Mansoura University	Final 2nd, Semester, Exam on امتحان مقرر" الجرارات والقوى الزراعية" Tractors and Farm Power لطلاب المستوى الثالث منتظمون وممتحنون من الخارج + طلاب مسجلين للمقرر من المستوى الثانى	Faculty of Agriculture
Total Marks :- (60)	Agric. And Biosystems Eng. Program	Agric. Eng. Department
Time : 2 Hours	Course Code (Eng.323)	Exam Date :- 10/6/2015
Please Answer the following questions:-		Time 1 : 3

First Question (20 Marks)

List out to illustrate each of the following:- (4 Marks for each)

1	Factors governed the maximum tractor pull	2	Common types of clutch used in tractors
3	The factors determined the maximum slope angle that a tractor can be driven on.		
4	The main steps of a practical method to measure the tractor wheel slip%,		
5	The parameters controlled the maximum turning speed of a tractor in short radius.		

Second Question (20 Marks)

Draw a neat sketch to indicate only five of the following:- (4Marks for each)

1	The distribution of tractor engine power (KW) as affected by drawbar pull (KN)		
2	The area of foot print for wheel and crawler tractors		
3	Graphical relationship between drawbar power and drawbar pull under different tractor speeds		
4	Components of Planetary Gear-set	5	Power transmission efficiencies of tractor engine
6	Components of a constant-mesh gear box	7	Main components of a hydraulic clutch

Third Question (20 Marks)

(1) The performance of a wheel tractor was tested, and the following data were obtained:- drawbar power =18 kW, while the power lost in each of slip; rolling resistance; and transmission gears were 10; 3; and 2 kW respectively. Assume engine efficiency of 30 %, and compute each of the following: - the used engine power; the wheel axle power; and the overall efficiency of that tractor? ..... (8 Marks)

(2) Estimate the horse power capacity of a multiple disk clutch has 4 steel disk and 3 bronze disks if the clutch rotates at 1800 rpm and the axial force (F) is 2000 N. Assume a mean radius of 5 cm , and coefficient of friction (f) is 0.25 ? ..... (6 Marks)

(3) Determine (in a suitable table) the different gear ratio calculation equations, the motion direction, and the drive speed state for the four different operation cases of planetary gear train as sun gear and are held stationary? ..... (6 Marks)

End of questions. Wish You Good Luck;

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