

Second Quiz

1. As you may remember from your Electricity and Magnetism course, the magnetic field produced by a circular current loop at a point on the axis of the loop is given by the formula

$$B_x = \frac{\mu_0}{4\pi} \frac{2\pi R^2 I}{(x^2 + R^2)^{3/2}},$$

where $\mu_0 = 4\pi \times 10^{-7}$ T m A⁻¹, R is the radius of the loop, I is the current, and x is the distance from the centre of the loop. The program `bfield` produces a table of values of B_x for x varying from 0 to 5 cm by step of 1 mm, for $I = 0.1$ A and $R = 1.4$ cm. Seven lines have been removed from the program, where missing statements are indicated. In random order, these lines are:

- (a) `bx = 1.d-7 * 2.d0*pi * radius**2 * current / &`
- (b) `enddo`
- (c) `end program bfield`
- (d) `x = dble(ix)/1.d3`
- (e) `write(*,1000)x/1.d-2, bx ! x is printed out in cm.`
- (f) `do ix = 0,50`
- (g) `sqrt(x**2 + radius**2)**3`

You should associate them to the corresponding missing statements. For example, Statement 7 is (c).

```
program bfield
implicit none
double precision:: bx, current, pi, radius, x
integer:: ix
pi = 4.d0*atan(1.d0)
radius = 1.4d-2
current = 0.1d0
! Missing statement 1
! Missing statement 2
! Missing statement 3
! Missing statement 4
! Missing statement 5
! Missing statement 6
1000 format(1x,f4.2,2x,e14.6)
! Missing statement 7
```

2. In order to have x printed with only one digit after the decimal point and B_x printed to 3 significant figures, what should the `format` statement be ?

- (1) `1000 format(1x,f1.2,2x,e14.3)`
- (2) `1000 format(1x,f1.2,2x,e3.3)`
- (3) `1000 format(1x,f3.1,2x,e14.3)`
- (4) `1000 format(1x,f4.1,2x,e3.3)`