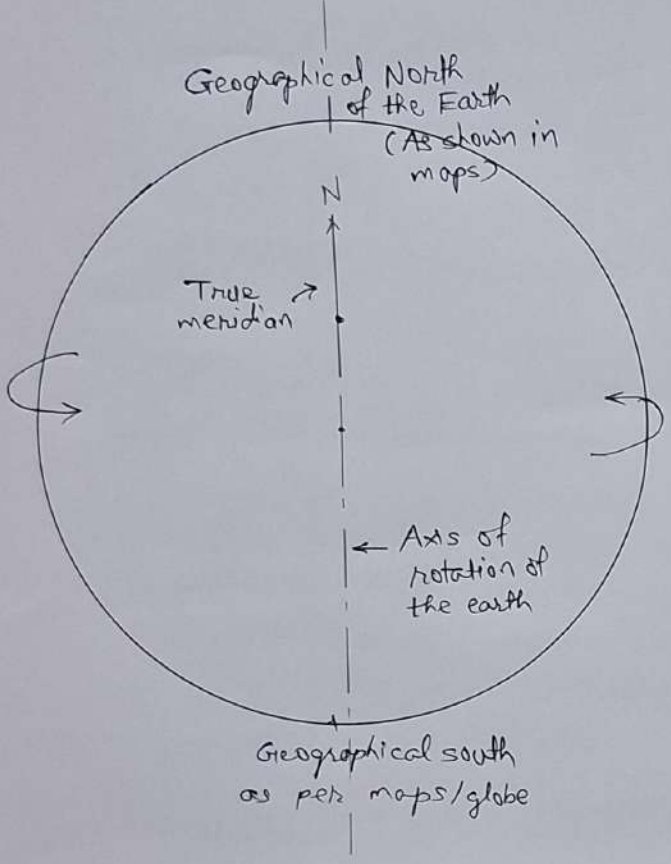
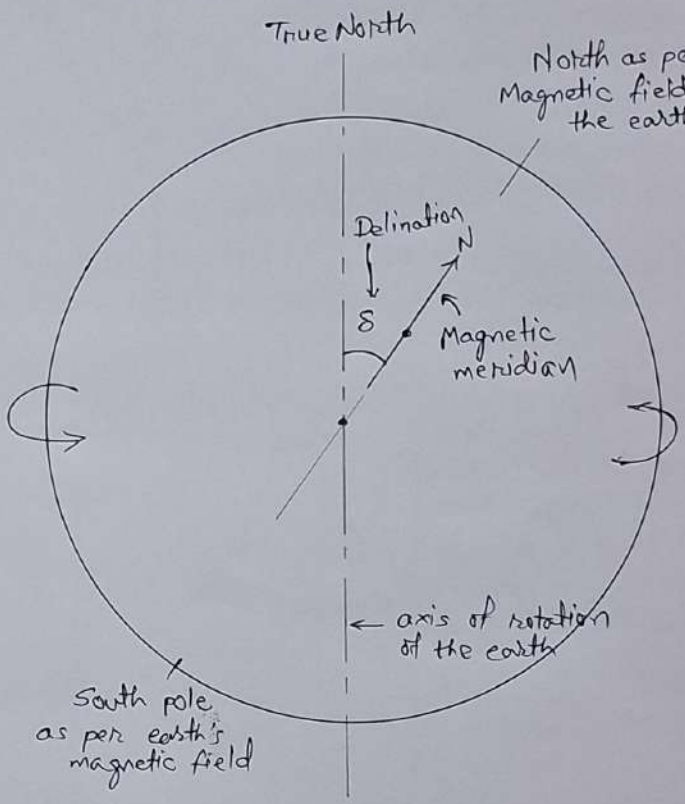
Meridian

True Meridian

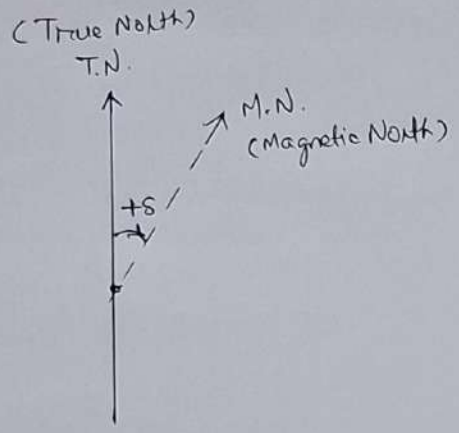


Magnetic Meridian

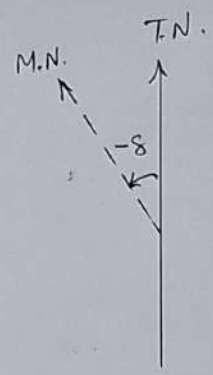


Magnetic Declination

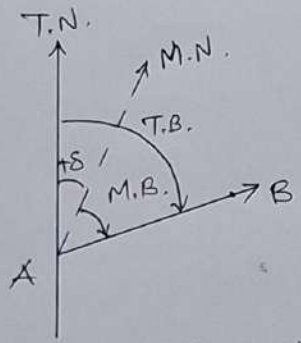
- It is the deviation angle of magnetic needle from the true north.
- It is the angle between True meridian and Magnetic meridian at a place.



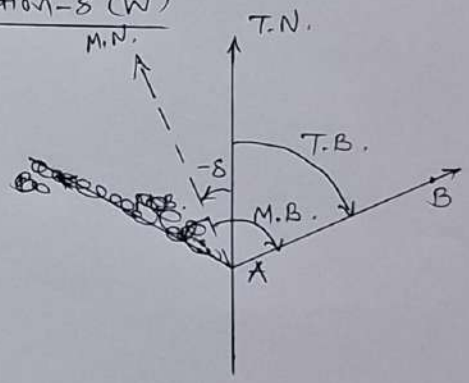
Declination +δ (E)



Declination -δ (W)

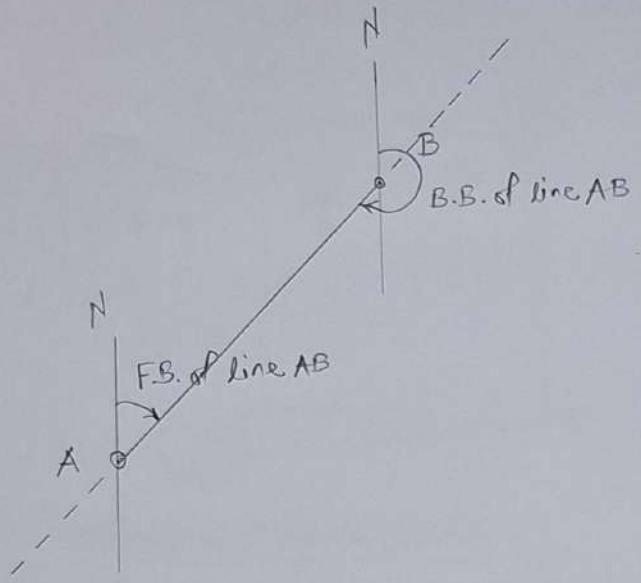


True Bearing (T.B.) = Magnetic Bearing (M.B.) + δ (E)



T.B. = M.B. − δ(W)

F.B. and B.B. of a line



Bearing of line AB measured at station A in $\overrightarrow{AB}$ direction is called F.B. of AB.

Bearing of line BA measured at station B in $\overrightarrow{BA}$ direction is called B.B. of AB.

For a traverse ABCDEFGA, the directions $A \to B$, $B \to C$, $C \to D$ or AB, BC, CD, DE... etc. are called direction of progress.

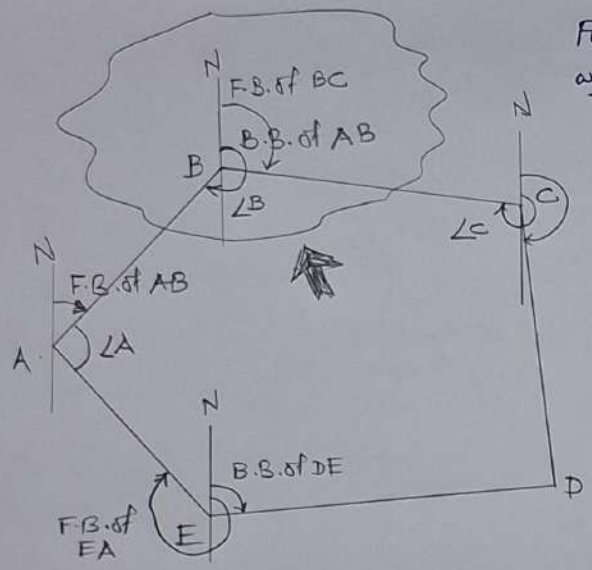
The bearing of a line in direction of progress of traverse is called Fore Bearing.

While,

$B \to A$, $C \to B$, $D \to C$ or $\overrightarrow{BA}$, $\overrightarrow{CB}$, $\overrightarrow{DC}$ are the reverse directions.

The bearing of a line in reverse direction of progress of traverse is called Back Bearing.

Formula to calculate included/interior angles with help of B.B. (Back Bearings) and F.B. (Fore Bearings)



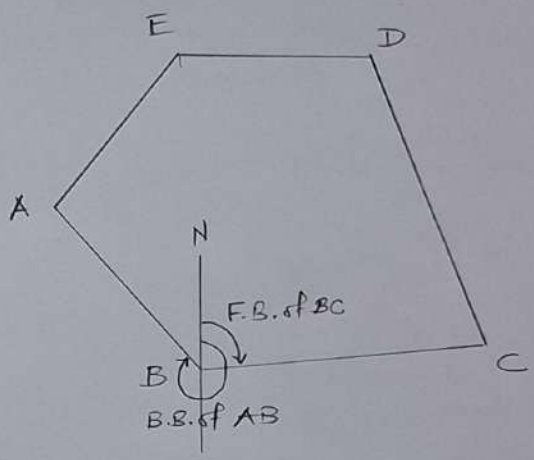
(1) Clockwise Traverse ABCDE.

See the enclosed area around B.

included angle $\angle B$ = B.B. of AB − F.B. of BC

Thus, for any included angle, formula will be

included angle = B.B. of previous line − F.B. of following line.
(interior)



(2) Anticlockwise Traverse ABCDE

Here, the formula will be reversed.

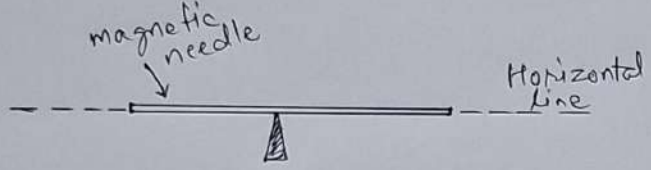
included angle $\angle B$ = F.B. of BC − B.B. of AB
(interior)

[illegible] negative [illegible]

So, add 360° (+360°) to get the interior angle.

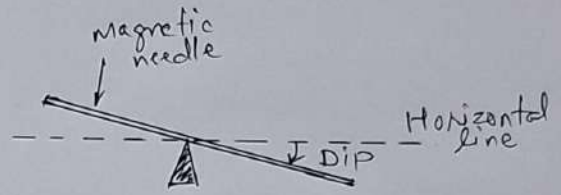
Dip of Magnetic Needle

It is the inclination of free (supported or suspended) magnetic needle with the horizontal line.



Zero (No) Magnetic Dip

Side View

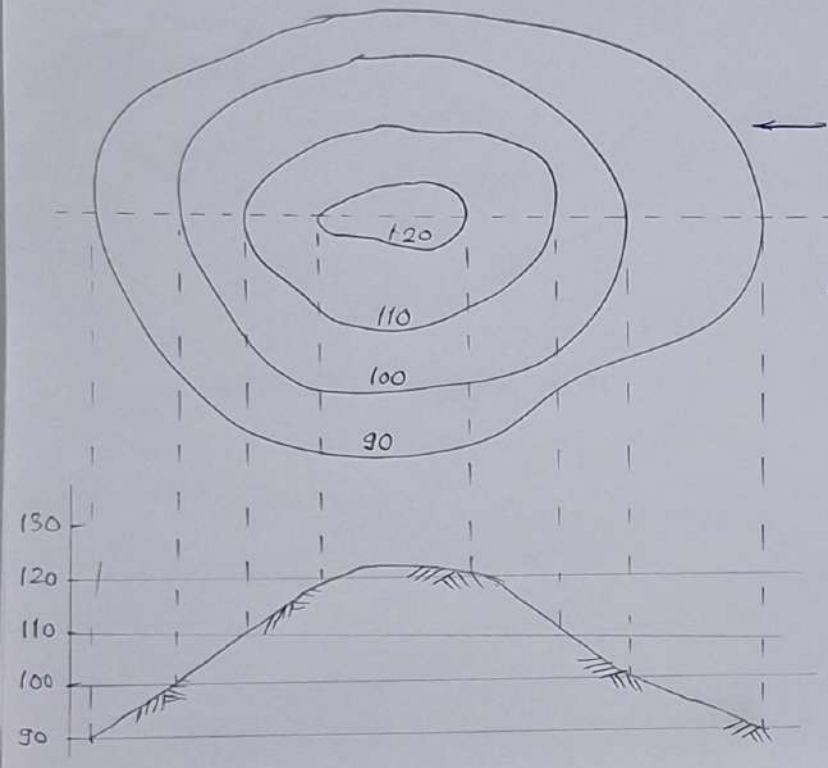


Side View

R.L. - Reduced Elevation - means height (level) of a point from datum (reference) surface.

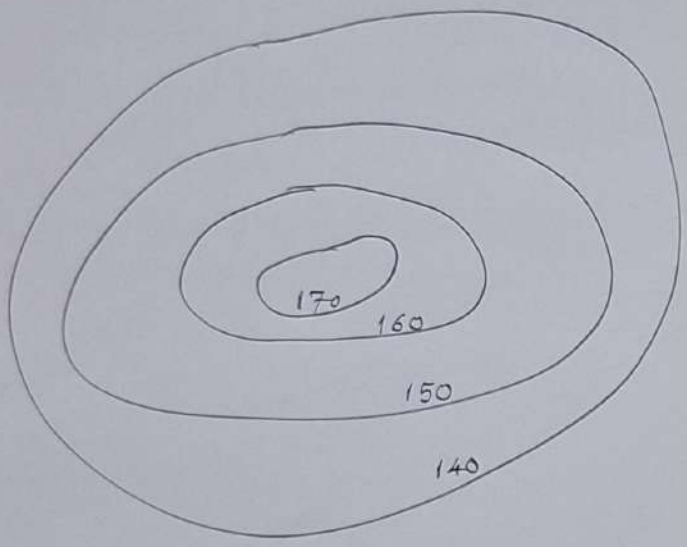
Contour - It is an imaginary line passing through the points having equal elevation or level or R.L.

Contours (sketches) for different types of ground or surfaces.

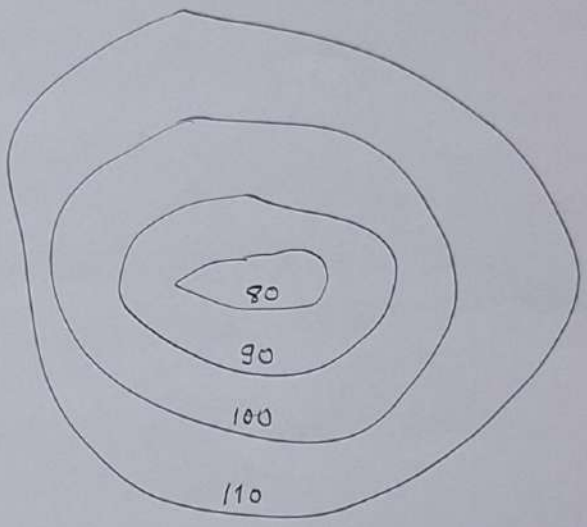


← Contour map of a Hill (ಬೆಟ್ಟದ), ಸ್ಥಳಾಕೃತಿ)

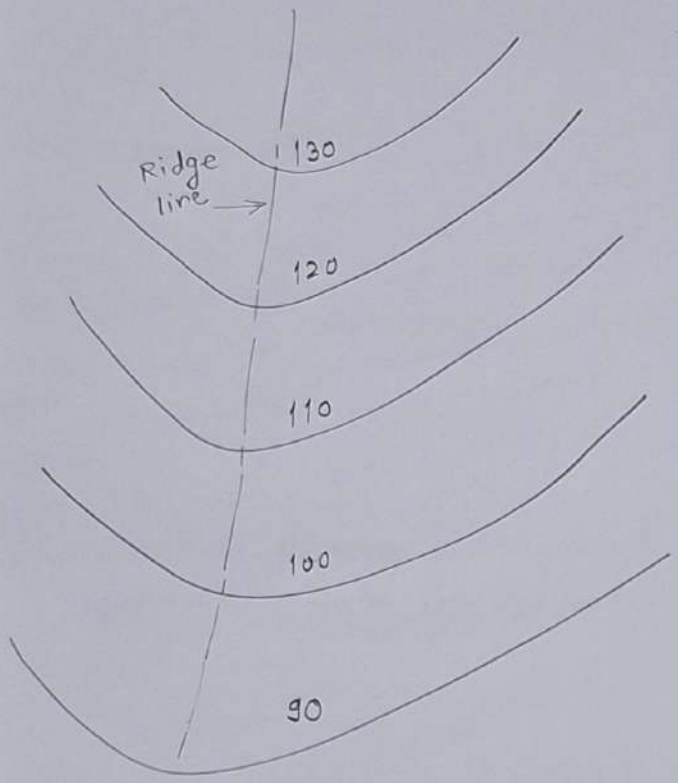
- The number 120, 110, 100, 90... are the R.L.s in metre.
- The R.L.s go on increasing ~~outside~~ inside within the closed contours.
- Below the contour plan, there is projection from contour which defines shape of ground.
- If we are asked to draw contour map for a hill, just draw the upper part with closed contours and R.L.s of contours increasing from outer to inner side.



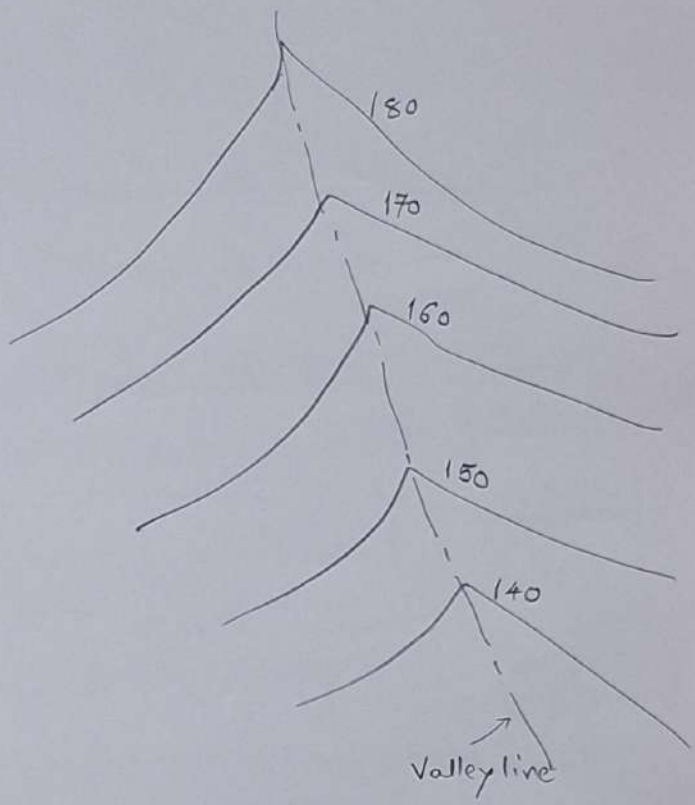
Contours showing a Hill



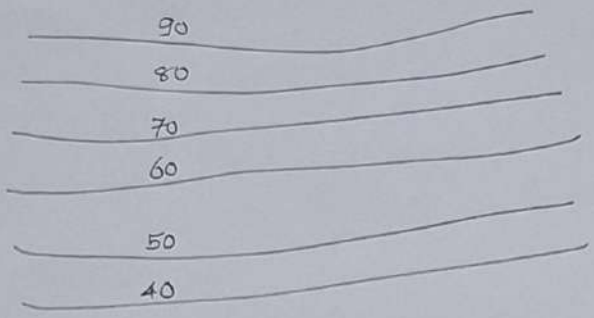
Contours showing a Depression or Pond



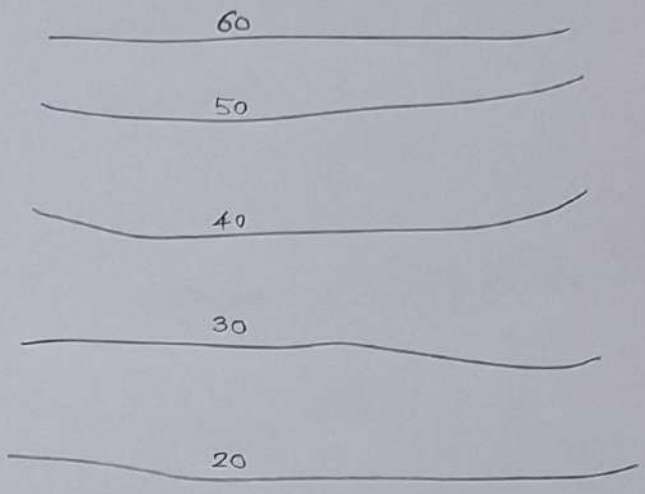
Contours showing a Ridge
(ડુંગર/ડુંગરની ધાર)



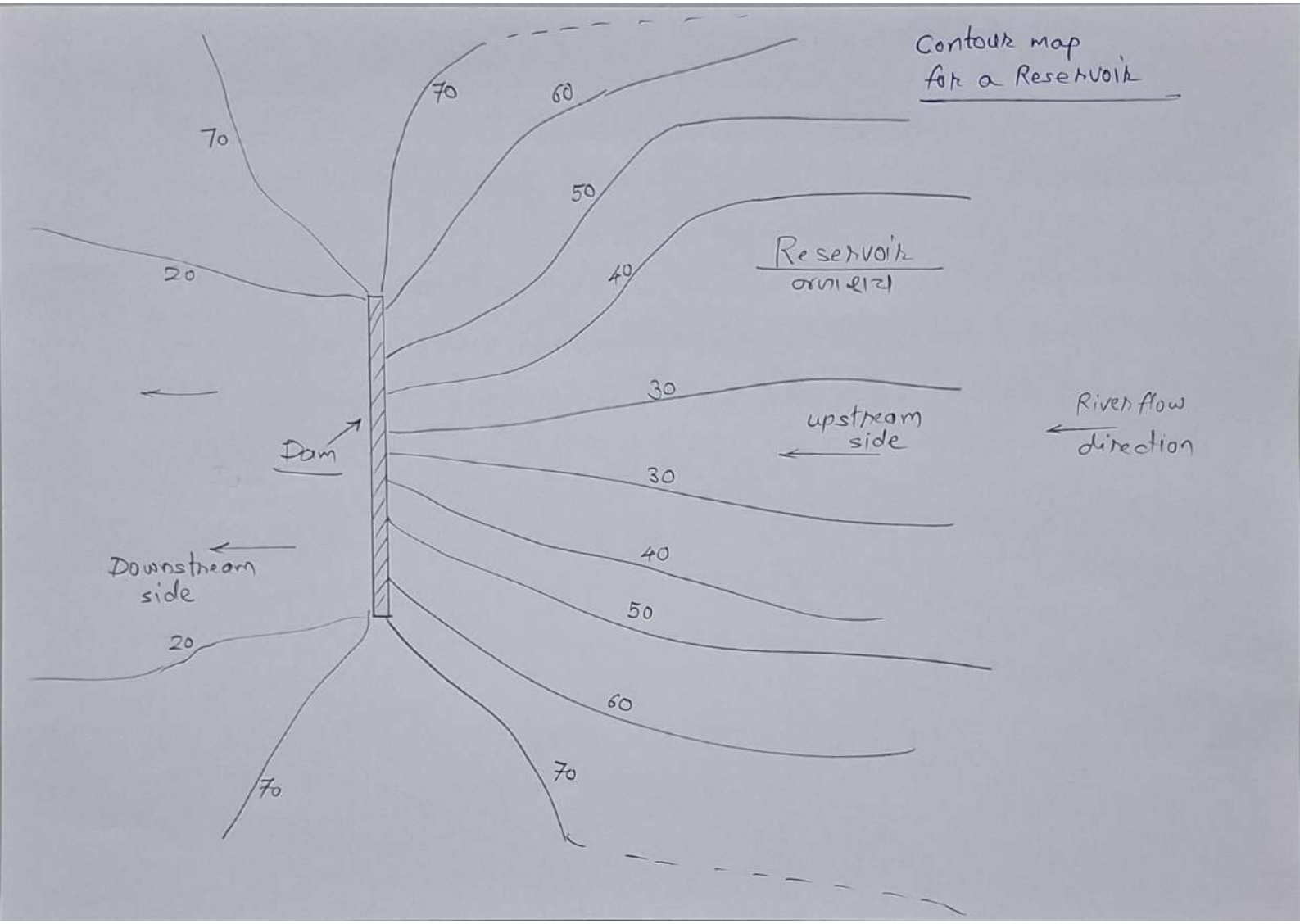
Contours showing a Valley (ખીણ)



Contours of steep sloped ground
(તીવ્ર ઢાળવાળી જમીન, ~~નજીક નજીક~~ contours)



Contours for gentlija (mild) sloped ground
(ઓછી ઢાળવાળી જમીન, contours દૂર દૂર)


Contour map for a Reservoir
70
60
70
50
40
20
Reservoir
Dam
30
upstream side
River flow direction
30
Downstream side
40
50
20
60
70
70

Characteristics of Contours

1. All points on a contour line have the same elevation.
2. Two contours do not cross, except in case of overhanging cliff.
3. Closed contours with higher values inside indicate a Hill.
4. Closed contours with lower values inside indicate a pond/depression.
5. Closely spaced contours with high contour interval indicate steep slope.
6. Far spaced contours with low contour interval indicate mild slope or flatter ground.

Contour interval : दो (सीधे) क्रमागत contours की R.L. की दूरी

It is the difference between R.L.s of consecutive ~~ect~~ contours.

Use / Application of Contour Map

1. From the study of contour map, the nature of ground (like flat or hilly etc.) ~~ect~~ can be known/identified.
2. Layout or center line of a linear structure like road, railway, canal, bridge etc. can be determined / selected.
3. Catchment area of a river / basin, capacity of a reservoir / lake can be determined.
4. ~~E~~ Amount / estimate of earthwork (like excavation / cutting, filling) etc. can be determined.
5. Useful in planning and design of the above mentioned projects.

Q. Necessity of Town Planning.

Ans.

– If a town is not planned properly, it leads to the following problems:

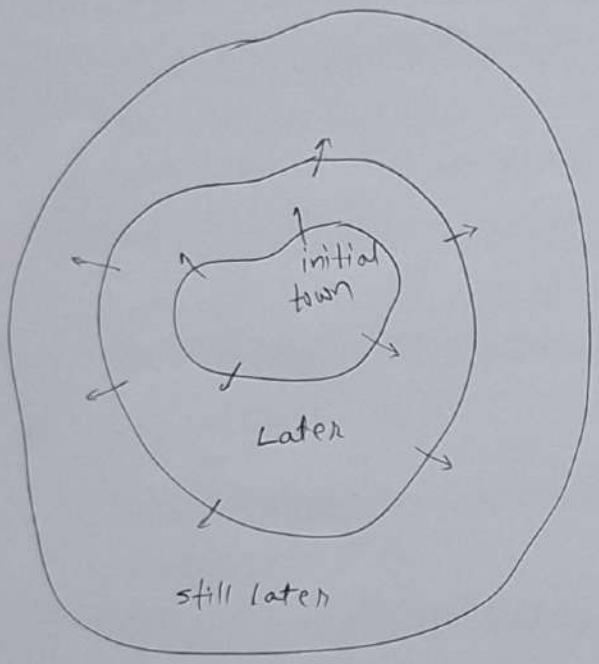
1. Roads congested with traffic and therefore more traveltime, delays, air pollution, noise pollution due to vehicles.
2. High population density which results into shortage of or inadequate amenities and services like water supply, drainage, sanitation, cleanliness, electricity, ~~etc~~. fire fighting etc.
3. Formation of slums which have unhealthy living conditions.
4. Inadequate/insufficient spaces for parks, playgrounds etc.
5. Unhealthy conditions like air pollution, noise pollution, visual pollution due to industries.

– On the other hand town planning:

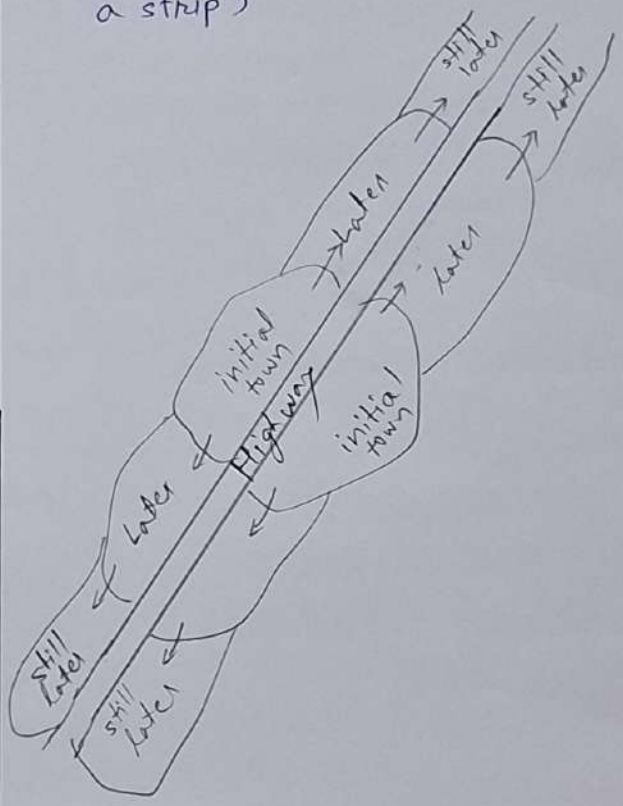
1. improves quality of life - clean air, water, places, sunlight etc.
2. Efficient and smooth transportation, better roads
3. Protects environment
4. Growth of business, services and economy
5. All people can ~~access~~ have better access to health, education, housing, entertainment
6. Increased safety,
7. Reduce accidents
8. Beauty and Aesthetics

Types of Growth of Towns

1. Concentric Spread (surrounding periphery)

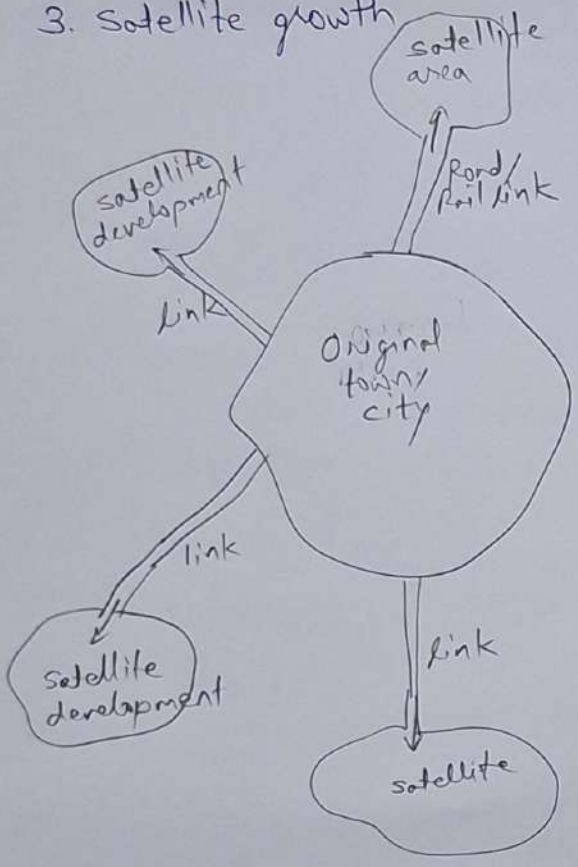


2. Ribbon development (Along a Highway or so in form of a strip)

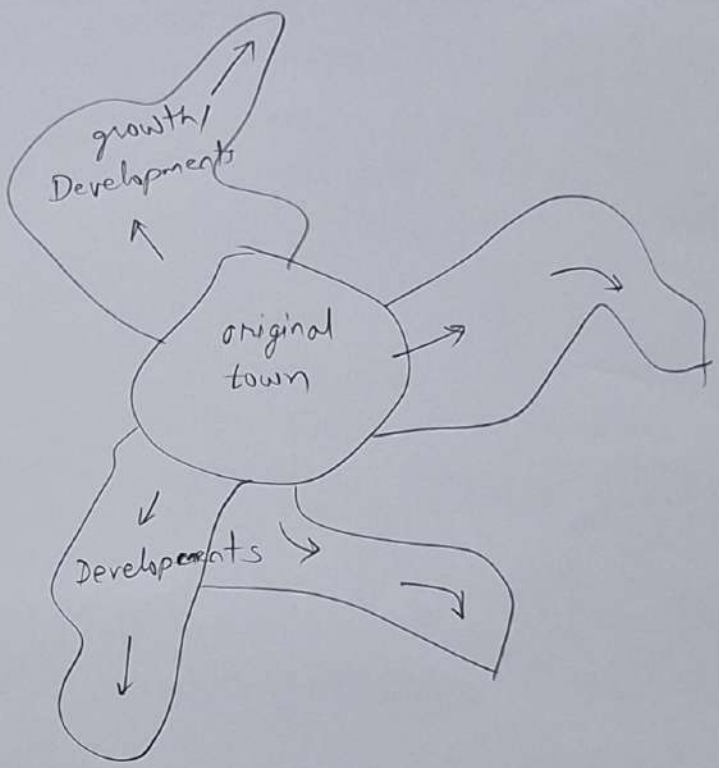


Continued

3. Satellite growth



4. Scattered growth - unplanned or unordered manner



Methods of Water Conservation
(વરસાદના પાણીની રીતો)

1. Rainwater Harvesting
   - collection of ~~as~~ rain water from ~~te~~rraces and roof-tops of the building and storing it.
   - collection of rain water from the built-up surfaces and barren lands into a pond or lake.

2. Traditional methods of collecting and storing rainwater or surface water like,
   Check dams, stepwells (વાવ)

3. Ground-water recharge wells
   To construct recharge wells and divert rain/surface water into them.

4. Use water efficiently and sparingly (કરકસર ભર્યા ઉપયોગ)
   like, - low-wastage plumbing fixtures
   - Drip-irrigation for crops
   - Smart irrigation using water level and moisture sensors
   - Crop rotation (પાકની ફેરબદલી)
   - Mulching (પાંદડા અને ઘાસથી) to retain moisture and reduce ~~evapori~~ evaporation (બાષ્પીભવન અટકાવવું)

5. To avoid / prevent wasteful use and wastage of water.
   - to use water in only required quantity.
   - Fix water meters to charge water use as per quantity

6. Prevent leakages and repair broken pipes of fixtures / fittings

continued

7. Reuse grey water for others purposes (Grey water means ~~and~~ waste water generated from ~~or~~ kitchen sinks, wash basins, wash places etc.)

8. To treat the wastewater before ~~leaving~~ disposing it into rivers or lakes.

9. To prevent contamination or pollution of waters of lakes, river or underground water.
   - not to ~~mix~~ dispose pollutants or polluted water into water sources.
   - not to use pesticides, chemical fertilizers etc.
   - not to dispose industrial effluent (waste water) into lakes, rivers, underground,

10. Proper ~~di~~ management and disposal of solid waste so as not to pollute water bodies
    - sanitary landfilling
    - covering and containing of solid waste etc.

11. To follow 5Rs and apply to water use.
    Refuse, Reduce, Reuse, Repurpose, Recycle

Enlist water (drinking water) quality parameters.

Answer:

A- Physical (ભૌતિક)
1. Colour
2. Odour
3. Taste
4. Temperature
5. Suspended solids - તરતા કણો
6. Turbidity - ડહોળાપણું
7. Total Dissolved Salts. (TDS) - કુલ ઓગાળેલા ક્ષાર

B- Chemical (રાસાયણિક)
1. pH
2. Alkalinity / Acidity
3. Hardness
4. Chlorides
5. Fluorides
6. Metals and Toxic chemicals like Pesticides etc.
7. Residual chlorine
8. Organic matter

C- Biological (જૈવિક)
1. Microorganisms and organic matter (વાયરસ-વિષાણુ-જૈવિક પદાર્થો)
2. Pathogens (Harmful microorganisms)

Q. Drinking water quality standards as per IS: 10500.

Ans.

Sr.No.	Parameter	Desirable - Permissible - Tolerable limits.	General Description
1.	Colour	5 - 15 Hazen	Should be colourless
2.	Odour	—	Should be odourless
3.	Taste	—	Should not have any specific taste. Should be tasteless, should taste fresh.
4.	Turbidity	1 - 5 NTU (Nephelometric Turbidity Unit)	Turbid water may have organic matter and microorganisms.
5.	pH	between 6.5 to 8.5	If less, cause sour taste. If more, cause bitter taste. Unpalatable / Unacceptable beyond this limits.
6.	TDS	500 - 1500 mg/L as $CaCO_3$	Higher values cause high B.P. and diabetes etc.
7.	Chlorides (Cl^- ion)	250 mg/L	Sudden rise in its level indicate contamination by sewage.
8.	Fluorides (F^- ion)	between 0.6 - 1.2 mg/L	Lower value cause dental cavities. Higher cause fluorosis.

9.	Nitrates (NO_3^- ion)	45 mg/L	more than limit cause problems in digestion system.
10.	Sulphates (SO_4^- ion)	200 mg/L	〃
11.	Nitrites (N^-)	0 - Nil	its presence cause Blue Babies disease in infants (kid below age of 6 month). (Mat-haemo-globi-nemia disease)
12.	Metals like Mg^{+2}, Fe^{+2}, Cu^{+2} etc.	< 0.05 mg/L	makes water toxic if more is present.
13.	Residual chlorine (Cl^- left after chlorination for disinfection/purification)	0.2 mg/L	To prevent further contamination of water.