TKP3501  
Farm Mechanization  
Exercise 1

**Question 1:**  
If the draft of the trailing implement, such as disk harrow is measured at 11.1 kN and is pulled at a speed of 8km/hr, what is the drawbar power (in kilowatt)? 

*Answer: Dhp = 24.67 kW*

**Question 2:**  
A tractor is pulling a plow with a total draft of 22.2kN. How fast can the plow be pulled if the tractor has 50 drawbar kW?  

*Answer: V = 8.1 km/hr*

**Question 3:**  
Assume a 110kW tractor operates at a speed of 8.9km/hr while pulling a field cultivator. The draft of the field cultivator is 4.96kN per meter of width when used in a given field. What width of the field could be pulled?  

*Answer: Two answers for the width 8.9 m or 6.6 m*

**Question 4:**  
A moldboard plow was pulled by a diesel tractor during a primary tillage operation for land preparation for vegetable production. The soil surface was at firm stage and the draft generated from the implement recorded via internal tractor instrument during the test was 19.97 kN, while travelling at a constant speed of 9 km/hr.

i. If we assumed the power generated at speed by the tractor is the maximum power at drawbar, what is the best size for the tractor suitable to pull the implement? (Tips: used 86% rules)  

*Answer: \( E_{hp} = 67.5 \text{kW} \)*

ii. What is the power ratios between engine to drawbar power and engine to PTO power?  

*Answer: \( E_{hp}:Dhp = 1.16:1 \) and \( E_{hp}:PTO = 1.35:1 \)*

iii. If we want to attach a rotovar that will utilized the power from PTO to mix the soil and organic fertilizer, what is the maximum speed of the PTO (in rpm) if the maximum allowable torque is 1026.52 Nm?  

*Answer: 540 rpm*

iv. Recorded ambient parameters plays an important factors in controlling the usable power. During above operation, the ambient temperature recorded was at 35˚C, operates at continuous load, altitude was at 400 m while running the fan and radiator. Calculate the available power from the engine.  

*Answer: 44.48 kW*

v. What will be happened to the engine power if the temperature during noon is suddenly increase to 45 °C, while maintaining other parameters?  

*Answer: 41.97 kW*

vi. Calculate the width of the moldboard plow if the draft per meter is 4 kN/m.  

*Answer: 5 m*