WelTec
Te Whare Wānanga o te Awakairangi

DC fundamentals EE3103

Student workbook 2019

Power and energy theory and calculation exercises

Student name

25070 efficiency and horsepower worksheet 6

Question 1 convert the following units

10 hp = kW	**0.5 hp = watts**	**1 kW = hp**
5 MJ = units	**500W for 10 hours = MJ**	**45W = hp**

Question 2 complete the passage below

Input power = Output power plus ..... . efficiency is the

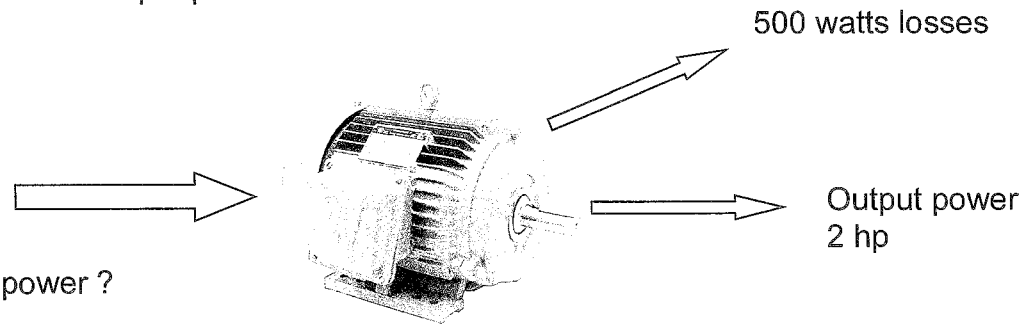
Ratio of ..... to ..... . The symbol for

efficiency is ..... and the unit is .....

Efficiency is normally stated as a .....

Question 3

A motor has losses of 500w and an output power rating of 2 hp.
Calculate the input power

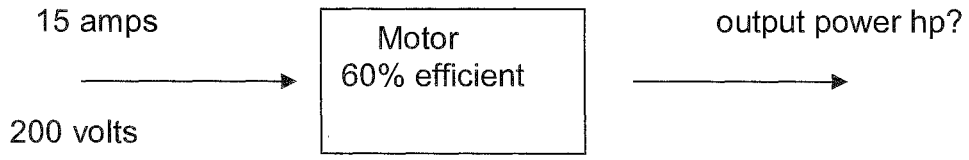


Question 4

What is the efficiency of a motor if the input power is 2300W and the output power is 2000W

Question 5

A motor draws 15 amps from a 200 volt supply. If the motor is 60% efficient calculate the output power in horsepower.



Question 6

An ac motor is driving a dc generator. The motor draws 36 amps from a 230 volt supply. The motor has an efficiency of 85% while the generator runs at 75% efficiency. The generator has an output voltage of 115 volts.

Sketch a block diagram showing the above information in the format illustrated in question 5.

Add to the diagram a) motor input power
b) motor output power
c) generator output power
d) generator output current

and **calculate each of these four values**

Working space for question 6

Question 7

A motor draws 2.3 amps from a 230 volts mains. The motor is 65% efficient and this motor drives a gearbox that is 90% efficient. Draw a block diagram showing inputs and outputs and calculate the gearbox output power in hp.

Question 8

Calculate the input current to a motor that has an efficiency of 55% and an output of 1 hp. The supply is 200 volts

Create a labelled drawing and show all working

Question 9

A generator supplies a load consisting of 8 parallel lamps that are each 100W. Find the generator's input power if the generator is 80% efficient

ANSWERS

Question 1

10 hp = 7.46kW	0.5 hp = 373 watts	1 kW = 1.34 hp
5 MJ = 1.39 units	500W for 10 hours = 18 MJ	45W = 0.06 hp

Question 2

Input power = Output power plus losses. efficiency is the

Ratio of output to input The symbol for

efficiency is η and the unit is there isn't one

Efficiency is normally stated as a percentage

Question 3

1992 watts or 2.67 hp

Question 4

87%

Question 5

2.41 hp

Question 6

a) 8280w b) 7038w c) 5278.5w d) 45.9A

Question 7

0.415 hp

Question 8

6.78A

Question 9

1kW