**Examine the factors which influence soil formation (80 marks)**

Soil in the loose material on the earth’s surface that has been formed by the weathering and erosion of rocks. A fully developed soil has layers or horizons in it that have formed due to a combination of factors such as climate, relief, the presence of living things, parent material and time. Soil forms in response to the conditions present in a particular place. For example latosols form in tropical wet climates and brown earth soils form in temperate climates where deciduous trees are present.

**Climate;** Climate affects temperature and rainfall in a region. Temperature and rainfall have important effects on soils. The temperature of a region affects the activity of living things such as bacteria in the soil. Earthworms, insects, fungi and bacteria break down dead organic material and convert it to humus. If the climate is too cold or too hot the activity of living things is reduced and so is the fertility of the soil. Climate affects the vegetation that can grow in a region, which in turn affects soil formation. For example in the Arctic region few plants survive and so there is little humus available to the soil to make it fertile, it temperate climates there may be large amounts of humus added when the trees lose their leaves. Climate affects the type of weathering that occurs in a region. In colder regions mechanical weathering like freeze thaw action is more common and provides minerals for the soil. In hot wet climates chemical weathering is responsible for releasing nutrients into the soil. Climate controls the rainfall in an area also, wet climates may have infertile soils that have been badly leached and contain little nutrients. Wet climates can have waterlogged soil preventing air being held in the pore spaces of the soil. Soils that lack oxygen are a patchy blue grey colour like gley soils. Dry climates are often affected by salinisation where the salt is deposited on the surface of the soil as a hard crust and prevent plants growing.

**Relief;** Relief refers to the “lay of the land”. Relief refers to the shape of the land, and can create microclimates that influence soil. In mountainous areas temperatures decrease with height, but precipitation also increase due to relief rain. These higher areas are covered by thin leached infertile soils. Steep slopes will generally be drier than flatter land because water runs off the slope quickly and does not seep into the soil quickly, they also have thin soil with few plants because of mass movement like soil creep so do not have developed horizons. Soil developed on flatter land is deeper and has more organic content because more plants can grow there, flatter land tends to be on lowland so are warmer with more living things to fertilize the soil. Aspect (direction of slope) also affects temperatures- south facing slopes get more sunshine. This can be seen in France’s Paris Basin where champagne grapevines are grown on south facing slopes while north facing slopes are used for sheep farming.

**The parent rock** . Parent Rock is the most dominant rock in an area. The soils get there minerals from this rock. These minerals are produced when rocks are eroded and weathered. Plants in the soil use these minerals for food and nutrients. The fact that minerals have compounds such as calcium and potassium prove this.The parent rock is also responsible for the colour, texture and depth of the rock. Limestone produces a soil that is fertile and crumb-textured and easy to work with.

**Biological Activity and Vegetation** Biological activity is when organic matter is made by the breakdown of dead plants and animal remains. Living organisms fertilise the soil and also help to mix the layers of soil. An earthworm supplies oxygen and nitrogen to plant roots by burrowing. These roots in turn bind the soil together. Animals can also improve the soil by creating spaces for air and mixing organic and inorganic material. Bacteria and fungi are also important as they turn organic material into humus and also turn nitrogen into a substance that can be absorbed by plants. This plant material on the surface of the soil protects it from weathering as well as adding much needed nutreints to the soil. Decidious forests like those covering a lot of Ireland are humus nutrient rich, while coniferous forests covering hillland areas do not lose their leaves so have little humus and are acidic.

I feel that all these factors contribute to the formation of soil.