Q1 briefly explain why the following aggregate properties are important to asphalt concrete used in pavements.

* 1. Strength [5 marks]
  2. Porosity and absorption [5 marks]
  3. Surface texture [5 marks]

**1-1**

**High strength aggregates are usually prescribed for asphalt concrete to:**

1. **Resist the action of rolling and compaction *during construction*.**
2. **Resist abrasion and polishing caused by the moving rubber wheels *during traffic.***

**The LA test can be used to check the impact strength of stones.**

**1-2**

* **Pores in aggregates affect the porosity of the asphalt concrete, high porosity reduces the durability of asphalt concrete.**
* **High porosity imply higher demand for bitumen, as bitumen is expected to fill the pores, which impact negatively on the economy of the asphalt concrete.**

**1-3**

* **Rough surface texture for the stones improves the bond between bitumen film and the aggregates, leading to higher strength of asphalt concrete.**
* **Rough texture of the aggregates also improves the skid resistance of the asphalt concrete surface.**

Q2 Answer True or false and provide a comment [3 marks each]

2-1 Flaky type of stones is the best for asphalt concrete. [False] flaky aggregates are not suitable for asphalt concrete because:

* Flaky stones are weak and therefore breakable. Thus reduces the strength of asphalt concrete.
* Flaky stones pack in a manner that leaves a relatively higher void content in asphalt concrete, thus reduces the strength of asphalt concrete OR increases the demand for bitumen (negative impact on economy)

2-2 Use of dusty stones reduces the strength of asphalt concrete.[True], because dust on surface of stones reduces the adhesion at the interface between bitumen and the stone surface. Therefore, reduces the strength of asphalt concrete.

2-3 Gravel is material with particle size less than 4.75 mm. [False], Sand is the material with particle size less than 4.75 mm while gravel is the material with particle size greater than 4.75 mm.

2-4 Approximately 92% to 96% of the volume of asphalt concrete is occupied by aggregates. [True], this is why the properties of aggregate are crucial to the quality and strength of asphalt concrete.

2-5 The specific gravity (G) of aggregates is approximately 2.5 to 2.7 mm/mm. [False], the specific gravity is a ***ratio*** and therefore cannot be measured as mm/mm. BUT it is true that the specific gravity of most stones used in asphalt concrete ranges between 2.5 and 2.7