d_cp2.13

The LaTex code that creates this quiz is released to the Public Domain
Attribution for each question is documented in the Appendix

Friday 9th November, 2018

Latex markup at
https://en.wikiversity.org/wiki/special:permalink/xxx

NOTICE:
Question 7 is solved incorrectly:
The posted solution used the circle's circumfrence $2\pi R$ when the area πR^2 should have been used. To get the correct answer, multiply the boldfaced answer by $\frac{1}{2}R$.

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Contents

1 Quiz

1. A square coil has sides that are L= 0.25 m long and is tightly wound with N=200 turns of wire. The resistance of the coil is R=5 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.04 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it? [1]

   A. 1.000E-01 A

   B. 1.100E-01 A

   C. 1.210E-01 A

   D. 1.331E-01 A

   E. 1.464E-01 A

2. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.5 m. The magnetic field is spatially uniform but decays in time according to $(1.5)e^{-\alpha t}$ at time t = 0.05 seconds, and α =5 s^{-1}. What is the current in the coil if the impedance of the coil is 10 Ω ?[2]

   A. 3.791E-01 A

   B. 4.170E-01 A

   C. 4.588E-01 A

   D. 5.046E-01 A

   E. 5.551E-01 A

3. The current through the windings of a solenoid with n= 2.000E+03 turns per meter is changing at a rate dI/dt=3 A/s. The solenoid is 50 cm long and has a cross-sectional diameter of 3 cm. A small coil consisting of N=20turns wraped in a circle of diameter 1 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?[3]

   A. 9.788E-06 V

   B. 1.077E-05 V

   C. 1.184E-05 V

   D. 1.303E-05 V

   E. 1.433E-05 V

4. Calculate the motional emf induced along a 20 km conductor moving at an orbital speed of 7.8 km/s perpendicular to Earth's 5.000E-05 Tesla magnetic field.[4]

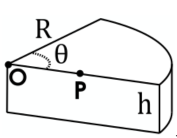
   A. 7.091E+03 V

   B. 7.800E+03 V

   C. 8.580E+03 V

   D. 9.438E+03 V

   E. 1.038E+04 V

5. 

A cylinder of height 1.1 cm and radius 3.1 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 2.1 cm from point O and moves at a speed of 5.1 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)] [5]

   A. 8.767E+00 cm^3/s

B. 9.644E+00 cm^3/s

C. 1.061E+01 cm^3/s

D. 1.167E+01 cm^3/s

E. 1.284E+01 $\mathbf{cm}^3$/s

6. A recangular coil with an area of 0.5 m^2 and 10 turns is placed in a uniform magnetic field of 1.5 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 2.000E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 50 s?[6]

A. 4.029E+02 V

B. 4.432E+02 V

C. 4.875E+02 V

D. 5.362E+02 V

E. 5.899E+02 V

7. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =1.5 T and ω =2.000E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.5 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.[7]

A. 9.425E+03 V

B. 1.037E+04 V

C. 1.140E+04 V

D. 1.254E+04 V

E. 1.380E+04 V

8. A long solenoid has a radius of 0.7 m and 50 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =3 A and α =25 s^{-1}.What is the induced electric fied at a distance 2.0 m from the axis at time t=0.04 s ?[8]

A. 2.124E-04 V/m

B. 2.336E-04 V/m

C. 2.570E-04 V/m

D. 2.827E-04 V/m

E. 3.109E-04 V/m

9. A long solenoid has a radius of 0.7 m and 50 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =3 A and α =25 s^{-1}.What is the induced electric fied at a distance 0.15 m from the axis at time t=0.04 s ?[9]

A. 1.300E-04 V/m

B. 1.430E-04 V/m

C. 1.573E-04 V/m

D. 1.731E-04 V/m

E. 1.904E-04 V/m

2 Renditions

2.1

1. A square coil has sides that are L= 0.673 m long and is tightly wound with N=211 turns of wire. The resistance of the coil is R=5.31 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0454 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 6.753E-01 A

   B. 7.428E-01 A

   C. 8.171E-01 A

   D. 8.988E-01 A

   E. 9.887E-01 A

2. A square coil has sides that are L= 0.861 m long and is tightly wound with N=538 turns of wire. The resistance of the coil is R=9.04 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0433 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 1.737E+00 A

   B. 1.910E+00 A

   C. 2.101E+00 A

   D. 2.311E+00 A

   E. 2.543E+00 A

3. A square coil has sides that are L= 0.259 m long and is tightly wound with N=628 turns of wire. The resistance of the coil is R=6.51 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0372 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 1.809E-01 A

   B. 1.989E-01 A

   C. 2.188E-01 A

   D. 2.407E-01 A

   E. 2.648E-01 A

4. A square coil has sides that are L= 0.894 m long and is tightly wound with N=255 turns of wire. The resistance of the coil is R=8.83 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0682 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 1.301E+00 A

   B. 1.431E+00 A

   C. 1.574E+00 A

   D. 1.732E+00 A

   E. 1.905E+00 A

5. A square coil has sides that are L= 0.436 m long and is tightly wound with N=284 turns of wire. The resistance of the coil is R=6.89 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0733 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

A. 5.743E-01 A
B. 6.318E-01 A
C. 6.950E-01 A
D. 7.645E-01 A
E. 8.409E-01 A

6. A square coil has sides that are L= 0.561 m long and is tightly wound with N=930 turns of wire. The resistance of the coil is R=5.08 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0548 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?
   A. 2.609E+00 A
   B. 2.870E+00 A
   C. 3.157E+00 A
   D. 3.473E+00 A
   E. 3.820E+00 A

7. A square coil has sides that are L= 0.547 m long and is tightly wound with N=198 turns of wire. The resistance of the coil is R=4.62 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0768 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?
   A. 8.953E-01 A
   B. 9.848E-01 A
   C. 1.083E+00 A
   D. 1.192E+00 A
   E. 1.311E+00 A

8. A square coil has sides that are L= 0.245 m long and is tightly wound with N=925 turns of wire. The resistance of the coil is R=8.0 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0618 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?
   A. 3.545E-01 A
   B. 3.899E-01 A
   C. 4.289E-01 A
   D. 4.718E-01 A
   E. 5.190E-01 A

9. A square coil has sides that are L= 0.568 m long and is tightly wound with N=482 turns of wire. The resistance of the coil is R=8.78 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0544 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?
   A. 6.581E-01 A
   B. 7.239E-01 A
   C. 7.963E-01 A
   D. 8.759E-01 A
   E. 9.635E-01 A

10. A square coil has sides that are L= 0.638 m long and is tightly wound with N=927 turns of wire. The resistance of the coil is R=8.34 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0718 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 2.685E+00 A
   B. 2.953E+00 A
   C. 3.248E+00 A
   D. 3.573E+00 A
   E. 3.931E+00 A

11. A square coil has sides that are L= 0.219 m long and is tightly wound with N=508 turns of wire. The resistance of the coil is R=8.42 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0619 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 1.791E-01 A
   B. 1.970E-01 A
   C. 2.167E-01 A
   D. 2.384E-01 A
   E. 2.622E-01 A

12. A square coil has sides that are L= 0.308 m long and is tightly wound with N=969 turns of wire. The resistance of the coil is R=8.64 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0498 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 4.817E-01 A
   B. 5.298E-01 A
   C. 5.828E-01 A
   D. 6.411E-01 A
   E. 7.052E-01 A

13. A square coil has sides that are L= 0.738 m long and is tightly wound with N=717 turns of wire. The resistance of the coil is R=5.25 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0655 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 3.660E+00 A
   B. 4.027E+00 A
   C. 4.429E+00 A
   D. 4.872E+00 A
   E. 5.359E+00 A

14. A square coil has sides that are L= 0.888 m long and is tightly wound with N=604 turns of wire. The resistance of the coil is R=4.31 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0441 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

   A. 3.661E+00 A
   B. 4.028E+00 A
   C. 4.430E+00 A

D. 4.873E+00 A

E. 5.361E+00 A

15. A square coil has sides that are L= 0.325 m long and is tightly wound with N=697 turns of wire. The resistance of the coil is R=4.87 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0842 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

A. 1.157E+00 A

B. 1.273E+00 A

C. 1.400E+00 A

D. 1.540E+00 A

E. 1.694E+00 A

16. A square coil has sides that are L= 0.727 m long and is tightly wound with N=376 turns of wire. The resistance of the coil is R=5.59 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0485 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

A. 1.567E+00 A

B. 1.724E+00 A

C. 1.897E+00 A

D. 2.086E+00 A

E. 2.295E+00 A

17. A square coil has sides that are L= 0.465 m long and is tightly wound with N=954 turns of wire. The resistance of the coil is R=6.06 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0367 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

A. 1.136E+00 A

B. 1.249E+00 A

C. 1.374E+00 A

D. 1.512E+00 A

E. 1.663E+00 A

18. A square coil has sides that are L= 0.819 m long and is tightly wound with N=887 turns of wire. The resistance of the coil is R=5.69 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0618 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

A. 4.414E+00 A

B. 4.855E+00 A

C. 5.341E+00 A

D. 5.875E+00 A

E. 6.462E+00 A

19. A square coil has sides that are L= 0.458 m long and is tightly wound with N=742 turns of wire. The resistance of the coil is R=6.81 Ω . The coil is placed in a spacially uniform magnetic field that is directed perpendicular to the face of the coil and whose magnitude is increasing at a rate dB/dt=0.0559 T/s. If R represents the only impedance of the coil, what is the magnitude of the current circulting through it?

A. 1.056E+00 A

B. 1.161E+00 A

C. 1.278E+00 A

D. 1.405E+00 A

E. 1.546E+00 A

2.2

1. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.72 m. The magnetic field is spatially uniform but decays in time according to $(1.3)e^{-\alpha t}$ at time t = 0.039 seconds, and α =9.5 s^{-1}. What is the current in the coil if the impedance of the coil is 18.0 Ω ?

   A. 7.013E-01 A

   B. 7.714E-01 A

   C. 8.486E-01 A

   D. 9.334E-01 A

   E. 1.027E+00 A

2. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.76 m. The magnetic field is spatially uniform but decays in time according to $(4.2)e^{-\alpha t}$ at time t = 0.058 seconds, and α =8.8 s^{-1}. What is the current in the coil if the impedance of the coil is 86.0 Ω ?

   A. 4.681E-01 A

   B. 5.149E-01 A

   C. 5.664E-01 A

   D. 6.231E-01 A

   E. 6.854E-01 A

3. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.28 m. The magnetic field is spatially uniform but decays in time according to $(2.7)e^{-\alpha t}$ at time t = 0.035 seconds, and α =6.6 s^{-1}. What is the current in the coil if the impedance of the coil is 76.0 Ω ?

   A. 3.131E-02 A

   B. 3.444E-02 A

   C. 3.788E-02 A

   D. 4.167E-02 A

   E. 4.584E-02 A

4. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.98 m. The magnetic field is spatially uniform but decays in time according to $(4.5)e^{-\alpha t}$ at time t = 0.045 seconds, and α =8.6 s^{-1}. What is the current in the coil if the impedance of the coil is 7.5 Ω ?

   A. 7.221E+00 A

   B. 7.943E+00 A

   C. 8.738E+00 A

   D. 9.611E+00 A

   E. 1.057E+01 A

5. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.53 m. The magnetic field is spatially uniform but decays in time according to $(2.0)e^{-\alpha t}$ at time t = 0.077 seconds, and α =7.5 s^{-1}. What is the current in the coil if the impedance of the coil is 67.0 Ω ?

A. 1.109E-01 A

B. 1.220E-01 A

C. 1.342E-01 A

D. 1.476E-01 A

E. 1.624E-01 A

6. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.65 m. The magnetic field is spatially uniform but decays in time according to $(5.7)e^{-\alpha t}$ at time t = 0.073 seconds, and $\alpha = 8.2\,\mathrm{s}^{-1}$. What is the current in the coil if the impedance of the coil is 51.0 Ω ?

A. 5.525E-01 A

B. 6.078E-01 A

C. 6.685E-01 A

D. 7.354E-01 A

E. 8.089E-01 A

7. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.77 m. The magnetic field is spatially uniform but decays in time according to $(2.7)e^{-\alpha t}$ at time t = 0.035 seconds, and $\alpha = 5.5\,\mathrm{s}^{-1}$. What is the current in the coil if the impedance of the coil is 38.0 Ω ?

A. 4.511E-01 A

B. 4.962E-01 A

C. 5.459E-01 A

D. 6.004E-01 A

E. 6.605E-01 A

8. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.68 m. The magnetic field is spatially uniform but decays in time according to $(2.6)e^{-\alpha t}$ at time t = 0.061 seconds, and $\alpha = 9.5\,\mathrm{s}^{-1}$. What is the current in the coil if the impedance of the coil is 13.0 Ω ?

A. 1.278E+00 A

B. 1.406E+00 A

C. 1.546E+00 A

D. 1.701E+00 A

E. 1.871E+00 A

9. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.42 m. The magnetic field is spatially uniform but decays in time according to $(4.7)e^{-\alpha t}$ at time t = 0.033 seconds, and $\alpha = 5.7\,\mathrm{s}^{-1}$. What is the current in the coil if the impedance of the coil is 25.0 Ω ?

A. 3.697E-01 A

B. 4.066E-01 A

C. 4.473E-01 A

D. 4.920E-01 A

E. 5.412E-01 A

10. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.73 m. The magnetic field is spatially uniform but decays in time according to $(1.2)e^{-\alpha t}$ at time t = 0.058 seconds, and $\alpha = 7.1\,\mathrm{s}^{-1}$. What is the current in the coil if the impedance of the coil is 54.0 Ω ?

A. 1.750E-01 A

B. 1.925E-01 A

C. 2.117E-01 A

D. 2.329E-01 A

E. 2.562E-01 A

11. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.97 m. The magnetic field is spatially uniform but decays in time according to $(1.6)e^{-\alpha t}$ at time t = 0.035 seconds, and α =7.5 s^{-1}. What is the current in the coil if the impedance of the coil is 97.0 Ω ?

A. 2.113E-01 A

B. 2.324E-01 A

C. 2.557E-01 A

D. 2.813E-01 A

E. 3.094E-01 A

12. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.75 m. The magnetic field is spatially uniform but decays in time according to $(5.2)e^{-\alpha t}$ at time t = 0.067 seconds, and α =9.6 s^{-1}. What is the current in the coil if the impedance of the coil is 71.0 Ω ?

A. 5.937E-01 A

B. 6.531E-01 A

C. 7.184E-01 A

D. 7.902E-01 A

E. 8.692E-01 A

13. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.73 m. The magnetic field is spatially uniform but decays in time according to $(3.3)e^{-\alpha t}$ at time t = 0.062 seconds, and α =8.1 s^{-1}. What is the current in the coil if the impedance of the coil is 53.0 Ω ?

A. 4.645E-01 A

B. 5.110E-01 A

C. 5.621E-01 A

D. 6.183E-01 A

E. 6.801E-01 A

14. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.68 m. The magnetic field is spatially uniform but decays in time according to $(1.8)e^{-\alpha t}$ at time t = 0.038 seconds, and α =5.3 s^{-1}. What is the current in the coil if the impedance of the coil is 91.0 Ω ?

A. 1.245E-01 A

B. 1.370E-01 A

C. 1.507E-01 A

D. 1.657E-01 A

E. 1.823E-01 A

15. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.92 m. The magnetic field is spatially uniform but decays in time according to $(2.8)e^{-\alpha t}$ at time t = 0.032 seconds, and α =6.6 s^{-1}. What is the current in the coil if the impedance of the coil is 88.0 Ω ?

A. 3.397E-01 A

B. 3.736E-01 A

C. 4.110E-01 A

D. 4.521E-01 A

E. 4.973E-01 A

16. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.48 m. The magnetic field is spatially uniform but decays in time according to $(3.8)e^{-\alpha t}$ at time t = 0.036 seconds, and α =9.3 s^{-1}. What is the current in the coil if the impedance of the coil is 68.0 Ω ?

A. 2.022E-01 A

B. 2.224E-01 A

C. 2.447E-01 A

D. 2.691E-01 A

E. 2.961E-01 A

17. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.59 m. The magnetic field is spatially uniform but decays in time according to $(2.6)e^{-\alpha t}$ at time t = 0.051 seconds, and α =9.1 s^{-1}. What is the current in the coil if the impedance of the coil is 63.0 Ω ?

A. 1.940E-01 A

B. 2.134E-01 A

C. 2.347E-01 A

D. 2.582E-01 A

E. 2.840E-01 A

18. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.4 m. The magnetic field is spatially uniform but decays in time according to $(2.3)e^{-\alpha t}$ at time t = 0.051 seconds, and α =4.1 s^{-1}. What is the current in the coil if the impedance of the coil is 1.7 Ω ?

A. 1.545E+00 A

B. 1.700E+00 A

C. 1.870E+00 A

D. 2.057E+00 A

E. 2.262E+00 A

19. A time dependent magnetic field is directed perpendicular to the plane of a circular coil with a radius of 0.38 m. The magnetic field is spatially uniform but decays in time according to $(1.5)e^{-\alpha t}$ at time t = 0.032 seconds, and α =4.4 s^{-1}. What is the current in the coil if the impedance of the coil is 7.6 Ω ?

A. 2.571E-01 A

B. 2.828E-01 A

C. 3.111E-01 A

D. 3.422E-01 A

E. 3.764E-01 A

2.3

1. The current through the windings of a solenoid with n= 2.120E+03 turns per meter is changing at a rate dI/dt=4 A/s. The solenoid is 94 cm long and has a cross-sectional diameter of 2.56 cm. A small coil consisting of N=30turns wraped in a circle of diameter 1.15 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

A. 3.019E-05 V

B. 3.321E-05 V

C. 3.653E-05 V

D. 4.018E-05 V

E. 4.420E-05 V

2. The current through the windings of a solenoid with n= 2.460E+03 turns per meter is changing at a rate dI/dt=7 A/s. The solenoid is 87 cm long and has a cross-sectional diameter of 3.32 cm. A small coil consisting of N=38turns wraped in a circle of diameter 1.29 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

   A. 7.340E-05 V

   B. 8.075E-05 V

   C. 8.882E-05 V

   D. 9.770E-05 V

   E. 1.075E-04 V

3. The current through the windings of a solenoid with n= 2.100E+03 turns per meter is changing at a rate dI/dt=7 A/s. The solenoid is 91 cm long and has a cross-sectional diameter of 3.24 cm. A small coil consisting of N=22turns wraped in a circle of diameter 1.22 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

   A. 3.245E-05 V

   B. 3.569E-05 V

   C. 3.926E-05 V

   D. 4.319E-05 V

   E. 4.751E-05 V

4. The current through the windings of a solenoid with n= 2.220E+03 turns per meter is changing at a rate dI/dt=10 A/s. The solenoid is 70 cm long and has a cross-sectional diameter of 2.73 cm. A small coil consisting of N=28turns wraped in a circle of diameter 1.45 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

   A. 1.066E-04 V

   B. 1.173E-04 V

   C. 1.290E-04 V

   D. 1.419E-04 V

   E. 1.561E-04 V

5. The current through the windings of a solenoid with n= 2.840E+03 turns per meter is changing at a rate dI/dt=19 A/s. The solenoid is 65 cm long and has a cross-sectional diameter of 2.18 cm. A small coil consisting of N=25turns wraped in a circle of diameter 1.35 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

   A. 2.206E-04 V

   B. 2.426E-04 V

   C. 2.669E-04 V

D. 2.936E-04 V

E. 3.230E-04 V

6. The current through the windings of a solenoid with n= 2.040E+03 turns per meter is changing at a rate dI/dt=19 A/s. The solenoid is 76 cm long and has a cross-sectional diameter of 3.23 cm. A small coil consisting of N=25turns wraped in a circle of diameter 1.67 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

   A. 2.204E-04 V

   B. 2.425E-04 V

   C. 2.667E-04 V

   D. 2.934E-04 V

   E. 3.227E-04 V

7. The current through the windings of a solenoid with n= 2.970E+03 turns per meter is changing at a rate dI/dt=15 A/s. The solenoid is 89 cm long and has a cross-sectional diameter of 3.48 cm. A small coil consisting of N=28turns wraped in a circle of diameter 1.5 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

   A. 2.081E-04 V

   B. 2.289E-04 V

   C. 2.518E-04 V

   D. 2.770E-04 V

   E. 3.047E-04 V

8. The current through the windings of a solenoid with n= 1.820E+03 turns per meter is changing at a rate dI/dt=7 A/s. The solenoid is 78 cm long and has a cross-sectional diameter of 3.26 cm. A small coil consisting of N=35turns wraped in a circle of diameter 1.68 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

   A. 1.242E-04 V

   B. 1.366E-04 V

   C. 1.503E-04 V

   D. 1.653E-04 V

   E. 1.819E-04 V

9. The current through the windings of a solenoid with n= 2.210E+03 turns per meter is changing at a rate dI/dt=18 A/s. The solenoid is 65 cm long and has a cross-sectional diameter of 2.2 cm. A small coil consisting of N=36turns wraped in a circle of diameter 1.29 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

   A. 2.352E-04 V

   B. 2.587E-04 V

   C. 2.846E-04 V

   D. 3.131E-04 V

   E. 3.444E-04 V

10. The current through the windings of a solenoid with n= 2.760E+03 turns per meter is changing at a rate dI/dt=8 A/s. The solenoid is 74 cm long and has a cross-sectional diameter of 2.57 cm. A small coil consisting of N=32turns wraped in a circle of diameter 1.49 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

    A. 1.407E-04 V
    B. 1.548E-04 V
    C. 1.703E-04 V
    D. 1.873E-04 V
    E. 2.061E-04 V

11. The current through the windings of a solenoid with n= 2.060E+03 turns per meter is changing at a rate dI/dt=12 A/s. The solenoid is 68 cm long and has a cross-sectional diameter of 2.96 cm. A small coil consisting of N=29turns wraped in a circle of diameter 1.74 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

    A. 1.463E-04 V
    B. 1.609E-04 V
    C. 1.770E-04 V
    D. 1.947E-04 V
    E. 2.142E-04 V

12. The current through the windings of a solenoid with n= 1.830E+03 turns per meter is changing at a rate dI/dt=14 A/s. The solenoid is 87 cm long and has a cross-sectional diameter of 2.5 cm. A small coil consisting of N=30turns wraped in a circle of diameter 1.34 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

    A. 1.126E-04 V
    B. 1.238E-04 V
    C. 1.362E-04 V
    D. 1.498E-04 V
    E. 1.648E-04 V

13. The current through the windings of a solenoid with n= 2.260E+03 turns per meter is changing at a rate dI/dt=12 A/s. The solenoid is 62 cm long and has a cross-sectional diameter of 3.37 cm. A small coil consisting of N=23turns wraped in a circle of diameter 1.7 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

    A. 1.215E-04 V
    B. 1.337E-04 V
    C. 1.470E-04 V
    D. 1.617E-04 V
    E. 1.779E-04 V

14. The current through the windings of a solenoid with n= 2.500E+03 turns per meter is changing at a rate dI/dt=4 A/s. The solenoid is 96 cm long and has a cross-sectional diameter of 2.39 cm. A small coil consisting of N=22turns wraped in a circle of diameter 1.44 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

A. 3.721E-05 V

B. 4.093E-05 V

C. 4.502E-05 V

D. 4.953E-05 V

E. 5.448E-05 V

15. The current through the windings of a solenoid with n= 2.590E+03 turns per meter is changing at a rate dI/dt=11 A/s. The solenoid is 95 cm long and has a cross-sectional diameter of 2.29 cm. A small coil consisting of N=25turns wraped in a circle of diameter 1.15 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

A. 6.985E-05 V

B. 7.683E-05 V

C. 8.452E-05 V

D. 9.297E-05 V

E. 1.023E-04 V

16. The current through the windings of a solenoid with n= 2.960E+03 turns per meter is changing at a rate dI/dt=10 A/s. The solenoid is 85 cm long and has a cross-sectional diameter of 3.12 cm. A small coil consisting of N=32turns wraped in a circle of diameter 1.44 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

A. 1.602E-04 V

B. 1.762E-04 V

C. 1.939E-04 V

D. 2.132E-04 V

E. 2.346E-04 V

17. The current through the windings of a solenoid with n= 1.850E+03 turns per meter is changing at a rate dI/dt=17 A/s. The solenoid is 98 cm long and has a cross-sectional diameter of 3.38 cm. A small coil consisting of N=23turns wraped in a circle of diameter 1.72 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

A. 1.587E-04 V

B. 1.745E-04 V

C. 1.920E-04 V

D. 2.112E-04 V

E. 2.323E-04 V

18. The current through the windings of a solenoid with n= 2.980E+03 turns per meter is changing at a rate dI/dt=9 A/s. The solenoid is 88 cm long and has a cross-sectional diameter of 2.69 cm. A small coil consisting of N=28turns wraped in a circle of diameter 1.64 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

A. 1.498E-04 V

B. 1.647E-04 V

C. 1.812E-04 V

D. 1.993E-04 V

E. 2.193E-04 V

19. The current through the windings of a solenoid with n= 2.400E+03 turns per meter is changing at a rate dI/dt=3 A/s. The solenoid is 93 cm long and has a cross-sectional diameter of 2.13 cm. A small coil consisting of N=30turns wraped in a circle of diameter 1.35 cm is placed in the middle of the solenoid such that the plane of the coil is perpendicular to the central axis of the solenoid. Assume that the infinite-solenoid approximation is valid inside the small coil. What is the emf induced in the coil?

A. 3.885E-05 V

B. 4.274E-05 V

C. 4.701E-05 V

D. 5.171E-05 V

E. 5.688E-05 V

2.4

1. Calculate the motional emf induced along a 40.1 km conductor moving at an orbital speed of 7.85 km/s perpendicular to Earth's 5.160E-05 Tesla magnetic field.

A. 1.477E+04 V

B. 1.624E+04 V

C. 1.787E+04 V

D. 1.965E+04 V

E. 2.162E+04 V

2. Calculate the motional emf induced along a 24.9 km conductor moving at an orbital speed of 7.82 km/s perpendicular to Earth's 5.040E-05 Tesla magnetic field.

A. 8.111E+03 V

B. 8.922E+03 V

C. 9.814E+03 V

D. 1.080E+04 V

E. 1.187E+04 V

3. Calculate the motional emf induced along a 27.5 km conductor moving at an orbital speed of 7.86 km/s perpendicular to Earth's 4.520E-05 Tesla magnetic field.

A. 8.074E+03 V

B. 8.882E+03 V

C. 9.770E+03 V

D. 1.075E+04 V

E. 1.182E+04 V

4. Calculate the motional emf induced along a 42.1 km conductor moving at an orbital speed of 7.77 km/s perpendicular to Earth's 4.730E-05 Tesla magnetic field.

A. 1.279E+04 V

B. 1.407E+04 V

C. 1.547E+04 V

D. 1.702E+04 V

E. 1.872E+04 V

5. Calculate the motional emf induced along a 11.9 km conductor moving at an orbital speed of 7.8 km/s perpendicular to Earth's 4.870E-05 Tesla magnetic field.
   - A. 3.736E+03 V
   - B. 4.109E+03 V
   - **C. 4.520E+03 V**
   - D. 4.972E+03 V
   - E. 5.470E+03 V
6. Calculate the motional emf induced along a 24.7 km conductor moving at an orbital speed of 7.77 km/s perpendicular to Earth's 5.410E-05 Tesla magnetic field.
   - A. 7.801E+03 V
   - B. 8.581E+03 V
   - C. 9.439E+03 V
   - **D. 1.038E+04 V**
   - E. 1.142E+04 V
7. Calculate the motional emf induced along a 37.9 km conductor moving at an orbital speed of 7.84 km/s perpendicular to Earth's 5.410E-05 Tesla magnetic field.
   - A. 1.208E+04 V
   - B. 1.329E+04 V
   - C. 1.461E+04 V
   - **D. 1.608E+04 V**
   - E. 1.768E+04 V
8. Calculate the motional emf induced along a 50.7 km conductor moving at an orbital speed of 7.88 km/s perpendicular to Earth's 4.930E-05 Tesla magnetic field.
   - A. 1.791E+04 V
   - **B. 1.970E+04 V**
   - C. 2.167E+04 V
   - D. 2.383E+04 V
   - E. 2.622E+04 V
9. Calculate the motional emf induced along a 25.2 km conductor moving at an orbital speed of 7.72 km/s perpendicular to Earth's 4.900E-05 Tesla magnetic field.
   - A. 7.162E+03 V
   - B. 7.878E+03 V
   - C. 8.666E+03 V
   - **D. 9.533E+03 V**
   - E. 1.049E+04 V
10. Calculate the motional emf induced along a 49.5 km conductor moving at an orbital speed of 7.77 km/s perpendicular to Earth's 5.310E-05 Tesla magnetic field.
   - A. 1.395E+04 V
   - B. 1.534E+04 V

C. 1.688E+04 V

D. 1.857E+04 V

E. 2.042E+04 V

11. Calculate the motional emf induced along a 34.3 km conductor moving at an orbital speed of 7.86 km/s perpendicular to Earth's 4.780E-05 Tesla magnetic field.

A. 8.802E+03 V

B. 9.682E+03 V

C. 1.065E+04 V

D. 1.172E+04 V

E. 1.289E+04 V

12. Calculate the motional emf induced along a 30.3 km conductor moving at an orbital speed of 7.76 km/s perpendicular to Earth's 5.100E-05 Tesla magnetic field.

A. 1.090E+04 V

B. 1.199E+04 V

C. 1.319E+04 V

D. 1.451E+04 V

E. 1.596E+04 V

13. Calculate the motional emf induced along a 48.8 km conductor moving at an orbital speed of 7.88 km/s perpendicular to Earth's 4.660E-05 Tesla magnetic field.

A. 1.224E+04 V

B. 1.346E+04 V

C. 1.481E+04 V

D. 1.629E+04 V

E. 1.792E+04 V

14. Calculate the motional emf induced along a 14.1 km conductor moving at an orbital speed of 7.8 km/s perpendicular to Earth's 4.910E-05 Tesla magnetic field.

A. 3.688E+03 V

B. 4.057E+03 V

C. 4.463E+03 V

D. 4.909E+03 V

E. 5.400E+03 V

15. Calculate the motional emf induced along a 21.3 km conductor moving at an orbital speed of 7.75 km/s perpendicular to Earth's 5.320E-05 Tesla magnetic field.

A. 6.598E+03 V

B. 7.258E+03 V

C. 7.984E+03 V

D. 8.782E+03 V

E. 9.660E+03 V

16. Calculate the motional emf induced along a 46.2 km conductor moving at an orbital speed of 7.9 km/s perpendicular to Earth's 4.630E-05 Tesla magnetic field.

A. 1.536E+04 V

B. 1.690E+04 V

C. 1.859E+04 V

D. 2.045E+04 V

E. 2.249E+04 V

17. Calculate the motional emf induced along a 24.4 km conductor moving at an orbital speed of 7.79 km/s perpendicular to Earth's 4.790E-05 Tesla magnetic field.

A. 6.840E+03 V

B. 7.524E+03 V

C. 8.277E+03 V

D. 9.105E+03 V

E. 1.002E+04 V

18. Calculate the motional emf induced along a 32.1 km conductor moving at an orbital speed of 7.8 km/s perpendicular to Earth's 5.280E-05 Tesla magnetic field.

A. 1.093E+04 V

B. 1.202E+04 V

C. 1.322E+04 V

D. 1.454E+04 V

E. 1.600E+04 V

19. Calculate the motional emf induced along a 24.6 km conductor moving at an orbital speed of 7.89 km/s perpendicular to Earth's 5.180E-05 Tesla magnetic field.

A. 9.140E+03 V

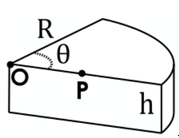
B. 1.005E+04 V

C. 1.106E+04 V

D. 1.217E+04 V

E. 1.338E+04 V

2.5

1. 

A cylinder of height 1.98 cm and radius 2.62 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 1.33 cm from point O and moves at a speed of 2.0 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

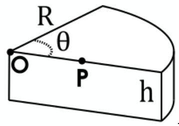
A. 6.980E+00 cm^3/s

B. 7.678E+00 cm^3/s

C. 8.446E+00 cm^3/s

D. 9.290E+00 cm^3/s

E. 1.022E+01 cm^3/s

2. 

A cylinder of height 3.5 cm and radius 5.36 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 2.79 cm from point O and moves at a speed of 3.24 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

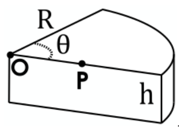
A. 5.308E+01 cm^3/s

B. 5.839E+01 cm^3/s

C. 6.422E+01 cm^3/s

D. 7.065E+01 cm^3/s

E. 7.771E+01 cm^3/s

3. 

A cylinder of height 2.58 cm and radius 9.47 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 3.62 cm from point O and moves at a speed of 4.7 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

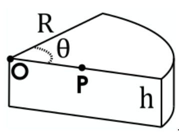
A. 1.128E+02 cm^3/s

B. 1.241E+02 cm^3/s

C. 1.365E+02 cm^3/s

D. 1.502E+02 cm^3/s

E. 1.652E+02 cm^3/s

4. 

A cylinder of height 1.3 cm and radius 6.01 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 3.61 cm from point O and moves at a speed of 2.11 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

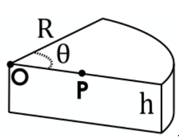
A. 1.372E+01 cm^3/s

B. 1.509E+01 cm^3/s

C. 1.660E+01 cm^3/s

D. 1.826E+01 cm^3/s

E. 2.009E+01 cm^3/s

5. 

A cylinder of height 2.63 cm and radius 6.27 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 2.35 cm from point O and moves at a speed of 2.7 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

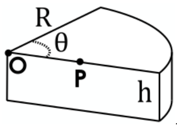
A. 4.057E+01 cm^3/s

B. 4.463E+01 cm^3/s

C. 4.909E+01 cm^3/s

D. 5.400E+01 cm^3/s

E. 5.940E+01 cm^3/s

6. 

A cylinder of height 2.12 cm and radius 2.28 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 1.52 cm from point O and moves at a speed of 8.21 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

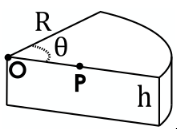
A. 2.976E+01 cm^3/s

B. 3.274E+01 cm^3/s

C. 3.601E+01 cm^3/s

D. 3.961E+01 cm^3/s

E. 4.358E+01 cm^3/s

7. 

A cylinder of height 2.42 cm and radius 6.94 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 2.59 cm from point O and moves at a speed of 4.87 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

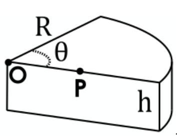
A. 9.962E+01 cm^3/s

B. 1.096E+02 cm^3/s

C. 1.205E+02 cm^3/s

D. 1.326E+02 cm^3/s

E. 1.459E+02 cm^3/s

8. 

A cylinder of height 2.94 cm and radius 5.05 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 2.37 cm from point O and moves at a speed of 7.29 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

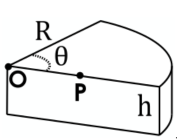
A. 1.153E+02 cm^3/s

B. 1.268E+02 cm^3/s

C. 1.395E+02 cm^3/s

D. 1.535E+02 cm^3/s

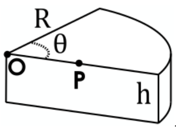
E. 1.688E+02 cm^3/s

9. 

A cylinder of height 2.15 cm and radius 7.03 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 3.83 cm from point O and moves at a speed of 5.7 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

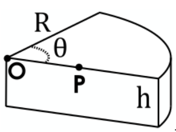
A. 6.534E+01 cm^3/s

B. 7.188E+01 cm^3/s
C. 7.907E+01 cm^3/s
D. 8.697E+01 cm^3/s
E. 9.567E+01 cm^3/s

10. 

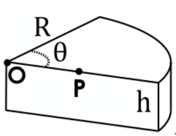
A cylinder of height 1.27 cm and radius 8.63 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 3.15 cm from point O and moves at a speed of 1.26 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

A. 1.892E+01 cm^3/s
B. 2.081E+01 cm^3/s
C. 2.289E+01 cm^3/s
D. 2.518E+01 cm^3/s
E. 2.770E+01 cm^3/s

11. 

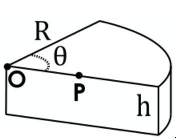
A cylinder of height 1.34 cm and radius 2.47 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 1.23 cm from point O and moves at a speed of 6.23 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

A. 1.414E+01 cm^3/s
B. 1.556E+01 cm^3/s
C. 1.711E+01 cm^3/s
D. 1.882E+01 cm^3/s
E. 2.070E+01 cm^3/s

12. 

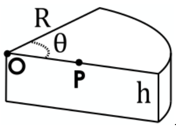
A cylinder of height 1.68 cm and radius 3.44 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 1.28 cm from point O and moves at a speed of 1.41 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

A. 7.479E+00 cm^3/s
B. 8.227E+00 cm^3/s
C. 9.049E+00 cm^3/s
D. 9.954E+00 cm^3/s
E. 1.095E+01 cm^3/s

13. 

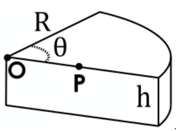
A cylinder of height 1.19 cm and radius 4.51 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 2.7 cm from point O and moves at a speed of 8.35 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

A. 3.093E+01 cm^3/s
B. 3.403E+01 cm^3/s
C. 3.743E+01 cm^3/s
D. 4.117E+01 cm^3/s
E. 4.529E+01 cm^3/s

14. 

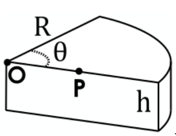
A cylinder of height 1.68 cm and radius 2.74 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 1.78 cm from point O and moves at a speed of 3.44 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

A. 8.324E+00 cm^3/s
B. 9.157E+00 cm^3/s
C. 1.007E+01 cm^3/s
D. 1.108E+01 cm^3/s
E. 1.219E+01 cm^3/s

15. 

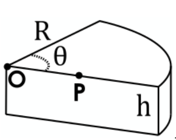
A cylinder of height 3.82 cm and radius 5.6 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 2.89 cm from point O and moves at a speed of 4.25 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

A. 7.280E+01 cm^3/s
B. 8.008E+01 cm^3/s
C. 8.808E+01 cm^3/s
D. 9.689E+01 cm^3/s
E. 1.066E+02 cm^3/s

16. 

A cylinder of height 2.91 cm and radius 8.33 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 3.7 cm from point O and moves at a speed of 9.14 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

A. 2.061E+02 cm^3/s
B. 2.267E+02 cm^3/s
C. 2.494E+02 cm^3/s
D. 2.743E+02 cm^3/s
E. 3.018E+02 cm^3/s

17. 

A cylinder of height 1.48 cm and radius 7.74 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 3.76 cm from point O and moves at a speed of 3.09 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

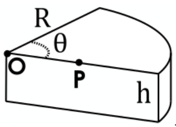
A. 3.312E+01 cm^3/s

B. 3.643E+01 cm^3/s

C. 4.008E+01 cm^3/s

D. 4.408E+01 cm^3/s

E. 4.849E+01 cm^3/s

18. 

A cylinder of height 2.25 cm and radius 6.77 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 3.27 cm from point O and moves at a speed of 4.07 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

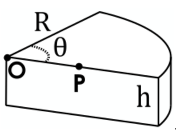
A. 5.834E+01 cm^3/s

B. 6.418E+01 cm^3/s

C. 7.059E+01 cm^3/s

D. 7.765E+01 cm^3/s

E. 8.542E+01 cm^3/s

19. 

A cylinder of height 1.69 cm and radius 4.56 cm is cut into a wedge as shown. Now imagine that the volume grows as θ increases while the radius R and height h remains constant. What is the volume's rate of change if point P is 2.33 cm from point O and moves at a speed of 4.9 cm/s? Assume that the wedge grows in such a way as the front face moves by rotating around the axis (that contains point O.)

A. 3.054E+01 cm^3/s

B. 3.359E+01 cm^3/s

C. 3.695E+01 cm^3/s

D. 4.065E+01 cm^3/s

E. 4.471E+01 cm^3/s

2.6

1. A recangular coil with an area of 0.371 m^2 and 20 turns is placed in a uniform magnetic field of 2.51 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 3.060E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 88 s?

A. 5.694E+04 V

B. 6.263E+04 V

C. 6.889E+04 V

D. 7.578E+04 V

E. 8.336E+04 V

2. A recangular coil with an area of 0.479 m^2 and 11 turns is placed in a uniform magnetic field of 1.34 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 4.200E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 38 s?

A. 2.148E+04 V

B. 2.363E+04 V

C. 2.599E+04 V

D. 2.859E+04 V

E. 3.145E+04 V

3. A recangular coil with an area of 0.39 m^2 and 16 turns is placed in a uniform magnetic field of 3.07 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 3.320E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 44 s?

   A. 3.792E+04 V

   B. 4.172E+04 V

   C. 4.589E+04 V

   D. 5.048E+04 V

   E. 5.552E+04 V

4. A recangular coil with an area of 0.137 m^2 and 18 turns is placed in a uniform magnetic field of 1.18 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 4.120E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 47 s?

   A. 1.086E+04 V

   B. 1.195E+04 V

   C. 1.314E+04 V

   D. 1.446E+04 V

   E. 1.590E+04 V

5. A recangular coil with an area of 0.219 m^2 and 14 turns is placed in a uniform magnetic field of 3.71 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 7.540E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 15 s?

   A. 2.959E+04 V

   B. 3.255E+04 V

   C. 3.581E+04 V

   D. 3.939E+04 V

   E. 4.332E+04 V

6. A recangular coil with an area of 0.449 m^2 and 20 turns is placed in a uniform magnetic field of 3.58 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 4.990E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 66 s?

   A. 7.734E+04 V

   B. 8.507E+04 V

   C. 9.358E+04 V

   D. 1.029E+05 V

   E. 1.132E+05 V

7. A recangular coil with an area of $0.157\,m^2$ and 17 turns is placed in a uniform magnetic field of 3.64 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of $5.890E+03\,s^{-1}$. What is the "magnitude" (absolute value) of the induced emf at t = 9 s?

   A. 4.464E+04 V
   B. 4.911E+04 V
   C. 5.402E+04 V
   D. 5.942E+04 V
   E. 6.536E+04 V

8. A recangular coil with an area of $0.315\,m^2$ and 20 turns is placed in a uniform magnetic field of 3.45 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of $9.480E+03\,s^{-1}$. What is the "magnitude" (absolute value) of the induced emf at t = 26 s?

   A. 1.342E+04 V
   B. 1.476E+04 V
   C. 1.624E+04 V
   D. 1.786E+04 V
   E. 1.965E+04 V

9. A recangular coil with an area of $0.23\,m^2$ and 20 turns is placed in a uniform magnetic field of 1.66 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of $1.380E+03\,s^{-1}$. What is the "magnitude" (absolute value) of the induced emf at t = 4 s?

   A. 2.317E+03 V
   B. 2.549E+03 V
   C. 2.804E+03 V
   D. 3.084E+03 V
   E. 3.393E+03 V

10. A recangular coil with an area of $0.178\,m^2$ and 17 turns is placed in a uniform magnetic field of 2.62 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of $4.380E+03\,s^{-1}$. What is the "magnitude" (absolute value) of the induced emf at t = 45 s?

    A. 1.068E+04 V
    B. 1.175E+04 V
    C. 1.293E+04 V
    D. 1.422E+04 V
    E. 1.564E+04 V

11. A recangular coil with an area of $0.412\,m^2$ and 18 turns is placed in a uniform magnetic field of 3.81 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of $2.120E+03\,s^{-1}$. What is the "magnitude" (absolute value) of the induced emf at t = 79 s?

    A. 4.465E+04 V
    B. 4.912E+04 V
    C. 5.403E+04 V

D. 5.943E+04 V

E. 6.538E+04 V

12. A recangular coil with an area of 0.815 m^2 and 11 turns is placed in a uniform magnetic field of 3.62 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 4.700E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 59 s?

    A. 1.197E+05 V

    B. 1.316E+05 V

    C. 1.448E+05 V

    D. 1.593E+05 V

    E. 1.752E+05 V

13. A recangular coil with an area of 0.432 m^2 and 16 turns is placed in a uniform magnetic field of 3.7 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 5.020E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 55 s?

    A. 1.055E+05 V

    B. 1.161E+05 V

    C. 1.277E+05 V

    D. 1.405E+05 V

    E. 1.545E+05 V

14. A recangular coil with an area of 0.446 m^2 and 13 turns is placed in a uniform magnetic field of 3.17 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 5.060E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 54 s?

    A. 1.957E+03 V

    B. 2.153E+03 V

    C. 2.368E+03 V

    D. 2.605E+03 V

    E. 2.865E+03 V

15. A recangular coil with an area of 0.897 m^2 and 8 turns is placed in a uniform magnetic field of 2.83 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 8.740E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 3 s?

    A. 4.695E+04 V

    B. 5.165E+04 V

    C. 5.681E+04 V

    D. 6.249E+04 V

    E. 6.874E+04 V

16. A recangular coil with an area of 0.45 m^2 and 18 turns is placed in a uniform magnetic field of 2.68 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 3.730E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 87 s?

A. 4.861E+04 V

B. 5.347E+04 V

C. 5.882E+04 V

D. 6.470E+04 V

E. 7.117E+04 V

17. A recangular coil with an area of 0.182 m^2 and 5 turns is placed in a uniform magnetic field of 2.74 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 2.390E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 79 s?

A. 1.656E+03 V

B. 1.821E+03 V

C. 2.003E+03 V

D. 2.204E+03 V

E. 2.424E+03 V

18. A recangular coil with an area of 0.291 m^2 and 6 turns is placed in a uniform magnetic field of 2.63 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 7.130E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 35 s?

A. 1.490E+04 V

B. 1.639E+04 V

C. 1.803E+04 V

D. 1.983E+04 V

E. 2.181E+04 V

19. A recangular coil with an area of 0.587 m^2 and 13 turns is placed in a uniform magnetic field of 1.62 T. The coil is rotated about an axis that is perpendicular to this field. At time t=0 the normal to the coil is oriented parallel to the magnetic field and the coil is rotating with a constant angular frequency of 3.800E+03 s^{-1}. What is the "magnitude" (absolute value) of the induced emf at t = 93 s?

A. 2.512E+04 V

B. 2.763E+04 V

C. 3.039E+04 V

D. 3.343E+04 V

E. 3.677E+04 V

2.7

1. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin\omega t$ where B_0 =3.26 T and ω =9.250E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.385 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

A. 6.029E+04 V

B. 6.631E+04 V

C. 7.295E+04 V

D. 8.024E+04 V

E. 8.826E+04 V

2. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.29 T and ω =4.720E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.658 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 6.420E+04 V

   B. 7.062E+04 V

   C. 7.768E+04 V

   D. 8.545E+04 V

   E. 9.400E+04 V

3. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =1.89 T and ω =1.710E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.476 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 7.262E+03 V

   B. 7.988E+03 V

   C. 8.787E+03 V

   D. 9.666E+03 V

   E. 1.063E+04 V

4. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.71 T and ω =6.600E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.31 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 4.769E+04 V

   B. 5.246E+04 V

   C. 5.771E+04 V

   D. 6.348E+04 V

   E. 6.983E+04 V

5. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =2.18 T and ω =4.840E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.387 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 1.928E+04 V

   B. 2.120E+04 V

   C. 2.332E+04 V

   D. 2.566E+04 V

   E. 2.822E+04 V

6. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.7 T and ω =8.100E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.827 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 1.416E+05 V

B. 1.557E+05 V

C. 1.713E+05 V

D. 1.884E+05 V

E. 2.073E+05 V

7. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =2.34 T and ω =2.670E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.646 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 1.905E+04 V

   B. 2.096E+04 V

   C. 2.305E+04 V

   D. 2.536E+04 V

   E. 2.790E+04 V

8. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.84 T and ω =4.410E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.379 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 3.333E+04 V

   B. 3.666E+04 V

   C. 4.033E+04 V

   D. 4.436E+04 V

   E. 4.879E+04 V

9. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.54 T and ω =1.860E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.642 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 2.415E+04 V

   B. 2.656E+04 V

   C. 2.922E+04 V

   D. 3.214E+04 V

   E. 3.535E+04 V

10. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =2.25 T and ω =8.280E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.227 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

    A. 2.657E+04 V

    B. 2.923E+04 V

    C. 3.215E+04 V

    D. 3.537E+04 V

    E. 3.890E+04 V

11. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.75 T and ω =1.740E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.417 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 1.168E+04 V
   B. 1.284E+04 V
   C. 1.413E+04 V
   D. 1.554E+04 V
   E. 1.710E+04 V

12. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.75 T and ω =9.800E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.22 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 4.198E+04 V
   B. 4.618E+04 V
   C. 5.080E+04 V
   D. 5.588E+04 V
   E. 6.147E+04 V

13. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.79 T and ω =7.280E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.668 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 7.910E+04 V
   B. 8.701E+04 V
   C. 9.571E+04 V
   D. 1.053E+05 V
   E. 1.158E+05 V

14. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =1.8 T and ω =1.530E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.519 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 7.422E+03 V
   B. 8.164E+03 V
   C. 8.981E+03 V
   D. 9.879E+03 V
   E. 1.087E+04 V

15. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =1.97 T and ω =5.410E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.244 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

   A. 1.485E+04 V
   B. 1.634E+04 V
   C. 1.797E+04 V

D. 1.977E+04 V

E. 2.175E+04 V

16. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.31 T and ω =8.360E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.547 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

A. 7.145E+04 V

B. 7.860E+04 V

C. 8.646E+04 V

D. 9.510E+04 V

E. 1.046E+05 V

17. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.58 T and ω =4.310E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.879 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

A. 7.043E+04 V

B. 7.747E+04 V

C. 8.522E+04 V

D. 9.374E+04 V

E. 1.031E+05 V

18. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =3.11 T and ω =1.150E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.171 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

A. 2.887E+03 V

B. 3.176E+03 V

C. 3.493E+03 V

D. 3.843E+03 V

E. 4.227E+03 V

19. A spatially uniform magnetic points in the z-direction and oscilates with time as $\vec{B}(t) = B_0 \sin \omega t$ where B_0 =1.71 T and ω =4.780E+03 s^{-1}. Suppose the electric field is always zero at point $\mathcal{O}$, and consider a circle of radius 0.294 m that is centered at that point and oriented in a plane perpendicular to the magnetic field. Evaluate the maximum value of the line integral $\oint \vec{E} \cdot d\vec{s}$ around the circle.

A. 1.510E+04 V

B. 1.661E+04 V

C. 1.827E+04 V

D. 2.010E+04 V

E. 2.211E+04 V

2.8

1. A long solenoid has a radius of 0.442 m and 63 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =7 A and α =22 s^{-1}.What is the induced electric fied at a distance 1.94 m from the axis at time t=0.0331 s ?
   A. 2.964E-04 V/m
   B. 3.260E-04 V/m
   C. 3.586E-04 V/m
   D. 3.945E-04 V/m
   E. 4.339E-04 V/m

2. A long solenoid has a radius of 0.521 m and 46 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =1 A and α =30 s^{-1}.What is the induced electric fied at a distance 2.42 m from the axis at time t=0.0449 s ?
   A. 2.529E-05 V/m
   B. 2.782E-05 V/m
   C. 3.060E-05 V/m
   D. 3.366E-05 V/m
   E. 3.703E-05 V/m

3. A long solenoid has a radius of 0.8 m and 77 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =5 A and α =28 s^{-1}.What is the induced electric fied at a distance 2.2 m from the axis at time t=0.0757 s ?
   A. 1.616E-04 V/m
   B. 1.778E-04 V/m
   C. 1.955E-04 V/m
   D. 2.151E-04 V/m
   E. 2.366E-04 V/m

4. A long solenoid has a radius of 0.413 m and 17 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =1 A and α =21 s^{-1}.What is the induced electric fied at a distance 2.25 m from the axis at time t=0.0689 s ?
   A. 3.006E-06 V/m
   B. 3.307E-06 V/m
   C. 3.637E-06 V/m
   D. 4.001E-06 V/m
   E. 4.401E-06 V/m

5. A long solenoid has a radius of 0.644 m and 20 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =7 A and α =27 s^{-1}.What is the induced electric fied at a distance 2.84 m from the axis at time t=0.083 s ?
   A. 3.353E-05 V/m
   B. 3.689E-05 V/m
   C. 4.058E-05 V/m
   D. 4.463E-05 V/m
   E. 4.910E-05 V/m

6. A long solenoid has a radius of 0.45 m and 35 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =1 A and α =28 s^{-1}.What is the induced electric fied at a distance 2.35 m from the axis at time t=0.0709 s ?

   A. 5.475E-06 V/m
   B. 6.023E-06 V/m
   C. 6.625E-06 V/m
   D. 7.288E-06 V/m
   E. 8.017E-06 V/m

7. A long solenoid has a radius of 0.716 m and 96 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =9 A and α =23 s^{-1}.What is the induced electric fied at a distance 2.67 m from the axis at time t=0.0226 s ?

   A. 1.426E-03 V/m
   B. 1.568E-03 V/m
   C. 1.725E-03 V/m
   D. 1.897E-03 V/m
   E. 2.087E-03 V/m

8. A long solenoid has a radius of 0.806 m and 41 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =2 A and α =21 s^{-1}.What is the induced electric fied at a distance 2.67 m from the axis at time t=0.0701 s ?

   A. 6.040E-05 V/m
   B. 6.644E-05 V/m
   C. 7.309E-05 V/m
   D. 8.039E-05 V/m
   E. 8.843E-05 V/m

9. A long solenoid has a radius of 0.786 m and 60 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =2 A and α =21 s^{-1}.What is the induced electric fied at a distance 1.98 m from the axis at time t=0.049 s ?

   A. 1.605E-04 V/m
   B. 1.766E-04 V/m
   C. 1.942E-04 V/m
   D. 2.136E-04 V/m
   E. 2.350E-04 V/m

10. A long solenoid has a radius of 0.578 m and 34 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =7 A and α =27 s^{-1}.What is the induced electric fied at a distance 2.63 m from the axis at time t=0.0462 s ?

    A. 1.473E-04 V/m
    B. 1.621E-04 V/m
    C. 1.783E-04 V/m
    D. 1.961E-04 V/m
    E. 2.157E-04 V/m

11. A long solenoid has a radius of 0.777 m and 67 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =6 A and α =20 s^{-1}.What is the induced electric fied at a distance 2.39 m from the axis at time t=0.0399 s ?

   A. 3.924E-04 V/m
   B. 4.317E-04 V/m
   C. 4.748E-04 V/m
   D. 5.223E-04 V/m
   E. 5.745E-04 V/m

12. A long solenoid has a radius of 0.434 m and 41 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =9 A and α =28 s^{-1}.What is the induced electric fied at a distance 2.28 m from the axis at time t=0.0392 s ?

   A. 1.479E-04 V/m
   B. 1.627E-04 V/m
   C. 1.789E-04 V/m
   D. 1.968E-04 V/m
   E. 2.165E-04 V/m

13. A long solenoid has a radius of 0.845 m and 65 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =6 A and α =30 s^{-1}.What is the induced electric fied at a distance 2.63 m from the axis at time t=0.0561 s ?

   A. 3.371E-04 V/m
   B. 3.709E-04 V/m
   C. 4.079E-04 V/m
   D. 4.487E-04 V/m
   E. 4.936E-04 V/m

14. A long solenoid has a radius of 0.583 m and 38 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =6 A and α =24 s^{-1}.What is the induced electric fied at a distance 2.09 m from the axis at time t=0.0388 s ?

   A. 1.655E-04 V/m
   B. 1.821E-04 V/m
   C. 2.003E-04 V/m
   D. 2.203E-04 V/m
   E. 2.424E-04 V/m

15. A long solenoid has a radius of 0.394 m and 13 turns per meter; its current decreases with time according to $I_0e^{-\alpha t}$, where I_0 =9 A and α =28 s^{-1}.What is the induced electric fied at a distance 1.8 m from the axis at time t=0.0757 s ?

   A. 2.132E-05 V/m
   B. 2.345E-05 V/m
   C. 2.579E-05 V/m
   D. 2.837E-05 V/m
   E. 3.121E-05 V/m

16. A long solenoid has a radius of 0.887 m and 43 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =7 A and α =28 s^{-1}.What is the induced electric fied at a distance 2.66 m from the axis at time t=0.0332 s ?

   A. 6.182E-04 V/m
   B. 6.801E-04 V/m
   C. 7.481E-04 V/m
   D. 8.229E-04 V/m
   E. 9.052E-04 V/m

17. A long solenoid has a radius of 0.624 m and 84 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =6 A and α =20 s^{-1}.What is the induced electric fied at a distance 1.78 m from the axis at time t=0.0579 s ?

   A. 3.597E-04 V/m
   B. 3.956E-04 V/m
   C. 4.352E-04 V/m
   D. 4.787E-04 V/m
   E. 5.266E-04 V/m

18. A long solenoid has a radius of 0.306 m and 98 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =6 A and α =22 s^{-1}.What is the induced electric fied at a distance 2.52 m from the axis at time t=0.0246 s ?

   A. 1.598E-04 V/m
   B. 1.758E-04 V/m
   C. 1.934E-04 V/m
   D. 2.127E-04 V/m
   E. 2.340E-04 V/m

19. A long solenoid has a radius of 0.757 m and 90 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =7 A and α =30 s^{-1}.What is the induced electric fied at a distance 2.08 m from the axis at time t=0.0442 s ?

   A. 6.527E-04 V/m
   B. 7.180E-04 V/m
   C. 7.898E-04 V/m
   D. 8.688E-04 V/m
   E. 9.556E-04 V/m

2.9

1. A long solenoid has a radius of 0.508 m and 90 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =7 A and α =25 s^{-1}.What is the induced electric fied at a distance 0.145 m from the axis at time t=0.0643 s ?

   A. 2.614E-04 V/m
   B. 2.875E-04 V/m
   C. 3.163E-04 V/m
   D. 3.479E-04 V/m
   E. 3.827E-04 V/m

2. A long solenoid has a radius of 0.732 m and 55 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =9 A and α =25 s^{-1}.What is the induced electric fied at a distance 0.203 m from the axis at time t=0.0448 s ?

    A. 5.150E-04 V/m

    B. 5.665E-04 V/m

    C. 6.232E-04 V/m

    D. 6.855E-04 V/m

    E. 7.540E-04 V/m

3. A long solenoid has a radius of 0.682 m and 38 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =2 A and α =27 s^{-1}.What is the induced electric fied at a distance 0.16 m from the axis at time t=0.0736 s ?

    A. 2.571E-05 V/m

    B. 2.828E-05 V/m

    C. 3.111E-05 V/m

    D. 3.422E-05 V/m

    E. 3.764E-05 V/m

4. A long solenoid has a radius of 0.887 m and 45 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =3 A and α =25 s^{-1}.What is the induced electric fied at a distance 0.169 m from the axis at time t=0.072 s ?

    A. 4.896E-05 V/m

    B. 5.385E-05 V/m

    C. 5.924E-05 V/m

    D. 6.516E-05 V/m

    E. 7.168E-05 V/m

5. A long solenoid has a radius of 0.845 m and 78 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =3 A and α =20 s^{-1}.What is the induced electric fied at a distance 0.214 m from the axis at time t=0.0655 s ?

    A. 1.160E-04 V/m

    B. 1.276E-04 V/m

    C. 1.403E-04 V/m

    D. 1.544E-04 V/m

    E. 1.698E-04 V/m

6. A long solenoid has a radius of 0.851 m and 12 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =3 A and α =30 s^{-1}.What is the induced electric fied at a distance 0.14 m from the axis at time t=0.0531 s ?

    A. 1.319E-05 V/m

    B. 1.451E-05 V/m

    C. 1.596E-05 V/m

    D. 1.756E-05 V/m

    E. 1.932E-05 V/m

7. A long solenoid has a radius of 0.447 m and 85 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =7 A and α =23 s^{-1}.What is the induced electric fied at a distance 0.212 m from the axis at time t=0.0819 s ?

   A. 1.893E-04 V/m

   B. 2.082E-04 V/m

   C. 2.290E-04 V/m

   D. 2.519E-04 V/m

   E. 2.771E-04 V/m

8. A long solenoid has a radius of 0.596 m and 19 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =5 A and α =29 s^{-1}.What is the induced electric fied at a distance 0.209 m from the axis at time t=0.0604 s ?

   A. 6.277E-05 V/m

   B. 6.904E-05 V/m

   C. 7.595E-05 V/m

   D. 8.354E-05 V/m

   E. 9.190E-05 V/m

9. A long solenoid has a radius of 0.645 m and 37 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =9 A and α =23 s^{-1}.What is the induced electric fied at a distance 0.189 m from the axis at time t=0.0698 s ?

   A. 1.372E-04 V/m

   B. 1.509E-04 V/m

   C. 1.660E-04 V/m

   D. 1.826E-04 V/m

   E. 2.009E-04 V/m

10. A long solenoid has a radius of 0.857 m and 58 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =1 A and α =21 s^{-1}.What is the induced electric fied at a distance 0.144 m from the axis at time t=0.0898 s ?

   A. 1.256E-05 V/m

   B. 1.382E-05 V/m

   C. 1.520E-05 V/m

   D. 1.672E-05 V/m

   E. 1.839E-05 V/m

11. A long solenoid has a radius of 0.436 m and 87 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =4 A and α =27 s^{-1}.What is the induced electric fied at a distance 0.153 m from the axis at time t=0.02 s ?

   A. 4.785E-04 V/m

   B. 5.264E-04 V/m

   C. 5.790E-04 V/m

   D. 6.369E-04 V/m

   E. 7.006E-04 V/m

12. A long solenoid has a radius of 0.793 m and 45 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =2 A and α =29 s^{-1}.What is the induced electric fied at a distance 0.216 m from the axis at time t=0.0208 s ?

    A. 1.456E-04 V/m
    B. 1.601E-04 V/m
    C. 1.762E-04 V/m
    D. 1.938E-04 V/m
    E. 2.132E-04 V/m

13. A long solenoid has a radius of 0.517 m and 23 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =1 A and α =30 s^{-1}.What is the induced electric fied at a distance 0.162 m from the axis at time t=0.0679 s ?

    A. 6.256E-06 V/m
    B. 6.882E-06 V/m
    C. 7.570E-06 V/m
    D. 8.327E-06 V/m
    E. 9.160E-06 V/m

14. A long solenoid has a radius of 0.861 m and 28 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =1 A and α =20 s^{-1}.What is the induced electric fied at a distance 0.106 m from the axis at time t=0.055 s ?

    A. 1.026E-05 V/m
    B. 1.129E-05 V/m
    C. 1.242E-05 V/m
    D. 1.366E-05 V/m
    E. 1.502E-05 V/m

15. A long solenoid has a radius of 0.749 m and 62 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =9 A and α =25 s^{-1}.What is the induced electric fied at a distance 0.139 m from the axis at time t=0.071 s ?

    A. 2.065E-04 V/m
    B. 2.271E-04 V/m
    C. 2.499E-04 V/m
    D. 2.748E-04 V/m
    E. 3.023E-04 V/m

16. A long solenoid has a radius of 0.591 m and 41 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =1 A and α =30 s^{-1}.What is the induced electric fied at a distance 0.234 m from the axis at time t=0.0208 s ?

    A. 6.618E-05 V/m
    B. 7.280E-05 V/m
    C. 8.008E-05 V/m
    D. 8.809E-05 V/m
    E. 9.689E-05 V/m

17. A long solenoid has a radius of 0.603 m and 51 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =2 A and α =26 s^{-1}.What is the induced electric fied at a distance 0.105 m from the axis at time t=0.0659 s ?

    A. 2.154E-05 V/m

    B. 2.369E-05 V/m

    C. 2.606E-05 V/m

    D. 2.867E-05 V/m

    E. 3.154E-05 V/m

18. A long solenoid has a radius of 0.613 m and 75 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =2 A and α =22 s^{-1}.What is the induced electric fied at a distance 0.206 m from the axis at time t=0.0387 s ?

    A. 1.370E-04 V/m

    B. 1.507E-04 V/m

    C. 1.657E-04 V/m

    D. 1.823E-04 V/m

    E. 2.005E-04 V/m

19. A long solenoid has a radius of 0.442 m and 41 turns per meter; its current decreases with time according to $I_0 e^{-\alpha t}$, where I_0 =4 A and α =20 s^{-1}.What is the induced electric fied at a distance 0.2 m from the axis at time t=0.0833 s ?

    A. 6.438E-05 V/m

    B. 7.082E-05 V/m

    C. 7.790E-05 V/m

    D. 8.569E-05 V/m

    E. 9.426E-05 V/m

3 Attribution

Notes

[1]Example 13.1 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:BTZF6vX4@2/131-Faradays-Law_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx

[2]Example 13.2 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:ZNcjduzK@4/132-Lenzs-Law_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx

[3]Example 13.3 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:ZNcjduzK@4/132-Lenzs-Law_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx

[4]Example 13.3 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:ZNcjduzK@4/132-Lenzs-Law_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx

[5]Example 13.5 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:UbKygyP4@2/133-Motional-Emf_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx

[6]Example 13.6 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:UbKygyP4@2/133-Motional-Emf_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx

[7]Example 13.7 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:F-UkvfQz@3/134-Induced-Electric-Fields_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx

[8]Example 13.8 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:F-UkvfQz@3/134-Induced-Electric-Fields_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx

[9]Example 13.8 from OpenStax University Physics2: https://cnx.org/contents/eg-XcBxE@9.7:F-UkvfQz@3/134-Induced-Electric-Fields_1 placed in Public Domain by Guy Vandegrift: https://en.wikiversity.org/wiki/special:permalink/xxx