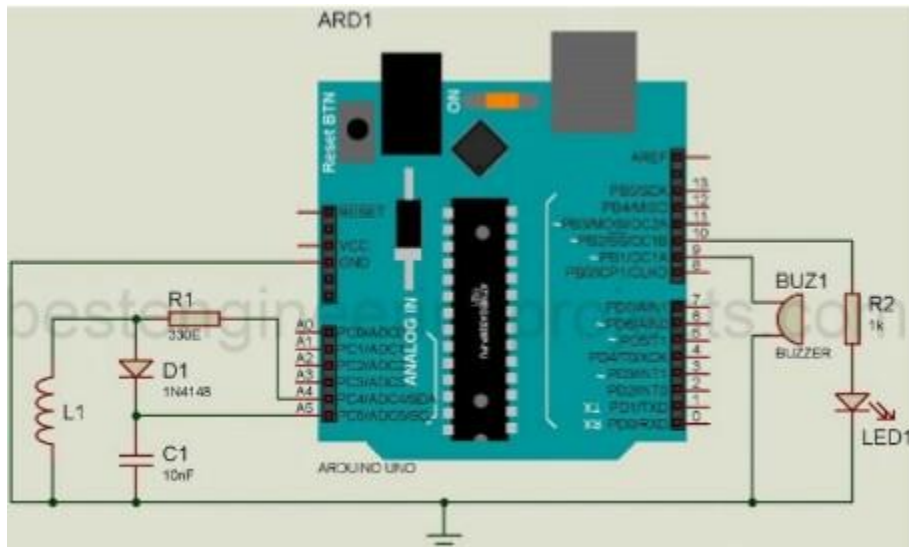# METAL DETECTION USING ARDUINO

Circuit diagram:-

Code:-

```
#define vinPin A5

#define buz 9

#define pulsePin A4


#define led 10


long sumExpect=0;

long ignor=0;

long diff=0;

long pTime=0;

long buzPeriod=0;
```

```
void setup()

{

  Serial.begin(9600);

  pinMode(pulsePin, OUTPUT);

  digitalWrite(pulsePin, LOW);

  pinMode(vinPin, INPUT);

  pinMode(buz, OUTPUT);

  digitalWrite(buz, LOW);

  pinMode(led, OUTPUT);

}


void loop()

{

  int minval=1023;

  int maxval=0;

  long unsigned int sum=0;

  for (int i=0; i<256; i++)

  {

    pinMode(vinPin,OUTPUT);

    digitalWrite(vinPin,LOW);

    delayMicroseconds(20);

    pinMode(vinPin,INPUT);

    applyPulses();
```

```
int val = analogRead(vinPin);

minval = min(val,minval);

maxval = max(val,maxval);

sum+=val;


long unsigned int cTime=millis();

char buzState=0;

if (cTime<pTime+10)

{

  if (diff>0)

    buzState=1;

  else if(diff<0)

    buzState=2;

}

if (cTime>pTime+buzPeriod)

{

  if (diff>0)

  buzState=1;

  else if (diff<0)

  buzState=2;

  pTime=cTime;

}

if (buzPeriod>300)

buzState=0;
```

```
  if (buzState==0)

  {

    digitalWrite(led, LOW);

    noTone(buz);

  }

  else if (buzState==1)

  {

    tone(buz,2000);

    digitalWrite(led, HIGH);

  }


  else if (buzState==2)

  {

    tone(buz,500);

    digitalWrite(led, HIGH);

  }

}


sum-=minval;

sum-=maxval;


if (sumExpect==0)

sumExpect=sum<<6;

long int avgsum=(sumExpect+32)>>6;
```

```
  diff=sum-avgsum;

 if (abs(diff)<avgsum>>10)

 {

   sumExpect=sumExpect+sum-avgsum;

   ignor=0;

 }

 else

   ignor++;

 if (ignor>64)

 {

   sumExpect=sum<<6;

   ignor=0;

 }

 if (diff==0)

   buzPeriod=1000000;

 else

 buzPeriod=avgsum/(2*abs(diff));

}


void applyPulses()

{

  for (int i=0;i<3;i++)

  {

    digitalWrite(pulsePin,HIGH); //take 3.5 uS

    delayMicroseconds(3);
```

```
    digitalWrite(pulsePin,LOW);  //take 3.5 uS

    delayMicroseconds(3);

  }

}
```