Mansoura University	Final 2nd, Semester, Exam on الجرارات والقوى الزراعية Tractors and Farm Power units	Faculty of Agriculture
Total Marks :- (60)	Agric. And Biosystems Eng. Program	Agric. Eng. Department
Exam. time : 2 Hours	Course Code (Eng.323)	Date :- 11 / 6 / 2013
Please Answer the following questions:-		

Question one (15 Marks ,three for each)

List out to illustrate each of the following:

(1) The advantages and disadvantages of draught animals as a source of farm power
(2) The practical steps to determine the wheel slip of a tractor
(3) Stability and inverse moments affecting on tractor operations
(4) The operational states of a tractor wheels
(5) Types of clutch used in tractors, and major functions that main clutch should accomplish.

Question two(15 Marks)

Draw a neat sketch to indicate each of the following:-

(1) The basic components of disk clutch
(2) The major components of constant- mesh gear box used in tractors
(3) The main components of planetary gear- set
(4) Forces and dimensions affecting on the tractor stability under simplest operation condition.
(5) The distribution of tractor engine power (hp) as affected by Drawbar pull (KN)

Question three(15 Marks)

Write the proper equations to compute each of the following:-

(1) The power converted from the wind energy into rotational energy in the turbine.
(2)Tractive-Power efficiency of a tractor ..... (3) Coefficient of traction of a tractor
(4)The operation cost of a tractor per year
(5)The weight that transfers from the front wheels to the rear wheels of the tractor.

Question four (15 Marks)

(1) Calculate the maximum travel speed of a tractor with a mass of 3000 kg as it turns at turning radius of 3 meters Knowing that, the tractor center of gravity (CG) is at a height of 80 cm from the ground surface, (5 marks)

(2) A planetary gear-set, has a ring gear with 45 teeth , a planet gear with 10 teeth ,and a sun gear with 25 teeth. Calculate the output rotation of the sun gear, Assume an input rotation of 2400 rpm is providing by the planet carrier ,and ring gear is held stationary. (5 marks)

(3) Compare the horse power capacity of two clutches, one is a multiple disk type and the other is a cone type, Both clutches operate at the speed, both have the same mean friction diameter, and the same axial force is exerted on both clutches. The coefficient of friction is the same for both clutches. The multiple disk clutch has 4 steel, and 3 bronze disks. The pitch angle of the cone clutch is 10^0. Assume uniform wear in both clutches..... (5 marks)

Wish You Good Luck ;;;;

Prof. Dr. A.E. Abou El-Magd