Due to the increasing population of the world in the present century, there is so much tendency to urbanization in most areas of the Earth that the population of the urban areas in the world has exceeded 48 percent of the world's population and it is predicted that it will reach 61.1 percent in 2025. Obviously, cities need vast and extensive lands composed of topography and geomorphology units. The more developed and extended the cities, the more they will meet different units of topography and geomorphology and issues related to them. The regional topography in which a city is located influences the city's development in different ways. Inequalities of lands, the slope of the ups and downs and the like directly influence the development of cities. In mountain areas where there are but limited facilities for the physical development of cities, cities have very limited development both quantitatively and qualitatively. However, there is a high potential for development of cities in flat places with lower slopes. The role of high and low lands and proper slope is very considerable in road construction, the surface of cities, the height of buildings and finally in the landscape of cities [6].

Despite the great importance of geomorphologic studies in urban development planning, studies show that urban planners in Iran have dealt less with this subject or have regarded it as a cliché. The studies conducted in this field are mostly related to metropolitan cities like Tehran and fewer geomorphologic studies have been done regarding the urban development plans of small and medium-sized cities. The urban planners are required to first study the geomorphologic phenomena affecting cities and identify the processes affecting them, and then deal with adequate planning for development of cities in appropriate directions. Therefore, the present research has investigated the relationship between geomorphologic environment and the physical development of Zanjan city, as disproportionate development of this city in any direction can lead to death and financial risks.
Literature:
External Studies:
In an article named "the effect of hydrologic processes and geomorphologic limitations of urbanization on fans", A. P. Schick et al. studied some cities located on fans and concluded that fans have more urban uses due to the favorable natural environment [32]. Avijit Ahmad conducted a research called "geomorphology and cities of tropical regions", in which he investigated rapid development of cities in tropical lands and came to the conclusion that rapid development of cities has a serious and negative effect on natural environment due to the physical development of cities and an increase in groundwater level as well as too much use of the natural resources of these areas [26].

Internal Studies:
In an article named "the use of geomorphology in location of cities and its consequences", Negaresh investigated the phenomena and processes which are effective in locating cities [14]. Safari studied the geomorphologic evaluation of urban development and the vulnerability arising from the mountain slopes of metropolis of Tehran, analyzing vulnerability arising from interaction with urban development. He suggests that a strategy to reduce the damages of mountain slopes is avoiding living in such areas [7]. Servati et al. also investigated the natural constraints of the physical development of Sanandaj city and analyzed the topography and the natural phenomena in location, physical development and morphology of this city (Servati, 1388). In his dissertation named "power assessment of the natural environment and physical development of cities", Azizpour mentioned some of the morphodynamic and morphotectonic forms that affect urban growth, but he alluded merely to the existence of such phenomena in the environment, rather than their possible effects on urban development [26]. In his book called "the usage of geomorphology in land use and environment management", Rajaei has written about the importance of geomorphology in urban planning and investigated different geomorphologic processes which may appear in different urban areas. Shayan et al. investigated in a research the geomorphologic constraints in selecting the axes of urban development in Darab city and analyzed the facilities and limitations of Darab's urban development.

MATERIALS AND METHODS
The method used in the research is descriptive-analytic, and since most studies on geomorphology are fieldworks by nature, this research has also been conducted based on field surveys with the following stages:
1- Using topographic and geological maps of the region as the base of the research.
2- Studying documents, books, magazines and valid academic journals.
3- Drawing various maps of the area such as maps of geology, hydrology, earthquake etc.
4- Using softwares such as Google Earth to provide satellite pictures of the area and Arc Gis and Arc View in order to provide geomorphologic maps of the region.

The Studied Region:
Zanjan city is considered the largest urban spot in Zanjan province and the political -administrative center of the province with an urbanization history of more than 1400 years (Map number one). This city is 48°c and 28 to 30 minutes of eastern length to Greenwich Hour Circle and 36°c and 40 to 41 minutes of northern width to the Equator. Based on the census made in 1385, this city has a population of about 350000 (Statistics Center of Iran, 1385). It has a space of 2469 square kilometers which constitutes 17 percent of the city's space. It has a population of 350000 people based on the census made in 1385 (Statistics Center of Iran, 1385).

Fig. 1: Geographical position of studied region.
Geomorphological limitations of the Zanjan City:

Zanjan city is located in a mountain and semi-mountain area with a lot of ups and downs, so that the most space of the region consists of mountain regions and foothills. The land's slope is from the north to the south and the difference of height (about 100 meters) is not much tangible as the slope is moderate. Zanjan city is located to the right side of a river with the same name and the nearest mountain to the city is located to the eastern north of it with a distance of 4.5 km from Azadi (Freedom) Square and the height difference of 135 meters from the square's level and 1985 meters from the sea's level. The area under study belongs to a branch of tectonic-sedimentary plains of Central Iran-northwest of Alborz. From the morphological perspective, this region includes several parallel mountain ranges from the northwest to the southeast, separated from one another by inter-mountain plains. This region includes Tarem Mountains, Abhar-Zanjan subsidence, Soltanieh Mountains and finally Kavand subsidence from the northeast of the region to its southwest. Tarem Mountains are located to the southwest of Manjil subsidence, which have been composed mainly by volcanic rocks and intrusive Tertiary masses. The northeast side of these mountains has a moderate slope toward Manjil subsidence, whereas its southwest side is so steep with a height of 3000 meters from the sea level. Abhar-Zanjan subsidence is a high, extended and thin plain located along the southern margins of Tarem Mountains. This plain is 1000 meters higher than Manjil subsidence. In the common areas between Tarem Mountains and Abhar-Zanjan subsidence lies the covered fault of Teram with a slope toward the north. Tarem fault level has been observed nowhere to have cut Quaternary sediments. Soltanieh Mountains are in the form of a thin mountain range with a length of about 160 km and a width of less than 15 km. The highest mountain peaks of Soltanieh are located in its southwest branch with a height of 2740 meters from the sea level. Much geological evidence shows Soltanieh Mountains have moved as a result of Soltanieh fault pressure on Abhar-Zanjan subsidence. Conglomerates, freshwater sediments, terraces and river terraces as well as the spacious plains of alluvial deposits of the Quaternary are located within the inter-mountain plains, especially Zanjan Plain and Zanjan City. The extension of Soltanieh Mountains in Zanjanroud branch which is seen more in Ghanibiglou village better than any other place is a complex model of long and important faults in which Precambrian rocks have moved on the Tertiary Period formations. The strongest tectonic phenomena in this region have occurred in Precambrian and Tertiary Period and several phases of fault formation, magmatic transformation and activity and formation of minerals related to them can be identified.

Alaei Taleghani located Zanjan Region in the southwest unit in terms of geomorphic units. This unit includes: a) Azarbayjan and Northen Kurdistan, b) eastern Kurdistan, and c) Zanjan. Based on the special criterion, a geomorphic unit of Iran is considered the largest level the forms or shapes of which have relative congruity and coordination and are thus separable from its neighboring space. Graph 2 shows the hypsometry of the region around Zanjan city as well as the position of Zanjan city.

![Fig. 2: hypsometry map of around Zanjan city.](image)

Zanjan Unit:

The ups and downs of Zanjan Unit is considered a topography unit which GhazelOuzan River has surrounded from the north, east and west. Inequalities in this area have a special order and mountains with building pits among them are specifically extended from northwest to southeast. Zanjan mountains are divided into two distinct branches of northeast and southwest by Abhar and Zanjanroud rivers. Zanjan-Abhar subsidence has been composed of two branches in terms of the surface form: the northern branch (from Zanjan to Mianeh) and the southern branch (from Soltanieh to Abhar, and then its extension up to Takestan.

These two branches are separated in the boundaries of Zanjan city where the plain is less than 3 to 4 km wide. While the plain in the northern half (Zanjan-Mianeh) is twice as wide as that in the southern half, and Zanjan river has massively removed Quaternary sediments and consequently Pliocene layers constitute the plain's bedrock, several terraces have been found at the two sides of Zanjanroud's bed which are interesting topographic elements of the plain.
Mountains of Zanjan South-west Branch:

The roughness of Zanjan south-west branch is made by several parallel mountain ranges extending from the southeast to the northwest between Ghazelouzan Valley and Zanjan-Abhar subsidence, and has been made up of sedimentary rocks, and mines of the First to the Tertiary Periods have been used in their buildings.

Mountains of Zanjan North-east Branch:

Mountains of Zanjan northeast branch are, on the contrary, in the form of a parallel prominence and vast masses of granite and Green Tuffs of Eocene form its main skeleton. The limits of this prominence are determined by Zanjan pit in the west and Ghazelouzan valley in the east. Its direction is also from the southeast to the northwest. Ghajar Mountain (2889 meters) and Chehelkhaneh (2724 meters) are two of its most important peaks [9]. Active valleys are considered important elements of topography all over the area. Spring is the season when the rivers rise. This is the time when melting of the snow stored in mountains is added to spring rain's water and rivers become muddy. Such water not only carries the materials remaining from destroyed domains, but it can dig the beds and deepen the valleys. Summer and autumn cloudbursts also often cause spades which help wash the hillsides. These spades are destructive and powerful enough to accumulate the materials resulting from erosion of hillsides in the adjacent pits. Regardless of these cases, most of the valleys are dried in summer, and those which are not, actually have no noticeable use and efficiency. Erosion is the dominant river process in the area, but regardless of the rock's material, there is much difference in the function of this process in different spots. The most important process of rock destruction in mountains is the mechanical destruction in the form of ice cleavage. All the climate stations of the area show between 4 and 6 months of glacial conditions In Zanjan station, the average glacial conditions of 121 days in 6 months besides the environmental conditions prevent creation of protective coverage like thick earth and rainforest along all the foothills. Obviously, in these conditions, the naked rocks will never be safe against the severe glacial conditions and the relatively long period of winter. In addition, the water arising from the melted snow is very important in washing the domains.

Tectonics of Zanjan Region:

The geological formations of Zanjan region are located in the west part of the area on formations known as Mianehe Bloki mountains, which, due to pressures, have risen horizontally and are clearly visible, and the sediments of these formations include marl, clay, sand, salt, gypsum and water bondage. Bloke Mountains are extended up to vicinities of Zanjan along the two sides of the plain. In the southwest of Zanjan lie Bijar formations dominating Zanjan plain associated with the Infracambrian Period (the oldest geological period). The mountains of the eastern part of the branch which are mostly located outside Zanjanroud branch and within the limits of the central part of Zanjan city have been formed out of granite rocks belonging to the Jurassic Period and are signs of the second geological period dating back to 125 million years ago. The study performed on the geological map of Zanjan by Eshtoklin & Eftekharnejad shows that the oldest formations of this are rocks which have slightly transformed as well as shales belonging to Davaran granite formations which date back to Precambrian Period. Over this lie sand, shale and dolomite rocks named Anfracambrian. The layer over them is called Zagon which ends with Lalun sandstone which is 600 meters thick and dates back to old Cambrian. Milla formations as thick as 500 meters date back to middle Cambrian up to alluvial deposits, which are replete with fossil and are mainly formed out of dolomitic limestone and shale. Throughout the map of Zanjan province, limestone and shale belonging to early Permian (Doroud formations as thick as 100 meters) and Ruteh limestone as thick as 200 meters belonging to the late Permian have been distributed and placed irregularly on the old rocks. Plant fossil sandstone, shales and conglomerates and Shemshak formation Lias as thick as 1000 to 2000 meters which have a little coal are seen over an erosion surface at which different formations of the first period and Precambrian are also sporadically found, and Larbeh limestone with a thickness of 500 meters belonging to Middle Jurassic and Young Jurassic are regularly found on Shemshak formations. Unlike Soltanieh mountains, Tarem mountains have tolerated fewer tectonic changes. From tectonic perspective, Soltanieh mountains are considered the continuity of the northeast parts of Central Iran Tectonic Branch. Abundant longitudinal faults are conspicuous along Soltanieh mountains which are guessed to have led to rising of Mesozoic, Paleozoic and probably Precambrian rocks. In addition to the above-mentioned faults which are along northwest-southeast, there are other faults found from the north to the south and from the east to the south. The direction of movements of the longitudinal faults is not known, but other faults which are mostly north-south have left-oriented slide. Regional folds which have brought about synclines and anticlines and are along the northwest-southeast often follow the longitudinal faults' process. The mentioned structures and faults in Soltanieh mountains have found their present shapes and forms as a result of Alpine Orogenic events which have occurred in upper and Tertiary Cretaceous. (Graph 3).

The status of the region’s faults:

Faults are tectonic fractures which influence the region. It is obvious that faults with less degree of importance are active alongside the main faults and are influenced by them.
a. Tabriz fault: this fault specifically continues from the north of Tabriz to Morrow-Misho mountains (north of Marand). According to Eftekharnejad, Early Tectonic Devonian phenomenon has been followed by fracture and this fracture starts from Zanjan-Abhar plain, extending from northeast up to mountain ridges of northern Tabriz and from there to the northwest of Azarbayjan and Caucasus. This fault is one of the active faults of Iran, but it has ceased to be active since the last 8 decades, and it is possible to be moved by destructive earthquakes. The last movement of this fault has been a movement to the right side and its length has been over 600 km from the south of Abhar to Arrarat in Turkey. This fault influences a vast portion of Zanjan city anyway.

![Geological map of Zanjan](image)

**Fig. 3:** geological map of around Zanjan city.

Soltanieh Fault: this fault is located alongside Soltanieh mountains and in the margin of its northern part, so that it separates Soltanieh mountains (Precambrian, Paleozoic and Mesozoic) from the northeastern and northern volcanic strip. Its direction is from northwest to the southeast and it is over 150 km long. Pre-tertiary formations along this fault in Soltanieh mountains have received faults and a part of it on Zanjan-Abhar pit has thrusting. This fault became activated again during Pliocene phase, extending up to the southwest of Eocene formations, playing a part in creation of them. Therefore, this fault should be older than Eocene. These faults are the oldest geological phenomena which influence Zanjan. However, how the city is influenced depends on its distance from the active faults (Graph 4).

![Tectonics map of Zanjan](image)

**Fig. 4:** Tectonics map of Zanjan.

![Natural and Environmental Elements map with fault map of Zanjan](image)

**Fig. 5:** Natural and Environmental Elements map with fault map of Zanjan.

**Seismicity of the region:**

Iran is situated at the waistline of global earthquakes and various active faults bring about average and strong earthquakes. Those flatlands that are located around big active faults are influenced more in terms of seismicity. Based on the regions' distance from the active faults, flatlands are identified with high-medium and low seismicity. Therefore, these flatlands should be identified with as much care as possible so that the damages resulting from earthquakes are minimized to the most possible extent. The accelerometers available in the cities
of Zanjan and Abhar show that the entire province is located in a region with high-velocity flatlands and earthquakes with medium to high velocity (Map 6).

**Table 1: earthquakes characteristics of Zanjan province.**

<table>
<thead>
<tr>
<th>Richter</th>
<th>Longitude</th>
<th>Latitude</th>
<th>hours</th>
<th>minutes</th>
<th>seconds</th>
<th>date</th>
</tr>
</thead>
<tbody>
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<td>6/9</td>
<td>48°</td>
<td>37°24'</td>
<td>19</td>
<td>-</td>
<td>-</td>
<td>1844/5/13</td>
</tr>
<tr>
<td>6/7</td>
<td>47°59'</td>
<td>37°48'</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>1879/3/22</td>
</tr>
<tr>
<td>5/6</td>
<td>47°30'</td>
<td>36°30'</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1880/7/4</td>
</tr>
<tr>
<td>5/6</td>
<td>47°</td>
<td>36°34'48&quot;</td>
<td>5</td>
<td>18</td>
<td>-</td>
<td>1903/2/9</td>
</tr>
<tr>
<td>6/2</td>
<td>48°40'48&quot;</td>
<td>37°</td>
<td>6</td>
<td>17</td>
<td>-</td>
<td>1905/1/9</td>
</tr>
<tr>
<td>5</td>
<td>48°30'</td>
<td>36°30'</td>
<td>3</td>
<td>34</td>
<td>50</td>
<td>1951/6/5</td>
</tr>
<tr>
<td>5/5</td>
<td>49°</td>
<td>36°</td>
<td>16</td>
<td>18</td>
<td>30</td>
<td>1958/9/21</td>
</tr>
<tr>
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<td>49°19'48&quot;</td>
<td>35°35'36&quot;</td>
<td>7</td>
<td>12</td>
<td>4</td>
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<tr>
<td>5/6</td>
<td>49°10'50&quot;</td>
<td>36°57'</td>
<td>2</td>
<td>41</td>
<td>1</td>
<td>1983/7/22</td>
</tr>
</tbody>
</table>

**Fig. 6:** The dispersion of the earthquake with the great 5 Richter.

Soltanieh mountain ranges in the south of Zanjan city display a complex model of various pieces resulting from fault. No earthquake center has been observed in Soltanieh fault yet, although it is always quite possible for the fault to move as landslide. Generally, earthquakes with a intensity of higher than 7 degrees of mercalli are dangerous in Zanjan city. According to the Geophysics Institute of Tehran University, the utmost rate of horizontal velocity of the past earthquakes in Zanjan city is about 0.07. The return period of 6, 6.5 and 7-Richter earthquakes is estimated 13, 23 and 41 years in Mako-Zanjan tectonic piece. As shown in Table 1, such strong earthquakes have happened in the northern and northeastern parts of Zanjan Province and its neighboring regions. Moreover, regions with high rate of tectonics (Map 6) can be divided into two northern and southern parts in relation to Zanjan city. The two regions have the direction of north and southeast and the northern part has active faults. In the southern part, Soltanieh fault and the peripheral faults around it have led to tectonization of Soltanieh mountains. This region is potentially seismic and its pressure phase has started since the late Cretaceous and is still continuing. Therefore, the farther people live away from Soltanieh and Talesh mountains, the better. Land study is one of the primary stages in development of urban structures. How to use land is a function of the characteristics of the underlying layers, and details related to its shape, surface and slopes as well as geological layers should be studied for future development.

**The Geomorphologic processes affecting land use:**

The processes discussed in urban planning are those which have affected the earth in a relatively short scale of time, especially those which have made the earth’s surface unstable and have made its development difficult. In Zanjan, it is river erosion or sediments that have brought about rivers’ change of direction and blocked development in its neighborhood and have paved the way for occurrence of landslides in the northern part of the city in Tarem mountains. Wherever, weak materials are along with vertical edges, lands with high slope, steep lands, lands with medium slope and lands with little or no slope (flatlands) (Graph 8).
Inequalities play an important part in location of cities. Height is important because many meteorological phenomena such as temperature, relative humidity, rainfall, winds and the like have a close relation with it. "In equal conditions", as height increases, temperature decreases and relative humidity and rainfall increase (Map 4). An important point of uneveness changes is the issue of land's slope. Its importance is because less slope are more economical for many urban uses such as creating streets, creating playgrounds, creating industrial regions, creating educational spaces and generally creating most buildings. High slope creates problems for transportation during snowfalls and glacial conditions and are very dangerous. They also intensify the speed of the surface water and may help create spates during heavy rainfalls when it is windy. Such conditions may become worse in urban areas where the land's surface is covered with impenetrable materials like asphalt.

Inequalities and slope in urban areas may also influence land's price. However, the increasing of costs in high slope is noticeable. Different parts of cities such as residential spaces, industrial lands, service lands, playgrounds, parks, streets, urban installations such as wastewater, water transmission pipelines, power transmission lines and so on are not the same in terms of appropriate slope. For example, residential lands need have a slope of at most 15 percent and streets and alleys should have a slope of at most 8 and at least 0.05 percent in order to protect them against surface water. Playgrounds should not have a slope between 0.5 and 2 percent. The favorable slope for industrial lands is less than 5 percent, but can be even 25 percent for grasslands. Growing trees on lands with 20 and 30 -percent –slope is also possible. Slope can be classified in terms of city development as between 0 and 30 percent (flat and nearly flat), between 3 and 8 percent (moderate slope), between 8 and 15 percent (average slope up to slippery), between 15 and 30 percent (steep and slippery slope), and more than 30 percent (very steep slope or hill). Those lands whose slope is less than 5 percent will be proper for all urban uses including irrigated farming.

Lands with a slope of between 5 and 10 percent are appropriate for all urban uses. Those with a slope between 10 and 15 percent are proper for most uses including buildings and streets. Therefore, these lands can be said to have an average appropriateness for city development. Lands with a slope of between 15 and 30 percent are inappropriate for most urban uses and those with a slope of 30 percent and so are considered inappropriate in terms of city development and thus are not studied. The slope direction is also important, which is north and northeast in Zanjan city.

Topographic Characteristics of Zanjan Region:
Zanjan region is restricted in terms of construction into two parallel mountain ranges (Tarem and Soltanieh) along the northwest-southeast and the low part located between them and the high plain of Zanjan-Abhar separates Tarem mountains from long and thin mountains ranges of Soltanieh. The height of Zanjan plain reaches at least 1500 meters in the west and at most 1800 meters in the northeast. The curve of parallel lines is closed at heights of 1500, 1600 and 1700 meters and Zanjanroud flatland continues with a very little slope.
toward the northwest of the region. Generally, 4 types of land, mountains, hills, plains and slope plains are found in the area. Mountains and hills start in the south of Zanjan city away from riverside and are extended in the region, but the mountains of the northern part of the region gradually give their position to Zanjan plain and end in the river.

**General Directions of Slope:**

Zanjan is divided into two parts (1) and (2) in terms of the general direction of slope. What is common between the two parts is Zanjanroud which is moving toward the northwest with a little slope. General slope is toward southwest in the north of the river, and toward the north in the south of the river. The slope's rate is changing between 2.3 and 4 percent in the north of the river and the city from the height of less than 180 meters, and Zanjan city has been located in its common parts with the south of the city with an average slope of 2.5 percent. The southern part is divided into two southern and southeastern parts and mountains and hills end into Zanjanroud with a steep slope, and the western part continues toward the west side with general slope of 2.3 percent.

**The Topographic Characteristics of the City's Direct Influence Domain:**

In general, the type of lands in this area is mountain, hill, plain and slope plain. It is necessary to know about the topographic status around a city or region when studying it especially for big projects, and a logical solution should be looked for in order to prevent from spates and to direct the surface water. On the other hand, identification of the topographic status of a city can help design the skeleton of a city and decide on how to solve the problem of the surface water. Zanjan's topographic status in the southern side is 16 km long and relatively tall mountains are in the northern part of the city, such as Aghbalagh, Susandagh, and Daredashi, accommodating villages of Zarnan, Chournab, Duasb, Amand, Homayoun, Jarchi, Paenkouh, Tahn, Khoshkroud, Golehrourd, Taherabad, Sarmasaghlou and so on, and use the rivers' water. The most height of the northern part is Banaroudbeh Peak with a height of 2692 meters and Gharedagh Peak with a height of 2517 meters in the northeast of Zanjan. The northern heights are mostly high mountains which are considered a part of southern Alborz mountains and have steep slopes and deep valleys as well as many villages. The southern heights are places where citizens use for entertainment and picnic. The northern villages use the water of rivers and springs for agricultural purposes, but the southern villages use deep wells as well as aqueducts as they lack surface water and permanent rivers (Graph 9). There has been no growth in the southern part of the city, and the growth of the city has been toward the north which is due to the topographic status of the region. The reason for the lack of city's growth in the south is the existence of green strip and gardens in the river's bed, which has made a height difference of about 8 to 10 meters with the last limit of the southern lands and is a bar to the development of the city in the south.

**Fig. 9:** hydrological map and surface waters in around zanjan city.

**The Effect of Topographic Features on Zanjan's Appearance:**

Zanjan city is located in a thin plain between two ranges of northern and southern mountains and has a nearly moderate slope between 1.5 and 2 percent from the northeast to the southwest. The general appearance of the city in the north and the south is a variety of hills surrounding the city with great ups and downs. The southern part of the city where the end line of buildings joins hills is covered with Tabrizi tall trees. This scene in any spot of the city gives a special image which can be considered as the sole feature in Zanjan's urban appearance. Besides these, the only sign existing inside the city is Gardeh hill, which can be used as a sign in the city's urban appearance if it is equipped with entertainment centers. Zanjan city has been influenced by topographic features along its growth.

**The Influence of Topographic Features on Urban Development Regions’ status:**

A part of those lands which have been placed under the urban status in recent years have had slight ups and downs due to their topographic features. Because of the municipality' inattention in some parts of the city, many
of the small watercourses located in these regions have been placed under the urban status and buildings have been constructed over them. This action has the following problems:

Fig. 10 : physical development map and existing situation of zanjan city.

1- The city's appearance has come out of its coordination and buildings have been constructed with ups and downs following the ups and downs of the lands.
2- Disposal of the rainfall's surface water has never been taken into consideration and the danger of small spates resulting from spring and autumn heavy rainfalls keep threatening these buildings.

Conclusion:
If the goal of urban planning is to create welfare for citizens by creating a healthy and favorable environment for them, it is an urgent need to value studying the natural environment of cities including geomorphology, climatology, and geology before creation of cities and heavy investments in it in order to prevent from unhealthy and unfavorable cities. Data analysis, field visits and map interpretations reveal that Zanjan city is subject to threats from different environmental factors. Some of these factors such as slope have created limitations seriously and have given rise to inappropriate conditions for the occurrence of other environmental menaces such as slope movements. Therefore, after the data analysis and as the final conclusion, the following results as the most important factors that limit development of Zanjan city can be achieved:
1- Since 8-degree or 15-percent slope has been considered as the utmost slope applicable for urban constructions, the lands with fewer slopes are very few in Zanjan city and over 3 percent of the city surface are lands higher than 50-percent slope and is facing serious limitation in practice.
2- The distance from fault and the possible effect of earthquake is very important in creating landslides. Distance from fault or density of the levels without continuity including faults, gaps and fractures has an effective role in increasing the instability of the slopes. The results of the present study indicate that frequency of slide has a direct relation with distance from where faults cross and the earthquake-prone areas.
3- Growth, development and extension of Zanjan city occurs due to shortage of sufficient space to create settlements and excavation from hills, and the existence of steep slopes in potentially dangerous regions. The built houses and the city's development are on unresisting and vulnerable lands. This can be shown by examining the potential of the natural force majors such as floods and earthquake in Zanjan city. All branches of the city lie on dangerous lands. This status shows the city's inappropriate position in terms of being on faults, fractures and lands with steep slope. These conditions pave the way for different geomorphologic processes, especially earthquakes, landslides, creeps and water bondage.
4- Due to the slope factor, development of Zanjan city is possible only on the present lands of the city and in vacant spaces in small scales in the form of در جاسازی and by observing the technical principles.

REFERENCES