Machakos University

SCHOOL OF ENGINEERING

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

CERTIFICATE IN AUTOMOTIVE ENGINEERING MODULE I SEMESTER 1

SEP-DECEMBER 2021

APPLIED SCIENCE CAT I

Answer all questions.

1. (a) Define the following terms terms stating their S.I units.

(i)Power. (2marks)

(ii)Potential Energy (2marks)

(iii) Work (2marks)

(b) A Vehicle having a mass of 2000kg accelerates uniformly from 27km/h to 72km/h in 20 seconds. Calculate,

(i) The force required (4marks)

(ii)The Total work done. (3marks)

(iii) The power developed in producing this acceleration. (3marks)

2. (a) A Vehicle having a mass of 1600kg increases its speed uniformly from 36km/h to 72km/h by the action of an accelerating force of 2.4KN. By how much will its kinetic energy have increased during the acceleration period. Show that this increase in K.E is equal to the work done by the accelerating force. (8marks)

(b) An engine has a mass of 150kg and is suspended from a crane by a sling 4m above the ground level. Determine;

(i)The potential energy of the engine due to its position above the ground. (2marks) (2marks)

(ii)Due to a fault in the sling the engine falls freely to the ground from that height. Calculate the velocity and kinetic energy of the engine at the point of impact with the ground. (4marks)