Python For Electrical Workout - I

Pi Research Tech

1) Loads are Fan = 150 W, pc =150 W, LED = 2 x 20 W. Supply Voltage = 230 V. Find the minimum current requirement of inverter?

Options:

a)0.544	b)1.478	c)2.832	d) 0.871

Hint:

Imin= TotalPower (P)/Voltage

Code and Output Screenshot:

```
fan = 150

pc = 150

LED = 40

voltage = 230

total = fan+pc+LED

minimumI = total / voltage

print('minimum current requirement of interval:',minimumI)
```

output:

```
minimum current requirement of interval: 1.47826086956521 73
```

2) Compute motor Efficiency (All units in SI)

Motor torque= 100

Angular speed = 0.8

input Power (Pin) = 100

Options

a)0.8	b)1.25	c)0.5	d) 0.2

Hint:

Pout= torque * Angular Speed

Efficiency = Pout/Pin

Code and Output Screenshot:

```
torque = 100

angularspeed  = 0.8

Pin = 100

Pout = torque*angularspeed

Efficiency = Pout/Pin

print('The efficiency is:', Efficiency)
```

output:

```
The efficiency is: 0.8
```

3) Two induction motors names like ‘A’, ‘B’. That copper coil has Resistance resA= 30 Ω & resB =400 Ω . Both units have same current values I = 10A. Compute power loss. Which one has high heat?

Options

a)A	b)B	c)A&B	d) none

Hint:

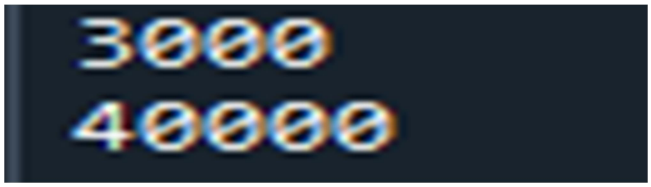
Power loss= I^2R

Heat ∞ Powerloss

Code and Output Screenshot:

```
A = 30

B = 400

I = 10

powerloss1 = (I**2) * A

print(powerloss1)

powerloss2 = (I**2) * B

print(powerloss2)
```

output:



4) True Power =120 W

Apparent Power =170 VA

Find Power-factor theta value in degree?

Options

a)0.787	b)1.27	c)40.46	d) 30.15

Hint:

PowerFactor (Cos (θ)) = True power/ Apparent Power

θ = $\cos^{-1}$ (value) # radians

θ = $\cos^{-1}$ (value) * 180/pi #degree

Code and Output Screenshot:

```
import math
truepower = 120
Apparent = 170
value = truepower/Apparent
print('result=',math.acos(value), 'in radians')
degrees = value * (180 / 3.14)
print('result=', degrees,'in degrees')
```

output:

```
result= 0.787128270656128 in radians
result= 40.46459348070438 in degrees
```

5) Find R_1?

R2= 1 K

Find R1 when

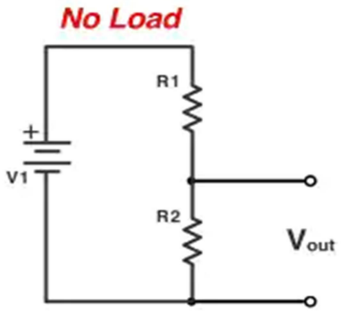
V1 =9 V

Vout= 5V

Find R1 when

V1 =9 V

Vout= 1V



$$V_{out} = V_1 \frac{IR_2}{I(R_1 + R_2)} = \frac{V_1 R_2}{(R_1 + R_2)}$$

Options

a) 4K,2K	b) 8K,2K	c) 8K,4K	d) 12K,10K

Hint:

$R_1 = (V_1 * R_2)/V_{out} - R_2$

Code and Output Screenshot:

```
V1 = [9, 5]
Vout = 1
R2 = 1e3
R1max = ((V1[0]*R2)/Vout) - R2
R1min = ((V1[1]*R2)/Vout) - R2
print(R1min)
print(R1max)
```

output:

```
4000.0
8000.0
```