Question 1:
A 110kW 4WD tractor operates at a speed of 8.9 km/hr while pulling a field cultivator under firm soil. The draft of the field cultivator is 4.96 kN per meter of width when used in a given field. (3 points)
   a) What maximum width of cultivator could be pulled?
   b) If the tractor operates under same soil condition, and the draft was increased by 20%, what is the new optimum tractor speed? State your assumptions, if necessary.

Question 2:
A disk plow with three tandem disks on the 150 cm wide frame was used to plow the soil as a part of crop land preparation. The recorded ambient temperature at the beginning of the operation was at 27˚C then raised to 35˚C, with fan and radiator on the service to operate the intermittent loads. If each disk contributed about 20 Hp during full load of the acting force from the soil;
   a) If PTO power is 14% less than Indicated power, and Drawbar power is 86% of the PTO power, calculate the tractor size requirement to be able to perform such tillage operation by using a safety factor of 10% of the calculated engine power?. (3 marks)
   b) If the draft force created from the implement was at 28.8 kN/m, calculate the optimum tractor speed. (2 marks)
   c) Using calculated value of the tractor engine power in question 2(a), calculate the most current usable engine power by taking into consideration of the power loses. (2 marks)