**IDE ALEXIUS AZIBANYE**

**COMPUTER ENGINERING**

**17/ENG02/032**

**ASSIGNMENT**

**QUESTION A**

Filters are electronic circuits that remove any unwanted components or features from a signal. In simple words, you can understand it as the circuit rejects certain band of frequencies and allows others to pass through. They are widely used in Instrumentation, Electronics and Communication Systems especially in Signal and Image processing systems.

* Filter Circuits are used to eliminate background Noise
* They are used in Radio tuning to a specific frequency
* Used in Pre-amplification, Equalization, Tone Control in Audio Systems
* They are also used in Signal Processing Circuits and Data Conversion

**QUESTION B**



**QUESTION C**

Cut Off Frequency is given as F=$^{1}/\_{πRC}$ therefore;

We have R to be = 0.005Ω, and C = 0.01F;

Therefore F = 6366.2Hz

**QUESTION D**

The transfer function equation for the circuit is given as( $^{1}/\_{RC}$ )/(S +$\frac{1}{RC}$ )

When R= 0.005Ω and C= 0.01F

Transfer Fcn=(1/0.005\*0.01)/(S + (0.005\*0.01))= (20000)/(s+ 20000)



**QUESTION E**

When the signal of 5 KΩ is passed through the filter, this is the result that was found:

The transfer function equation for the circuit is given as

(1/RC)/(S + 1/RC)

When R= 5000Ω and C= 0.01F

Transfer Fc=(1/5000\*0.01)/(S + (5000\*0.01))= (0.02)/(s+ 0.02)

**Observations:** The Signal attenuated to 3.89Ω

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Hence: When it is 2Ω:
The transfer function equation for the circuit is given as (1/RC)/(S + 1/RC) When R= 2000Ω and C= 0.01F Transfer Fcn=(1/2000\*0.01)/(S + (2000\*0.01))= (0.05)/(s+ 0.05)



**Observations:** The signal is attenuated to 9.266Ω