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Started on Sunday, 4 September 2022, 4:03 PM

State Finished

Completed on Sunday, 4 September 2022, 5:29 PM

Time taken 1 hour 26 mins

Grade **70.0** out of 100.0

Information

Multiple choice:

What happens to the inductance presented by a coil wound on a uniform magnetic circuit if you double the ... ?

Question 1

Correct

Mark 2.0 out of 2.0

... **double the cross-sectional area of the magnetic circuit?**

- ☐ A. It remains the same.
- ☐ B. It halves.
- ☒ C. It doubles.
- ☐ D. It quadruples.
- ☐ E. I do not know.



The correct answer is:

It doubles.

Question 2

Correct

Mark 2.0 out of 2.0

... **double the cross-sectional area of the coil copper conductor?**

- ☒ A. It remains the same.
- ☐ B. It halves.
- ☐ C. It doubles.
- ☐ D. It quadruples.
- ☐ E. I do not know.



The correct answer is:

It remains the same.

Question 3

Correct

Mark 2.0 out of 2.0

... **double the length of the magnetic circuit?**

- ☐ A. It remains the same.
- ☒ B. It halves.
- ☐ C. It doubles.
- ☐ D. It quadruples.
- ☐ E. I do not know.



The correct answer is:

It halves.

Question 4

Correct

Mark 3.0 out of 3.0

... **double the length of the coil copper conductor?**

- ☒ A. It remains the same.
- ☐ B. It halves.
- ☐ C. It doubles.
- ☐ D. It quadruples.
- ☐ E. I do not know.



The correct answer is:

It remains the same.

Question 5

Correct

Mark 3.0 out of 3.0

... **double the relative permeability of the magnetic circuit iron?**

- ☐ A. It remains the same.
- ☐ B. It halves.
- ☒ C. It doubles.
- ☐ D. It quadruples.
- ☐ E. I do not know.



The correct answer is:

It doubles.

Question 6

Correct

Mark 3.0 out of 3.0

... **double the number of turns of the coil?**

- ☐ A. It remains the same.
- ☐ B. It halves.
- ☐ C. It doubles.
- ☒ D. It quadruples.
- ☐ E. I do not know.



The correct answer is:
It quadruples.

Information

Numerical answers only:

A circular magnetic circuit of iron with relative permeability of 1800 and of length of 50 cm and uniform cross-section area of 4 cm^2 is wound with a copper-conductor coil of 100 turns.

Question 7

Correct

Mark 10.0 out of 10.0

What is the reluctance, in A/Wb, presented by the magnetic circuit as seen by the coil? [A whole number, i.e., 0 decimal places]

Answer:



The correct answer is: 552621

Question 8

Correct

Mark 10.0 out of 10.0

What is the inductance, in mH, presented by the coil? [A whole number, i.e., 0 decimal places]

Answer: 

The correct answer is: 18

Question 9

Correct

Mark 10.0 out of 10.0

What is the required mmf, in A, if the desired magnetic flux density in the magnetic circuit is 0.6 T. [A whole number, i.e., 0 decimal places]

Answer: 

The correct answer is: 133

Question 10

Correct

Mark 5.0 out of 5.0

What is the dc current in the coil, in A, required to achieve the flux density desired in Question 4 (0.6T)? [1 decimal place]

Answer: 

The correct answer is: 1.3

Question 11

Correct

Mark 10.0 out of 10.0

A saw-cut is made through the cross-section of the magnetic circuit to create an air-gap of 1 mm. What is the reluctance of the airgap, in A/Wb? [A whole number, i.e., 0 decimal places]

Answer: 

The correct answer is: 1989437

Question 12

Incorrect

Mark 0.0 out of 10.0

With the information of Question 2 and 6, what is the effective reluctance of the magnetic circuit, in A/Wb, as seen by the coil? [A whole number, i.e., 0 decimal places]

Answer: 

The correct answer is: 2542058

Question 13

Correct

Mark 10.0 out of 10.0

The coil wire of Question 2 is now known to have uniform diameter of 1 mm, is of total length of 10 m and is made of copper with conductivity of 60 MS/m. What is the value of the series resistance, in Ω , in the equivalent circuit representation of copper loss of the inductor arrangement? [2 decimal places]

Answer: 

The correct answer is: 0.22

Question 14

Incorrect

Mark 0.0 out of 10.0

When the coil of Question 2 is connected to a 50-Hz ac voltage of 240 V, a current of 2.4 A flows with power consumption of 2 W. With the help of the result in Question 8, what could be the value of the parallel resistance, in Ω , in the equivalent circuit representation of iron loss of the inductor arrangement? [A whole number, i.e., 0 decimal places]

Answer: 

The correct answer is: 132

Question 15

Incorrect

Mark 0.0 out of 10.0

For the situation described in Question 9, what is the value of the peak magnetic flux density, in T, in the magnetic circuit?

Answer: 

The correct answer is: 1.1

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