Scilab Textbook Companion for A Comprehensive Textbook Of Applied Physics by M. Kumar[1]

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Book Description

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Scilab numbering policy used in this document and the relation to the above book.

Exa Example (Solved example)

Eqn Equation (Particular equation of the above book)

AP Appendix to Example(Scilab Code that is an Appednix to a particular Example of the above book)

For example, Exa 3.51 means solved example 3.51 of this book. Sec 2.3 means a scilab code whose theory is explained in Section 2.3 of the book.

Contents

List of Scilab Codes

Chapter 1

Waves and Vibrations

Scilab code Exa 1.1 1

```
clc;
n=512;  //frequency in Hz
l=67;   //wavelength in cm
v=n*l;   //calculating velocity
disp(v,"Velocity in cm/sec = ");   //displaying
   result
```

Scilab code Exa 1.2 2

```
clc;
v=340;  //velocity in m/sec
l=0.68;   //wavelength in m
n=v/l;   //calculating frequency
disp(n,"Frequency in Hz = ");   //displaying result
```

Scilab code Exa 1.3 3

```
clc;
v=3*10^8;  //velocity in m/sec
n=500*10^3;   //frequency in Hz
l=v/n;   //calculating wavelength
disp(l,"Wavelength in m = ");   //displaying result
```

Scilab code Exa 1.4 4

```
clc;
v=330;  //velocity in m/sec
n=560;   //frequency in Hz
l=v/n;   //calculating wavelength
disp(l*30,"Distance travelled in 30 vibrations in m
   = ");   //displaying result
```

Scilab code Exa 1.5 5

```
clc;
s=90;      //distance in m
u=0;       //initial velocity in m/sec
t=sqrt(90/4.9);     //calculating time using
   kinematical equation
t1=4.56-t;       //calculating time taken by sound to
    travel
v=s/t1;       //calculating velocity
disp(v,"Velocity in m/sec = ");  //displaying result
```

Scilab code Exa 1.6 6

```
clc;
```

```
2 l1=1.5;    //wavelength in m
3 l2=2;    //wavelength in m
4 v1=120;   //velocity in m/sec
5 n=v1/l1;     //calculating frequency
6 v2=n*l2;    //calculating velocity
7 disp(v2,"Velocity in m/sec = ");  //displaying
    result
```

Scilab code Exa 1.7 7

```
1 clc;
2 l=5641*10^-10;    //wavelength in m
3 c=3*10^8;          //velocity in m/sec
4 n=c/l;           //calculating frequency
5 u=1.58;         //refractive index of glass
6 cg=c/u;          //calculating velocity of light in
    glass
7 l1=cg/n;        //calculating wavelegth in glass
8 disp(l1*10^10,"Wavelength in glass in Angstrom =");
     //displaying result
```

Scilab code Exa 1.8 8

```
1 clc;
2 n=12*10^6;          //frequency in Hz
3 v=3*10^8;          //velocity in m/sec
4 l=v/n;             //calculating wavelength
5 disp(l,"Wavelength in m = ");  //displaying result
```

Scilab code Exa 1.9 9

```
clc;
n=400;          //frequency in Hz
v=300;          //velocity in m/sec
l=v/n;             //calculating wavelength
disp(l,"Wavelength in m = ");  //displaying result
```

Scilab code Exa 1.10 10

```
clc;
a=20;       //amplitude in cm
n=6;       //frequency per second
w=2*(%pi)*n;    //omega in radians/sec
disp(w,"Omega in radians/sec = ");    //displaying
   result
```

Scilab code Exa 1.11 11

```
clc;
a=6;      //amplitude in cm
n=9;      //frequency in Hz.
vmax=2*(%pi)*n*6;  //calculating velocity in cm/sec
acc=-((18*(%pi))^2)*6;  //calculating acc. in m/sec
   square
disp(vmax,"Maximum velocity in cm/sec = ");  //
   displaying result
disp("Velocity at extreme position = 0");   //
   displaying result
disp("Accelaration at mean position = 0");  //
   displaying result
disp(acc,"Accelaration at extreme position in m/sec
   square = ");  //displaying result
```

Scilab code Exa 1.12 12

```
clc;
g=9.8;    //gravitational constant
m=50;    //mass in kg
l=0.2;    //length in m
T=0.6;     //time period
k=(m*g)/l;    //calculating constant
m=2450*((T/(2*(%pi)))^2);  //calcualting mass using
    given time period
disp(m,"Mass of body in kg = ");  //displaying
    result
```

Chapter 2

Application of Sound Waves

Scilab code Exa 2.1 1

```
clc;
disp("Example 2.1");
v=3000;                 //volume in metre cube.
theta=0.2;              //theta in owu(open window unit)
    .
s=1850;                 //area in metre cube.
as=theta*s;     //calculating total absorbtion of
    surface.
T=(0.165*v)/as //calculating T using Sabine formula
disp(T,"Reverberation time of Room = ");    //
    Displaying Result.
```

Scilab code Exa 2.2 2

```
clc;
disp("Example 2.2");
v=120000;                                   //volume in
    metre cube.
```

```
4 t=1.5;                                    //time in second
    .
5 s=25000;                                  //area in metre
    cube.
6 a=(0.16*v)/(t*s);                        //using Sabine
    formula for calculating a
7 disp(a,"Average Absorbing Power of Surface = "); //
    Displaying Result.
```

Scilab code Exa 2.3 3

```
1 clc;
2 disp("Example 2.3");
3 v=6000                          //Volume in metre cube.
4 as=20                           //surface absorbtion in
    owu(open window unit).
5 T=(0.165*v)/(as);               //calculating T using
    Sabine Formula.
6 disp(T,"Reverberation Time = "); //Displaying
    Result.
```

Scilab code Exa 2.4 4

```
1 clc;
2 disp("Example2.4");
3 v=3500;                        //volume in metre cube.
4 n1=370-300;                    //no. of audience on wooden
    seats.
5 n2=300-70;                     //no. of empty wooden seats.
6 a1s1=0.04*60;                  //absorption due to wooden
    doors.
7 a2s2=0.03*700;                 //absorption due to
    plastered walls.
```

```
a3s3=0.06*50;              //absorption due to glass
   work.
a4s4=4.2*370;              //absorption due to audience
    on spungy and wooden
//seats.
a5s5=2*230;                //absorption due to empty
   seats.
sum=a1s1+a2s2+a3s3+a4s4+a5s5; //total absorption of
   cinema hall.
T=(0.165*v)/sum;           //calculating T using
   Sabine Formula.
disp(T,"Reverberation Time = ");      //Displaying
   Result.
```

Scilab code Exa 2.5 5

```
clc;
disp("Example 2.5");
l=10;                                  //length in
   centimetres.
Y=20*10^11;                            //Young's Modulus in
   dyne/cm square.
R=8;                                   //Density in gram/cc
n=(1/(2*l))*sqrt(Y/R); //calculating frequency of
   vibration using
//young's modulus.
disp(n,"Frequency of vibration in Hz.");     //
   Displaying Result.
```

Scilab code Exa 2.6 6

```
clc;
disp("Example 2.7");
```

```
3 t=0.1;                    //thickness in centimetre.
4 Y=8.75*10^11;             //Young's Modulus in dyne/cm
    square.
5 R=2.654;                  //Density in gram/cm square.
6 n=(1/(2*t))*sqrt(Y/R);    //calculating frequency
    using Young's modulus.
7 disp(n,"Frequency of Vibration in Hz = "); //
    Displaying Result.
```

Scilab code Exa 2.7 7

```
1 clc;
2 disp("Example 2.7");
3 K=2.026*10^9;                 //Bulk Modulus in N/m
    square.
4 R=10^3;                       //Density in Kg/m cube.
5 V=sqrt(K/R);                  //Calculating speed using
    Bulk Modulus.
6 disp(V,"Velocity of sound waves in water in m/sec =
    "); //displaying result.
```

Scilab code Exa 2.8 8

```
1 clc;
2 disp("Example 2.8");
3 Y=1.41;                   //Young's Modulus.
4 R=1.293*10^-3;            //Density of air in g/centimetre
    cube.
5 P=76*13.6*980;            //atmospheric pressure in dyne/cm
    square.
6 V=sqrt((Y*P)/R);          //calculating speed using young'
    s modulus.
```

```
7 disp(V,"Speed of ultrasonic wave in air at n.t.p. in
      cm/sec = "); //displaying result.
8 disp(V*10^-2,"Speed in m/sec"); //displaying result
      .
```

Chapter 3

Principles of Optics

Scilab code Exa 3.1 1

```
clc;
f=15;              //focal length in cm
v=10;             //image distance in cm
u=(150/5);  //calculating u using (1/f)=(1/v)-(1/u)
disp(u,"Object Distance in cm = ");  //displaying
    result
```

Scilab code Exa 3.2 2

```
clc;
f=80;      //focal length in cm
f1=20;     //focallength of first lens in cm
f2=(80/3);  //using (1/F)=(1/f1)+(1/f2)
P=(100/f);   //power in D
P1=100/20;     //power of first lens
P2=P1-P;     //power in D
disp(P2,"Power in D = ");  //displaying result
```

Scilab code Exa 3.3 3

```
clc;
P=2.5;      //Power in D
f=-(1/P);   //calculating f in m
disp(f,"Focal length in m = ");  //displaying result
```

Scilab code Exa 3.4 4

```
clc;
m=4;      //magnigication
f=20;     //focal length in cm
u=(20*3)/(4);  //on simplifying (1/f)=(1/v)-(1/u)
v=(4*u);  //calculating v in cm
disp(u,"Object distance in cm = ");    //displaying
   result
disp(v,"Image distance in cm = ");     //displaying
   result
```

Scilab code Exa 3.5 5

```
clc;
u=14;     //object distance in cm
f=-21;     //focal distance in cm
v=(-5/42);  //simplifying(1/f)=(1/v)-(1/u)
I=(3*-8.4)/(-14);    //using m=(1/0)=(v/u);
disp(v,"Image distance in cm = ");  //displaying
   result
disp(I,"I in cm = ");  //displaying result
```

Scilab code Exa 3.6 6

```
clc;
fe=5;  //focal length in cm
D=25;  //distance od distinct vision in cm
m=1+(D/fe);  //calculating magnifying power
disp(m,"magnifying Power = ");  //displaying result
```

Scilab code Exa 3.7 7

```
clc;
fe=5;  //focal length in cm
D=25;  //distance od distinct vision in cm
mo=30/(1+(D/fe));  //calculating magnification of
    objective lens
disp(mo,"Magnification produced by objective lens =
    ");  //displaying result
```

Scilab code Exa 3.8 8

```
clc;
u=-6;    //object distance in cm
fo=4;    //focal distance in cm
fe=6;  //focal length in cm
D=25; //distance of distinct vision in cm
v=(12);   //using (1/f)=(1/v)-(1/u)
m=(v/u)*(1+(D/fe));  //calculating m
disp(v,"Image distance in cm = ");   //displaying
    result
```

```
9 disp(-m,"Magnifying Power = ");      //displaying
    result
```

Scilab code Exa 3.9 9

```
1 clc;
2 D=25;          //distance of distinct vision
3 u=-9;     //object distance in cm
4 fe=10;  //focal length in cm
5 v=(-90/1);    //using (1/f)=(1/v)-(1/u)
6 m=(v/u);  //calculating m
7 M=D/u;     //calculating Magnifying power of lens
8 disp(m,"Magnification of lens = ");    //displaying
    result
9 disp(-M,"Magnifying Power = ");      //displaying
    result
```

Scilab code Exa 3.10 10

```
1 clc;
2 fo=0.5;     //focal length of eye lens
3 D=25;          //distance of distinct vision
4 L=15;        //length in cm
5 m=375;    //magnification
6 fe=(-L*D)/(fo*((L/fo)-m));  //calculating fe
7 disp(fe,"Focal length of eye lens in cm = ");  //
    displaying result
```

Scilab code Exa 3.11 11

```
clc;
m=5;     //magnifying power
L=24;       //length in cm
fe=4;    //focal length in cm
fo=5*fe;  //calculating fo
disp(fo,"Focal length of lens in cm = ");  //
   displaying result
```

Scilab code Exa 3.12 12

```
clc;
D=25;          //distance of distinct vision in cm
fo=140;     //focal length of eye lens
fe=5;          //focal length in cm
m=-(fo/fe);    //calculating magnifying power
disp(m,"Magnifying power at normal adjustment = ");
    //displaying result
m1=-(fo/fe)*(1+(fe/D));     //calculating magnifying
   power
disp(m1,"Magnifying power atleast distance of
   distinct vision = ");  //displaying result
```

Scilab code Exa 3.13 13

```
clc;
M=5;          //Magnifying power
fo=10;     //focal length of eye lens
fe=fo/M;      //calculating fe
disp(fe,"Focal length of eye lens in cm = ");  //
   displaying result
```

Scilab code Exa 3.14 14

```
clc;
fo=75;     //focal length of eye lens
D=25;        //distance of distinct vision
fe=5;       //focal  of eye lens in cm
M=-(fo/fe)*(1+(fe/D));  //calculating M
disp(M,"Magnifying power = ");  //displaying result
```

Scilab code Exa 3.15 15

```
clc;
M=7;       //magnifying power
L=40;     //length
fe=(40/8);  //focal length of eye lens in cm
fo=(7*fe);    //calculating focal length
disp(fo,"Focal Length of lens in cm =");  //
   displaying result
```

Chapter 4

Electrostatics

Scilab code Exa 4.1 1

```
1 clc;
2 q=1;          //no of coulomb
3 e=1.6*10^-19;    //charge on an electron
4 n=(q/e);  //calculating no of electrons
5 disp(n,"No of electrons = ");  //displaying result
```

Scilab code Exa 4.2 2

```
1 clc;
2 F=4.5*9.8;    //in Newton
3 q=sqrt(((0.03^2)*4.5*9.8)/(9*10^9));  //calculating
     q using F=(1/4*3.14*eo)*((q1*q2)/(r^2))
4 disp(q,"Charge in coulomb = ");  //displaying result
```

Scilab code Exa 4.3 3

```
clc;
q1=2*10^-7;     //charge in C
q2=3*10^-7;     //charge in C
r=30*10^-2;     //r in m
F=(9*10^9)*((q1*q2)/r^2);  //calculating F
disp(F,"Force in Newton = ");  //displaying result
```

Scilab code Exa 4.4 4

```
clc;
q1=1;     //charge in C
q2=1;     //charge in C
r=1;     //r in m
F=(9*10^9)*((q1*q2)/r^2);  //calculating F
disp(F,"Force in Newton = ");  //displaying result
```

Scilab code Exa 4.5 5

```
clc;
m=9*10^-31;       //mass of electron in kg
q=-3.2*10^-7;     //charge in C
e=-1.6*10^-19;     //charge on electron in C
n=(q/e);  //calculating n
M=n*m;     //calculating mass transfered
disp(n,"no. of electrons = ");   //displaying result
disp(M,"Mass transfered to polythene in kg = ");  //
   displaying result
```

Scilab code Exa 4.6 6

```
clc;
q1=1.6*10^-19;     //charge in C
q2=-1.6*10^-19;     //charge in C
r=10^-9;     //r in m
F=(9*10^9)*((q1*q2)/r^2);  //calculating F
disp(F,"Force in Newton = ");  //displaying result
```

Scilab code Exa 4.7 7

```
clc;
Va=-10; //voltage in volts
W=100;  //work in Joule
q=2;    //charge in Coulomb
v=(Va)+(W/q);  //calculating v
disp(v,"Voltage in Volts = ");  //displaying result
```

Scilab code Exa 4.8 8

```
clc;
eo=(8.854*10^-12);    //constant
E=2;    //magnitude of electric field in N/C
r=0.5;  //r in m
q=E*4*(%pi)*(eo)*(r^2);    //calculating charge
disp(q,"Charge in Coulomb = ");  //displaying result
```

Scilab code Exa 4.9 9

```
clc;
e=-1.6*10^-19;  //charge on electron in Coulomb
q=20*10^-6;  //charge in Coulomb
```

```
4 r1=0.1;  //r1 in m
5 r2=0.05;  //r2 in m
6 Va=9*10^9*(q/r1);  //calculating voltage at A
7 Vb=9*10^9*(q/r2);  //calculating voltage at B
8 V=Va-Vb;    //potential difference
9 W=V*e;     //calculating work done in joule
10 disp(W,"Work done to take the electron from A to B
    in Joule = ");  //displaying result
```

Scilab code Exa 4.10 10

```
1 clc;
2 q1=(2*10^-8);  //charge in coulomb
3 q2=(-2*10^-8);  //charge in coulomb
4 q3=(3*10^-8);  //charge in coulomb
5 q4=(6*10^-8);  //charge in coulomb
6 s=1;  //side in m
7 V=(9*10^9)*(1/s)*(q1+q2+q3+q4);  //calculating
    voltage
8 disp(V,"Voltage in Volts = ");  //displaying result
```

Scilab code Exa 4.11 11

```
1 clc;
2 eo=8.85*10^-12;  //constant
3 q=2*10^-6;   //charge in coulomb
4 l=9;   //length in cm
5 fi=(q/eo);  //calcualting flux in (N m square)/c
6 disp(fi,"Flux through the surface in (N m square)/c
   = ");  //displaying result
```

Scilab code Exa 4.12 12

```
clc;
eo=8.85*10^-12;  //constant
r=1.2;   //r in m
t=80*10^-6;  //surface sharge density in c/m square
q=t*4*(%pi)*(r^2);  //calculating charge
fi=q/eo;     //calculating flux
disp(fi,"Flux in N m square/c = ");  //displaying
   result
```

Scilab code Exa 4.13 13

```
clc;
eo=8.85*10^-12;  //constant
E=9*10^4;   //Electric field in N/C
r=2*10^-2;   //r in m
L=2*(%pi)*E*eo*r;  //calculating linear charge
   density
disp(L,"Linear charge density per cm = ");  //
   displaying result
```

Scilab code Exa 4.14 14

```
clc;
o=17*10^-22;   //surface charge density in cm^-2
eo=8.85*10^-12;  //constant
E=o/eo;  //calculating electric intensity in region
   III
disp("Electric Intensity in regions I and II = 0");
    //displaying result
disp(E,"Electric Intensity in region III in N/C = ")
   ;   //displaying result
```

Scilab code Exa 4.15 15

```
clc;
r=0.05;  // in m
eo=8.85*10^-12;  //constant
q=10^-9;  //charge at point P in Coulomb
E=q/(4*(%pi)*eo*(r^2));  //calculating electric
    field
disp(E,"Electric field in v/m = ");  //displaying
    result
r1=0.2;  //in m
V1=q/(4*(%pi)*eo*r1);  //calculating potential
    difference
disp(V1," Potential difference between two points in
     Volt = ");  //displaying result
```

Scilab code Exa 4.16 16

```
clc;
eo=8.85*10^-12;  //constant
o=80*10^-6;  //surface charge density in c/ square
r=1.2;  //in m
q=o*(%pi)*(r^2);  //calculating charge in Coulomb
fi=q/eo;  //calculating electric flux
disp(q,"Charge in Coulomb = ");  //displaying result
disp(fi,"Electric flux in N m square/c = ");  //
    displaying result
```

Scilab code Exa 4.17 17

```
clc;
V=250;  //potential difference in Volt
C=10^-11;  //capacitance in farad
q=C*V;  //calculating charge
disp(q,"Charge in Coulomb = ");  //displaying result
```

Scilab code Exa 4.18 18

```
clc;
r=6.4*10^6;  //in m
C=r/(9*10^9);  //calculating charge
disp(C,"Capacitance in Farad = ");  //displaying
    result
```

Scilab code Exa 4.19 19

```
clc;
C=2;  //capacitance in Farad
d=0.5*10^-2;  //distance in m
eo=8.85*10^-12;  //constant
A=(C*d)/(eo);  //calculating area
disp(A,"Area in m square = ");  //displaying result
```

Scilab code Exa 4.20 20

```
clc;
A=0.02;  //area in m square
r=0.5;  //r in m
d=(A/(4*(%pi)*r));  //calculating distance
disp(d,"Distance between the plates in m = ");  //
    displaying result
```

Scilab code Exa 4.21 21

```
clc;
eo=8.85*10^-12;  //constant
A=1;  //area in m square
d=2*10^-3;  //r in m
K=4;  //constant
C=(K*eo*A)/d;   //calculating capacitance
disp(C,"Capacitance in Farad = = ");  //displaying
   result
```

Scilab code Exa 4.22 22

```
clc;
cm=10*10^-6;  //capacitance in Farad
K=2;  //constant
co=cm/K;  //calculating co
disp(co,"capacity of capacitor with air between the
   plates in Farad = ");  //displaying result
```

Scilab code Exa 4.23 23

```
clc;
v=100;        //v in volt
c1=8*10^-6;  //capacitance in Farad
c2=12*10^-6;  //capacitance in Farad
c3=24*10^-6;  //capacitance in Farad
cs=4/(10^6);  //calculating series capacitance
cp=(c1+c2+c3);  //calculating parallel capacitance
```

```
8 disp(cs,"Equivalent Series capacitance in farad = ")
    ; //displaying result
9 disp(cp,"Equivalent parallel capacitance in farad =
    "); //displaying result
10 qs=cs*v; //calculating charge
11 disp(qs,"charge on plate in Coulomb = "); //
    displaying result
```

Scilab code Exa 4.24 24

```
1 clc;
2 C=9*10^-10; //capacitance in farad
3 V=100; //in volt
4 U=(1/2)*(C*(V^2)); //calculating energy stored
5 disp(U,"Energy stored in Joule = "); //displaying
    result
```

Scilab code Exa 4.25 25

```
1 clc;
2 eo=8.85*10^-12; //constant
3 A=90*10^-4; //area in m square
4 d=2.5*10^-3; //distance in m
5 V=400; //in volt
6 C=(eo*A)/d; //calculating capacitance
7 disp(C,"Capacitance in Farad = "); //displaying
    result
8 W=(1/2)*(C*(V^2)); //calculating electrical energy
    stored
9 disp(W,"Electrical Energy stored in capacitor in
    Joule = "); //displaying result
```

Scilab code Exa 4.26 26

```
clc;
v=100;          //v in volt
c1=1*10^-6;   //capacitance in Farad
c2=2*10^-6;   //capacitance in Farad
c3=3*10^-6;   //capacitance in Farad
cs=6/11;   //calculating series capacitance
cp=(c1+c2+c3);   //calculating parallel capacitance
disp(cs,"Equivalent Series capacitance in farad = ")
   ;  //displaying result
disp(cp,"Equivalent parallel capacitance in farad =
   ");  //displaying result
disp("Therefore Cp=(11*Cs)");   //displaying result
```

Scilab code Exa 4.27 27

```
clc;
eo=8.85*10^-12;   //constant
V=6;   //v in volt
A=25*10^-4;   //area in m square
d=10^-3;   //distance in m
q=(eo*A*V)/d;   //calculating charge
W=q*V;    //calculating work done
disp(q,"Charge through battery in Coulomb = ");  //
   displaying result
disp(W,"Work done by Battery in Joule = ");  //
   displaying result
```

Chapter 5

Electricity

Scilab code Exa 5.1 1

```
clc;
n=10^6;     //no. of electrons
e=1.6*10^-19;  //charge on an electron in C
q=n*e;    //calculating total charge
t=10^-3;    //time in second
I=q/t;     //calculating current
disp(I,"Current flowing in Ampere = ");  //
   displaying result
```

Scilab code Exa 5.2 2

```
clc;
I=300*10^-3;    //current n Ampere
t=60;    //time in second
e=1.6*10^-19;  //chatge on electron in C
q=I*t;  //calculating charge
n=q/e;  //calculating no of electrons
disp(n,"No. of electrons = ");  //displaying result
```

Scilab code Exa 5.3 3

```
clc;
V=200;  //voltage in volt
R=100;  //resistance in Ohm
e=1.6*10^-19;  //charge on an electron in C
I=V/R;      //Ohm's law
t=1;  //time in second
q=I*t;  //calculating charge
n=q/e;  //calculating no of electrons
disp(n,"No. of electrons = ");  //displaying result
```

Scilab code Exa 5.4 4

```
clc;
l=15;   //length in m
A=6*10^-7;  //area in m square
R=5;  //resistance in Ohm
p=(A*R)/l;  //calculating resistivity
disp(p,"Resistivity in Ohm metre = ");  //displaying
    result
```

Scilab code Exa 5.5 5

```
clc;
l=0.1;   //length in m
A=10^-4;  //area in m square
R=0.01;  //resistance in Ohm
p=(A*R)/l;  //calculating resistivity
```

```
6 disp(p,"Resistivity in Ohm metre = "); //displaying
    result
```

Scilab code Exa 5.6 6

```
1 clc;
2 L=1; //length in m
3 r=0.2*10^-3; //radius in m
4 A=%pi*(r)^2; //calculating area
5 disp(A)
6 R=2; //resistance in Ohm
7 P=(R*A)/L; //calculating resistivity
8 disp(P,"Resistivity in Ohm. metre = "); //
    displaying result
```

Scilab code Exa 5.7 7

```
1 clc;
2 R1=5; //resisitance in Ohm
3 R2=9*5; //calculating using R2/A1=(l2/A2)*(A1/l1)
4 disp(R2,"Resisitance in Ohm = "); //displaying
    result
```

Scilab code Exa 5.8 8

```
1 clc;
2 R1=5; //resisitance in Ohm
3 R2=4*5; //calculating using R2/A1=(l2/A2)*(A1/l1)
4 disp(R2,"Resisitance in Ohm = "); //displaying
    result
```

Scilab code Exa 5.9 9

```
clc;
R1=2;    //resisitance in Ohm
R2=4;   //resistance in Ohm
R3=5;    //resistance in Ohm
R=(R1^-1)+(R2^-1)+(R3^-1);  //calculating parallel
    resistance
Rp=(1/R);
disp(Rp,"Resisitance in Ohm = ");  //displaying
    result
```

Scilab code Exa 5.10 10

```
clc;
Rs=40;    //resisitance in Ohm
disp("R2=8 when R1=32, R2=32 when R1=8 Resisitance
    in Ohm ");  //displaying result using (1/Rp)=(1/
    R1)+(1/R2)
```

Scilab code Exa 5.11 11

```
clc;
V=2;      //in volts
R1=30;    //resisitance in Ohm
R2=60;   //resistance in Ohm
Rp=(30*60)/(30+60);  //calculating parallel
    resistance
```

```
6 disp(Rp,"Resisitance in Ohm = "); //displaying
    result
7 I=V/Rp;      //Ohm's law
8 disp(I,"Current in Ampere = "); //displaying result
```

Scilab code Exa 5.12 12

```
1 clc;
2 R1=2;    //resisitance in Ohm
3 R2=3;   //resistance in Ohm
4 R3=1;    //resistance in Ohm
5 Rp=(R1*R2)/(R1+R2);  //calculating parallel
    resistance
6 R=Rp+1;       //1 Ohm in series
7 disp(R,"(1)Equivalent Resisitance in Ohm = "); //
    displaying result
8 Rs=(R1+R2+R3);  //series resistances
9 disp(Rs,"(2)All resistances in series in Ohm = ");
    //displaying result
10 Rp=(1/R1)+(1/R2)+(1/R3);  //calculating parallel
    resistance
11 disp((1/Rp),"(3)All in Parallel in Ohm = "); //
    displaying result
```

Scilab code Exa 5.13 13

```
1 clc;
2 V=20;     //voltage in Volts
3 R1=2;    //resisitance in Ohm
4 R2=4;   //resistance in Ohm
5 R3=5;    //resistance in Ohm
6 Rp=(1/R1)+(1/R2)+(1/R3);  //calculating parallel
    resistance
```

```
7 R=1/Rp;       //Parallel
8 disp(R,"(a)Equivalent Resisitance in Ohm = "); //
    displaying result
9 I1=V/R1;  //calculating current through R1
10 I2=V/R2;  //calculating current through R2
11 I3=V/R3;  //calculating current through R3
12 I=V/R;   //calculating total current
13 disp(I1,"Current through R1 in Ampere = "); //
    displaying result
14 disp(I2,"Current through R2 in Ampere = "); //
    displaying result
15 disp(I3,"Current through R3 in Ampere = "); //
    displaying result
16 disp(I,"Total current in Ampere = "); //displaying
    result
```

Scilab code Exa 5.14 14

```
1 clc;
2 disp("Rp = 6/n");  //resistance in parallel
3 disp("R=7");  //total resistance
4 disp("From 1 and 2 we get n=3");  //displaying
    result
```

Scilab code Exa 5.15 15

```
1 clc;
2 R1=2;  //resistance in Ohm
3 R2=6;   //resistance in Ohm
4 R3=3;  //resistance in Ohm
5 V=24;   //voltage in volts
6 R=8;    //resistance in Ohm
7 I=V/R; //Ohm's Law
```

```
8 disp(I,"Current in Ampere = "); //displaying result
9 V1=I*R1; //Ohm's Law
10 disp(V1,"Voltage drop across R1 in Volts = "); //
   displaying result
11 V2=I*R2; //Ohm's Law
12 disp(V2,"Voltage drop across R2 in Volts = "); //
   displaying result
13 V3=I*R3; //Ohm's Law
14 disp(V3,"Voltage drop across R3 in Volts = "); //
   displaying result
```

Scilab code Exa 5.16 16

```
1 clc;
2 R=15; //resistance in Ohm
3 disp("KVL: 16I1+15I2=6 (1)"); //KVL equation
4 I1=-1.66; //from(1)
5 I2=2.17; //from (1)
6 disp(I1); //current in Ampere
7 disp(I2)
8 V=(I1+I2)*R; //calculating potential difference
9 disp(V,"Potential difference in Volt = "); //
   displaying result
```

Scilab code Exa 5.17 17

```
1 clc;
2 disp("3I1-I2-1=0 (1)"); //KVL equation
3 disp("3I1-I2+2I=2 (2)"); //KVL equation
4 disp("3I1-I1+2I=2 (3)"); //KVL equation
5 I1=0.2352; //from (1)(2)(3)through AB
6 I2=-0.11764; //from (1)(2)(3)through BD
7 I=0.58823; //from (1)(2)(3)through main circuit
```

```
Ig=-0.117647;  //current in Ampere
Ibc=I1-I2; //calculating current in BC
Iad=I-I1;  //calculating current in AD
Idc=I-I1-Ig;  //calculating current in DC
disp(Ibc,"Current in branch BC in Ampere = ");  //
   displaying result
disp(Iad,"Current in branch AD in Ampere = ");  //
   displaying result
disp(Idc,"Current in branch DC in Ampere = ");  //
   displaying result
```

Scilab code Exa 5.18 18

```
clc;
P=10;  //Ohm
Q=3;   //Ohm
R=12;  //Ohm
S=6;  //Ohm
G=20;  //Ohm
disp("-12I+22I1+IgG=0  (1)");  //KVL
disp("6I-9I1+29Ig=0  (2)");  //KVL
disp("13I1-3Ig=2  (3)");  //KVL
Ig=7.797*10^-3;   //from (1)(2)(3)
disp(Ig,"Current through Galvanometer in Ampere = ")
   ;  //displaying result
```

Scilab code Exa 5.19 19

```
clc;
P=500;  //power in Watts
V=200;  //voltage in Volts
R=(V^2)/P;  //using P=V^2*R
disp(R,"Resistance in Ohm = ");  //displaying result
```

```
6 V1=160;  //voltage in Volts
7 P1=(V1^2)/R;  //calculating power
8 Dp=500-P1;  //drop in heat
9 D=(Dp*100)/500;  //percentage drop
10 disp(D,"% Drop in heat production = ");  //
   displaying result
```

Scilab code Exa 5.20 20

```
1 clc;
2 P1=100;  //power in Watts
3 P2=500;  //power in Watts
4 P=P2/P1;  //ratio
5 disp("P>0 Therefore I2>I1");  //displaying result
```

Scilab code Exa 5.21 21

```
1 clc;
2 t=1200;  //time in second
3 P=100;  //power in Watts
4 V=230;  //voltage in Volts
5 R=(V^2)/P;  //calculating resistance
6 V1=115;  //supply voltage in Volts
7 E=((V1^2)*t)/R;  //calculating energy
8 disp(E,"Energy dissipated by bulb in Joule = ");  //
   displaying result
```

Scilab code Exa 5.22 22

```
1 clc;
```

```
2 P=10^4;  //power in Watts
3 V=250;  //voltage in Volts
4 R=0.2;  //resistance in ohm
5 Pl=((P/V)*(P/V))*R;  //calculating power loss
6 disp(Pl)
7 E=P/(Pl+P);  //calculating efficiency
8 disp(E*100,"Percent Efficiency = ");  //displaying
    result
```

Scilab code Exa 5.23 23

```
1 clc;
2 P=100;  //power in Watts
3 V=220;  //voltage in Volts
4 I=P/V;  //Current in Ampere
5 R=V/I;  //resistance
6 disp(I,"Current in Ampere = ");  //displaying result
7 disp(R,"Resistance in Ohm = ");  //displaying result
```

Scilab code Exa 5.24 24

```
1 clc;
2 V=50;  //voltage in Volts
3 I=12;  //Current in Ampere
4 P=V*I;  //power
5 Pd=P*0.7;  //power dissipated
6 R=(420/(12)^2);
7 disp(R,"Resistance in Ohm = ");  //displaying result
```