

# Energy Transmission Systems

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Project 01 Question 01  
Part a Solutions

project001

Energy Transmission Systems  
Project 0101

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**Inputs**

Three Phase(MVA): 400

Double-circuit transmission line(kV): 230

Width of the middle ROW(ft): 15

Width of the edge ROW(ft): 60

Height of 'a' (ft): 119.8

Height of 'b' (ft): 84.8

Height of 'c' (ft): 49.8

Current load (A): 502.044

Pick that you want to calculate

☐ Middle of the ROW

☒ Edge of the ROW

**Solutions**

Ra (m) : 40.8387

Rb (m) : 31.6626

Rc (m) : 23.7667

Ra' (m) : 45.6712

Rb' (m) : 37.6906

Rc' (m) : 31.3515

The magnetic field intensity (H) : 1.91626

The magnetic field density (mG) : 24.0804

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Project 01 Question 01  
Part b Solutions

project001

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**Inputs**

Three Phase(MVA): 400

Double-circuit transmission line(kV): 230

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Current load (A): 502.044

Pick that you want to calculate

☒ Middle of the ROW

☐ Edge of the ROW

**Solutions**

Ra (m) : 36.8002

Rb (m) : 26.2483

Rc (m) : 15.8526

Ra' (m) : 36.8002

Rb' (m) : 26.2483

Rc' (m) : 15.8526

The magnetic field intensity (H) : 5.09478

The magnetic field density (mG) : 64.0229

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**Project 01 Question 02**  
**Part a Solutions**

project002

Energy Transmission Systems  
Project 0102

Inputs

Resistance per phase( $\Omega/\text{km}$ ): 0.15

Inductance per phase(mH): 1.3263

Voltage (kV) : 220

Line Length (km) : 40

Frequency (Hz): 60

Power Factor: 0.8

MVA: 381

Select to calculate

☒ Lagging

☐ Leading

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Solutions

Voltage at the sending end(VS): 144.35<4.93 kV

Power at the sending end: 432.99<41.80 kV

Voltage Regulation (VR): 13.6448

Efficiency (%): 94.4252

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**Project 01 Question 01**  
**Part b Solutions**

project002

Energy Transmission Systems  
Project 0102

Inputs

Resistance per phase( $\Omega/\text{km}$ ): 0.15

Inductance per phase(mH): 1.3263

Voltage (kV) : 220

Line Length (km) : 40

Frequency (Hz): 60

Power Factor: 0.8

MVA: 381

Select to calculate

☐ Lagging

☒ Leading

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Solutions

Voltage at the sending end(VS): 121.41<9.29 kV

Power at the sending end: 364.18<27.58 kV

Voltage Regulation (VR): -4.41437

Efficiency (%): 94.4252

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**Project 01 Question 03**  
**Solution**

project003

Energy Transmission Systems  
Project 0102

Inputs

Apperent Power (MVA):	200
Voltage (kV) :	138
Frequency (Hz):	60
Power Factor :	0.9
Line Length (km) :	100
r (ohm/km) :	0.103
x (ohm/km) :	0.525
y (S/km) :	0.0000033

Calculate

Solutions

Per phase series impedance (Ω):	10.3+i52.5 Ω
Per phase series shunt admittance (S):	i3.3*(10^-4) S
A :	0.991<0.098
B :	53.501<78.90
C :	3.286*10^(-4)<90.05
D :	0.991<0.098
Medium	
Sending end voltage (V):	111.81<18.74 V
Voltage regulation (%):	40.34
Efficiency (%):	89.40