Higher Technological Institute   (CT 231) Highway & Airport Engineering
Civil Engineering Department   Spring (2019)
Dr. Mohamed Reda   Assignment No. (3)
                                          Asphalt Mix Design

10TH OF RAMADAN CITY

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Question 1

In designing an asphalt concrete mixture for highway pavement to support light traffic surface layer; the following table show the aggregate characteristic

Aggregate type	Percent by weight of Dry Aggregate	Bulk specific gravity	Apparent specific gravity
Coarse	56.3	2.706	2.769
Fine	43.7	2.611	2.915

If the bitumen content based on dry aggregate weight was 7.48% and its specific gravity was 1.01, Calculate Percentage of effective bitumen, Voids in mineral aggregate (VMA), Air voids percentage (Pa), and voids filled with asphalt (VMA). Bulk specific gravity of compacted paving mixture sample (Gmb) = 2.344, Maximum specific gravity of paving mixture sample (Gmm) = 2.438.

Question (2)

The following table lists data used in obtaining an asphalt mix design. The maximum specific gravity of the mixture is 2.41 and bulk specific gravity is 2.35. Determine: a) Bulk specific gravity of aggregates in the paving structure.
b) The asphalt absorbed.
c) Effective asphalt content of the paving mixture.
d) The percent voids in mineral aggregate (VMA)

Material	S.G	Mix composition by weight of total mix
Asphalt cement	1.02	6.40
Coarse Aggregate	2.51	52.35
Fine Aggregate	2.74	33.45
Mineral filler	2.69	7.80

Question (3)

The results of Marshall Test for five specimens are given below. Find the optimum bitumen content for the mix.

Bitumen content	Stability (kg)	Flow (units)	V_v (%)	VFB (%)	Gm
3.5	510	9.0	12.5	34	2.17
4	700	9.5	7.2	65	2.21
4.5	815	11.5	3.9	84	2.26
5	770	15	2.4	91	2.23
5.5	660	19	1.9	93	2.18