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SSC JE 2023

PGCIL & DDA JE

Electrical Machine & Network

New MCQ with tips & trick

Day-5

> LIVE

6:00 PM Abhinesh sir

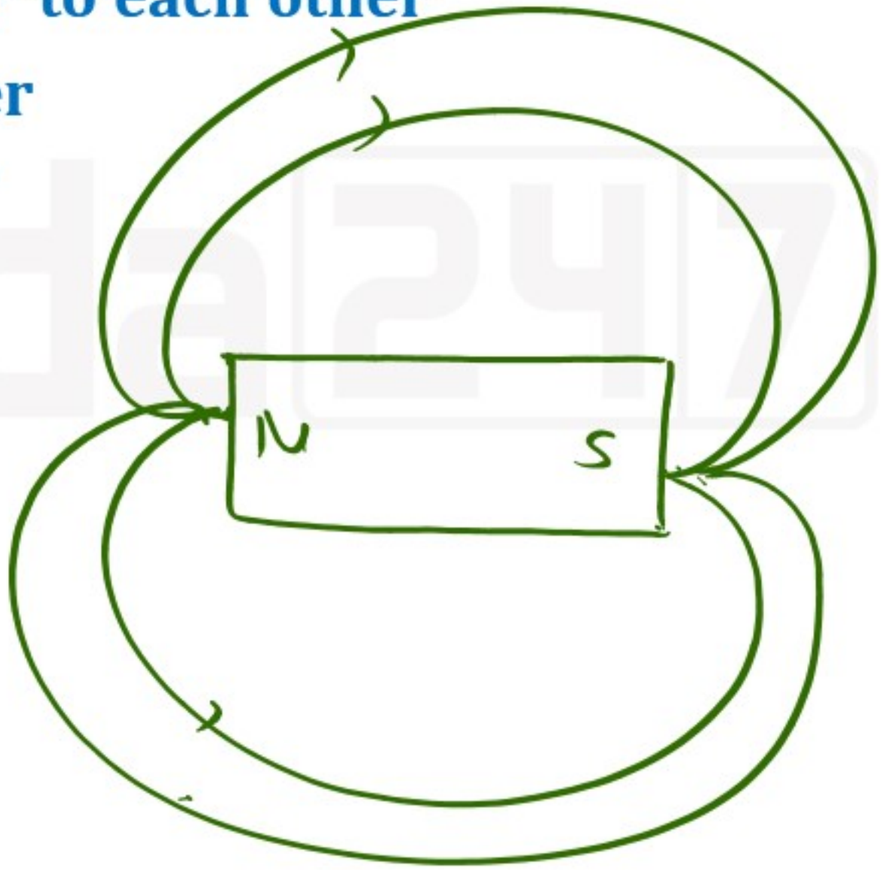
Q The magnetic field lines

(a) intersect at right angles to one another

(b) intersect an angle of 45° to each other

(c) do not cross one another

(d) cross at an angle of 60°



Q **Which type of charge carrier has the greatest mobility?**

(a) Positive ions

(b) Negative ions

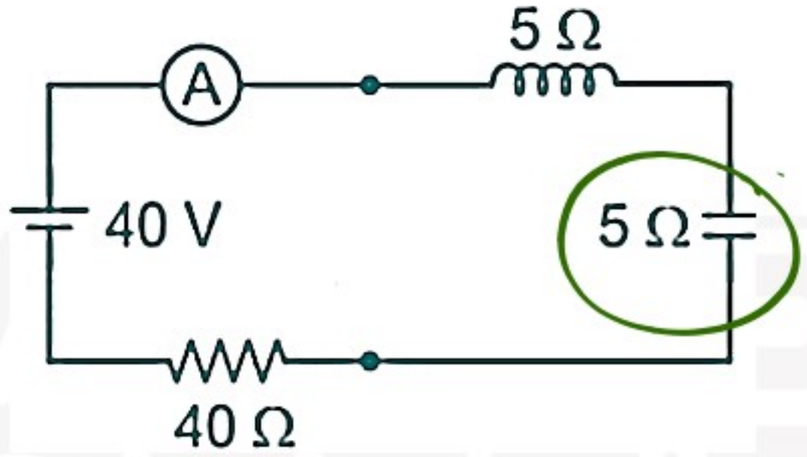
(c) Free Electrons

(d) Holes

$\mu_e > \mu_h$

→ it Required less energy

Q **What will be the reading of the ammeter for the given circuit?**



(a) 2 A

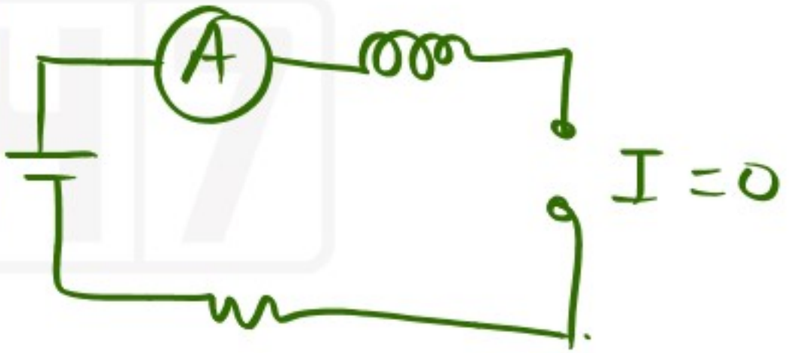
(b) 0 A

(c) 5 A

(d) 1 A

C → does Not allowd any d.c (f=0)

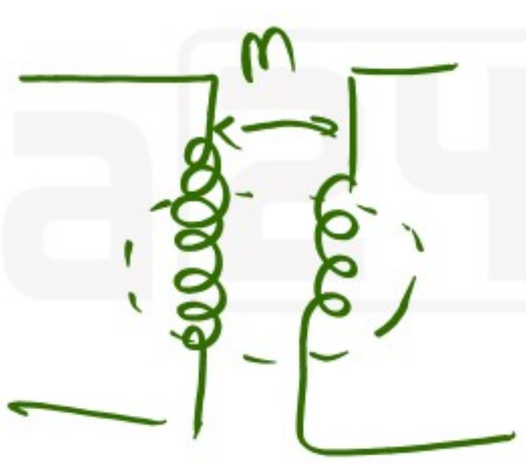
$X_C = \frac{1}{2\pi fC} = \infty = 0 \cdot C$



Q

The coefficient of coupling between two coils is 0.45. The first coil has an inductance of 75 mH and the second coil has an inductance of 105 mH. What is the mutual inductance between the coils?

(a) 3.54 mH
(b) 39.9 mH
(c) 7.88 mH
(d) 189.3 mH



$M = K\sqrt{L_1 L_2}$

$M = 0.45 \times \sqrt{75 \times 10^{-3} \times 105 \times 10^{-3}}$

Q

Precision is defined as -

(a) Repeatability

(b) Reliability

(c) Uncertainity

(d) Accuracy

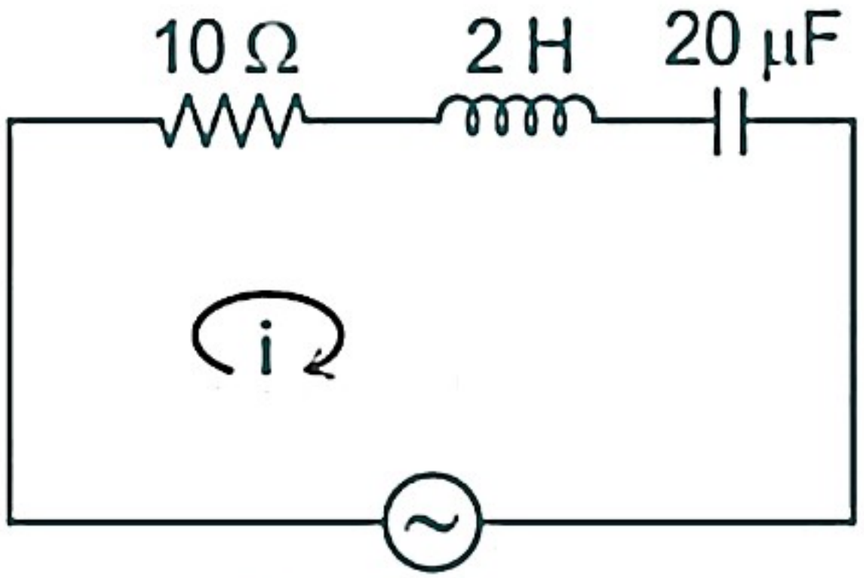
* Measurment Characteristics

precision → sharp or clear mea...

P - ✗
A - ✗

A - ✗
P - ✓

Q Find the resonant frequency ω_0 for the given RLC circuit –



(a) $\omega_0 = 0.158 \times 10^3$ rad/sec

(b) $\omega_0 = 2.5 \times 10^3$ rad/sec

(c) $\omega_0 = 42.31 \times 10^3$ rad/sec

(d) $\omega_0 = 1.12 \times 10^3$ rad/sec

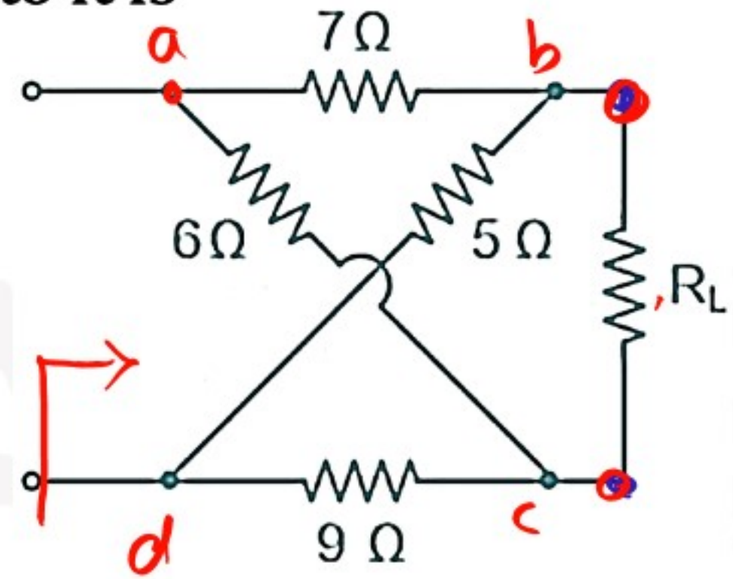
$$Q = \frac{\omega_0}{B.W.}$$

$$\omega_0 = \frac{1}{\sqrt{LC}}$$

$$\omega_0 = \frac{1}{\sqrt{2 \times 20 \times 10^{-6}}}$$

$$\omega_0 = \frac{10^3}{\sqrt{40}}$$

Q In the lattice network, the value of R_L for the maximum power transfer to it is



(a) 6.74 Ω

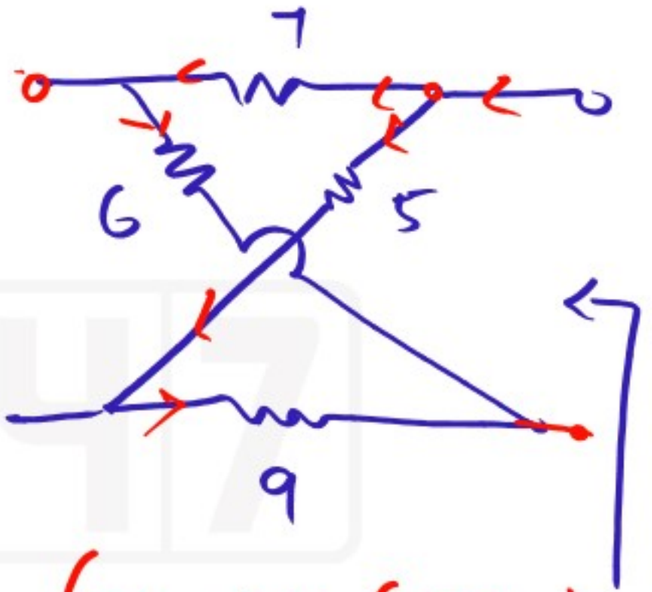
(b) 9 Ω

(c) 6.52 Ω

(d) 8 Ω

for MPT

$R_L = R_{th}$



$(7+6) \,||\, (5+9) = R_{th}$

$13 \,||\, 14 = R_{th}$

Q

The conduction current density in a conducting medium is given by

(a) $J = \sigma E$

(b) $J = \sigma / E$

(c) $J = E / \sigma$

(d) $J = \sigma^2 / E$

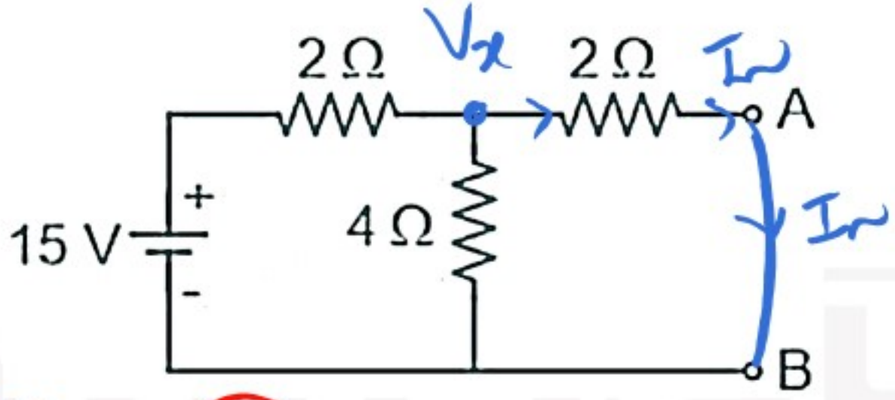
$V = IR$

$J = \sigma E$

$\rho \propto \frac{1}{\sigma}$

Q

In the following circuit, the values of Norton's current I_N and Norton's resistance R_N across AB are



(a) ~~3 A, 10/3 Ω~~

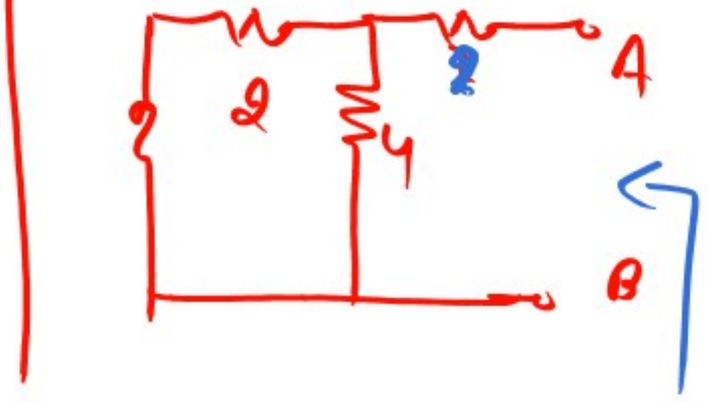
(b) 10 A, 4 Ω

(c) 1.5 A, 6 Ω

(d) 1.5 A, 4 Ω

R_N → V.S = Short

C.S = Open



$R_N = \frac{8}{6} + ?$

$R_N = 10/3$

$\frac{V_x - 15}{2} + \frac{V_x}{4} + \frac{V_x}{2} = 0$

$I_N = V_x/2 = 3$ A

Q

The EMF equation of D.C. Machine is -

(a) NϕZP/60A

(b) PNZ/60N

(c) PN/120

(d) Zϕ/120P

* Lap - w.

A = P

* Wave

A = 2

$$G = \frac{P\phi ZN}{60 \cdot A}$$

A = No. of parallel path

Q

In which single – phase motor, the rotor has no teeth or winding?

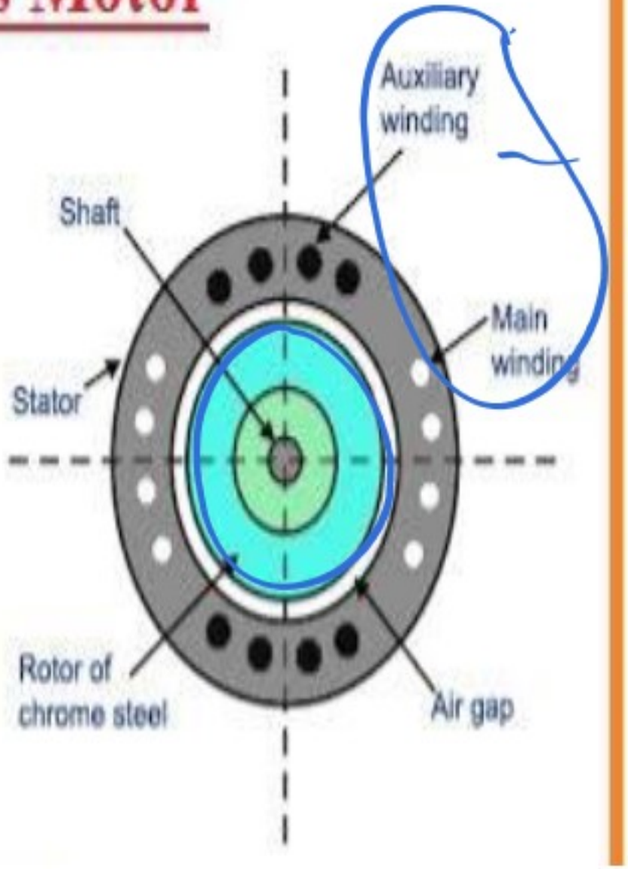
(a) Hysteresis motor

(b) Reluctance motor

(c) Split – phase motor

(d) Universal motor

Introduction to Hysteresis Motor



Q

Hysteresis loss and eddy current loss are proportional to

(a) f and f^2 respectively

(b) f and f^3 respectively

(c) f^2 and f respectively

(d) f^2 and f^3 respectively

$P_c = P_h + P_e$

$P_h = K_h f B_m^x$ } $x = 1.6$

$P_h \propto f$

$P_e = K_e f^2 B_m^2 t^2$

t = thickness of insulation

Q

Consider the following statement regarding Split Phase Induction Motor:

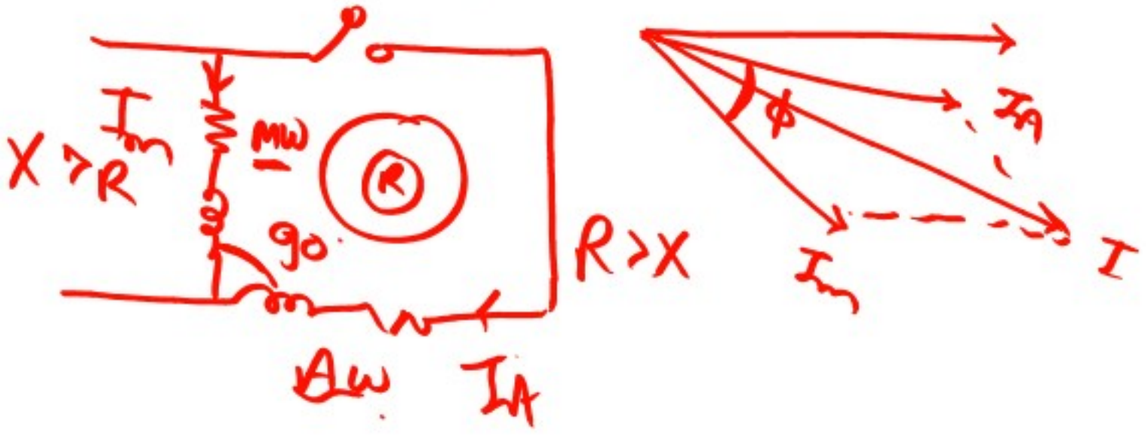
1. The starting winding is located 180° electrical from the main winding.
2. In a split – phase machine, the main winding has low resistance but high reactance whereas the starting winding has a high resistance, but low reactance.
3. In a split – phase motor, the currents flowing in the two windings have a reasonable phase difference of (25° to 30°)

(a) 1 : True, 2 : True, 3 : True

(b) 1 : False, 2 : True, 3 : True

(c) 1 : False, 2 : True, 3 : False

(d) 1 : True, 2 : True, 3 : False



Q

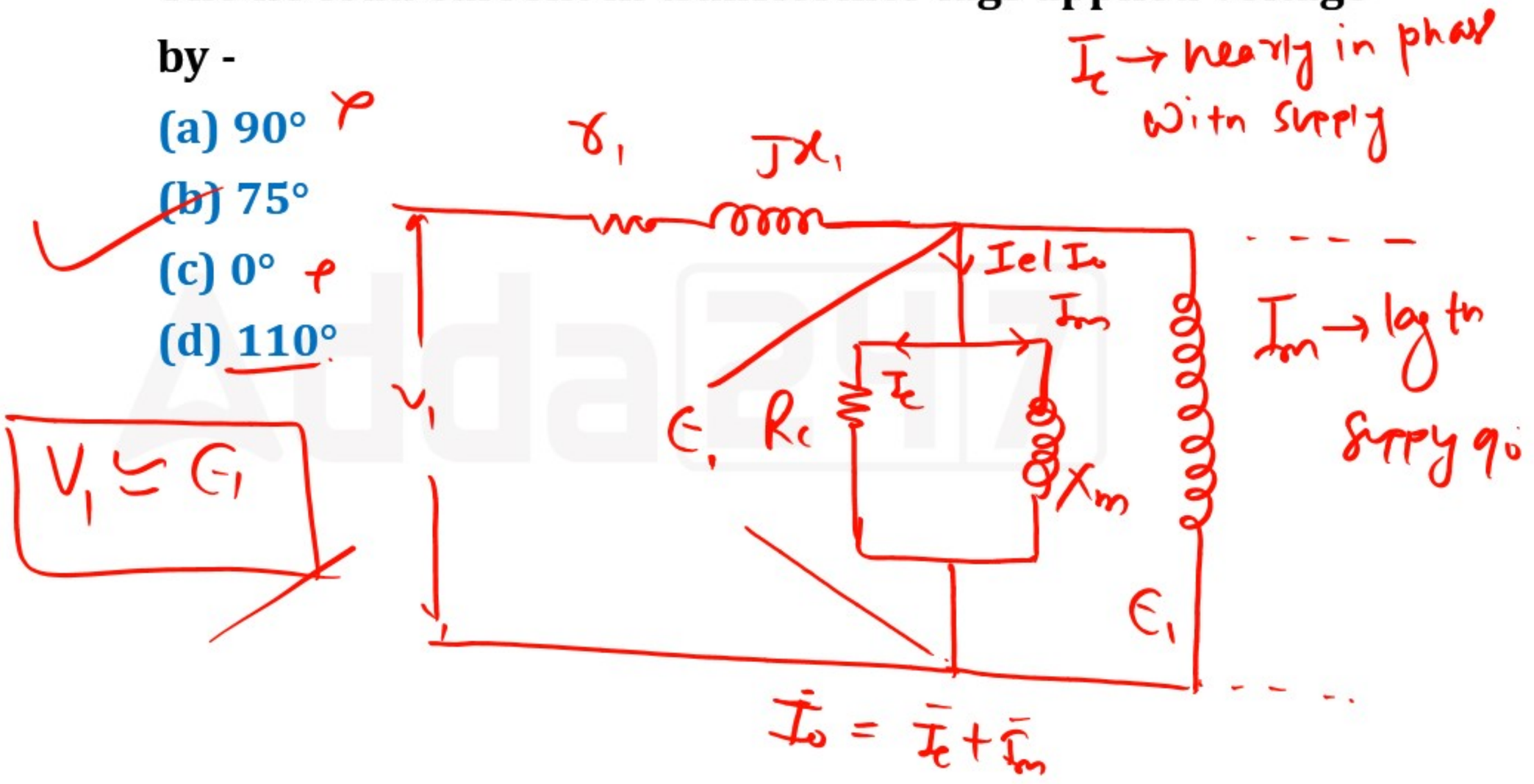
The no load current in transformer lags applied voltage by -

(a) 90°

(b) 75°

(c) 0°

(d) 110°



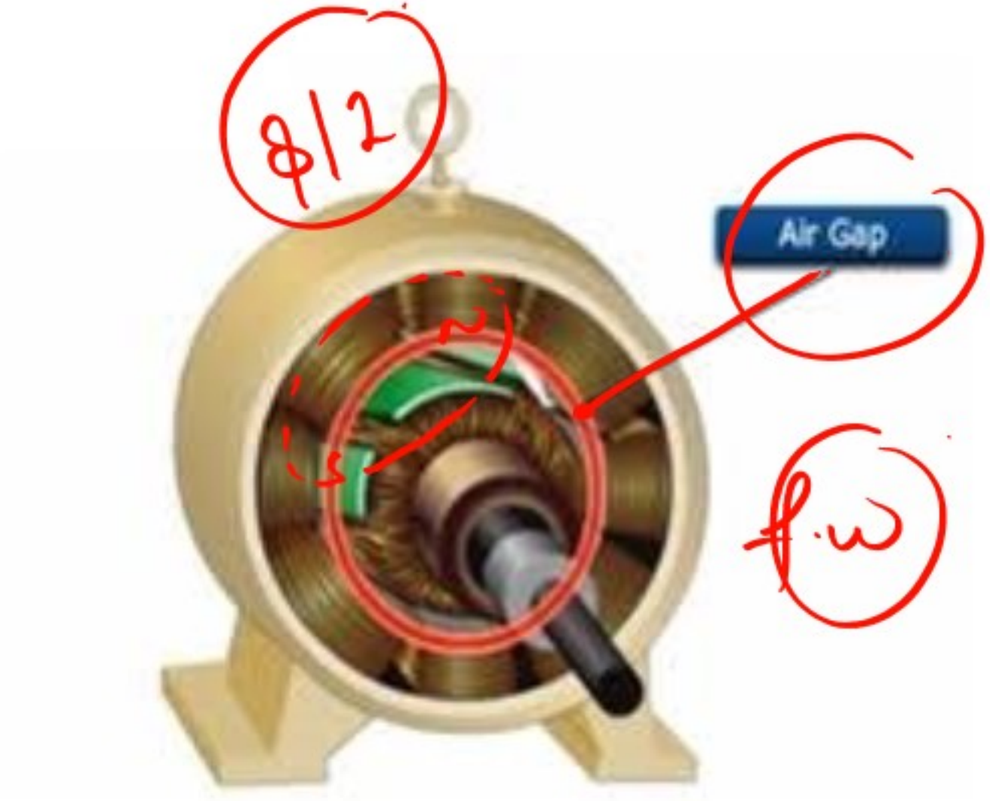
Q In a DC machine, the _____ serves as a return path for the pole flux.

(a) pole shoe

(b) yoke

(c) pigtail

(d) pole face


Air Gap


Yoke
Armature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Q

With reference to synchronous motors, state TRUE/FALSE for following statements.

1. A synchronous compensator is a synchronous motor running without a mechanical load.
2. For the same output and voltage rating, a synchronous motor is costlier than an induction motor.

(a) 1 – TRUE, 2 – FALSE
(b) 1 – TRUE, 2 – TRUE
(c) 1 – FALSE, 2 – TRUE
(d) 1 – FALSE, 2 – FALSE

Sy. motor → Not a self starting

Sy. motor → SPM → Shunt cap.

Sy. motor → over exited ($\delta = 0$)

Q **Which of the following characteristics is NOT true for a synchronous motor?**

(a) It can be made to operate from lagging to leading power factor.

(b) It has no self – starting torque.

(c) It requires no excitation at rotor.

(d) The speed remains constant from no load to full load.

Rotor - dc.

Q

What is the condition at which a transformer gives maximum efficiency?

(a) When iron loss is greater than copper loss

(b) When iron loss is zero

(c) When iron loss equals copper loss

(d) When iron loss is half of the copper loss

$x = 1$

$$\eta = \frac{V_2 I_2 \cos\theta_2}{V_2 I_2 \cos\theta_2 + P_{2R} + P_{core}}$$

$$\frac{d(\eta_{.1})}{dI} = 0$$

$$I^2 R' = P_c$$

Q

Which of the following motors are used in DC Traction systems?

(a) DC series motor

(b) DC compound motors

(c) Both dc Series & compound motors

(d) None of these

$T \propto \phi I_a$

$T \propto I_a^2$ – Up to Saturation

Load ↑ T ↑

Q

The induced emf of a dc machine running at 750 rpm is 220 V. the percentage increase in field flux for generating an induced emf of 250 V at 700 rpm would be:

(a) 7%
(b) 11.25%
(c) 21.7 %
(d) 42.4%

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$E_g \propto \phi N$

$\frac{E_{g1}}{E_{g2}} = \frac{\phi_1}{\phi_2} \times \frac{N_1}{N_2}$

$\frac{220}{250} = \frac{\phi_1}{\phi_2} \times \frac{750}{700}$

$\frac{22}{25} = \frac{\phi_1}{\phi_2} \times \frac{75}{70}$

$\phi_1 \rightarrow \phi_2$