

CHAPTER - 1 European Architecture

EGYPTIAN ARCHITECTURE

Egyptian civilization and its Architecture :-

- * Characteristic of Egyptian Architecture -
- * Architecture was based on religious monuments; massive structures characterized by thick sloping walls with few openings, to obtain stability.
- * Use of arch was developed during Fourth Dynasty.
- * Exterior & interior walls, columns & piers were covered with hieroglyphics and pictorial frescoes & carvings painted in brilliant colours.
- * Use of symbolic motifs :-
 - (a) Scarab (Sacred beetle)
 - (b) Solar disk
 - (c) Vulture
- * Common motifs :-
 - (a) Palm leaves
 - (b) Papyrus plant
 - (c) Buds & flowers of lotus
- * Ancient Egyptian temples were aligned with astronomically significant events such as solstices & equinoxes. Sun baked bricks and stone (limestone, sandstone & granite) were predominant material - due to scarcity of wood.
- * Old Kingdom onwards stones were reserved for tombs and temples.

* Bricks used for :-

- (a) Royal palaces
- (b) Fortresses
- (c) Walls of temple precincts and towns
- (d) Subsidiary buildings in temple complexes
- (e) Houses of the citizen.

* Geographical condition :-

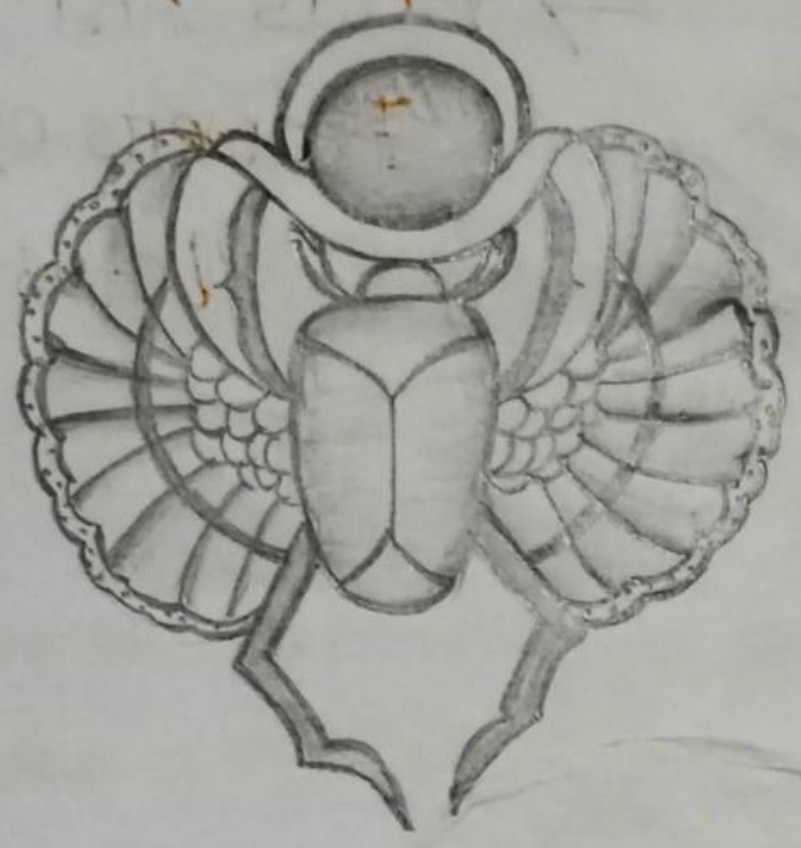
- * The blue and the white Nile jointly flows northward to the Nile delta, where it spills in to the Mediterranean sea.
- * Less than 2" of rain flow in Nile and rain is moderately unknown in most parts of Egypt.
- * The geographic factors determined the character of Egyptian civilization.
- * So the Egyptian civilization was based on the banks of Nile to facilitate cultivation.

Dynasties :-

<u>Name</u>	<u>Dynasty</u>	<u>Years</u>
Archaic period	1-2	3100-2700 B.C
Old Kingdom	3-6	2700-2200 B.C
Intermediate period	7-10	2200-2050 B.C
Middle Kingdom	11-12	2050-1800 B.C
Intermediate period	13-17	1800-1570 B.C
New Kingdom	18-20	1570-1085 B.C
Post Empire	21-31	1085-332 B.C

Egyptian Motifs

1.



⇒ Sacred Beetle

2.

Sun Disk



⇒ Palm Leaves

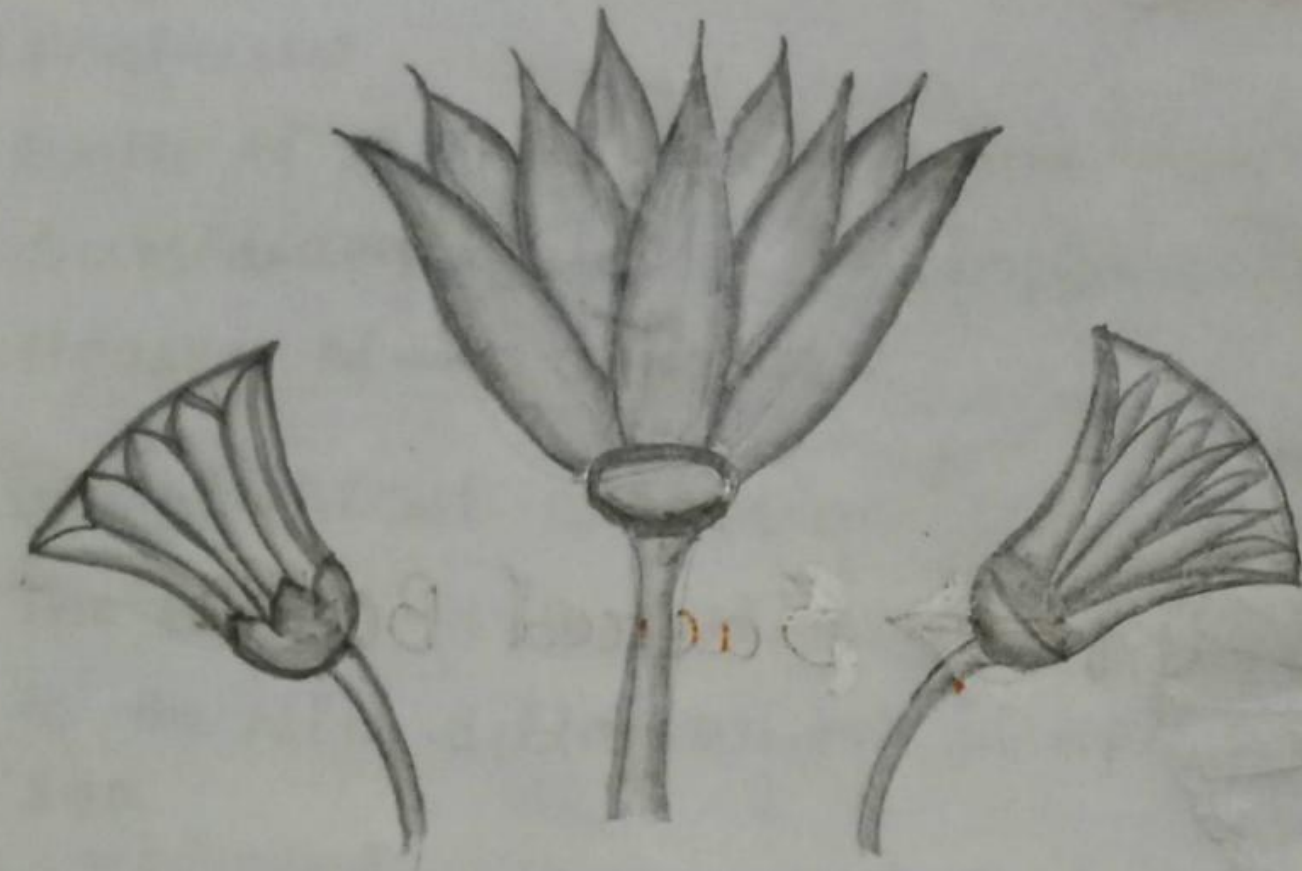
3.



⇒ Vulture

4.

Lotus flowers



⇒ Buds And
Flowers of
lotus

5.

Papyrus

Leaves ←



6.

←

⇒ Palm
Leaves

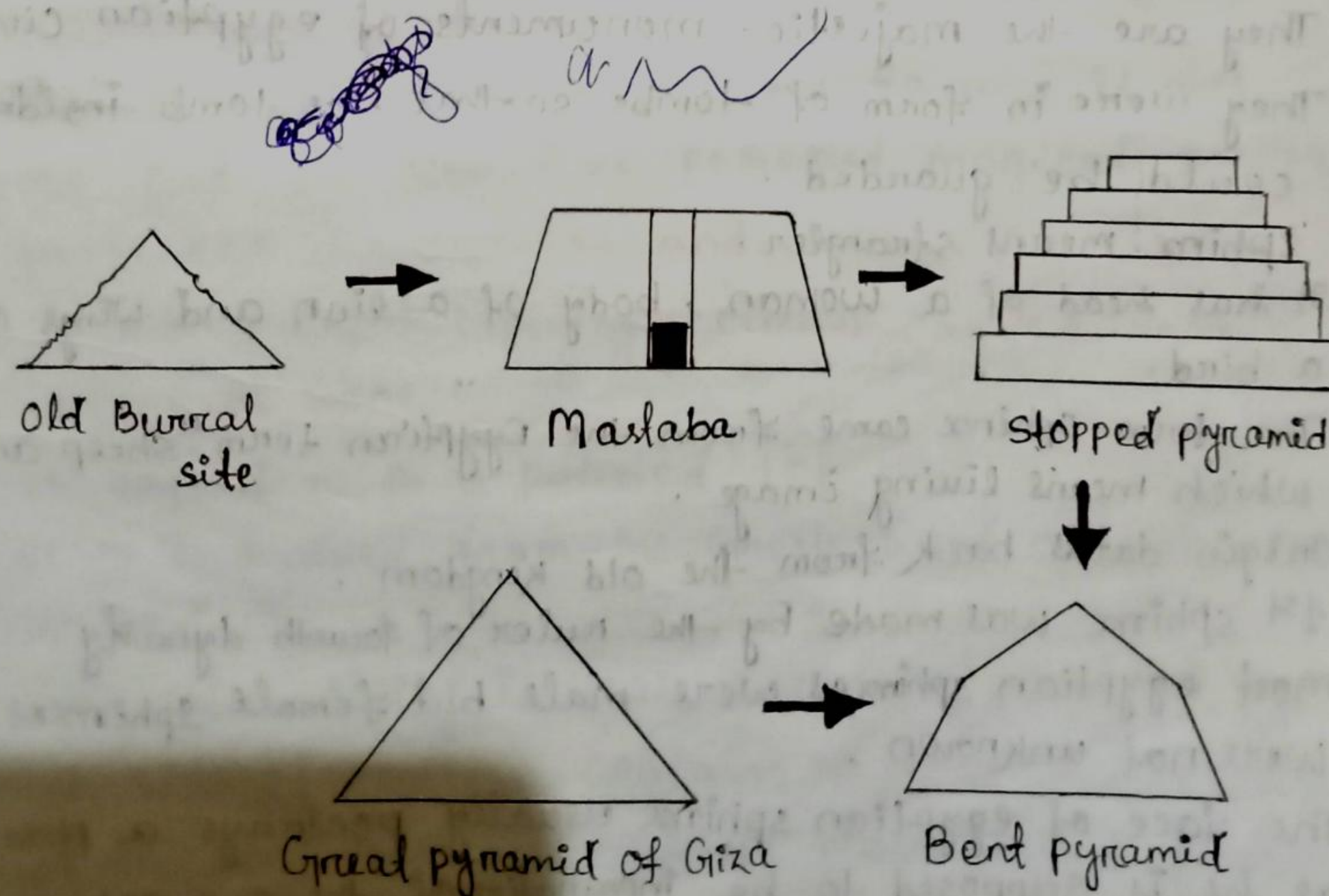


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Pyramids :-

They are the pyramided shaped masonry structures.

- > 138 pyramids discovered in Egypt as of 2008
- > Built as tombs for pharaohs and their consorts during old and middle kingdom period.
- > Estimate of workers = few thousand..... 20,000..... 100,000
- > Regarded as one of the wonders of the world.
- > They are square based, have four faces with smooth edges that connect the base to the summit, on which was located a pyramidion.
- > Exception, stepped pyramid of third dynasty.
- > It was build as a funerary monument above the tomb of the ruler.
- > Development started in the 27th century B.C, the Third Dynasty, evolving from mastaba style.



Pyramid symbolism :-

Thought to represent the primordial mound from which the Egyptians believed the earth was created. Also represents the descending rays of the sun. Most of them were faced with polished, highly reflective white limestone.

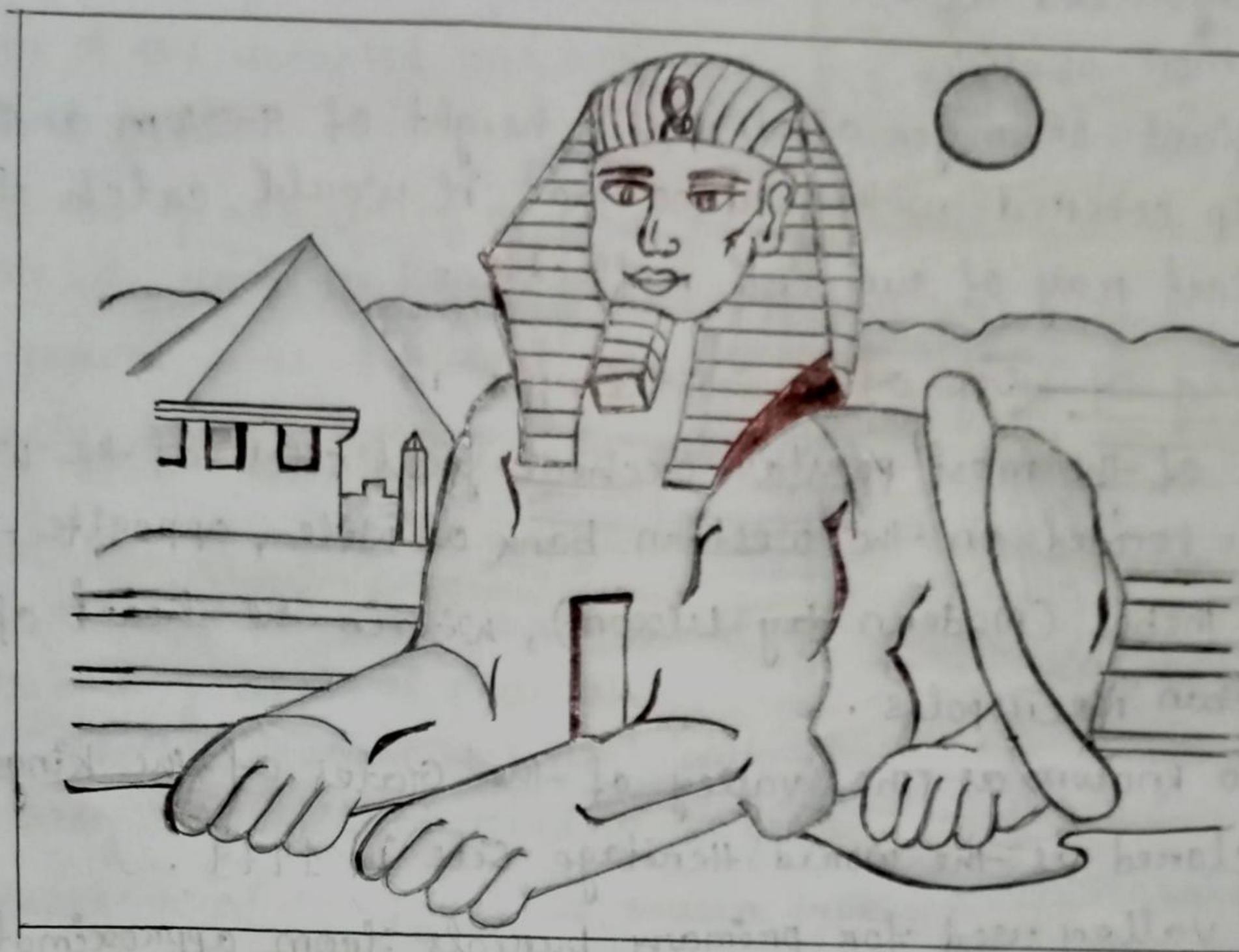
This gave them a brilliant appearance from distance. It was also named in ways to represent solar luminescence.

- > Example, the formal name of bent pyramid at Dashur is the southern shining pyramids.
- > Also believed to be designed as a machine of resurrection.
- > Built on the west bank of Nile, which as the site of the setting sun was associated with the realm of dead.

* Ancient Egyptian sphinxes :-

- > They are the majestic monuments of Egyptian civilization.
- > They were in form of tombs so that the tomb inside could be guarded.
- > Sphinx means strangler.
- > It has head of a woman, body of a lion and wings of a bird.
- > The term sphinx came from the Egyptian term "sheep ankh" which means living image.
- > Origin dates back from the old Kingdom.
- > 1st sphinx was made by the ruler of fourth dynasty.
- > Most Egyptian sphinxes were male but female sphinxes were not unknown.
- > The face of Egyptian sphinx usually portrays a pharaoh as he is supposed to be incarnation of the sun god.

THE GREAT SPHINX OF GIZA :-



* Ancient Egyptian obelisks :-

- > The obelisks symbolized the sun god Ra and it was believed that the structure possessed magical power and protected the temples and tombs.
- > It is a monumental tapering column carved from a single block of stone.
- > It was capped with a pointed top.
- > The term is derived from the Greek word obelisks meaning "needle".
- > Procedure of building it was similar to that of pyramid.
- > On each side of obelisk contains a line of hieroglyphic inscriptions containing the title of pharaoh and praising the god was seen.

> placed in pairs at the entrance of the temples associated with sun, also on some tombs.

> categorized as -

(a) minor obelisks

(b) "giant or major obelisks" - height of 9-32 m and tip covered with gold so that it would catch the first ray of sun and reflect.

* Valley of Kings of Ancient Egypt :-

> One of the most popular archeological sites of the world.

> It is located on the western bank of Nile, opposite to the Thebes (Modern day Luxor), within the heart of Theban Necropolis.

> Also known as the valley of the Graves of the Kings.

> Declared as the World Heritage Site in 1979.

> The valley used for primary burials from approximately 1539 B.C to 1075 B.C and contains some 60 tombs.

> Besides the tombs of pharaohs the site have the tombs of famous nobles and officials and their wives.

> The quality of the tombs vary in different qualities of Limestone.

> The site was damaged due to flood.

* Most tombs followed a similar pattern;

(a) 3 corridors.

(b) An antechamber.

(c) Sunken sarcophagus chamber.

* Types of Tomb :-

(a) simple pit graves

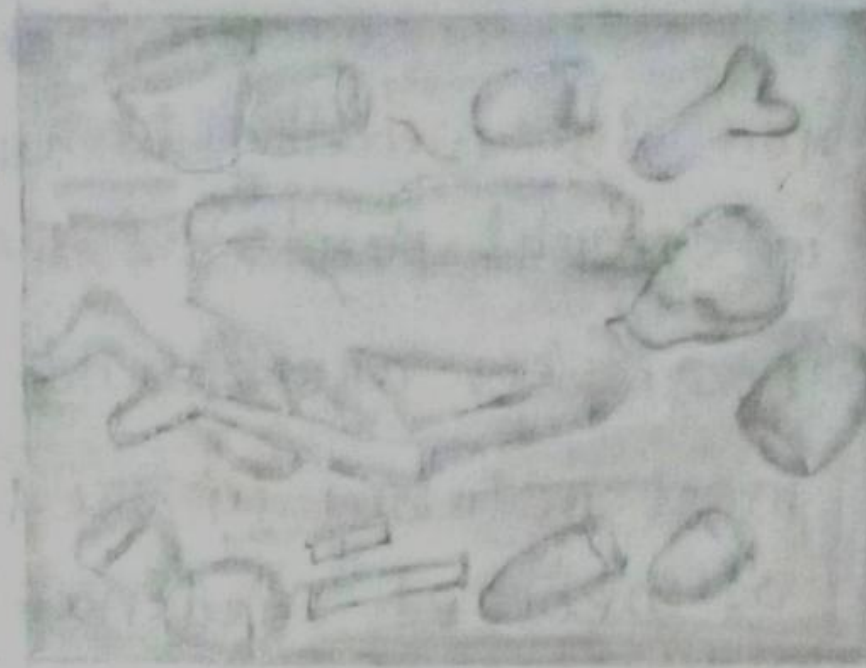
(c) Rock-cut chapels

(b) Mastabas

(d) Pyramid-tombs

* Simple pit graves :-

A simple hole in the ground which was just large enough to hold the body of the deceased and a few grave goods.



Over the years lining of wood or stone, a roof and then small chamber was added.

Pit graves was the most common type of graves, usually belonging to the commoners.

* Mastabas :-

> It's a heap of stone that would cover the graves of pharaoh.

> These blocks covered the real tomb - the body was still buried in the ground.

> Predecessor of the pyramids was a type of tomb used during the early stages of Egyptian civilization.

> Simplest mastabas have ridges in the form of truncated pyramids.

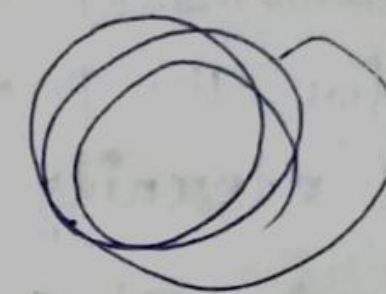
> The structure contains :

(a) ritual chapel.

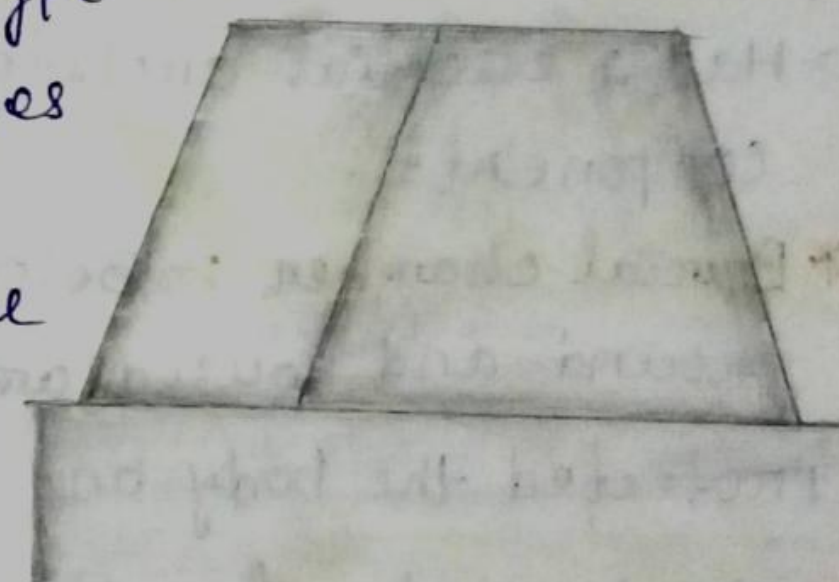
(b) False door

(c) shaft

> It was used by the rulers of dynasties as well as important members of the court.



Mastaba

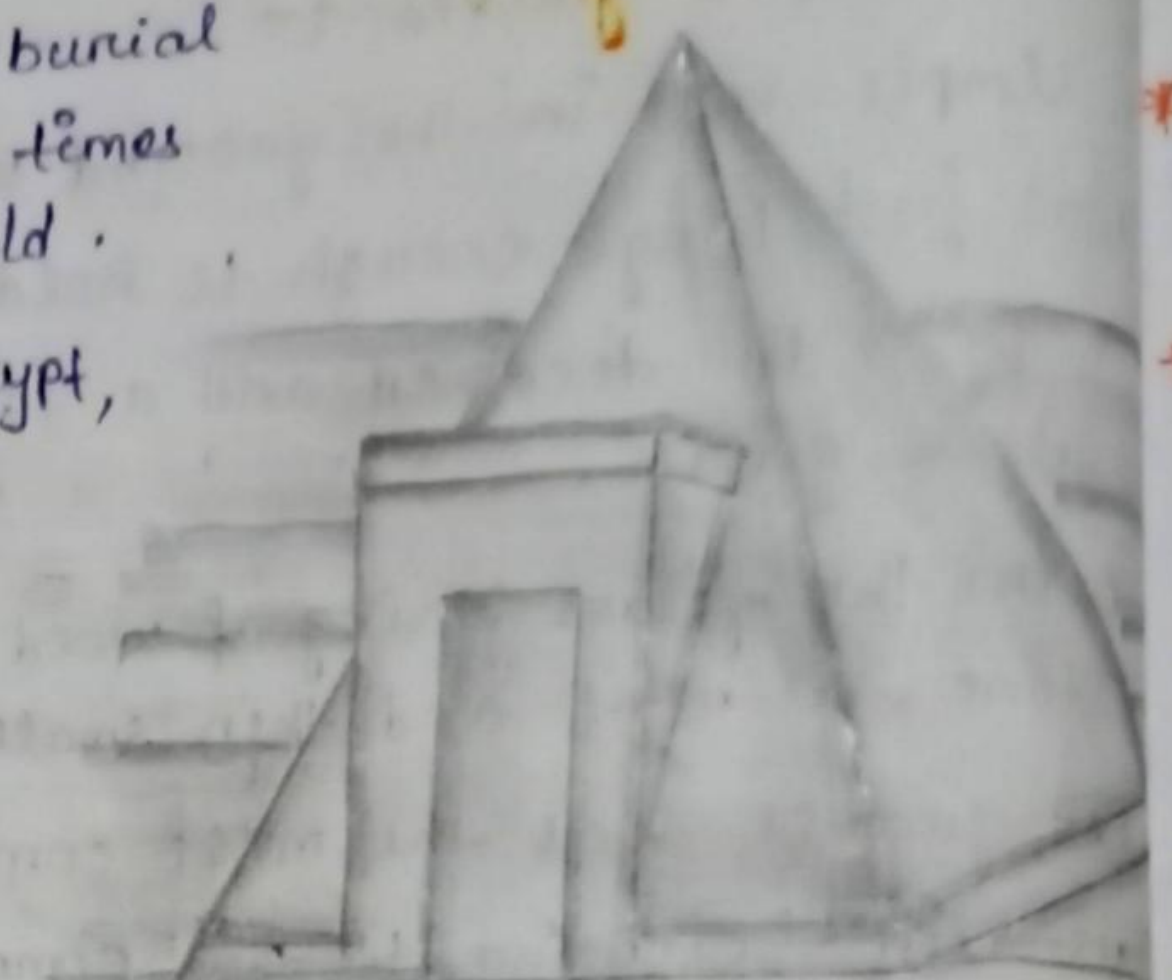


* Rock-cut chapels :-

> A rock-cut tomb or koka is a burial chamber the living rock usually along the side of a hill.

> It was a common form of burial for the wealthy in ancient times in several parts of the world.

> Examples are found in Egypt, most notably in the town of Deir el-Medina, betⁿ the valley of the Kings & the valley of the Queens.



* Pyramids :-

> Most famous of all types of burial tomb.

> Built for the pharaohs of the New Kingdom to last for all eternity.

> The dead was accompanied by all the things required for comfortable afterlife.

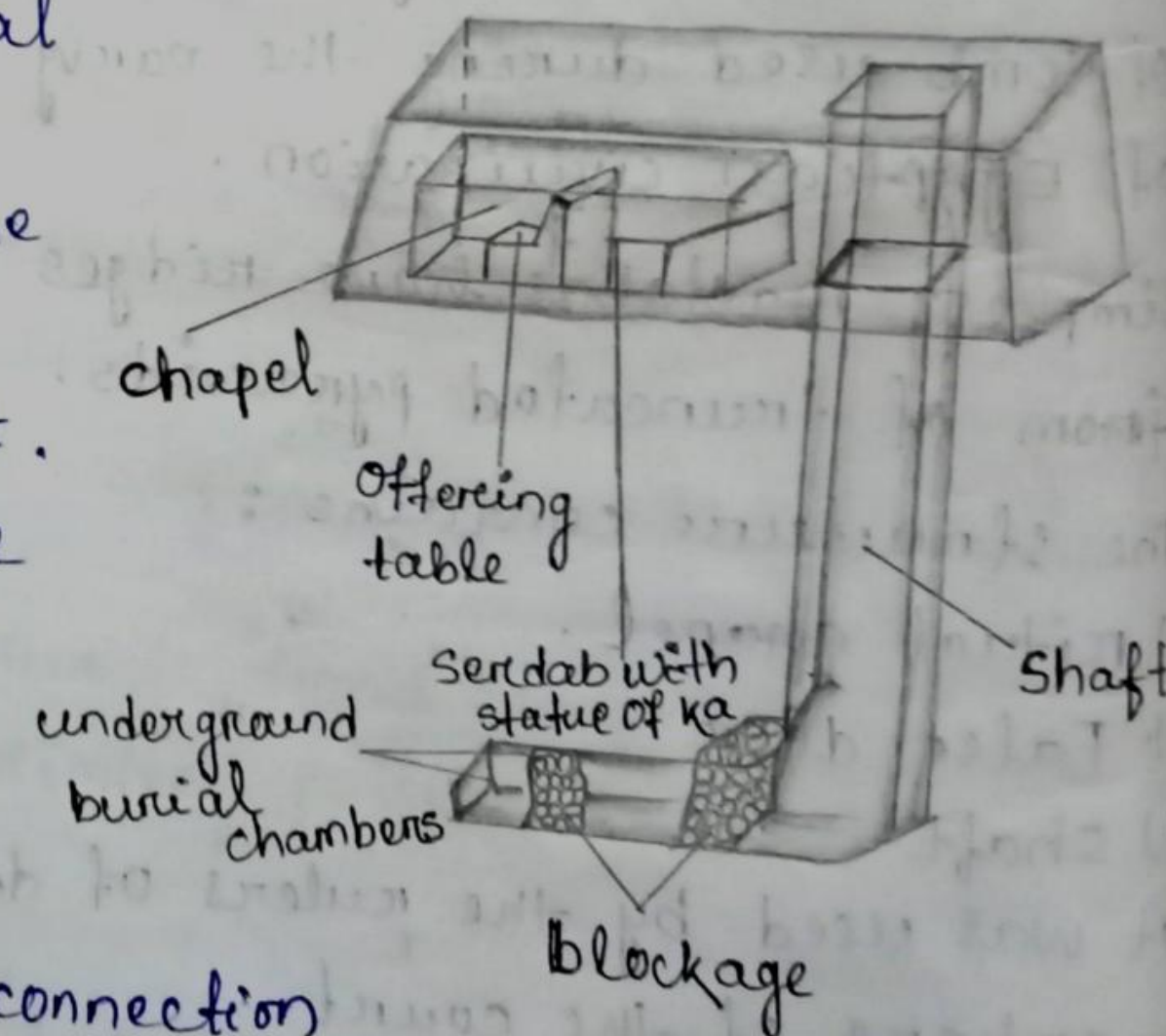
* Construction of Tombs :-

> Had 2 essential architectural components.

* **Burial chamber** :- Below the ground and housed and protected the body and spirit.

* **Mortuary chapel** :- above the ground and was accessible to visitors who would perform rites.

* **False door** :- to establish connection between world of dead and living. The design on the door allowed the spirit to move freely between tomb and the chapel.



* **Terracotta Funerary cone** :- Owner's name inscribed and placed above the entrance door.

* **Pyramid at Djosr at Saggara** :-

- > Built by the 2nd pharaoh of 3rd Dynasty.
- > Constructed as series of smaller terraces one on top of the other.

> 1st monument built entirely of stone.

> Designed by Imhotep and deified in Egypt as God of Architect.

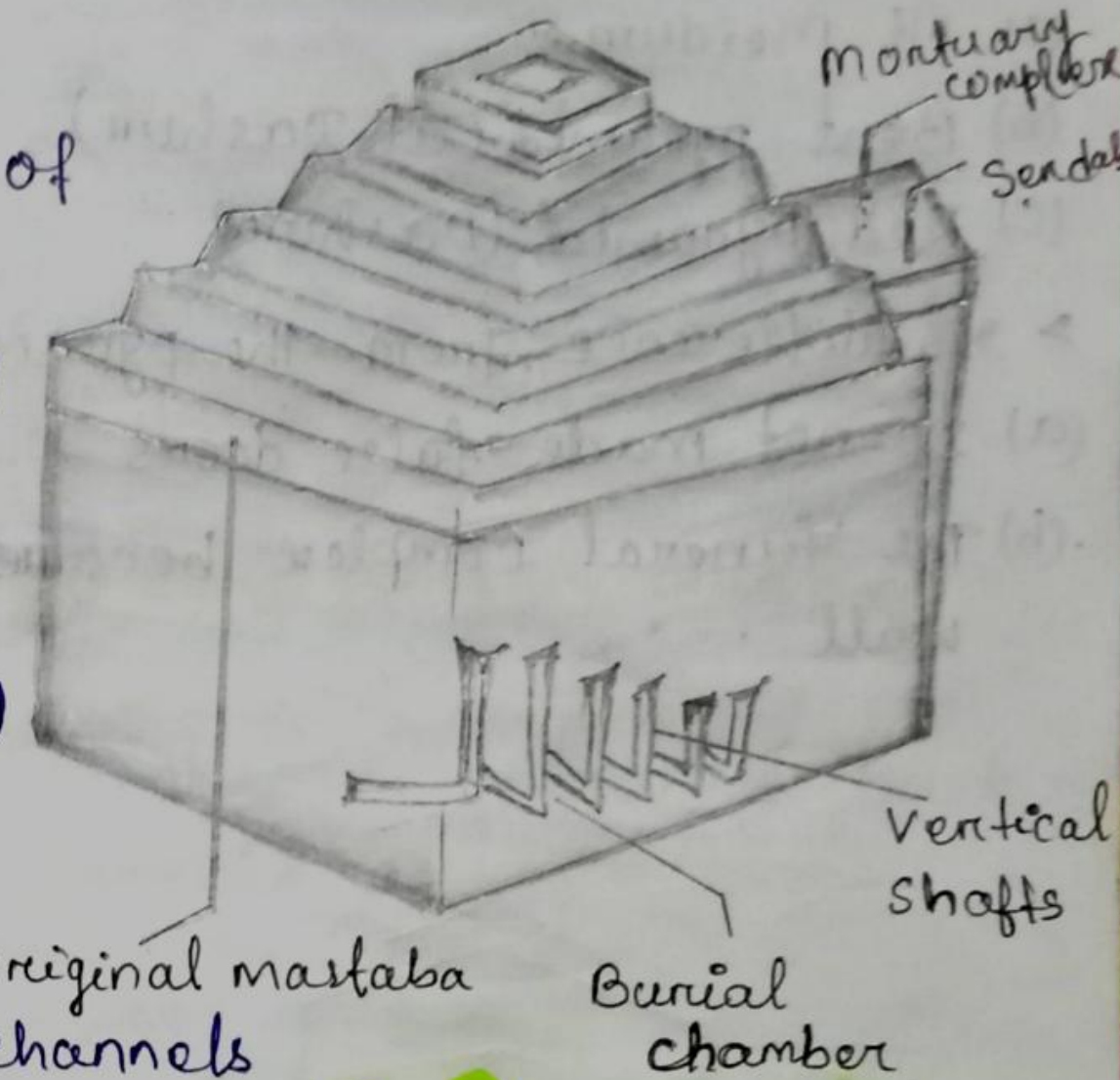
> Consists 6 tiers.

> Rectangular base (109 m x 121 m)

> Height : 59.93 m (now 58.63 m due to erosion)

> Interior contains network of channels and shaft with the burial chamber of Djosr at its centre.

> Stone blocks used were slightly larger than bricks previously used during the construction of raw mastabas.



* **Pyramid of Meidum** :-

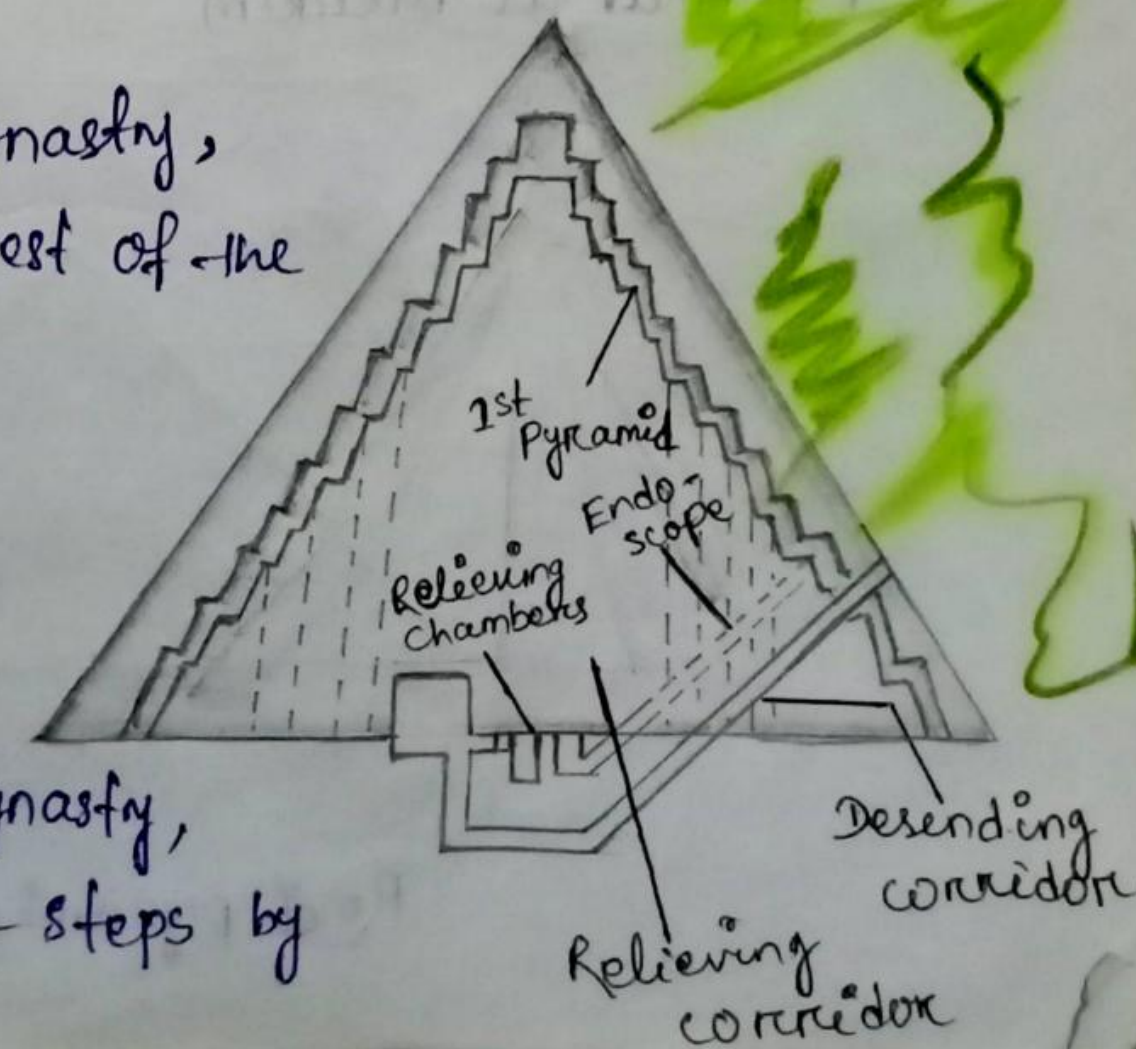
> The last ruler of the 3rd Dynasty, Huni, built the last and largest of the Stepped pyramid.

> Tiers : 7 - 8

> Base : 122 m.

> Height : 82 m

> Snefru the founder of 4th Dynasty, added the casing between the steps by adding the casing.



- > 1st regular pyramid was hence formed.
- > Over the years the terrace structure resurfaced due to erosion.

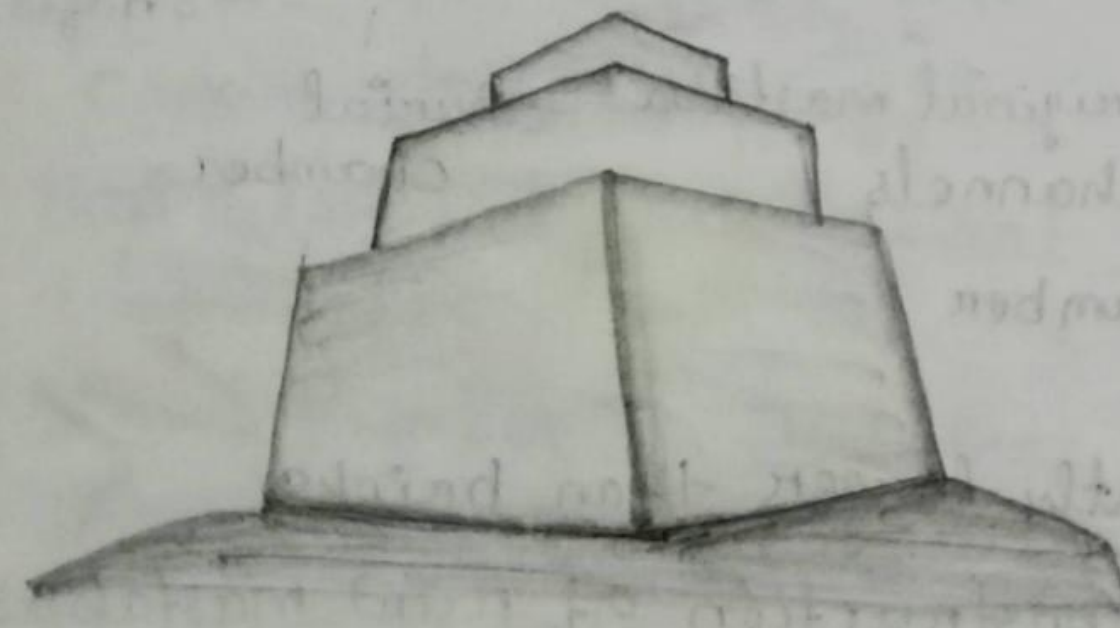
* Pyramids of snofru ~

> Snofru built 3 pyramids

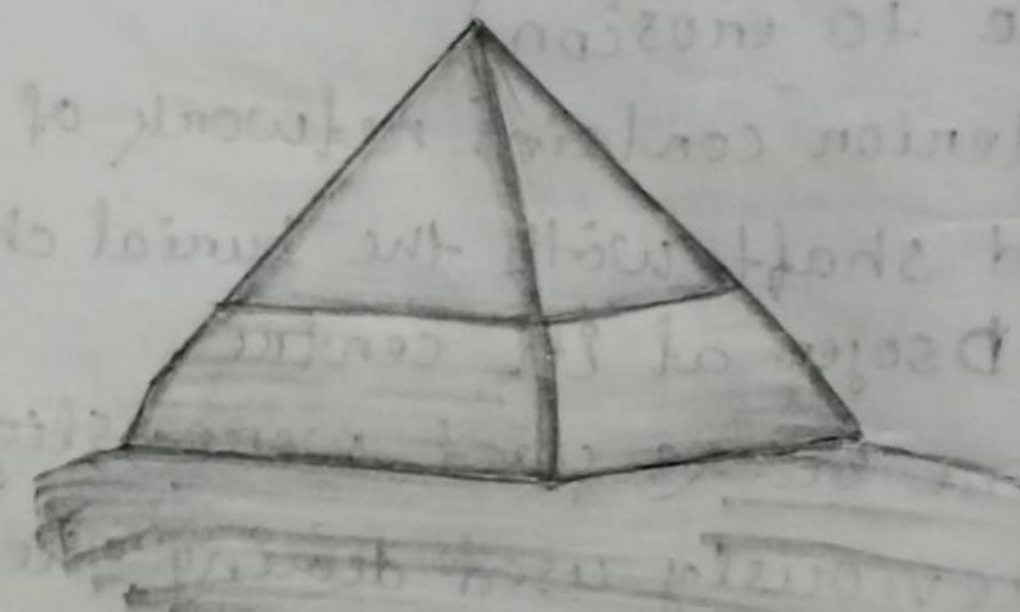
- (a) At Meidum
- (b) Bent pyramid (at Dashur)
- (c) Red pyramid (Dashur)

> Its difference from the pyramids of that of 3rd dynasty:

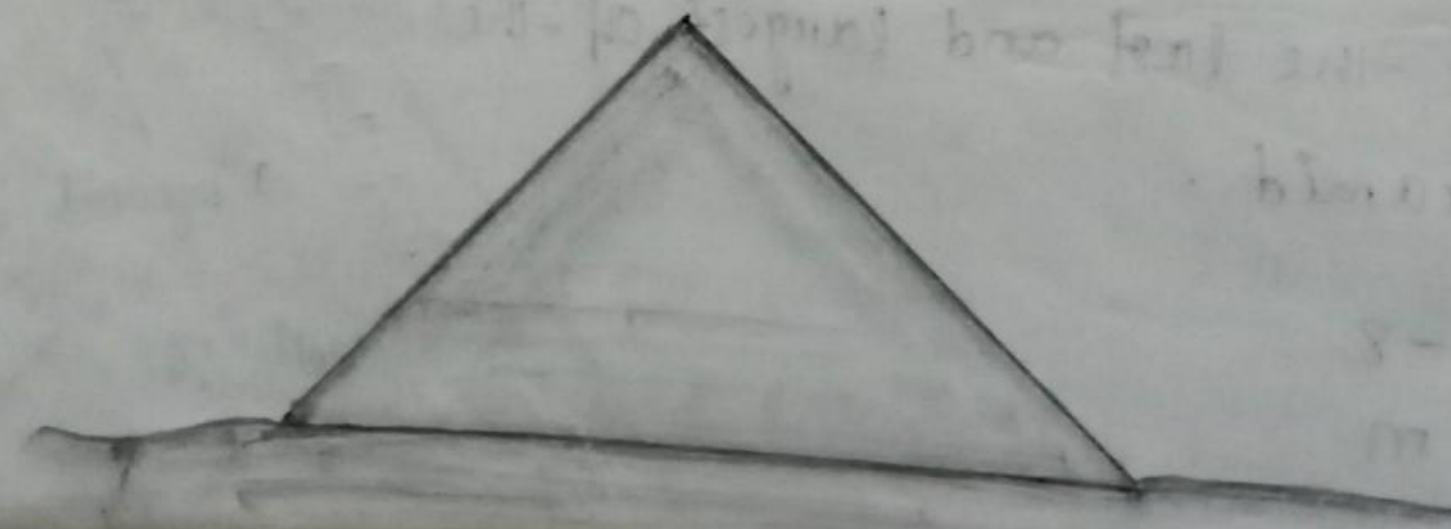
- (a) Do not made false doors.
- (b) The funeral complex became open with no surrounding wall.



Pyramid at Meidum



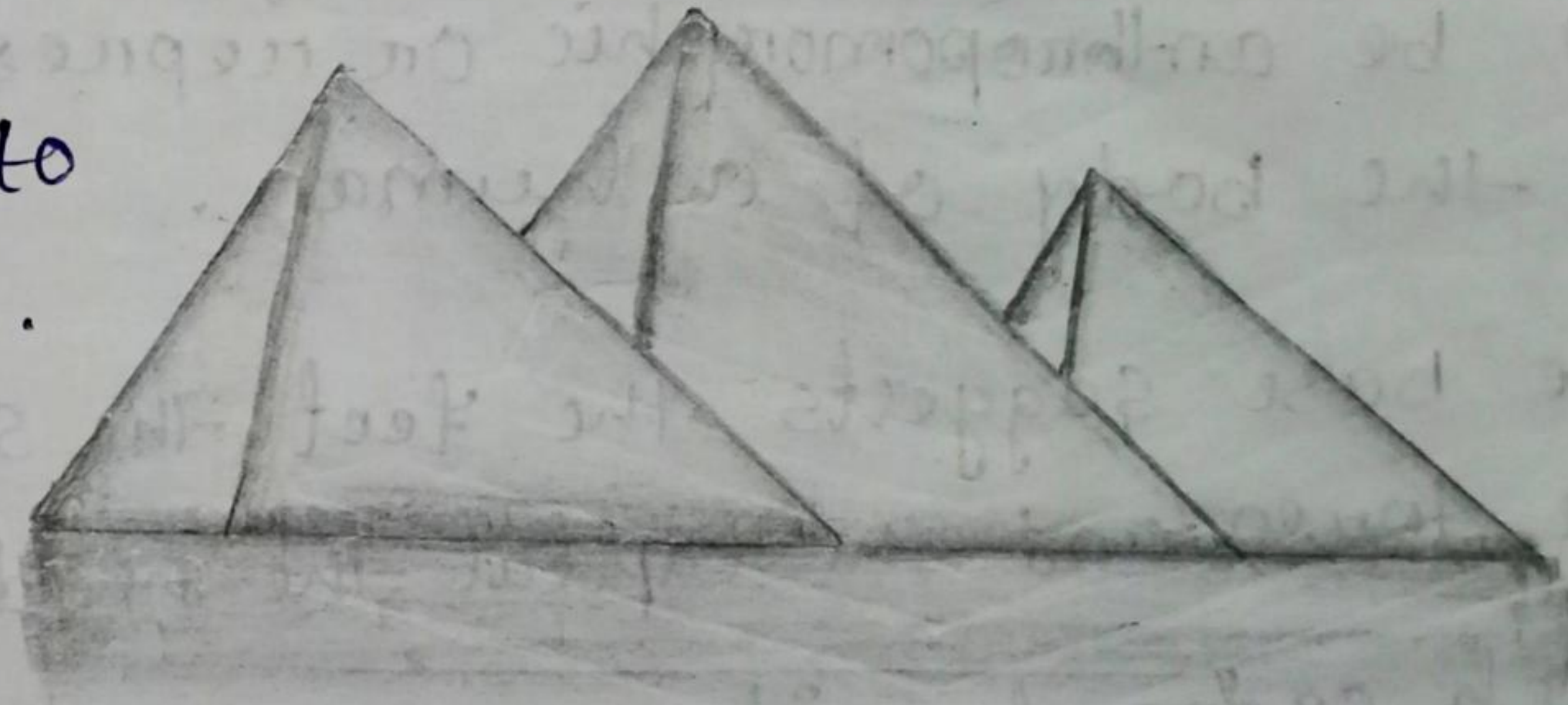
Bent pyramid, Dashur



Red pyramid Dashur

* Pyramid of Giza :-

- > After 2 centuries, of the pyramids of Snetru, the pyramid of Giza plateau was built.
- > It is the largest and most famous in history.
- > The largest one was commissioned by pharaoh cheops.
- > Height : 146.7 m
- > The sides are oriented to original cardinal points.
- > Error of 3 degrees.
- > Built 4500 years ago
- > The successor of pharaoh cheops, Djedefra didn't construct his pyramid at Giza.
- > His successors, Khafre and Menkuara returned back to Giza for placing their pyramid.



GREEK ARCHITECTURE

Architectural Characters → - The Orders
- Greek temple
- Temple Typology

* The Orders :-

columns were understood by the Greeks to be anthropomorphic or representative of the body of a human.

The base suggests the feet, the shaft the torso and the capital the head.

> Each order has its own conventions about the design of the entablature and divided into 3 sections:

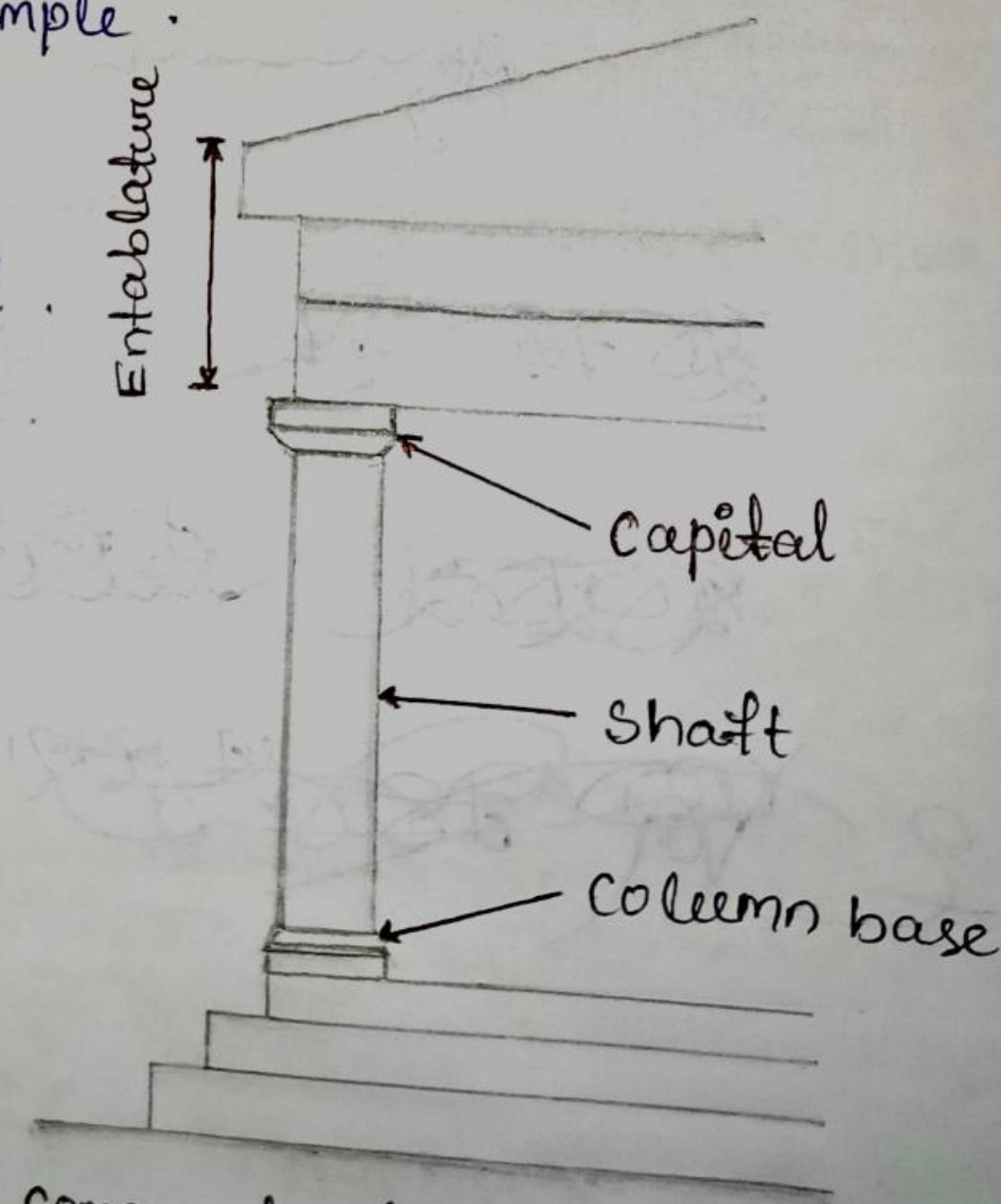
- (i) cornice
- (ii) Frieze
- (iii) Architrave



* The Orders :-

> Refer to the entire set of form that makes up the principle elevation of a temple.

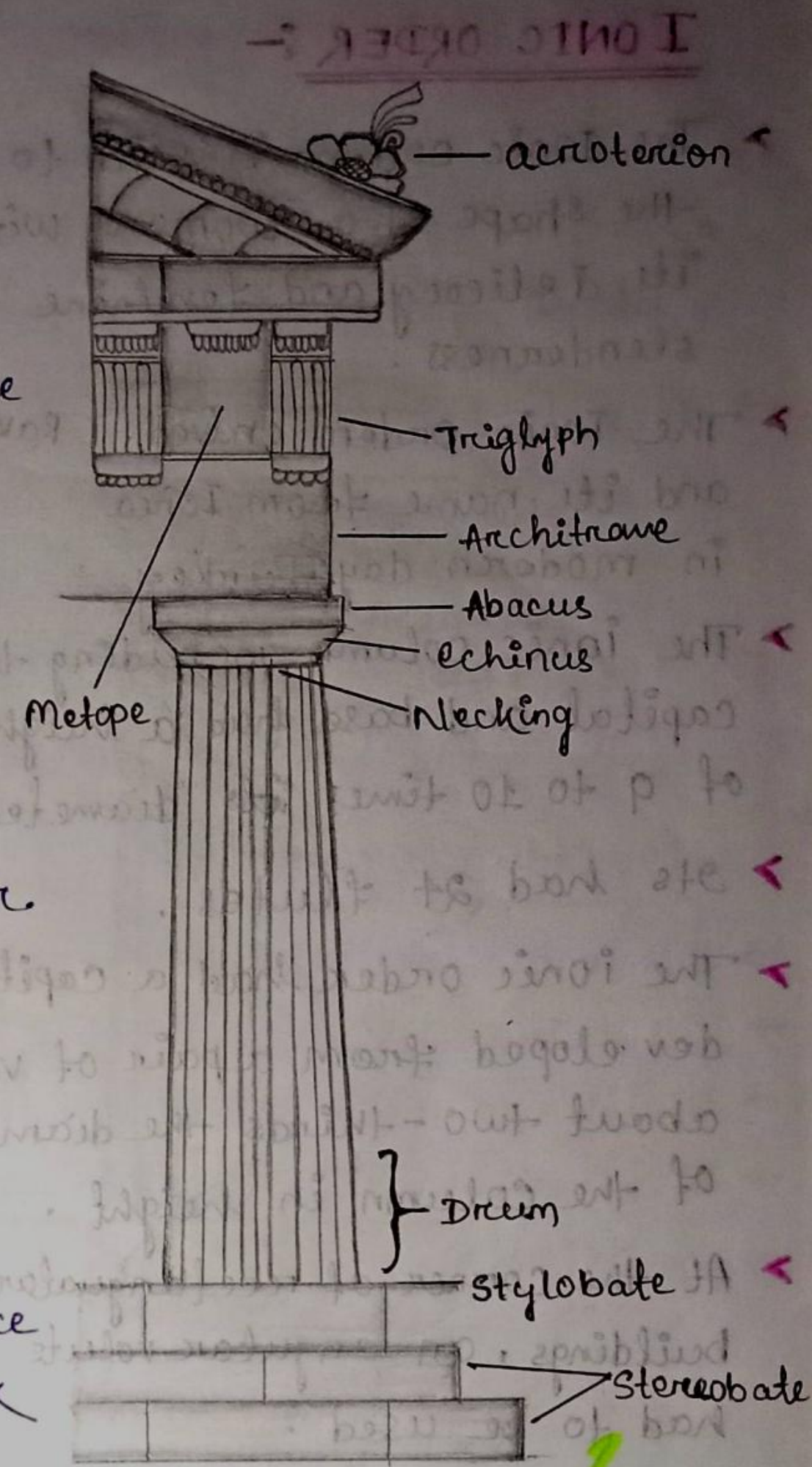
- Base
- upright column or support with its capital.
- Horizontal entablature.



Components of the greek order

DORIC ORDER :-

- > Represents the proportions of a man's body, its strength and beauty.
- > Made up of three elements
 - stylobate - a podium raised three steps on which the temple sits.
 - column
 - Entablature
- > A square capital.
- > Had a height of between 5 and 6 times its diameter.
- > shaft is usually divided into 20 shallow flutes.
- > A characteristics of the Doric order is the use of entasis.
- > Entasis - Refers to the practice of optical correction in Greek Doric temples.
- > The best example of the application of entasis is found in the parthenon.



* Optical correction (Entasis) in Doric temples -

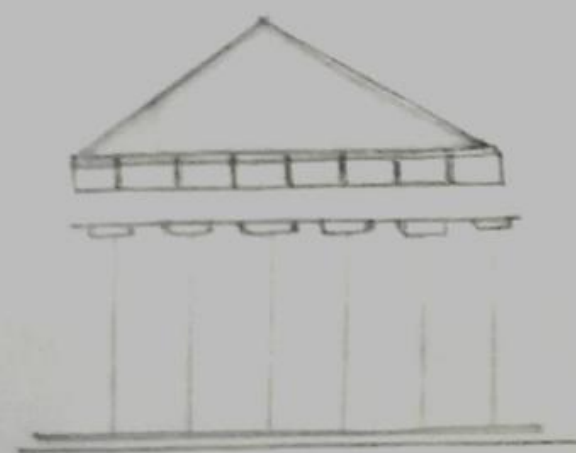


Diagram-1

The temple as it visually appears with correction.



Diagram-2

The temple as it would appear without correction.

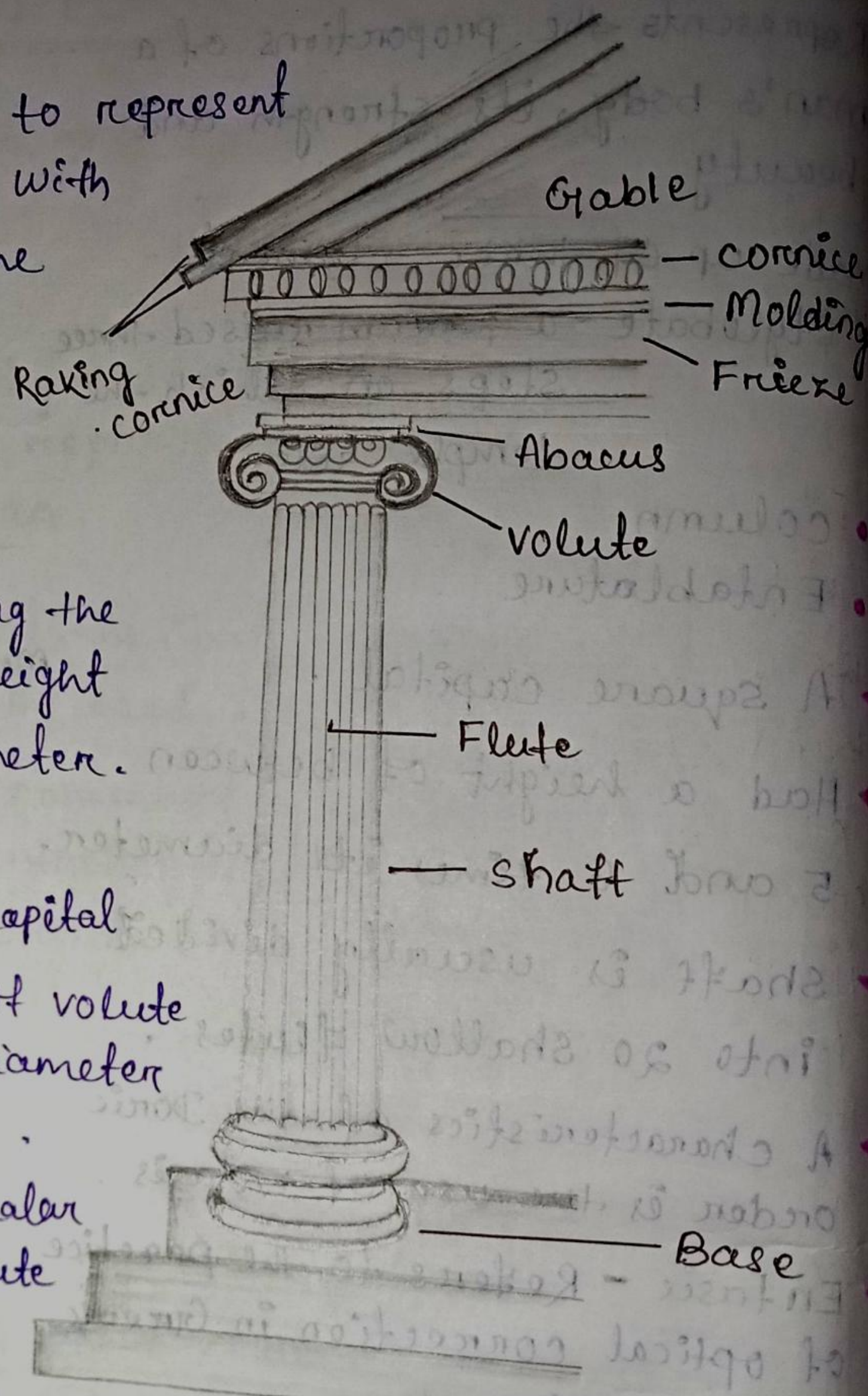


Diagram-3

The temple as it is actually built with correction.

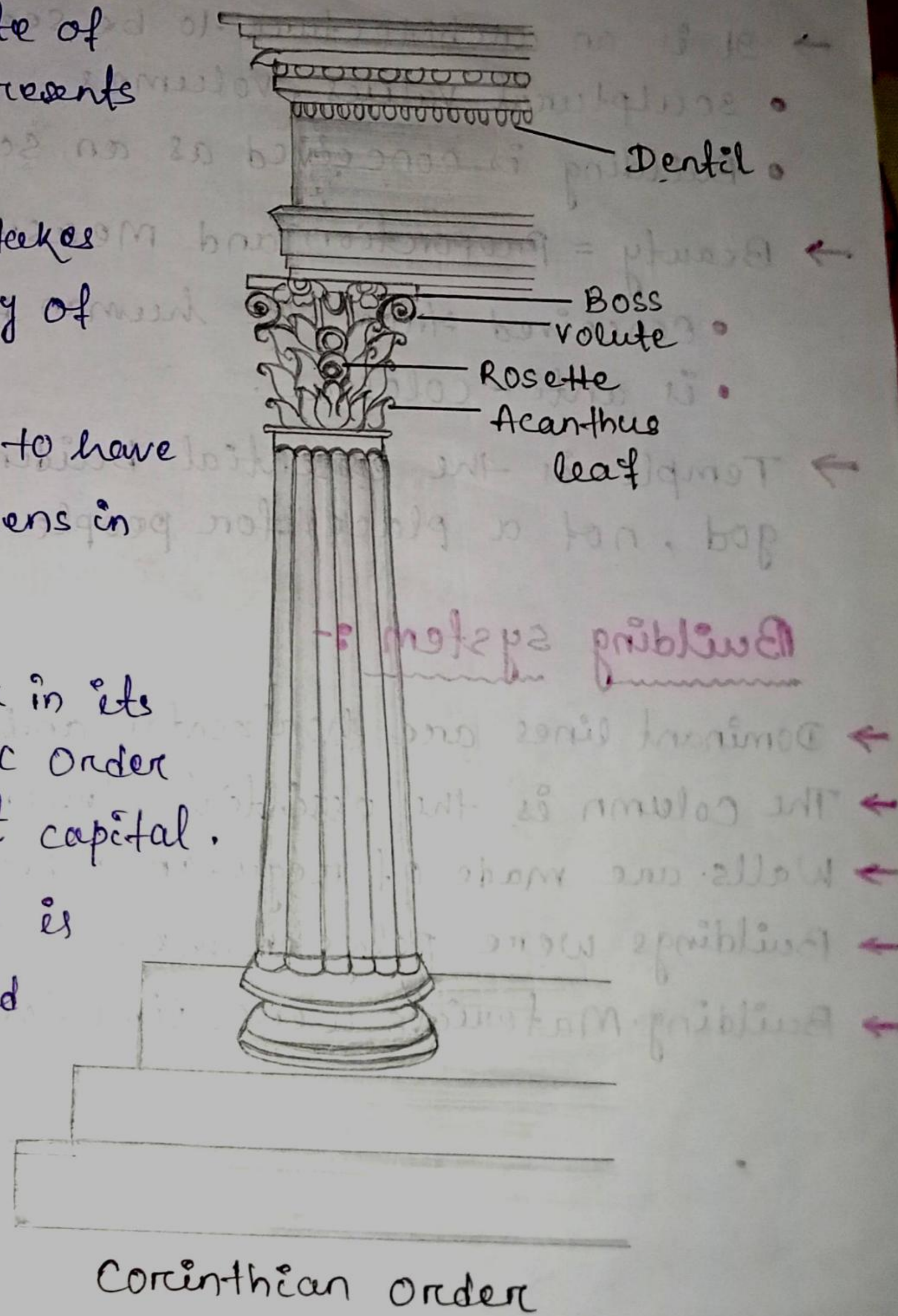
IONIC ORDER :-

- > The Ionic column is said to represent the shape of a woman with its delicacy and feminine slenderness.
 - > The Ionic Order evolved and its name from Ionia in modern day Turkey.
 - > The Ionic column including the capital and base had a height of 9 to 10 times its diameter.
 - > It had 24 flutes.
 - > The Ionic order had a capital developed from a pair of volute about two-thirds the diameter of the column in height.
 - > At the corner of rectangular buildings, an angular volute had to be used.
- one of the limitations of the Ionic order is that it is designed to be seen from the front only.



CORINTHIAN ORDER :-

- > The corinthian column, the most beautifully ornate of the three orders represents the figure of maiden.
- > The corinthian order takes its name from the city of corinth in Greece.
- > It however appeared to have been developed in Athens in the 5th century BC.
- > This order is similar in its proportions to the ionic order but has a different capital.
- > The core of the capital is shaped like an inverted bell.
- > The bell-like capital is decorated with rows of carved acanthus leaves.



Because of its symmetry, the corinthian capital unlike the ^{ionic} capital is designed to be seen from all directions.

Architecture : BASIC

- It is an architecture to be seen (temple)
 - sculptural values, volumes.
 - Building is conceived as an sculpture.
- Beauty = Proportion and Measure
 - Conceived from the human point of view.
 - is anti-colossal.
- Temple is the essential building, residence of god, not a place for people.

Building system :-

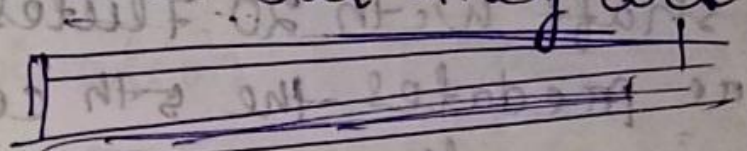
- Dominant lines are horizontal and vertical.
- The column is the essential element.
- Walls are made of regular ashlar.
- Buildings were polychrome.
- Building materials were limestone and white marble.

ROMAN ARCHITECTURE

Introduction :-

- In contrast to Greek architecture, which can be described as sculptural masses set in balanced contrast to the landscape, Roman Architecture is an arch of space, enclosed internal space and outdoor space, on a grand scale.
- The Romans perfected the art of the take-over.

Characteristic of Roman architecture :-

- * **Arches** - The size of the Greek post and lintel was limited by the length a single piece of stone can span. The Romans didn't invent the arch but they are the ones to apply it extensively.

- * **Architectural orders** -
 - To the three Greek Orders the Romans added the composite order, a blend that superimposed the scroll-like volutes of the Ionic capital over corinthian acanthus.
 - They also made a composite base by introducing an Ionic base into a Doric shaft.
- * **Circular plans** - Roman emperors were much taken by circular and oval plans, and others that made dramatic use of curves rather than classical straight lines.
- * **Pantheon Architecture** :- Roman arch stands today as a testament to the ability and grandeur of this once great civilization that, at one time, covered three continents.
- * **The Basics of Roman Architecture :-**
 - (1) Doric columns.
 - (2) Ionic columns.
 - (3) corinthian columns.
 - (4) Tuscan columns.
 - (5) Composite order.

* Roman columns :-

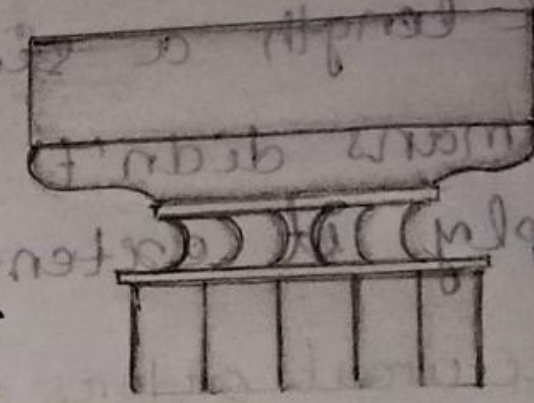
The architecture of classical Greece and Rome did not come about all at once, but came in different stages of design and style. There were five different types that the Romans and Greeks used throughout classical times, from pre 500 BC to the first century AD.

* Doric columns :-

→ **Doric style** - columns built in this style usually had no base and consisted of a massive shaft with 20 flutes. Doric architecture predates the 5th century BC.

It was infrequently used, but examples are seen in the Parthenon and Colosseum in Rome!

Later Roman columns differ from the Greek version in their addition of a base and changes in the capital profile.



→ **Ionic style** - More visibly complex than that of the Doric style, being of slender proportion, and their height being generally about nine times the column's lower diameter, the order is always used with a base and the column shaft usually has 24 flutings.



→ **Corinthian style** - This is the most ornate of the classical styles and is generally much more slender than the Ionic style. The Roman used the Corinthian order in numerous monumental works of imperial arch. They gave it a special base, made carved additions to the cornice, and created numerous capital variations, utilizing florid



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→ **Tuscan column** - The Tuscan column was the next form to be introduced and it was introduced by the Etruscans. The Tuscan column is a very simple, plain column with a base and non-fluted shaft. No major examples of this architectural type survive today.



→ **Composite order** - The final architectural type to come from the classical world is the composite order and it was first seen in 82 AD on the arch of Titus (above).

The composite form is a combination of Ionic and Corinthian orders. This form was the most complex due to the fact that it is used in the arch. Due to the advances of the composite style of architecture and the skill that the Romans had with concrete, the Romans were able to develop such architectural marvels like the arch, the vault and the dome.



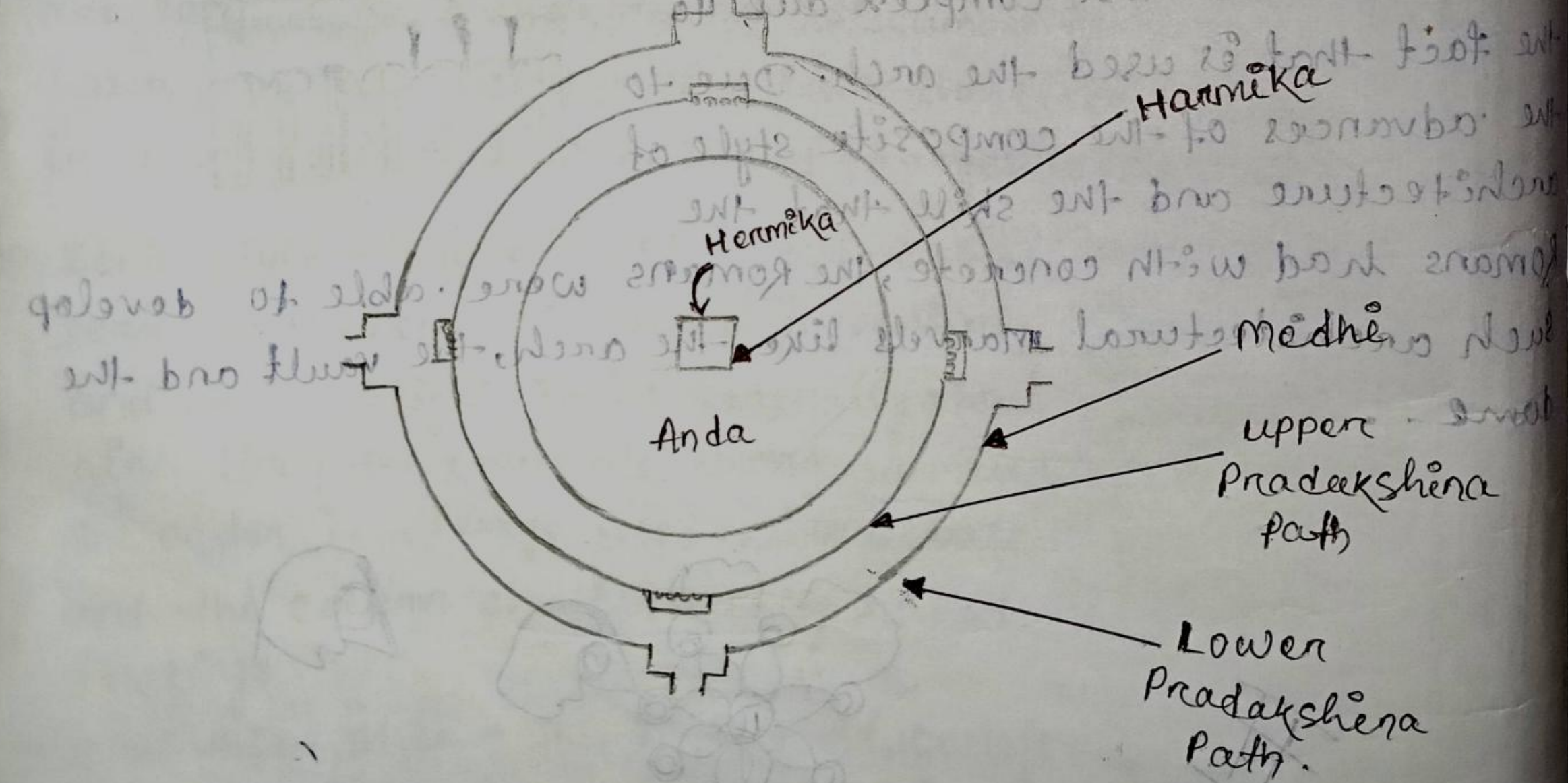
Indian Architecture :- Buddhist Architecture

Stupa is mound of the earth enclosing a relic can be compared with the massive form of the great pyramids of Egypt.

They also called as stupa in pali, Dagaba in Sinhalese, Tope in English & Dhatusnabh in Sanskrit. (Dhatusnabh = Relics preserved in vessel)

Classified into three types :-
(i) Sarika Stupa
(ii) Paribhojika Stupa
(iii) Uddeshika Stupa

* Stupa planning :-



- * **Sanchi stupa** - (i) Sanchi stupa is located 10 km north east of Bhopal and 10 km from Besnagar and Vidisha in the central part of the state of Madhya Pradesh.
- (ii) Sanchi stupa was built by Ashoka (273-236 B.C)
 - (iii) Sanchi stupa is located on the top of the Sanchi hill, which rises about 100m high above the plain.
 - (iv) The "great stupa" at Sanchi is the oldest stone structure in India.
- * **Site planning** :- (i) The stupa more than a funeral mound was planned like a Vedic village.
- (ii) The spherical dome symbolized the infinite space of the sky, abode of God. The dome is called an anda or egg.
 - (iii) The dome is a solid brick work is 36.60 m in dia and 16.46 m high.
 - (iv) A large hemispherical dome which is flat at the top, and crowned by a triple umbrella or chatra on a pedestal surrounded by a square railing or hermika.
 - (v) A railing enclosed called vedica which is about 3.35 m high leaving an ambulatory passage or pradikshina path with the gateways.
 - (vi) The terrace (mudi) 4.87 m high from the ground was added the, creating a separate and upper ambulatory passage 1.8 m wide.
 - (vii) There are four gateways known as Toranas at the cardinal points of the campus. Toranas built by ivory or metal work.
 - (viii) Torana consist of 2 square upright columns with capitals or lion or elephant heads denoting strength.
 - (ix) The top panels is crowned with Tri-ratna symbol of the Buddhist trinity, Buddha, the law (dharma) and monastic community (sangha) with wheels of justice. (centre - elephant)
 - (x) The total height of this erection is about 10.36 m & width 30

* Stupa Sarnath - Dharmaksha Stupa :-

- (i) Built in 7th century
- (ii) a commemorative Stupa.
- (iii) Situated 6.5 km to the north of Benares.
- (iv) Built by Ashoka and later rebuilt in Gupta period.
- (v) The stupa consist of large tower built in stone masonry at the basement for a height of 13m and in brick masonry above for a height 34m.
- (vi) The facing of stone basement has 8 niches.
- (vii) A line of sculptured ornaments, run below it.
- (viii) These niches were mostly provided to erect Buddha's statue. Delicately carved with beautiful floral and geo-metrical patterns.

- ## * Chaityas :-
- (i) The prayer hall or Buddhist Temple & usually referred to as the chaitya hall.
 - (ii) Chaityas are the halls enclosing the stupas.
 - (iii) A chaitya - graha Buddhist cave (stupa hall) is a meeting or assembly chamber often used for purposes similar to a stupa.
 - (iv) Architecturally they show similarities to Roman design concepts of column and Arch.

CONTEMPORARY ARCHITECTURE :- Eiffel Tower

* Design of the Eiffel Tower was originated by Maurice Koechlin and Emile Nouguier, two senior engineers.

* Facts about Eiffel Tower -

- Height - 324m.
- Located in Champ de Mars, Paris
- Iron Lattice Tower.
- Named after its engineer, Gustave Eiffel.
- The tower has three levels for visitors.
- Construction started = 28 January 1887
- Completed = 15 March.
- Opening = 31 March 1889.

* Foundations :- The foundation of the Eiffel Tower was very important because it needed to be able to successfully hold a load of about 10,000 tons.

As a result of the weak soil, Gustave Eiffel created a two-system foundation for the Eiffel Tower.

* Maintenance :- Maintenance of the tower includes applying 50 to 60 tonnes (49 to 59 long tons; 55 to 66 short tons) of paint every seven years to protect it from rust. The height of the Eiffel Tower varies by 15 cm (5.9 in) due to temperature.

(1) What type of metal was used to build it and why was that particular metal used?

Ans - Pure iron was used because it's strong and reliable.

(2) Why was the ~~the~~ Eiffel tower built?

Ans - It was built for the World Exhibition in 1889 to celebrate the French Revolution.

(3) Where is the elevator located in the Eiffel tower?

Ans - An elevator shaft runs up each leg of the Eiffel tower and a long shaft goes up the highest point.

4) Why is the Eiffel tower in France?

Ans - It is in France because the designer of the Eiffel tower was point.

5) Why is it called the Eiffel tower?

Ans - I was named after Gustave Eiffel.

6) Where in Paris is the Eiffel tower located?

Ans - In champ de mars park.

7) Why was it built in the capital of France?

Ans - Because it would be recognised more and Paris would be more popular because of it.

8) What is at the top of the Eiffel tower?

Ans - At the top is a cafe and gift shop.

9) How much did it cost to build?

Ans - It cost 260000 euros to build.

10) Why is it famous?

Ans - It is famous for being the worlds tallest building for over 41 years & for still being the biggest building in France.