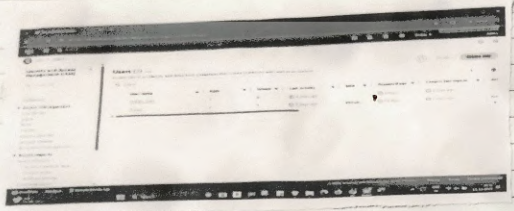

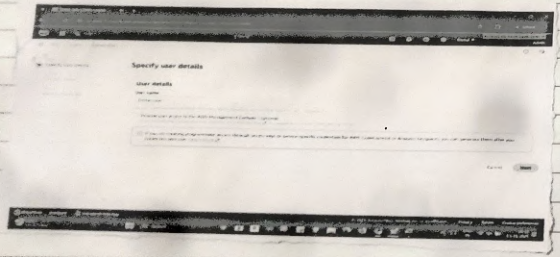

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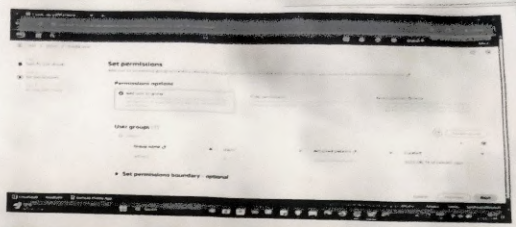

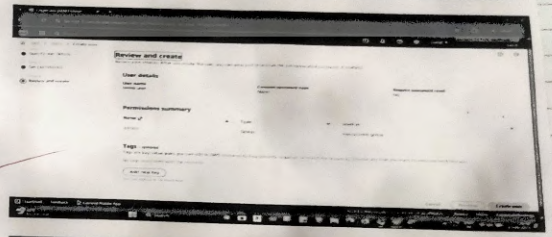

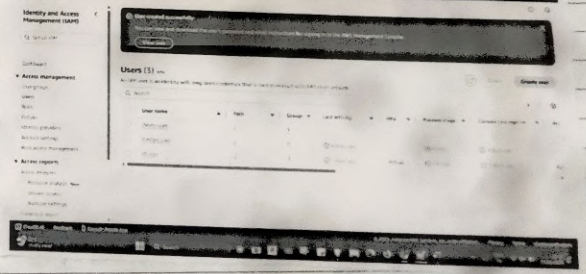

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Practical No. 5 (Amazon VPC

① Overview :
VPC is private virtual network where you control subnet routing, IP's & security

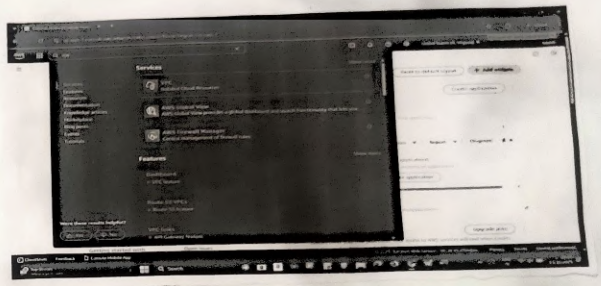
② Use cases :- Hosting EC2 & RDS
- Creating secure application network
- Isolating environment
- VPN connectivity

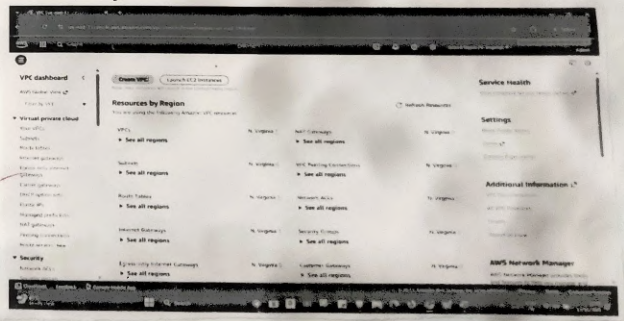
③ Benefits :- Full network control
- High security
- Custom routing

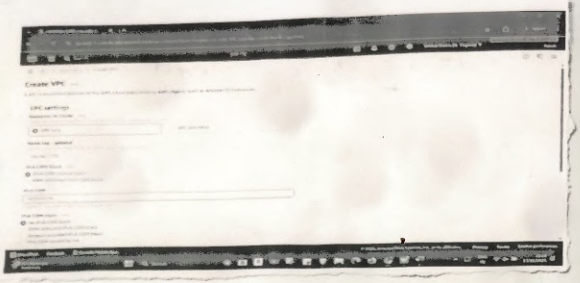
④ Advantages :- Public & private subnets
- NACL's & security groups
- Peering & VPN support

⑤ Disadvantages :- Networking knowledge required.
- Misconfiguration can block traffic

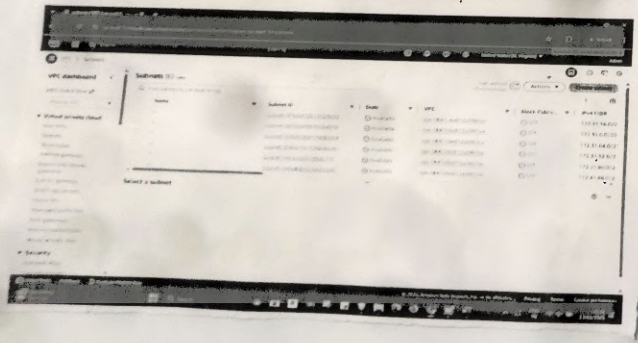
⑥ Steps to create VPC :- ① Go to VPC
② Click create VPC
③ Enter CIDR block
④ Create subnet
⑤ Create Internet Gateway & attach to VPC
⑥ Update Route tables
⑦ Launch EC2 inside VPC



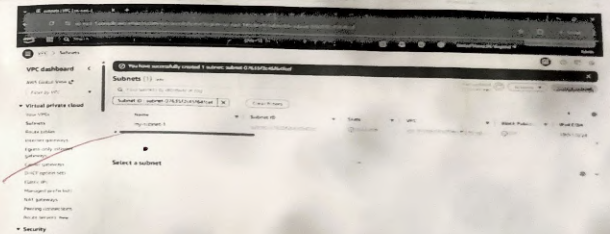



Create VPC

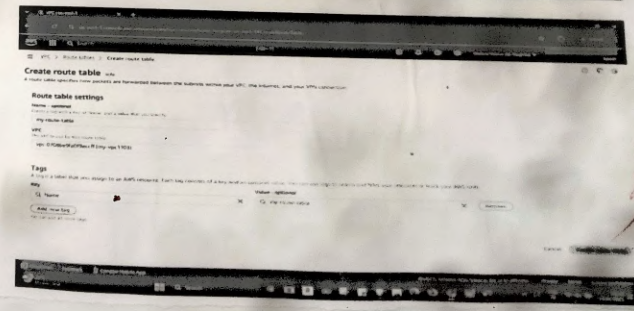
VPC dashboard
vpc-0708be9fa0f9eccff / my-vpc1103
Details
Resource map
VPC
Subnets (3)
Route tables (1)


VPC dashboard
Subnets
Select a subnet

Tags - optional
Create subnet


VPC dashboard
Subnets
Select a subnet

7.


Create route table
Route table settings
Tags

8.

Practical - 6 (Amazon RDS)

* RDS:-

Amazon RDS is a managed database service that supports SQL databases such as mySQL, PostgreSQL, MariaDB, SQL Server & Amazon Au...

Use case:

- Web & mobile applications requiring relational data.
- E-commerce platforms with high read/write operations
- Analytics & reporting workloads
- Enterprise applications (ERP, CRM)

Advantages:

- Fully managed
- high availibility
- Scalable
- Secure
- cost effective

Disadvantages:-

- Limited full control
- Some configuration restrictions
- Cost can increases
- Slow scaling.

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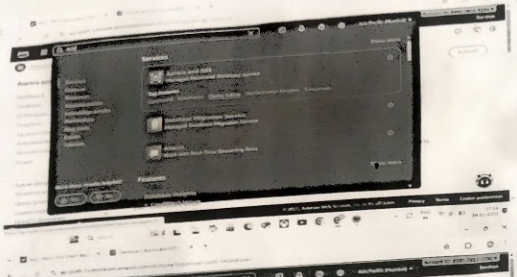
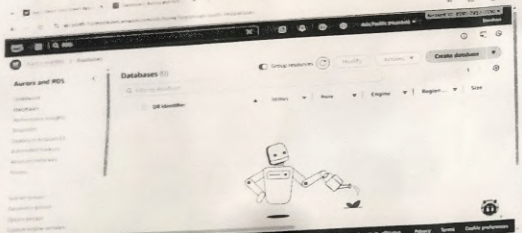
Benefits:-

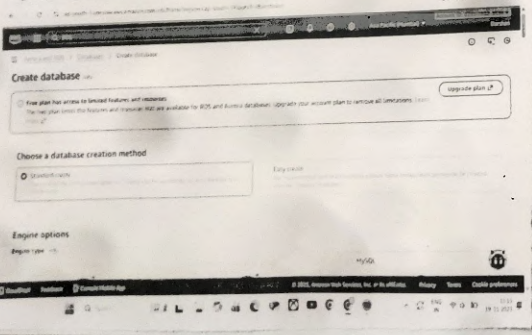
- Reduces operational overhead
- improves database reliability & uptime
- enhance data security & complience

steps:-

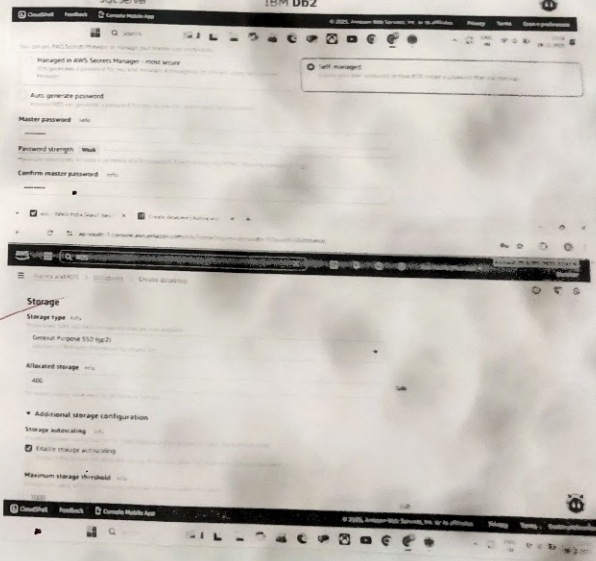
(i) Login to AWS console to RDS
(ii) Click create database
(iii) Choose standard create or easy create
(iv) Select a database engine.
(v) Choose a template
(vi) Enter DB instance identifire, username & password
(vii) Select DB instance class
(viii) Configures storage
(ix) Set connectivity
(x) Enable / Disable multi
(xi) Configure backup, monitoring, encryption
(xii) Review all setting - Click create database
(xiii) Connect using the end point from the RDS dash board.

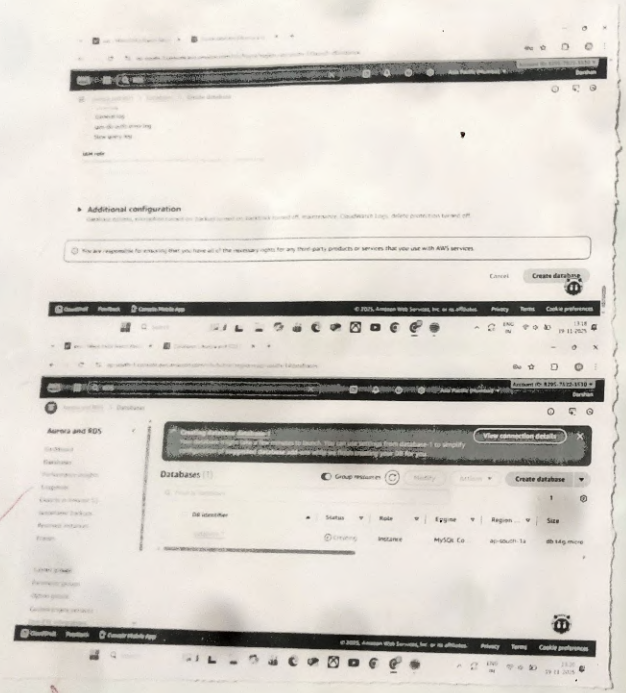



Databases
Create database


Create database
Choose a database creation method
Engine options

Engine options
PostgreSQL
MariaDB
MySQL
ORACLE
Microsoft SQL Server
SQL Server
IBM Db2


Storage
Storage type
General Purpose SSD (gp2)
Allocated storage
400
Additional storage configuration
Storage autoscaling
Enable storage autoscaling
Maximum storage threshold



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Practical No- 7 (Docker image)

* Docker Image / Container (AWS)
  - Docker image = packaged application.
  - Docker container = running instance of the image.
  - Amazon services used - ECR (store image) ECS / fargate (run containers), EC2 (run manually)

Use cases :-
- Microservices
- Web app hosting
- CI/CD deployments
- Batch jobs
- API hosting.

Benifits :-
- Portable & consistent
- Fast scaling
- Easy rollback with tags
- Works well with CI/CD.

Advantages :-
- Immutable deployment.
- Tight integration with ECR/ ECS
- Serverless option
- Resource isolation

Disadvantage:-

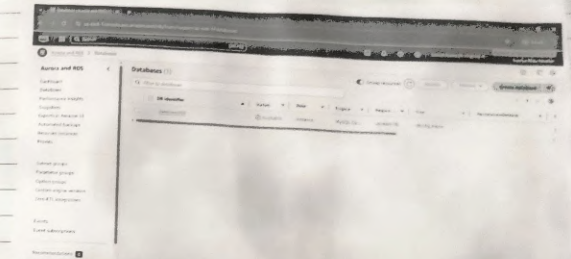
- large images = slow
- Needs networking & IAM setup
- can be complex for beginners
- Working scaling = higher cost

Steps

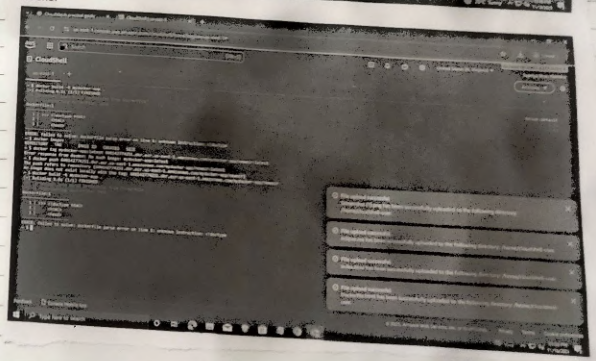
(A) Push image to ECR
(i) Write docker file
(ii) Docker build image
(iii) Create ECR Repo.
(iv) Login to ECR
(v) Tag image
(vi) Push image → ECR

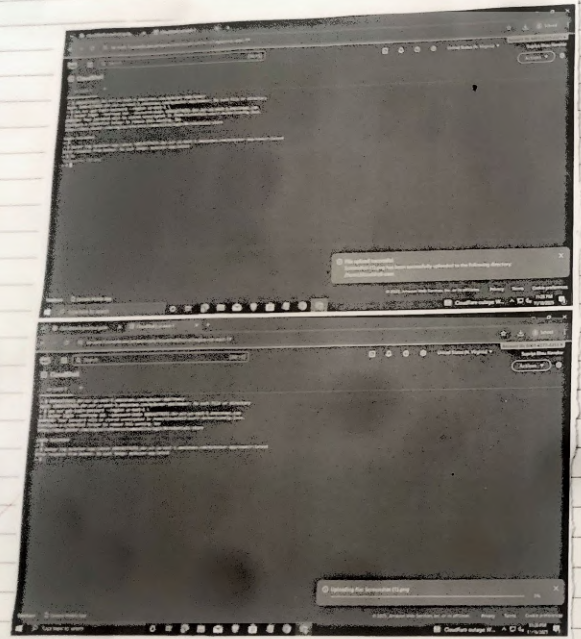
(B) Deploy on ECS (Fargate)
(i) Create ECS cluster
(ii) Create task defination
(iii) Create service
(iv) Attach VPC + security group
(v) Add load balancer
(vi) Run & test container

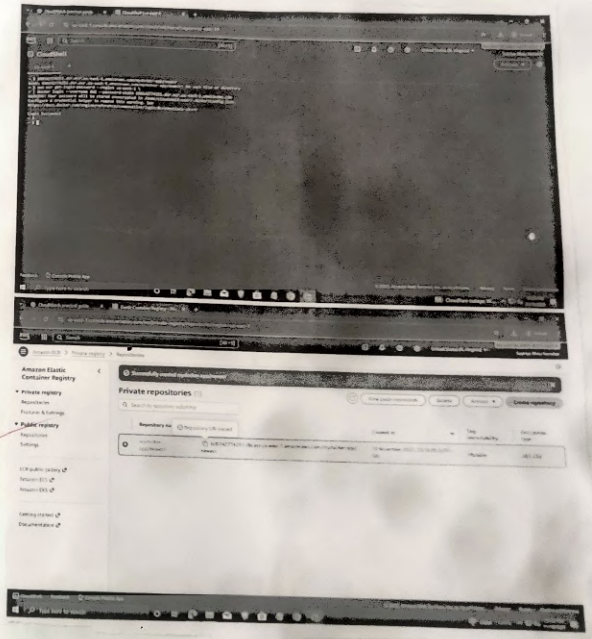
(C) Run on EC2
(i) Launch EC2
(ii) Install docker
(iii) Pull image
(iv) Docker run -p 80:300
(v) Access via EC2 Public IP



docker







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Practical No-8 (cloud watch)

* Amazon cloud Watch:-

Cloud Watch is a monitoring & observability services used to track logs, metrics, alarms, events & monitor AWS resources in Real time

Use cases:-
- Monitor EC2, lambda, RDS, ECS, S3
- Store & search application logs
- Set alarms for CPU, memory, errors
- Auto scaling triggers
- Dash board creation

Benifits:-
- Centralized monitoring
- Real time alerts
- log retention & analysis
- helps optimize performance

Advantages:-
- No servers to manage.
- Integrates with all AWS services
- Custom metrics supported
- supports dash board + Alarms

Disadvantages:-
- log storage can become costly
- Metric delays (30-60 sec)
- Querying logs is slow for large data.
- Complex pricing structure.

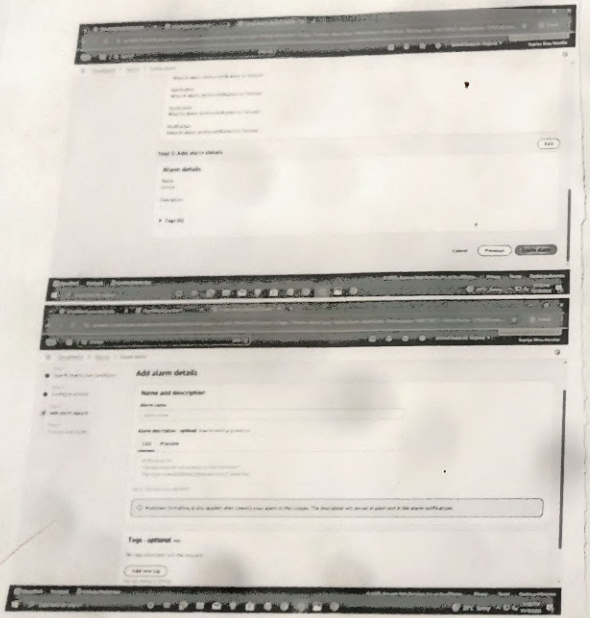
Steps:-

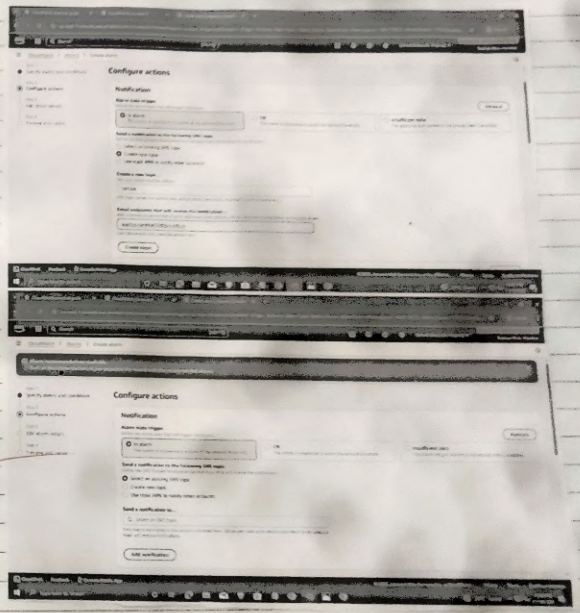
(A) View metrics:-
(i) Go to cloudwatch → metrics.
(ii) select AWS service (EC2 / lambda / RDS)
(iii) View CPU, memory, network etc.

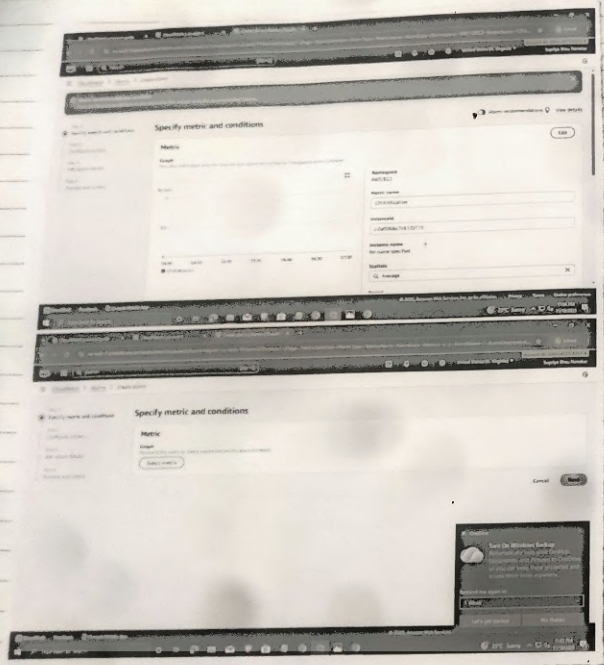
(B) Create Alarm:-
(i) Cloudwatch → Alarms → Create Alarm
(ii) choose metric (eg EC2 / lambda CPU 75%)
(iii) Set threshod
(iv) choose notification via SNS
(v) Create alarm

(C) Enable logs.
(i) Send logs from EC2 (cloudwatch agent)
(ii) send logs from Lambda (auto)
(iii) Send logs from ECS (awslogs drive)

(D) Create Dashboard:-
(i) Cloud watch → Dash boards - Create
(ii) add widgets (graph, numbers, logs)
(iii) Save dashboard to monitor all resources


Alarm details
Add alarm details
Name and description
Tags - optional


Configure actions
Notification
Configure actions
Notification



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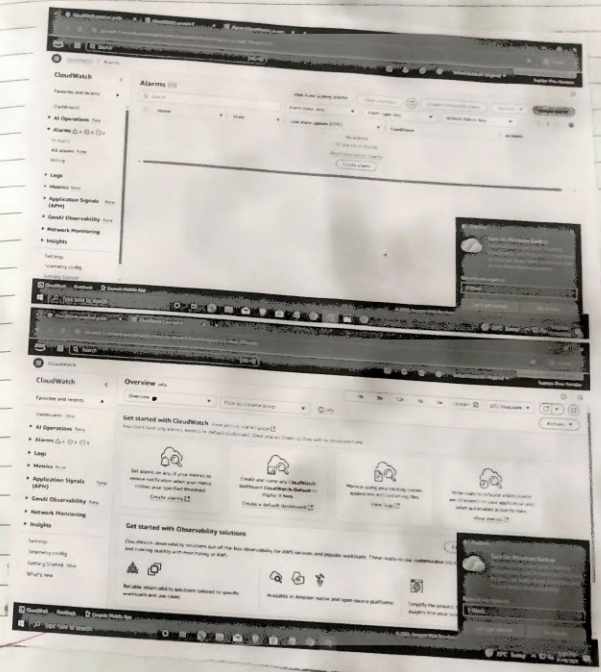


Practical No-9

* Azure SQL database:

- Azure SQL database is a fully managed relational database service built on microsoft SQL server.
- It handles backups, updates, scaling & high avalability automaticaly.

Use cases:

- Web / app backend databases.
- ERP/ CRM systems
- Data storage for API
- Cloud migrations from on-prem SQL server
- Reporting & analytics.

Benefits :-

- fully managed
- Automatic backups
- secure
- high performance & scaling.

Advantages:

- No maintainance (Microsoft manages)
- Works with SMS, VS code.
- Supports automatic tunning
- ~~Sty~~ Geo-replication available

Disadvantages:

- Can be costly at higher tiers
- limited control on prem SQL
- Storage cost increases with size

steps:-

① Go to Azure portal:-
- Search "SQL databases".
- Click Create.

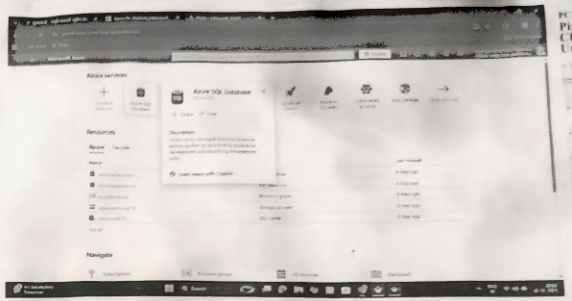
② Basic settings:
- Resource group → Select / Create.
- Database name
- Server → Create new SQL server

③ Compute + Storage:-
- Choose service tier (Basic/Standard)
- Choose DTU is or vCore model

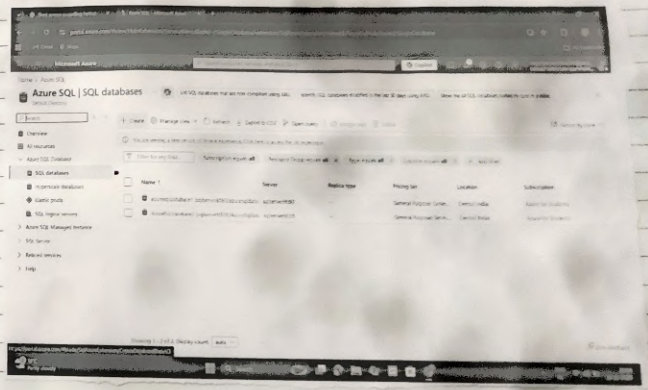
④ Networking:-
- Allow public access
- Add client IP to firewall
-

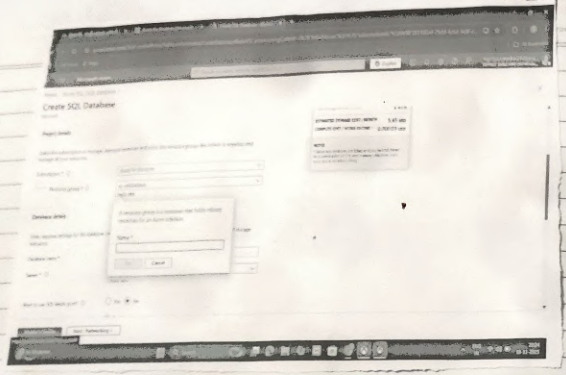
⑤ Additional settings:
- Select sample data (Optional
- or leave blank for empty DB

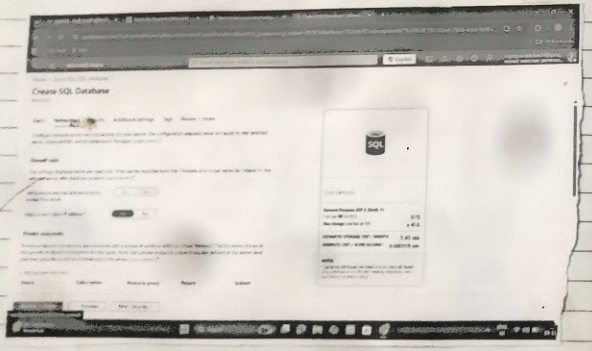
⑥ Review + Create-
- Click create
- Wait for deployment → Go to resource
connect to database.
- Use SQL server management studio or
azure data studio.
- Connection setting available in portal.
- login with admin creditials.

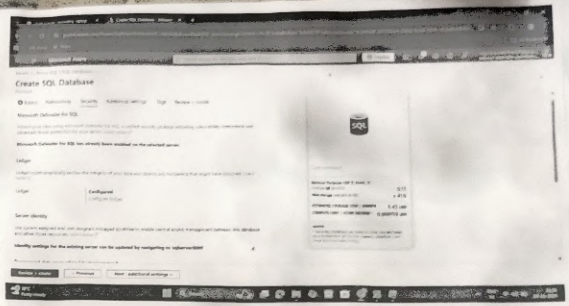


Step 2:- Click on create

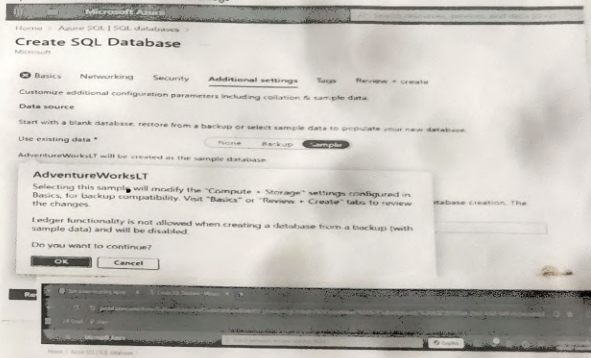


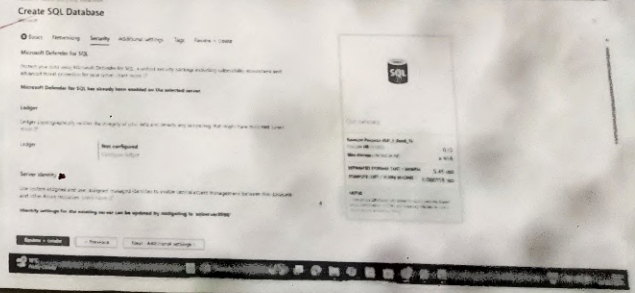


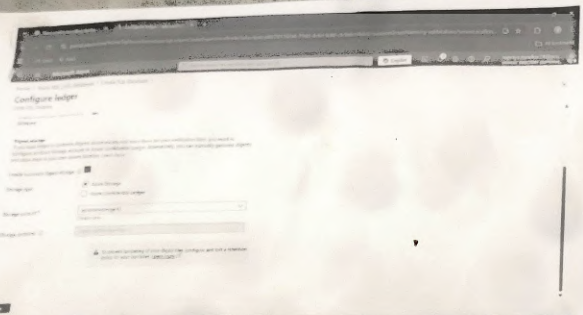


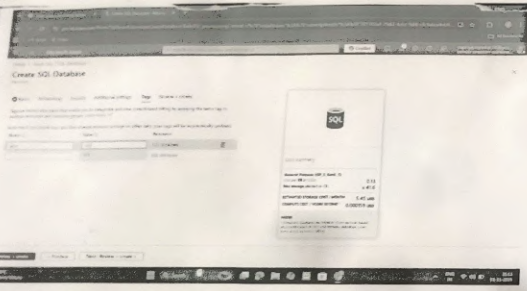


Step 6:-Click sample ->click ok->Next:Tags

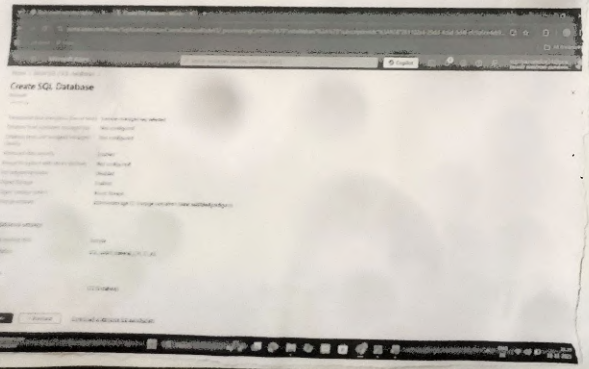


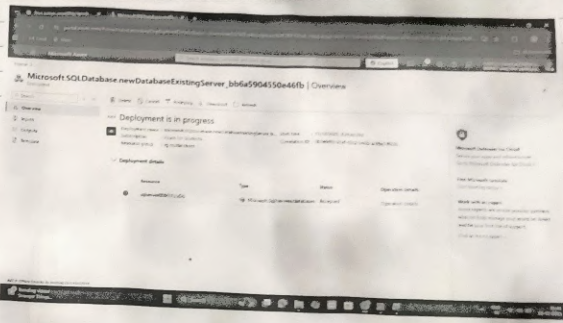


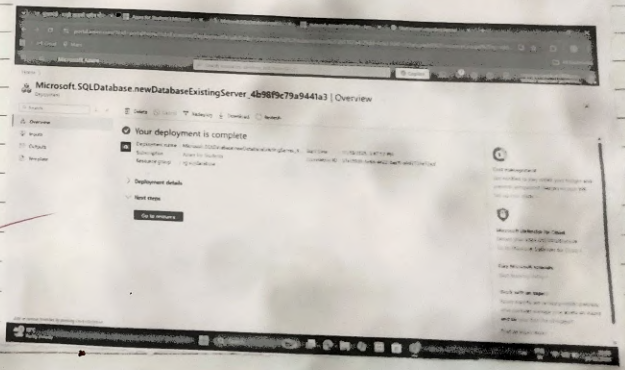


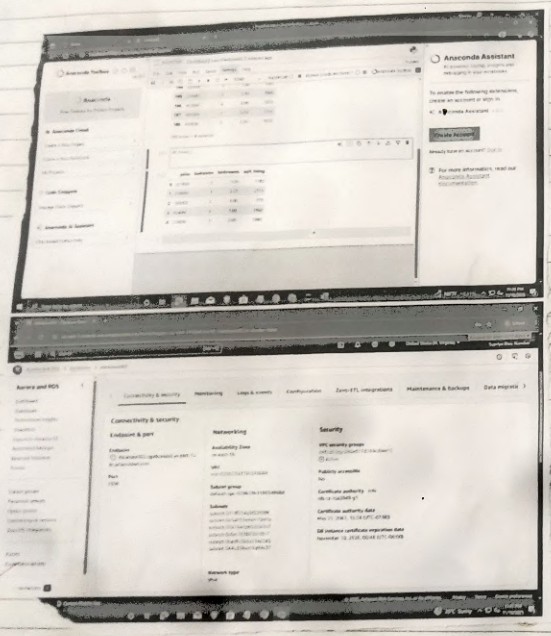


Step 8:-In Review & create click on Create









Practical No - 10

* Azure windows server (virtual machine)
- Azure windows server is a cloud based virtual machine running windows OS. used for hosting applications AD domain controls. RDP access IIS Websites & enterprise work loads.

Usecase :-
- Host windows applications
- Active directory domain services
- IIS website hosting
- File server / Remote desktop usage
- Testing & development environments.

Benefits :-
- Pay as you go.
- Easy scaling
- fully automizable VM.
- Built in security & updates.
- Accessible via RDP anywhere

Advantages :-
- Supports all windows workloads
- Integrates with Azure AD, Vnet, NSG
- snap shot & backup support
- High availibity.

Disadvantages:
- RDP needs secure configuration
- Licensing can increases cost
- Requires VM maintenance.
- Performance depends on size

Steps:
① Go to Azure portal.
- Search "Virtual machines"
- Click create → Azure virtual machine

② Basics:
- Resource group → Select / Create
- VM name → eg winserver. vm.
- Region → select nearest.
- Image → Windows server 2019/2022
- Size → Choose VM size.

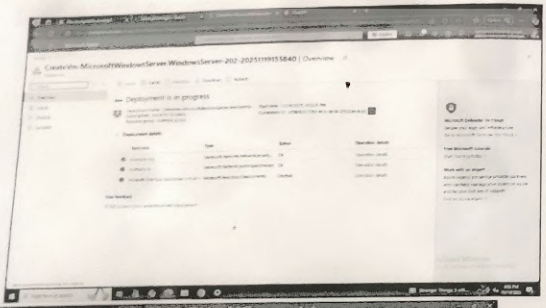
③ Admin Account:
- Username → eg. azure admin
- Password → Create strong password.

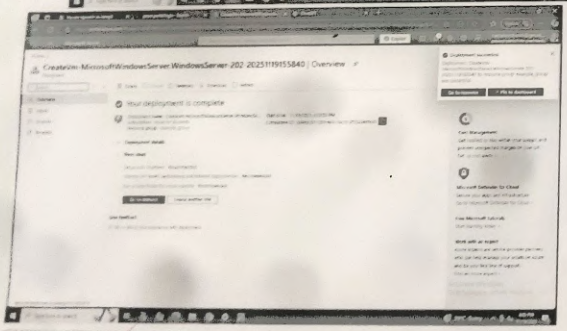
④ Networking:
- Select virtual network.
- Create subnet
- Public IP → enabled
- NSG Rule → Allow RDP (Port 3389)

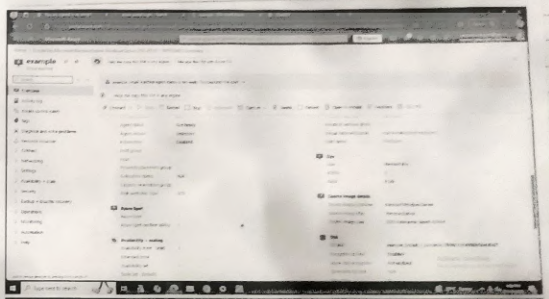
⑤ Disks:
- Choose OS Disk (Standard SSD recommendation)

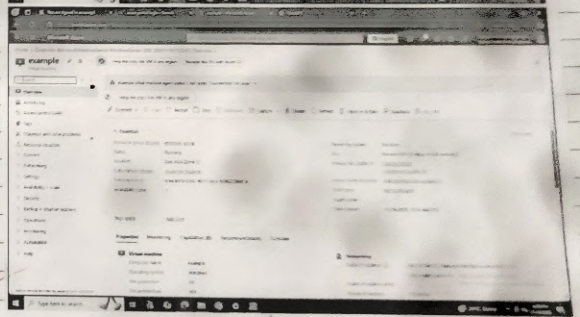
⑥ Review + Create.
- validate → create.
- Deployment Completes → Goto VM.

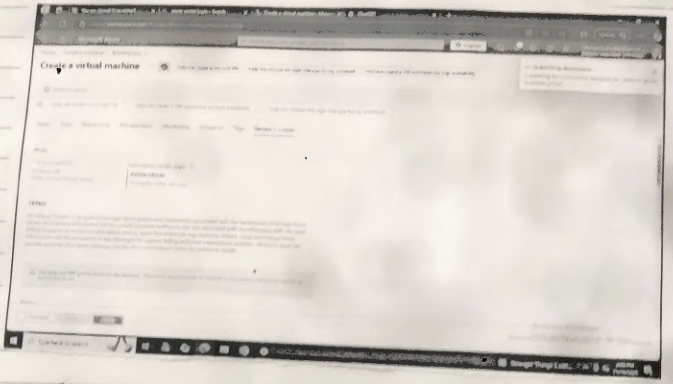
⑦ Connect to window server
- Click connect → RDP
- Download RDP file
- Open → enter username & password
- Windows server open in remote desktop


Deployment is in progress


Your deployment is complete







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