QUIZ – ANSWER KEY

QUIZ NO: 101

TOPIC: ELECTRICAL ENGINEERING

DATE: 23/08/2022

1. The magnetic field required to reduce the residual magnetism to zero is called _____ ?

   [A] Coercivity

   [B] Retentivity

   [C] Hysteresis

   [D] Saturation magnetism

   Answer: A

   Explanation:-

   From the B-H, the amount of magnetic field required to remove the residual magnetism is called Coercivity.

2. The magnetism left in the iron after exciting field has been removed is known as ?

   [A] permeance

   [B] residual magnetism

   [C] susceptance

   [D] reluctance

   Answer: B

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Explanation:-

- Whenever we apply the exciting field continuously to one coil, there is a chance that some magnetic power is left in that coil for a particular time even if we remove the applied exciting field. This left over magnetic power is called residual magnetism.

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3. Two coils have inductances L_1 = 1200 mH and L_2 = 800 mH. They are connected in such a way that flux in the two coils aid each other and inductance is measured to be 2500 mH, then Mutual inductance between the coils is _____ mH.

[A] 225

[B] 250

[C] 150

[D] 145

Answer: B

Explanation:-

Flux in two coils aid each other inductor of the combination

$L_{eq} = L_1 + L_2 + 2 * M$

Or, $2500 = 1200 + 800 + 2 * M$

$2 * M = 500$

So, the mutual inductance, M is 250 mH.

4. The energy stored in the magnetic field in a solenoid 10 cm long and 4 cm diameter wound with 2000 turns of wire carrying a current at 20 amp, is ?

[A] 24 joules

[B] 12 joules

[C] 30 joules

[D] 15 joules

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Answer: B

Explanation:-

Inductance, $L = [N^2 \mu_0 A]/l$

$L = [(2000 * 2000) (4\pi * 10^{-7}) (\pi /4) (16 * 10^{-4})]/0.1$

$L = 0.06$ H

Energy = $\frac{1}{2} L I^2 = \frac{1}{2} * (0.06) * (20^2) = 12$ joules

5. Electric intensity at any point in an electric field is equal to the _____ at that point ?

[A] electric flux

[B] magnetic flux density

[C] potential gradient

[D] none of them

Answer: C

Explanation:-

The total electric field at any point is equal to the vector sum of the separate electric fields that each point charge would create in the absence of the others. That is,

$$E = \Sigma_i E = E_1 + E_2 + E_3 + \ldots$$

The electric field is nothing but the potential gradient of that particular point.

6. Electric field inside a hollow metallic charged sphere is ?

[A] increasing towards centre

[B] decreasing towards centre

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[C] zero

[D] none of above

Answer: C

Explanation:-

Inside a hollow metallic charged sphere, that will not allow the outside electric field because of the charge separation of electrons and holes at the surface of sphere and creating an equal and opposite field. Hence, the electric field inside a hollow metallic charged sphere is zero.

7. A conductor of length 1 metre moves at right angles to magnetic field of flux density 1 Wb/m^2 with a velocity of 25 m/s. The induced emf in the conductor will be ?

[A] 25 V
[B] 50 V
[C] 75 V
[D] 100 V

Answer: A

Explanation:-

- Given data: Length 'l' = 1 meter; Flux density 'B' = 1 Wb/m^2; Velocity 'V' = 25 m/s. Then, the induced in the conductor is given by the following expression.
- $E = B \times l \times V = 1 \times 1 \times 25 = 25\,Volts$

8. The force required to separate two surfaces with a contact area measuring 5 cm by 6 cm, when flux density normal to the surface is 0.8 tesla, will be ?

[A] 76400 N
[B] 7640 N

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[C] 764 N

[D] 76.4 N

Answer: C

Explanation:-

Given data:

Area ‘A’ = ($5 \times 6 \times 10^{-4}$) = 0.003; Flux density ‘B’ = 0.8 Tesla; Force = ? The force can be calculated by using the below expression.

Force, $F = (B^2 * A) / 2\mu_0$

$= (0.82 * 0.03) / (2 * 4\pi * 10^{-7})$

= 763.94 764 Newtons

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9. The lagging of flux density behind the applied magnetising force is known as ?

[A] Permeance
[B] Flux
[C] Hysteresis
[D] All of the above

Answer: C

Explanation:-

The lag or delay of a magnetic flux density known commonly as magnetic Hysteresis. This relates to the magnetization properties of a material by which it firstly becomes magnetized and then de-magnetized.

10. Which of following is not a unit of flux?

[A] Maxwell
[B] Tesla
[C] Weber
[D] All of above

Answer: B

Explanation:-

A Weber (Wb) is a derived SI unit of magnetic flux. Maxwell is CGS unit of magnetic flux. Tesla is a SI unit of magnetic flux density or magnetic field strength. Tesla is the unit of flux density.