Mansoura University	Final 2nd, Semester, Exam on **Tractors and Farm Power units** الجرارات والقوى الزراعية For Third Level Students	Faculty of Agriculture
Total Marks :- (60)	Agric. And Biosystems Eng. Program	Agric. Eng. Department
Time : 2 Hours	Course Code (Eng.323)	Date :- 1 / 6 / 2014

Please answer the following questions:-

First Question (20 Marks)

List out to illustrate the following:- (2.5 Marks for each)

1	Differences between open and crossed belts.	2	Differences between belt and chain drives
3	Parameters used to describe tractor performance.	4	Parameters affecting wheel weight transfer
5	Factors affecting power capacity of a friction clutch	6	Main functions of differential unit
7	Differences between traction efficiency and coefficient of traction		
8	The steps of a practical method to measure the rolling resistance of a wheel tractor		

Second Question(10 Marks)

Write the proper equations to calculate each of the following:- (2Marks for each)

1	The maximum tractor pull on horizontal surface	2	Electrical energy generated from solar cells
3	Predicted energy production from biogas	4	Power loss in rolling resistance of a tractor
5	The maximum travel speed of a tractor as it turns in a short radius		

Third Question (15 Marks)

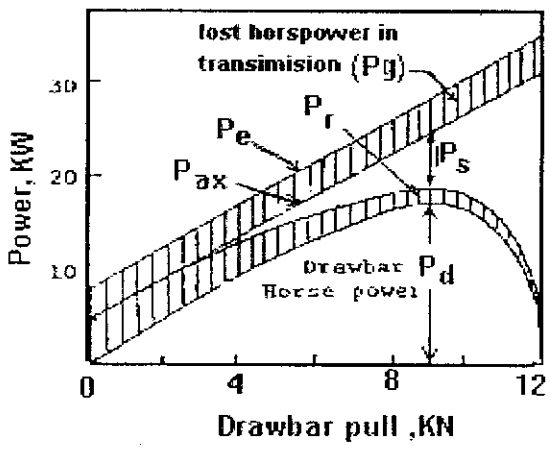
Draw a neat sketch to indicate each of the following:- (3Marks for each)

1	Power supply systems of tractor's PTO	2	The basic components of planetary gear- set
3	The basic components of friction single-disc clutch.	4	Components of differential unit in tractors
5	Forces affecting on the stability of a wheel tractor as it upraises on an inclined grade		

Fourth Question (15 Marks)

(1) Use the graphical relationship at the right hand figure, to compute the overall tractor efficiency at drawbar pull of 10 KN. Assume that engine efficiency is 30%,,,,,, (8 Marks)

(2) Determine the tractor speed (in km/h) and the maximum axle torque on the rear wheels if the tractor's engine is delivering 50 Kw at 1300 rpm with a power transmission efficiency=75%. Assume that tractor rear wheel diameter is 120 cm, and the speed reduction ratio due to gearbox is 12. While the speed reduction ratio due to the differential =4, and due to final drive=2 ..... (7 Marks)



End of questions. Wish You Good Luck;

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