



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FIFTH YEAR SPECIAL/ SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECV 503: HIGHWAY MATERIALS

DATE:

TIME:

INSTRUCTIONS

Answer question one and any other two questions

QUESTION ONE (20 MARKS)

- a) Briefly discuss three sources of aggregates (9 marks)
- b) Discuss the following shape properties of aggregates as use in highway materials (6 marks)
 - Flakiness Index (FI)
 - Elongation Index
 - Angularity Number
- c) Briefly discuss the mechanism of cement stabilization (5 marks)

QUESTION TWO (20 MARKS)

- a) Briefly discuss the types of bitumen used in highway construction (9 marks)
- b) Discuss the properties of bitumen as a highway material (7 marks)
- c) Briefly discuss the following the bitumen test (4 marks)
 - i. Penetration Test.
 - ii. Flash Point Tests

QUESTION THREE (20 MARKS)

- a) Discuss AASHTO classification system (10 marks)
- b) Discuss various types of compaction equipment used in highway construction (10 marks)

QUESTION FOUR (20MARKS)

- a) What is the difference between dry mix design and wet-mix design? (4 marks)
- b) Discuss the following classification of bituminous mixtures (12 marks)
 - i. Hot-mix asphalt (HMA)
 - ii. Penetration macadam
 - iii. Dense-graded
 - iv. Stone Matrix Asphalt (SMA)
- c) Outline the reasons why cement stabilization is widely use (4 marks)