RADIOAMATØR CERTIFIKATKURSUS

2021

OZ7SKB SKANDERBORG EDR

5
Kredsløb

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Aftenens overskrifter

- Serie- og parallel koblede:
  - Modstande
  - Spoler
  - Kondensatorer
  - Transformatorer
- Filtre
  - Lavpas-, højpas-, båndpas- og båndstopfiltre
  - Pi-, T- og krystalfiltre
- Strøm fra lysnet og batterier. Sikkerhed.
- Oscillatorer

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Husk nu

- Ohms lov: Større modstand giver mindre strøm ved samme spænding
- Jo større flade, jo større kondensatorværdi
- Jo flere vindinger, jo større spoleværdi
- En kondensator spærrer for DC
- En spole giver modstand for AC. Jo højere frekvens, jo større modstand

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Serie og parallel

- Anders And & Co er et seriehæfte. Udkommer som perler på en snor.

- Jernbanespor er parallelle

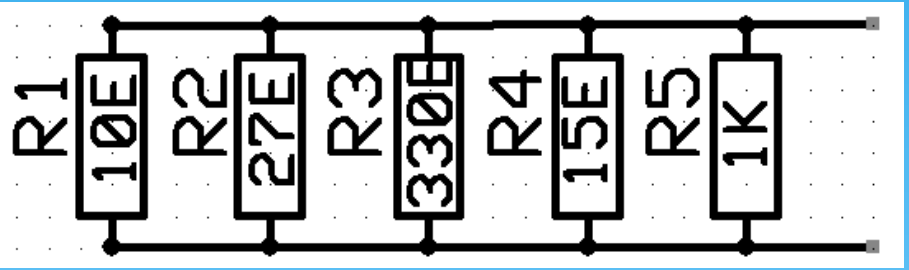
Modstande

- Seriel

Rs = R1 + R2 + R3 + R4 + R5

Rs = 10 + 27 + 330 + 15 + 1000 = 1382 ohm

- Parallel



1/Rp = 1/R1 + 1/R2 + 1/R3 + 1/R4 + 1/R5

1/Rp = 1/10 + 1/27 + 1/330 + 1/15 + 1/1000 = ca 0,2077

Rp = ca 4,81 ohm

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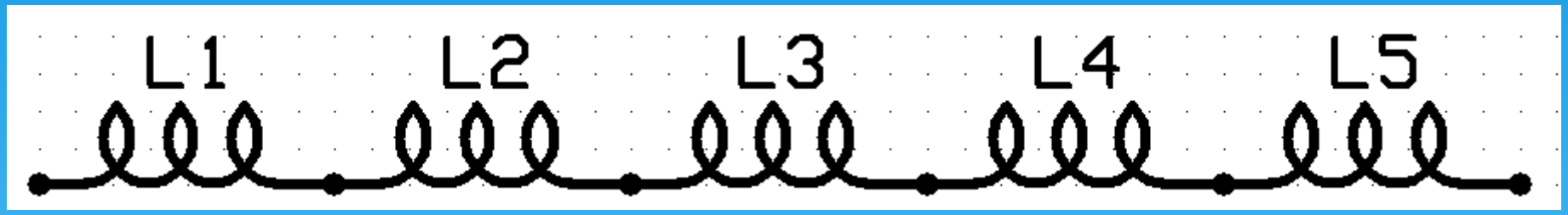
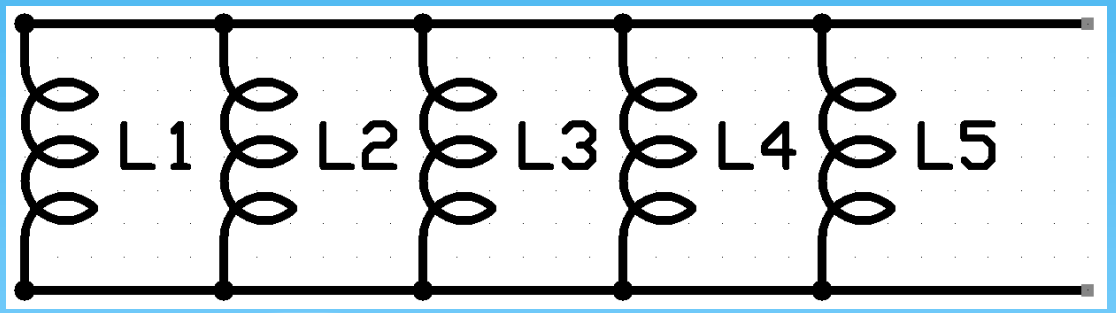
Spoler

- Serielle



$$Ls = L1 + L2 + L3 + L4 + L5$$

- Parallelle



$$1/Ls = 1/L1 + 1/L2 + 1/L3 + 1/L4 + 1/L5$$

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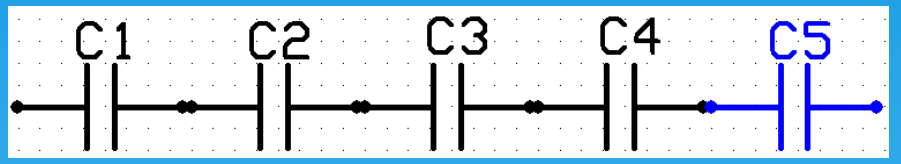
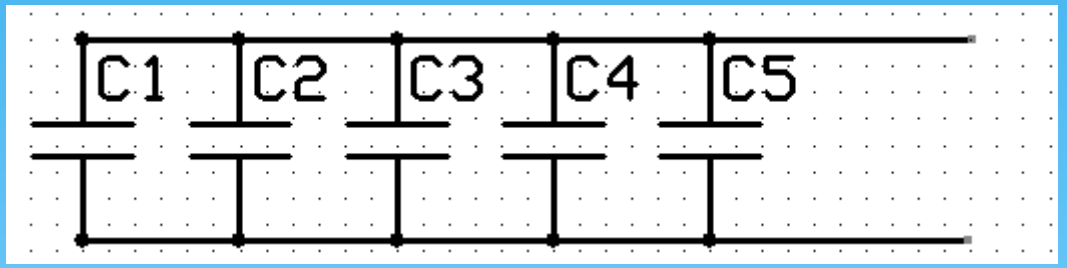
Kondensatorer

- Serielle



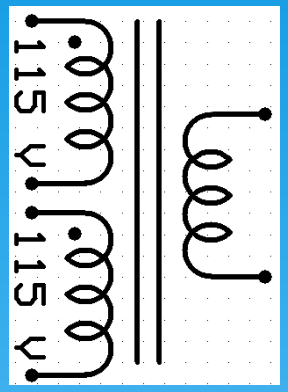
$1/C_s = 1/C_1 + 1/C_2 + 1/C_3 + 1/C_4 + 1/C_5$

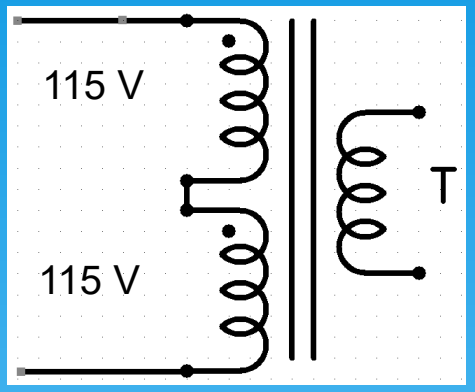
- Parallelle

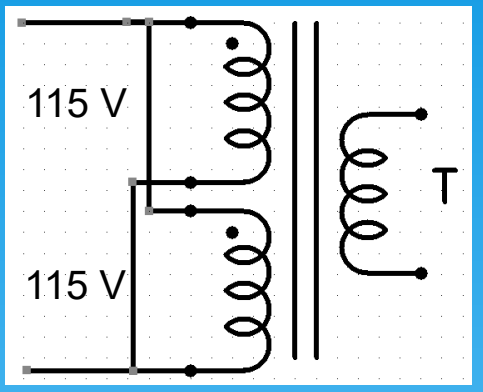


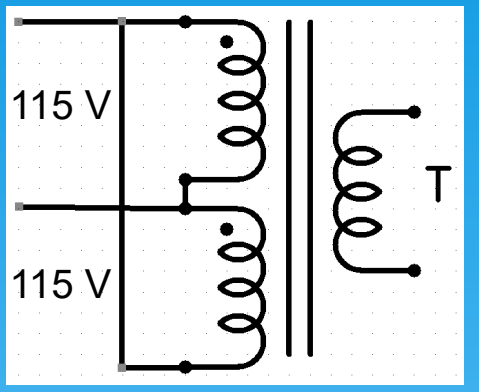
$C_s = c_1 + C_2 + C_3 + C_4 + C_5$

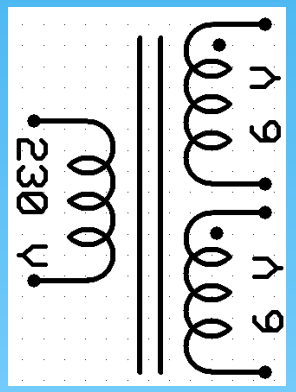
Transformatorer

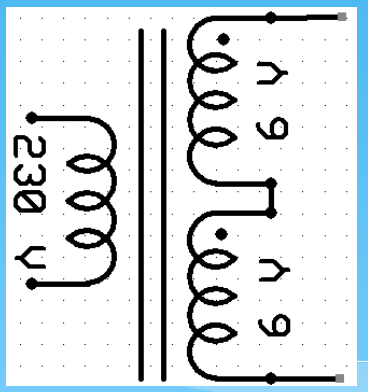


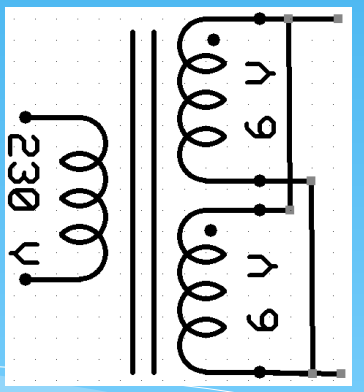


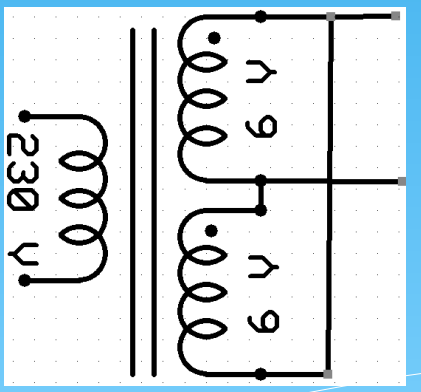












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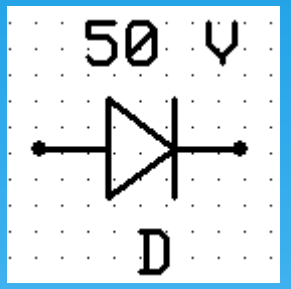
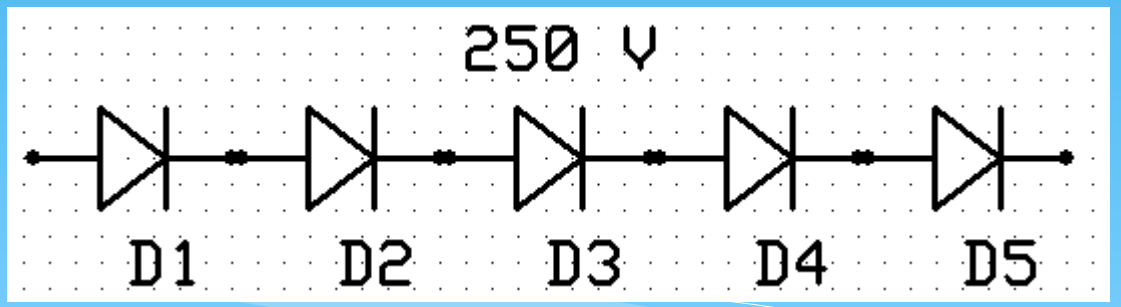
Dioder

- En diode kan klare op til f.eks. 50 V



- Serielt koblede dioder kan klare f.eks. fem gange 50 V = 250 V



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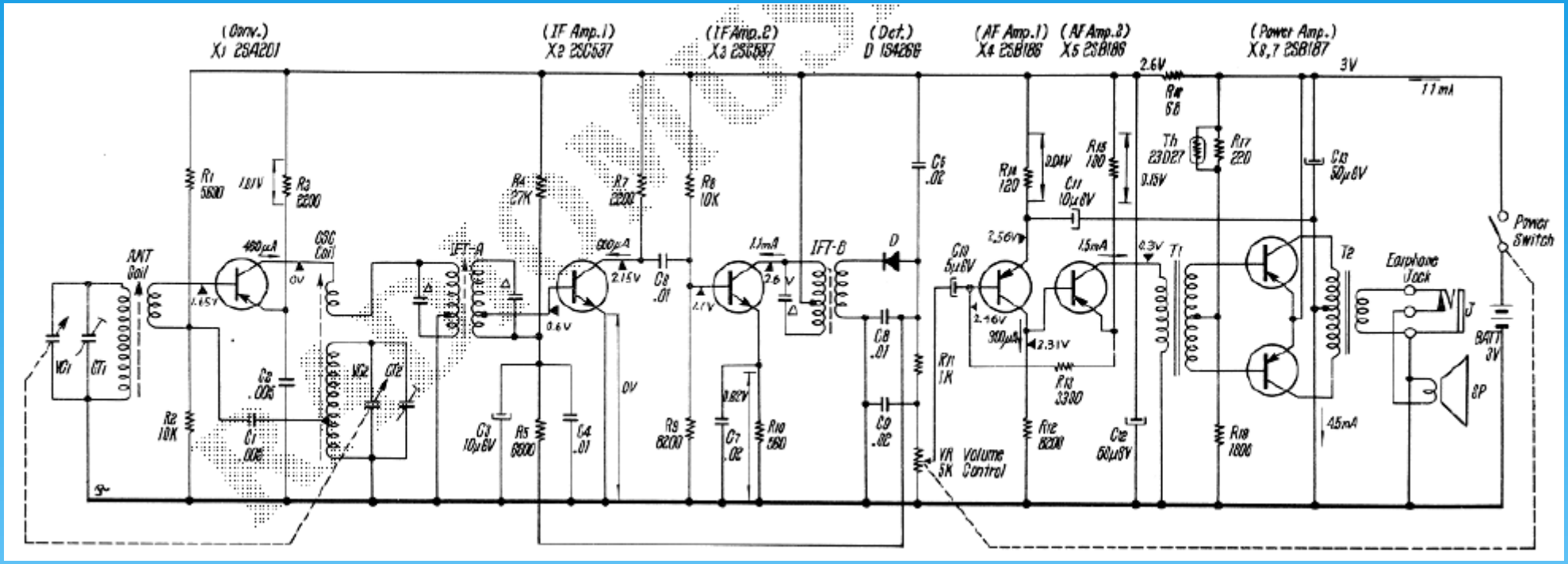
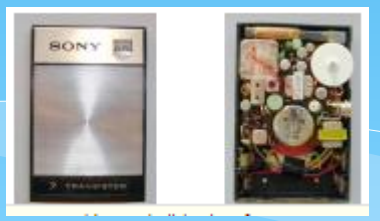
Strøm, spænding og impedans





Radiomuseum.org: Sony Corporation; Tokyo 7 Transistor 2R-30

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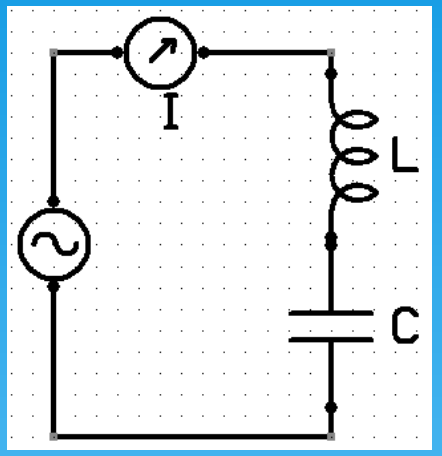
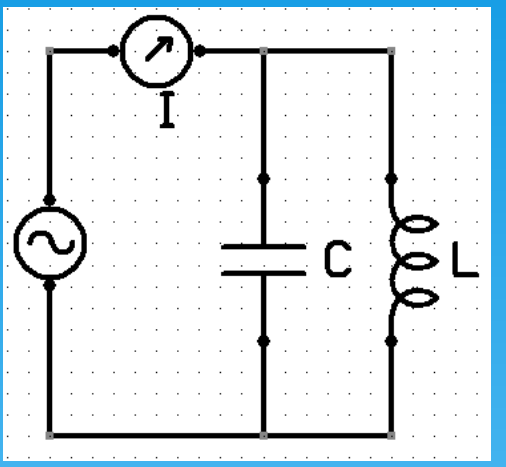
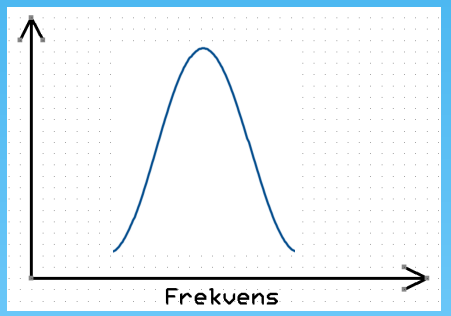
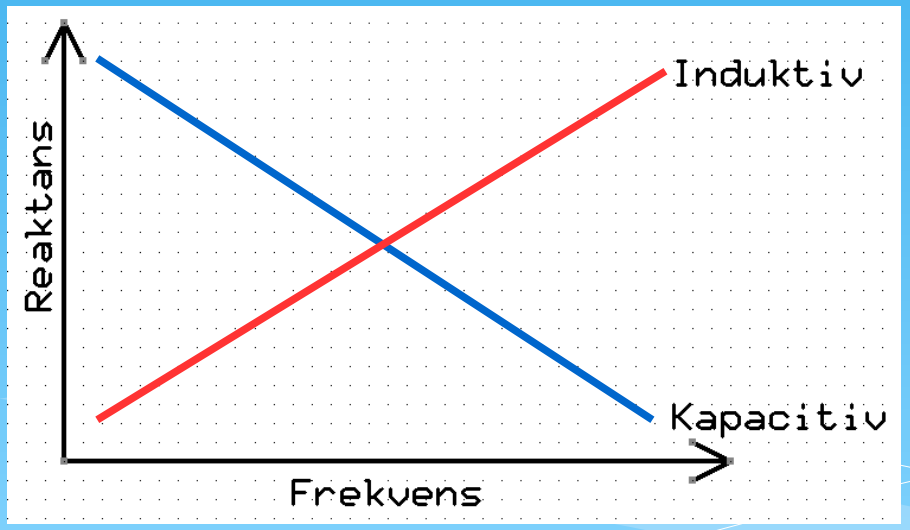
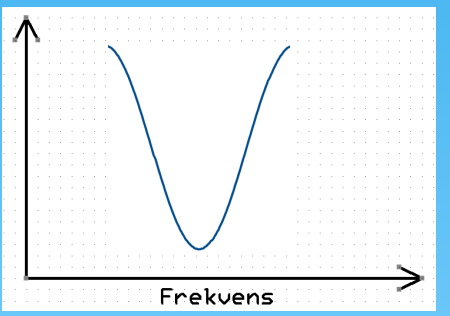
Lidt om afstemte kredsløb











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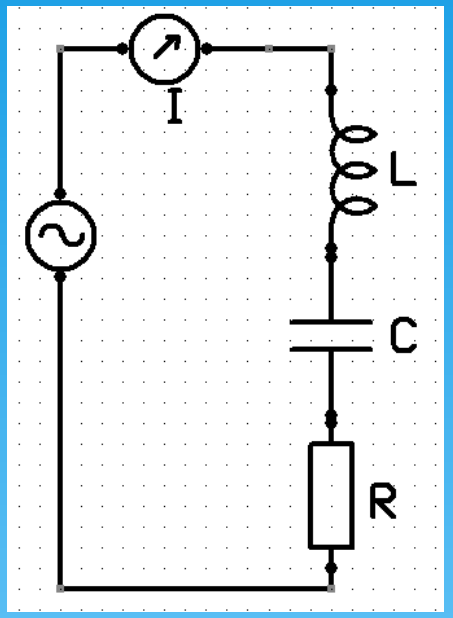
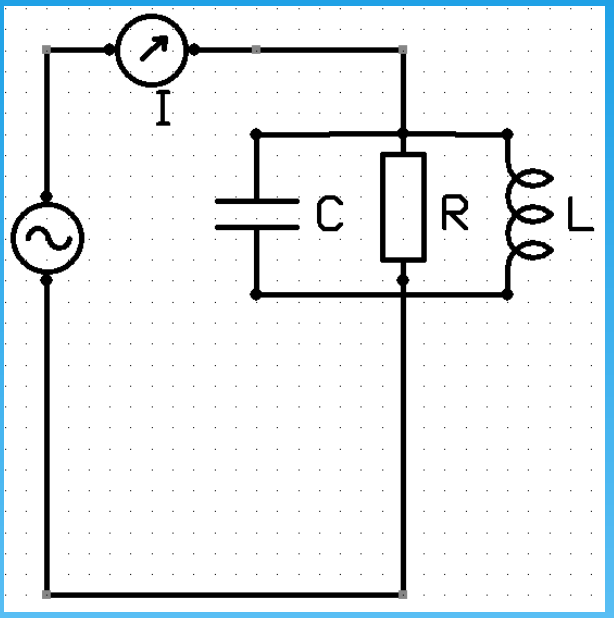
Q-faktoren





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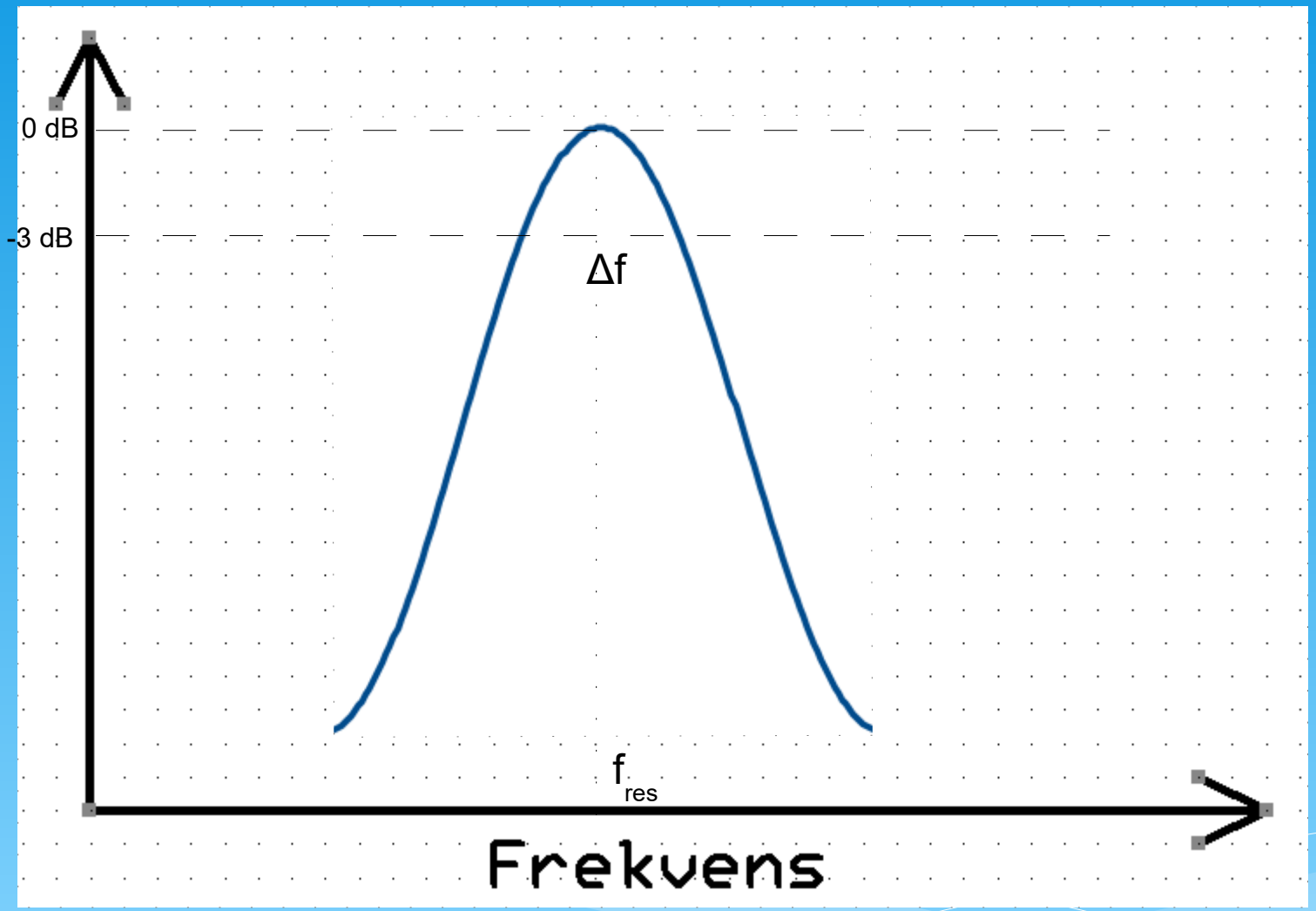
Båndbredde



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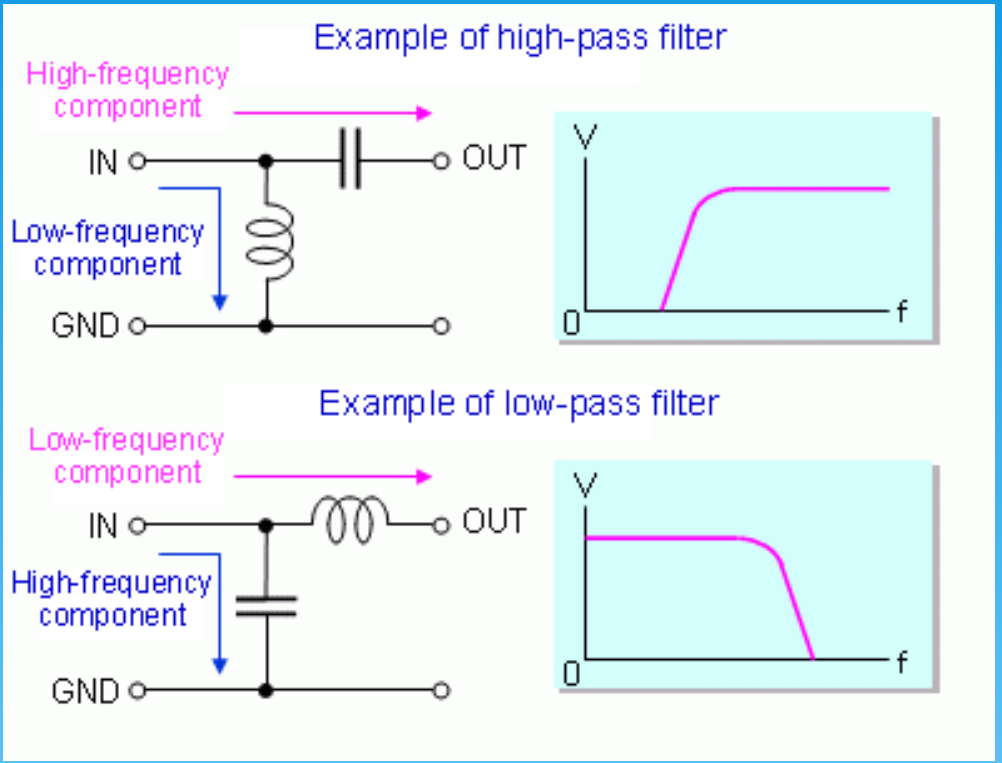
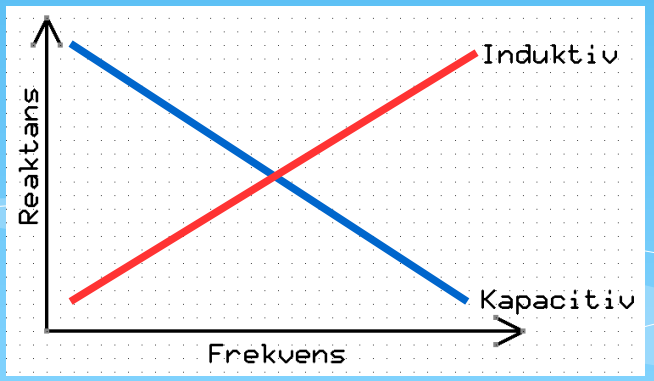
Lavpas- og højpasfiltre





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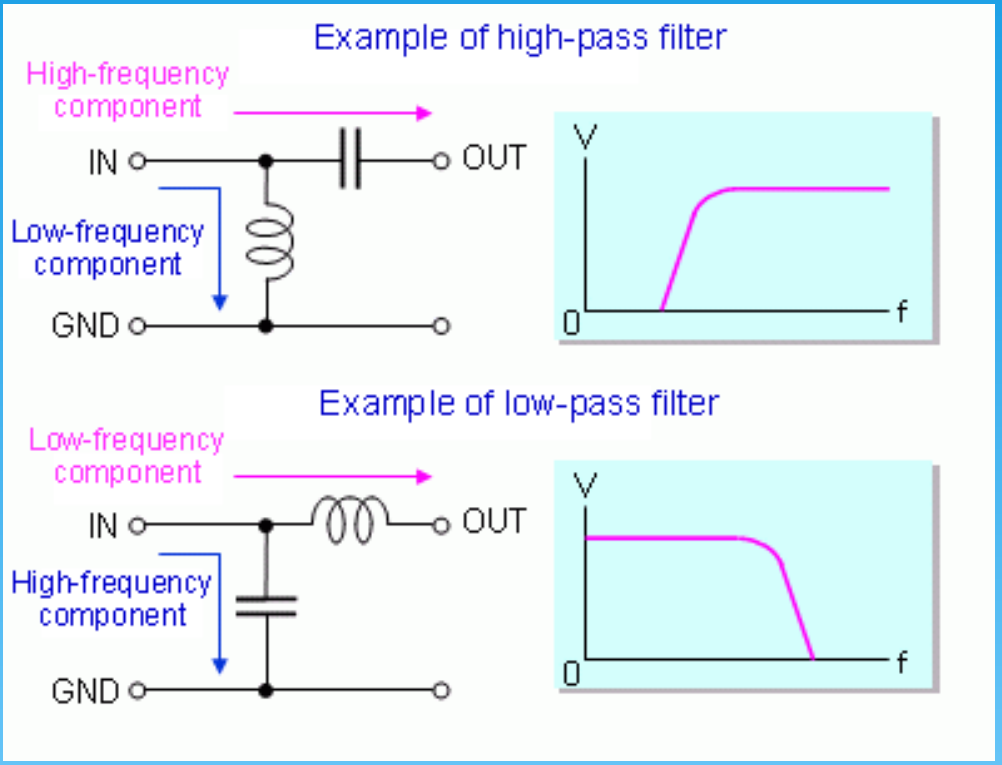
Lavpas- og højpasfiltre



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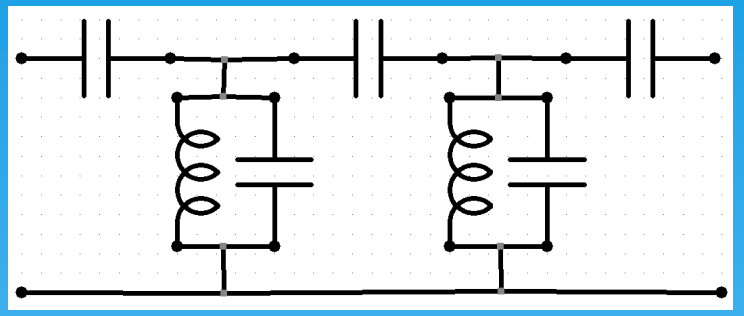
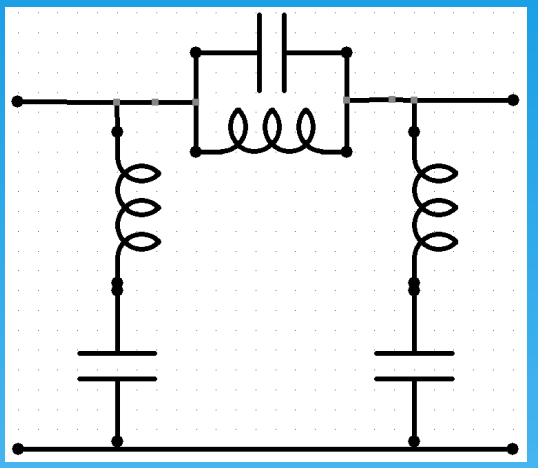
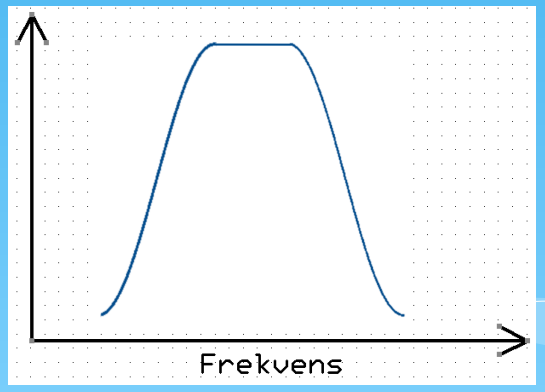
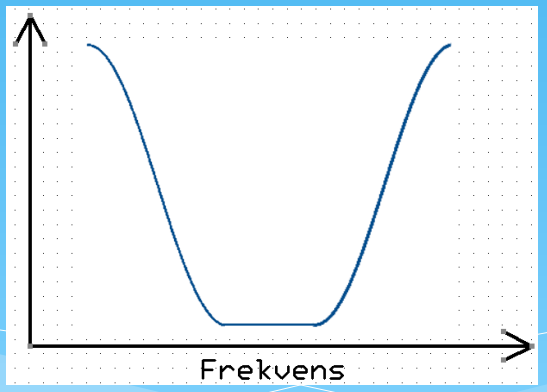
”Bånd”-filtre









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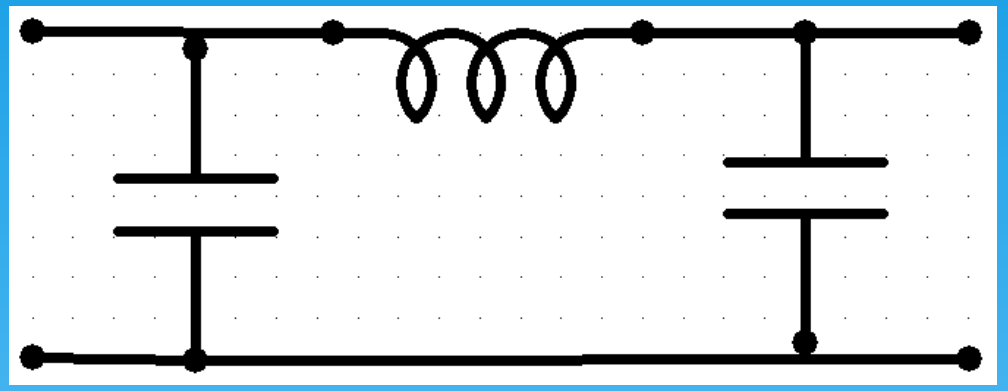
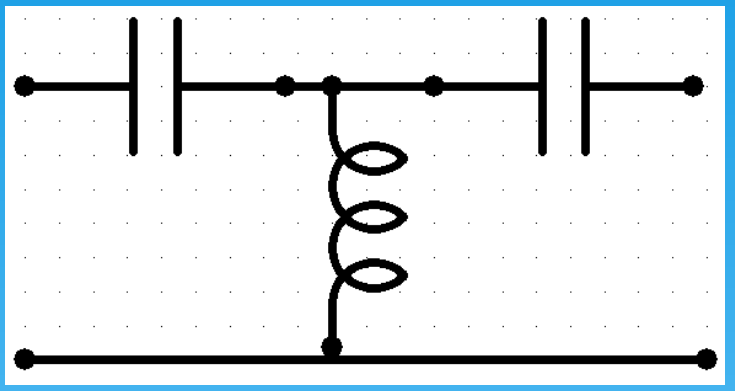
3 filtertyper

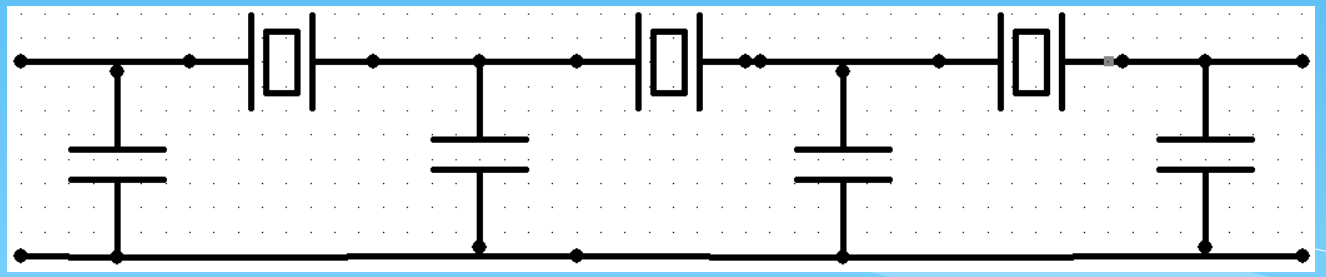
π - filter

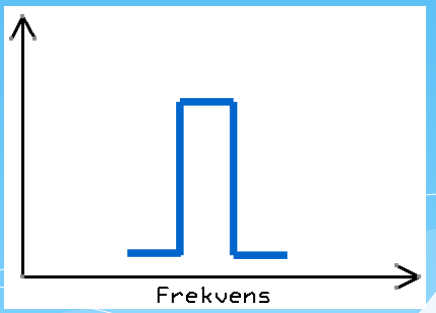


T - filter



Xtal - filter





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Strømforsyning

- Batteridrift
  - Elementer sammensat til et batteri
  - Engangs eller genopladelige
  - Akkumulator
    - Kapacitet angives i Ah (ampere-timer)
- Lysnet
  - Direkte eller via en ”strømforsyning”
  - Strømforsyningen omsætter 230 V til f.eks. 12 V, 48 V eller 800 V
- Sikkerhed
  - Personlig, andre og brand
  - Ved spændinger over ca. 24 V: Hold venstre hånd i lommen!!

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Oscillatorer

- Et vigtigt modul i modtagere og sendere
- Oscillatoren svinger ved en bestemt (grund)frekvens
  - Frekvensen kan ændres
- Opbygges med ”frekvensafhængige” komponenter
  - Spoler, kondensatorer og krystaller
- Mange typer med hver deres fordele og ulemper

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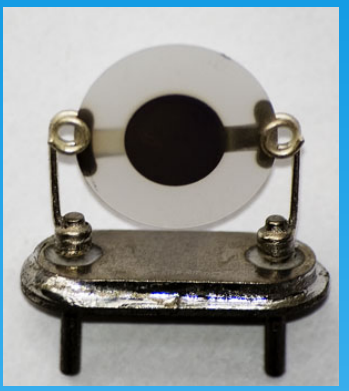
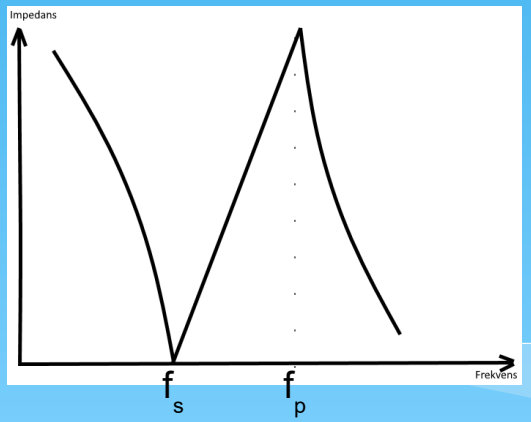
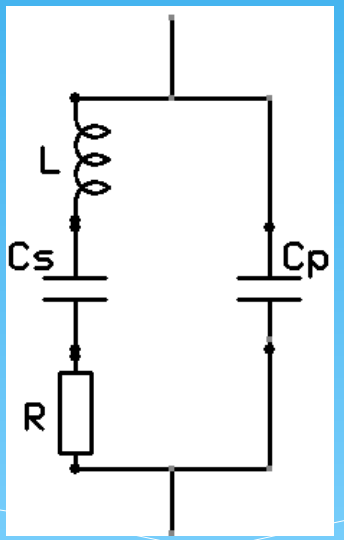
Krystaller

- Et krystal betår af en kvartsskive, som er pådampet en forbindelse på hver side
- Krystallets frekvens er bestemt af dens størrelse
- Et krystals svingninger er mekaniske
- Et krystal er meget frekvensstabilt





Frekvenskurve



Ækvivalensdiagram

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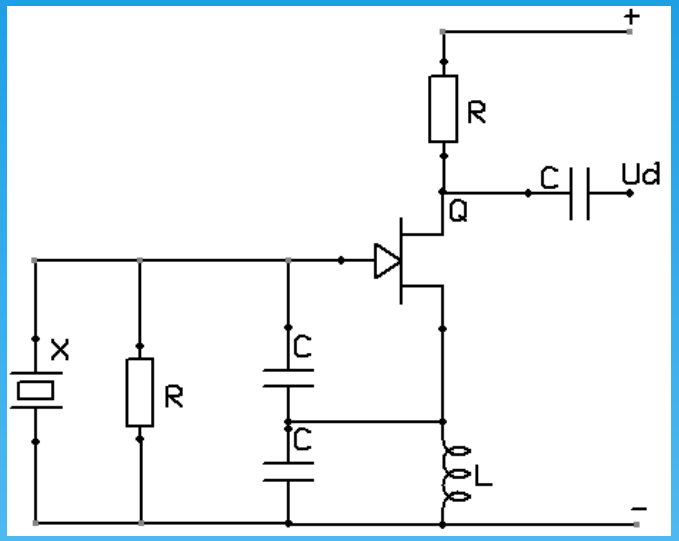
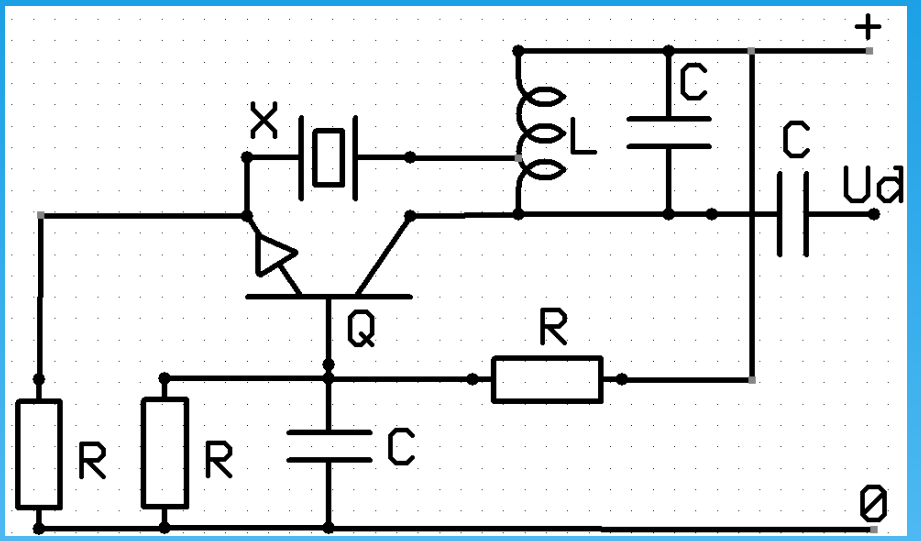
Krystaloscillator



Clapp-oscillator

Svinger på krystallets grundfrekvens



Hartley-oscillator

Afstemt til at svinge ved en given krystal-overtone

- En overtone-oscillator svinger på et krystals **ulige** overtone-frekvens

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Opgaver og repetition

- Der henvises til https://operatorlicens.dk/ og http://b-certifikat.dk/
- Opgavesæt: 2019-11-30 (1), 2020-05-23 (2) og 2020-08-16 (3) hhv. B og D

- Følgende opgaver er relevante for emnet Kredsløb:
  - B: Sæt 1: 5 og 6
    Sæt 2: 2, 5 og 6
    Sæt 3: 5 og 6
  - D: Ingen

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