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ENGINEERS

KVS TGT WE 2023

ELECTRICAL & ELECTRONICS

MOST EXPECTED QUESTIONS & PYQ

पेपर ऐसा ही आएगा

DAY-9

LIVE-6:00PM

Q

Which of the following material has the highest electrical conductivity?

(a) Gold

(b) Silver ✓ → it has only single electron in Valance

(c) Copper

(d) Aluminium

Q **In which of the following material's resistance is independent of change in temperature?**

(a) Brass

(b) Platinum

(c) Tungsten

(d) Alloys of Constantan and Magnanin

$R_t = R_0(1+\alpha \Delta t)$

α = low (as possible)

$\alpha = 0.00004 \cdot C$

PMMC

MI

$\rightarrow R_{sh}$

Q What is the relation between latching current and holding current in a thyristor?

(a) Latching current = Holding current

(b) Latching current > Holding current

(c) Latching current < Holding current

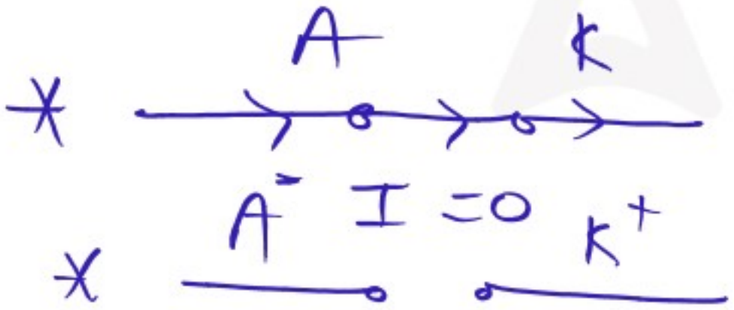
(d) Latching current ≥ Holding current

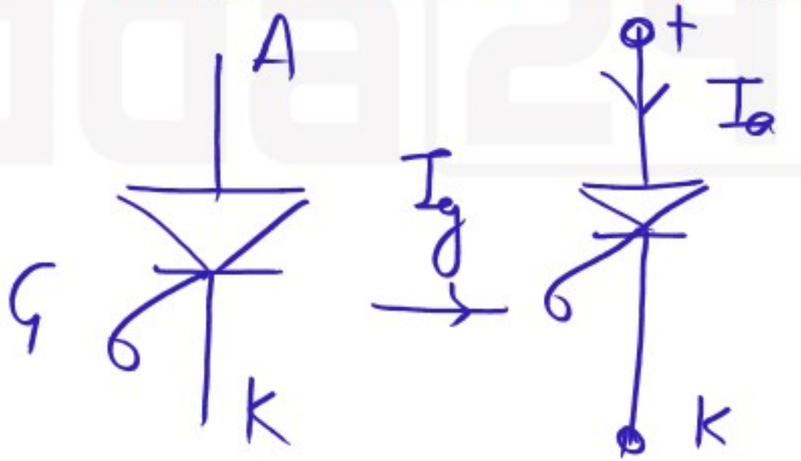
$I_L > I_H$

SCR

DC switch

→ AC switch





$I_L \rightarrow T_{on}$

$I_H \rightarrow T_{off}$

$I_g \geq I_L$ – ON

$I_g < I_H$

Q

Hall exp

→ Semi---

Yes No

When a magnetic field of 6 A/m with current of 2 A is applied across a semiconductor of width 4 m, then determine the value of Hall voltage (in Volts). Given: Number of carrier concentration is 10^{20}.

(a) 0.1875
(b) 1.1857
(c) 0.1117
(d) 1.1756

$B = 6$
$I = 2$
$W = 4$
$N = 10^{20}$

Hall coeffi

$R_H = \frac{1}{ne^-}$

$R_H = \frac{1}{10^{20} \times 1.6 \times 10^{-19}}$

$= 0.625$

$V_H = \frac{R_H I B}{W}$

Q

Calculate the value of lower cut – off frequency (in Hz) of RC low pass filter with resistance, R = 200 kilo-ohms and capacitance, C = 5 μF.

13-feb

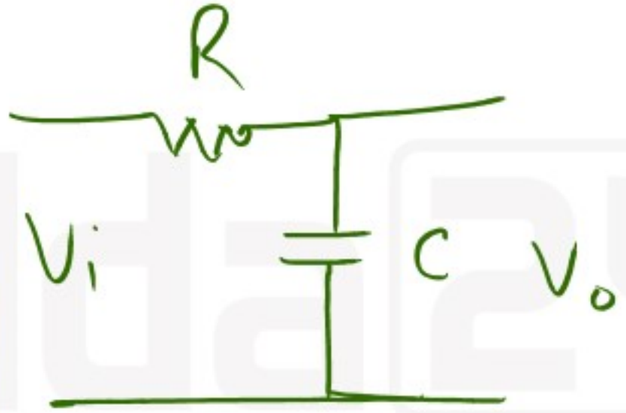
99%

(a) 0.159

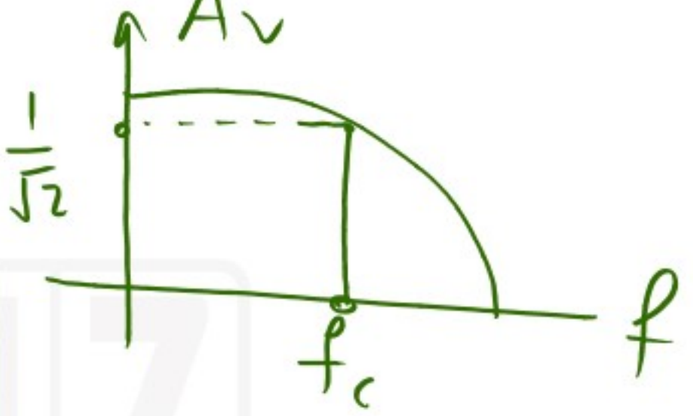
(b) 2

(c) 0.5

(d) 1.75



$$T/f = \frac{1}{1+sCR}$$



$$f_c = \frac{1}{2\pi RC} = \frac{1}{2\pi \times 200 \times 10^3 \times 5 \times 10^{-6}}$$

$$= 0.159$$

Q

Which of the following oscillator is used for audio frequency applications and provides wide range of frequency?

(a) Hartley oscillator

(b) Armstrong oscillator

(c) Phase shift oscillator

(d) Wien bridge oscillator

3-dB

$f_c = \frac{1}{2\pi RC}$

$f = \frac{1}{2\pi RC}$

if $R_1 = R_2$

$C_1 = C_2$

filter

Radio

→ LC

→ Colpit

→ Hartley

Audio

↳ RC ϕ...

↳ Wein bridge

Q Which of the following oscillator is also known as radio frequency (RF) oscillators?

(a) RC oscillators

(b) RL oscillators

(c) LC oscillators

(d) RLC oscillators

Q

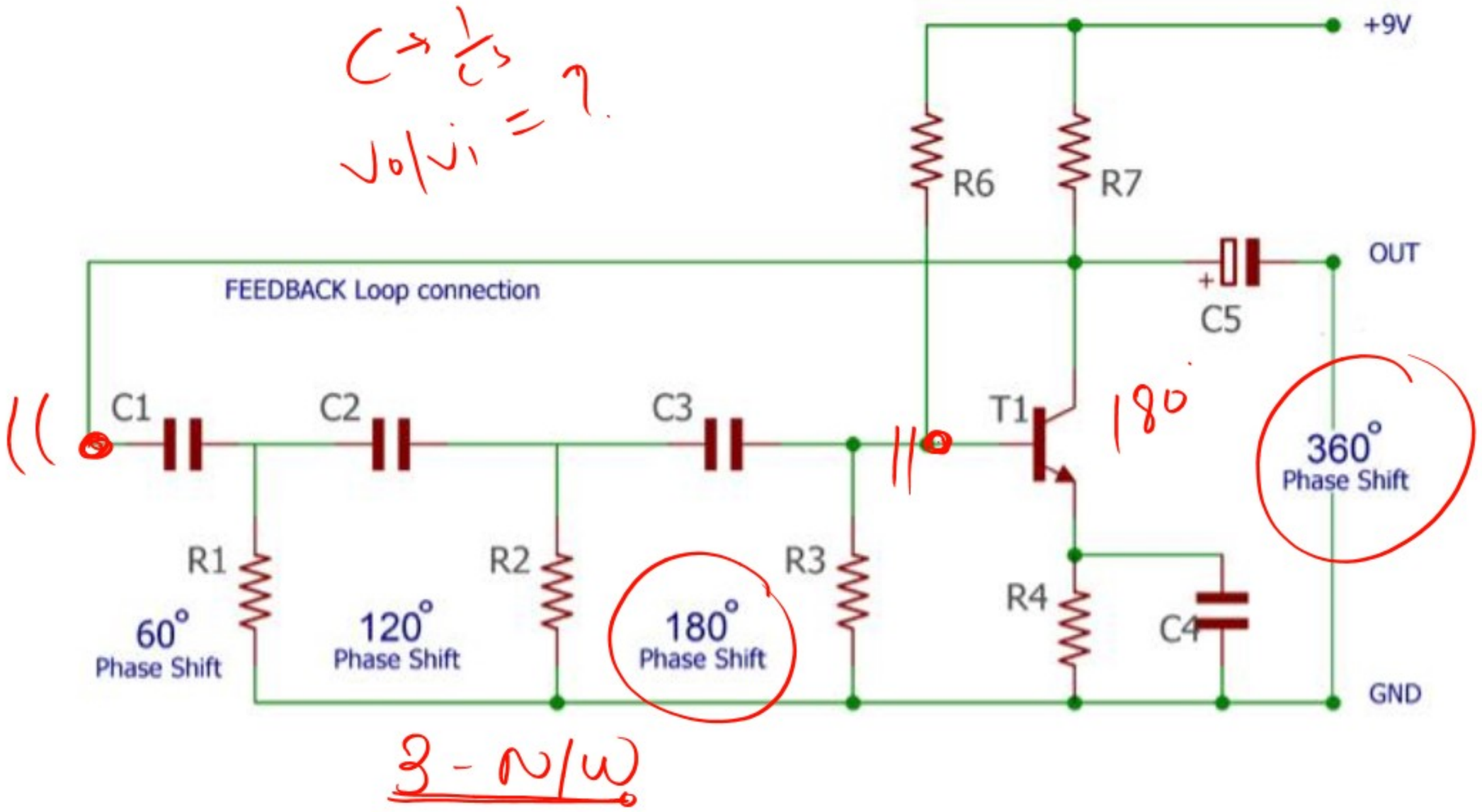
What is the minimum number of R-C network required to be cascaded in a RC phase shift oscillator?

(a) One

(b) Two

(c) Three

(d) Four



$C \to \frac{1}{C^3}$

$V_o/V_i = ?$

3 - N/W

Q

Which of the following condition a D-flip – flop is said to be in a transparent condition?

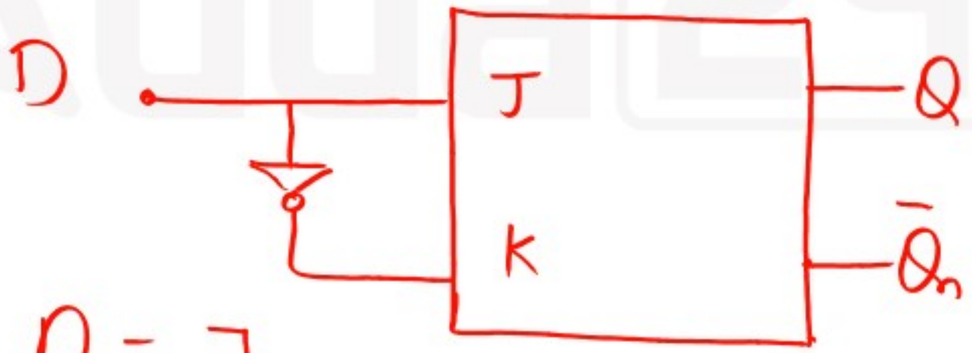
(a) Output is LOW

(b) Output is HIGH

(c) Output follows clock

(d) Output follows input

* Buffer ckt
  o/p ∝ I/p
* D-f/f
  act as a
  Buffer
* Data
  storg (0,1)



$D = J$

$\bar{D} = K$

J-K

$Q_{n+1} = J\bar{Q}_n + \bar{K}Q_n$

$D = J$

$Q_{n+1} = D$

o/p ∝ I/p

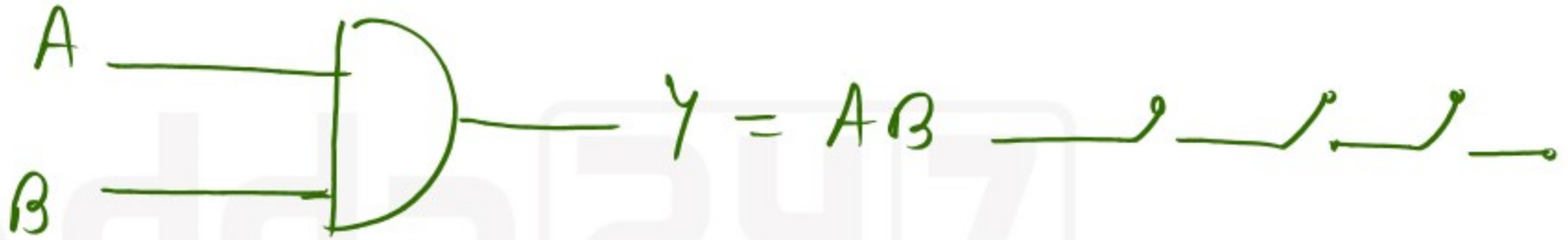
Q **Which of the following Boolean operation is equivalent to intersection function?**

(a) EXOR

(b) OR

(c) AND

(d) NOT



Y = High

↳ only when all I/p are High

Q

_____ is used to convert the coded form like BCD into an uncoded form.

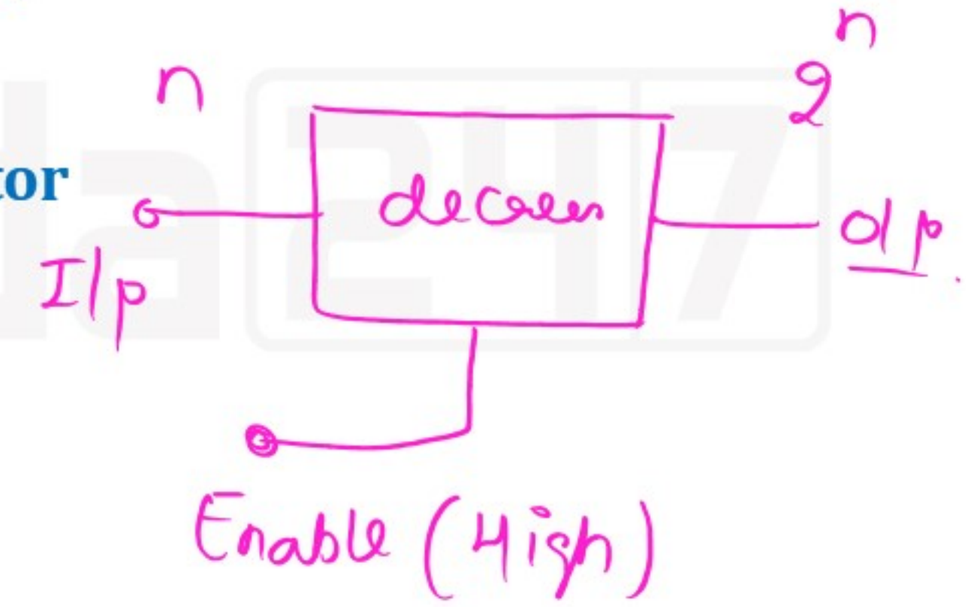
(a) Encoder

(b) Decoder

(c) Adder

(d) Subtractor

Combination ckt



Binary to any....

Q

Calculate the antenna current (in A) when the percent of modulation changes to 0.2 and the carrier current of an AM transmitter is 5A.

(a) 6.516

(b) 5.049

(c) 4.006

(d) 3.05

$$I_A = I_c \sqrt{1 + \frac{\mu^2}{2}}$$

$$\mu = m \cdot I$$

$$I_A = 5 \sqrt{1 + \frac{0.2^2}{2}} = 5.049$$

Q

On what basis the following techniques of encoding are selected in any telecommunication systems?

i. Efficiency

ii. Error

iii. Power level

(a) Only I

(b) Only III

(c) Both I and II

(d) All option are correct

Q

Calculate the Nyquist interval rate (in rad/sec) for the signal x(t) = cos (1000 t) + cos(500 t).

(a) 2000

(b) 200

(c) 1400

(d) 800

$f_s \geq 2 f_m$

$\omega_s \geq 2 \omega_m$

$= 2 \times 1000$

$= 2$ krad/s

Q

Which of the following analysis can be preferred for both planar and non – planar circuits in any network?

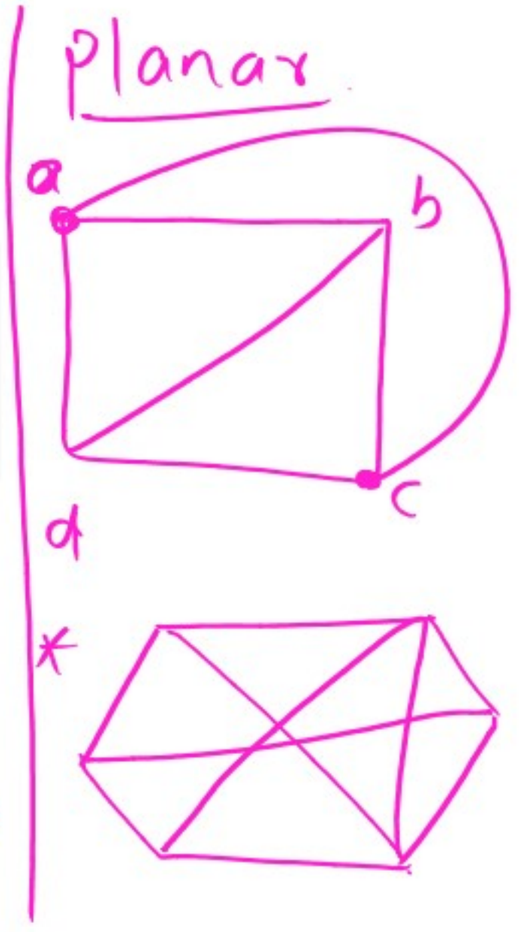
(a) Mesh analysis

(b) Nodal analysis

(c) Both mesh and nodal analysis

(d) None of these

* Mesh = KVL + ohm's law
* = only for planar
* Nodal = KCL + ohm
= planar + Non planar



Q

Calculate the active power if the phase angle difference between electric current and voltage is 90 degree?

(a) VI

(b) 0

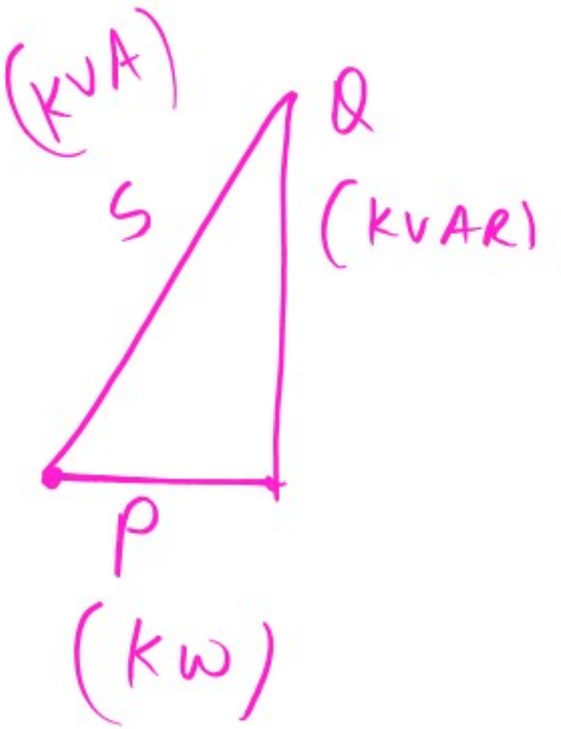
(c) VI/2

(d) 2VI

$P = V_\gamma I_\gamma \cos\phi$

$P = V_\gamma I_\gamma \cos 90^\circ$

$P = 0$

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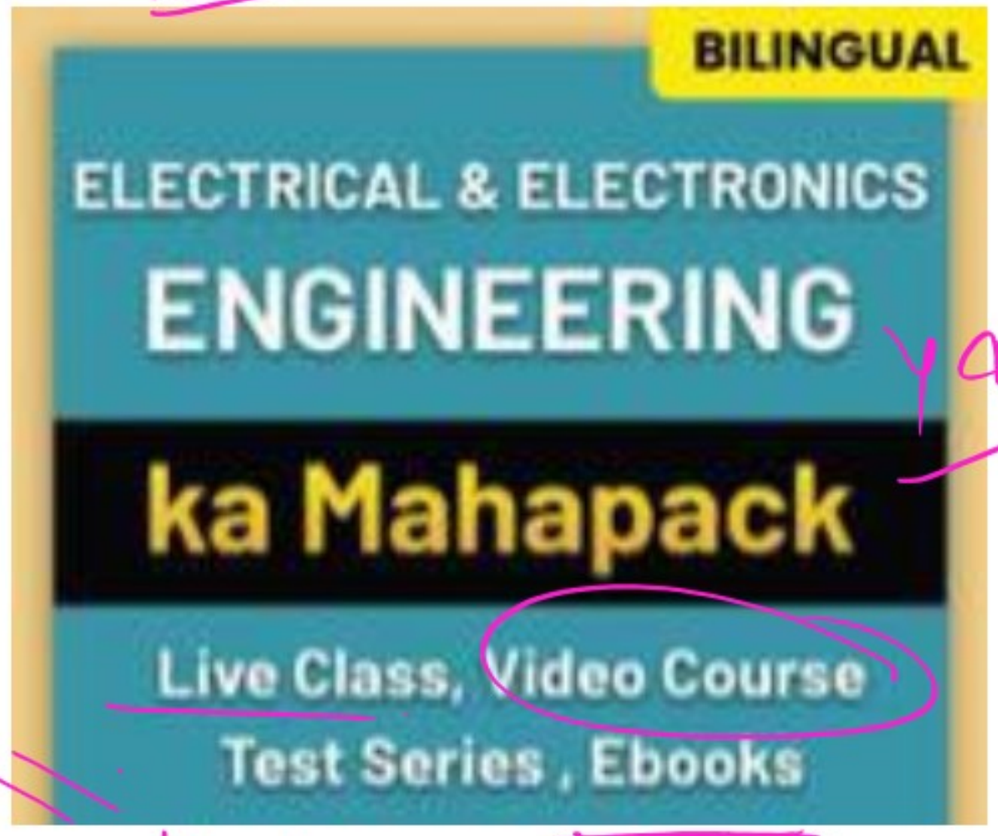
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Q **Calculate the value of resistance (in ohms) of the coil of an RL circuit with a time constant of 5 seconds and value of inductor is 15 H.**

(a) 5
(b) 3
(c) 4
(d) 6

$$L = \frac{\mu_0 \mu_r N^2 A}{l}$$

$$\boxed{L \propto N^2}$$

$N \uparrow \quad L \uparrow \quad \tau \uparrow$

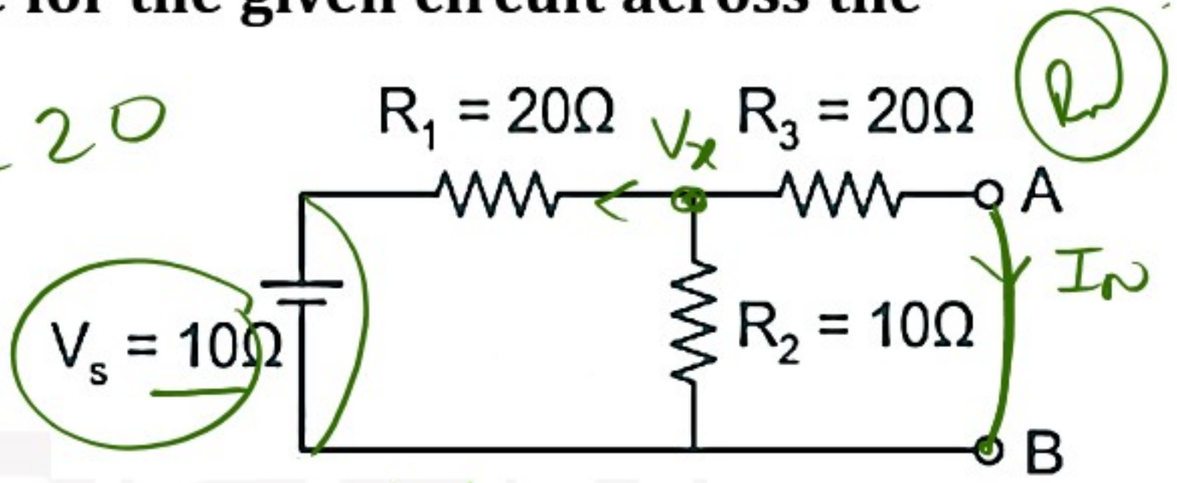
$$\tau = \frac{L_{eq}}{R_{eq}}$$

$$5 = \frac{15}{R}$$

$$\boxed{R = 3}$$

Q

Calculate the value of Norton's current and Norton's equivalent resistance for the given circuit across the terminal AB.



(a) 250 mA, 20 ohms

(b) 150 mA, 26.6 ohms

(c) 350 mA, 25.6 ohms

(d) 200 mA, 10 ohms

Q

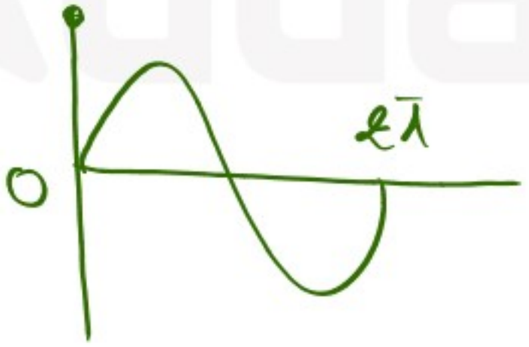
What is the expression for quality factor in terms of power?

(a) Ratio of power loss to power dissipated

(b) Ratio of power stored to power dissipated

(c) Ratio of power dissipated to power loss

(d) Ratio of power loss to power stored



$$Q = \frac{\text{max energy stored}}{\text{dissipate}} \times 2\pi$$

Q

How power factor behaves in a series RLC circuit above resonance frequency?

(a) Leading

(b) Lagging

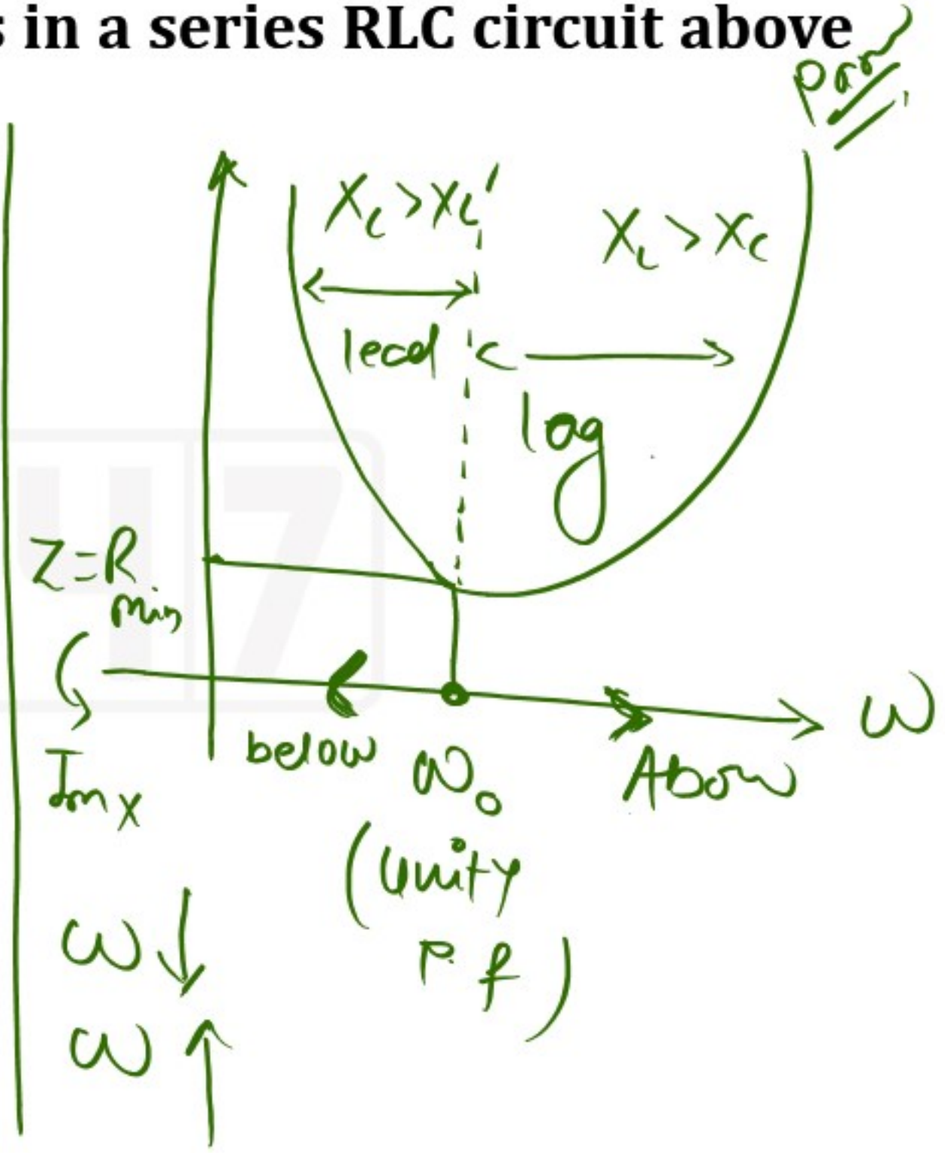
(c) Zero

(d) One

$$Z = R + jX_L - jX_C$$

$$= R + j\left(\omega L - \frac{1}{\omega C}\right)$$

$\uparrow$ $X_L \downarrow$ $X_C \uparrow \downarrow$



Q

Which among the following is a disadvantage of an emitter follower regulator?

(a) It does not provide high gain.

(b) No provision exists for varying the output voltage

(c) It cannot withstand high load current

(d) Its output resistance is high

emitter follower → CC Amplifier.

$V_o \propto V_i$

A_V = unity

$\frac{V_o}{V_i} = 1$

Q

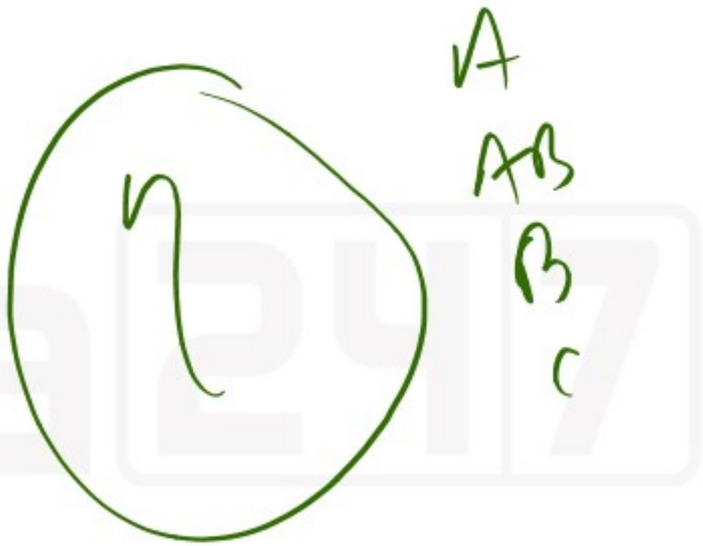
The maximum theoretical efficiency of a Class A push – pull transistor amplifier is _____.

(a) 0.5

(b) 70.56

(c) 0.5925

(d) 0.98

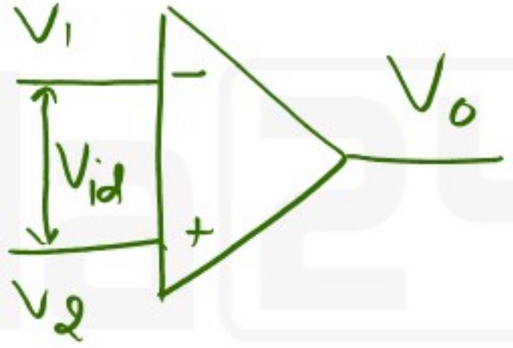


Power Amplifier	Conduction Angle	Maximum Efficiency	Figure of Merit
Class A	360°	50%	2
Class B	**180°**	**78.5%**	0.4
Class AB	180° - 360°	50 – 78.5%	0.4 – 2
Class C	< 180°	≥ 90°	< 0.25

Q

What is the largest sine wave output voltage (in Volts) possible at frequency of 1 MHz when an Op-amp has slew rate of 10 V/μs?

(a) 20
(b) 10π
(c) $(10/\pi)$
(d) $(5/\pi)$



Ideally Op-amp $\Rightarrow$ S.R $= \infty$

$$S.R = \frac{V_m 2\pi f}{10^6}$$

if $A_V = 1$.

$$10 = \frac{V_m \times 2\pi \times 10^6}{10^6}$$