Final exam Term-992

Q1 Q0 Ocean waves, with a wavelength of 12 m, are coming in at a
16 Q0 rate of 20 crests per minute. What is their speed?
Q0
A1 4.0 m/s
A2 8.0 m/s
A3 24 m/s
A4 30 m/s
A5 16 m/s
Q0
Q2 Q0 By what factor will the intensity of a sound wave change if
17 Q0 the sound level is increased by 3 dB?
Q0
A1 2
A2 9
A3 3
A4 4
A5 1000
Q0
Q3 Q0 The path difference between two waves is 5 m. If the
18 Q0 wavelength of the waves emitted by the two sources is 4 m,
Q0 what is the phase difference (in degrees)?
Q0
A1 450
A2 75
A3 180
A4 45
A5 320
Q0
Q4 Q0 A gold ring has a diameter of 2.168 cm at a temperature
19 Q0 of 15 degree-C. Determine its diameter when the temperature
Q0 is 215 degree-C.(alpha of gold = 1.42*10**(-5) /C-degree.)
Q0
A1 2.174 cm
A2 3.185 cm
A3 3.514 cm
A4 2.397 cm
A5 50.16 cm
Q0
Q5 Q0 The work done in the expansion of a gas from an initial to
20 Q0 a final state
Q0
A1 is the area under the curve of a PV diagram.
A2 depends only on the end points.
A3 is the slope of a PV curve.
A4 always equals P*(Vf - Vi).
A5 is negative.
Q0
Q6 Q0 One gram of water is heated from 0 degree-C to 80 degree-C
20 Q0 at a constant pressure of 1 atm. Determine the change in
Q0 internal energy of the water. Neglect the change in volume
Q0 of the water. (Cwater = 4186 J/kg*K.)
Q0
A1 80 cal
A2 100 cal

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   A3 180 cal
   A4 50  cal
   A5 250 cal
   Q0
Q7 Q0 The air in an automobile engine at 20 degree-C is
21 Q0 compressed from an initial pressure of 1 atm and a volume
   Q0 of 200 cm**3 to a final volume of 20 cm**3. Find the final
   Q0 temperature if the air behaves like an ideal gas
   Q0 (gamma = 1.4) and the compression is adiabatic.
   Q0
   A1 463 degree-C
   A2 526 degree-C
   A3 10  degree-C
   A4 50  degree-C
   A5 20  degree-C
   Q0
Q8 Q0 Assume an ideal gas expands adiabatically.
21 Q0 Which one of the following statements is TRUE.
   Q0
   A1 the temperature of the gas decreases.
   A2 the temperature of the gas increases.
   A3 the pressure of the gas increases.
   A4 the pressure of the gas remains constant.
   A5 the internal energy of the gas remains constant.
   Q0
Q9 Q0 An 800-MW electric power plant has an efficiency of 31%.
22 Q0 How much heat is lost to the atmosphere per second?
   Q0
   A1 1781  MJ
   A2 2677  MJ
   A3 807   MJ
   A4 544   MJ
   A5 260   MJ
   Q0
Q10Q0 A 40 micro-C charge is positioned on the x axis at
23 Q0 x = 4.0 cm. In order to produce a net electric field of zero
   Q0 at the origin, where, on the x-axis, should a -60 micro-C
   Q0 charge be placed?
   Q0
   A1  4.9 cm
   A2  5.7 cm
   A3 -5.3 cm
   A4 -6.0 cm
   A5  6.0 cm
   Q0
Q11Q0 A proton enters a region of uniform electric field
23 Q0 (E  = 80 N/C) with an initial velocity of 20 km/s directed
   Q0 perpendicularly to the electric field. What is the speed
   Q0 of the proton 2.0 micro-seconds after entering this region?
   Q0
   A1 25  km/s
   A2 35  km/s
   A3 4.7 km/s
   A4 15  km/s
   A5 42  km/s
   Q0
Q12Q0 Two infinite non-conducting parallel surfaces carry uniform
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24 Q0 charge densities of 0.20 nano-C/m**2 and -0.60 nano-C/m**2.
Q0 What is the magnitude of the electric field at a point
Q0 between the two surfaces?
Q0
A1 45 N/C
A2 23 N/C
A3 34 N/C
A4 17 N/C
A5 90 N/C
Q0
Q13Q0 A 4.0 nano-C point charge is located at the origin, and a
25 Q0 second point charge (-5.0 nano-C) is placed on the y axis
Q0 at y = 60 cm. If point A is at (45 cm, 0) and point B is at
Q0 (80 cm, 0), what is the potential difference between points
Q0 A and B (VA - VB)?
Q0
A1 20 V
A2 30 V
A3 17 V
A4 40 V
A5 zero
Q0
Q14Q0 A 30 micro-F capacitor charged to 3.0 V and a 50 micro-F
26 Q0 capacitor charged to 4.0 V are connected to each other,
Q0 positive plate to positive plate and negative to negative.
Q0 What is the charge on the 50 micro-F capacitor after the
Q0 two are so connected and equilibrium is reached?
Q0
A1 181 micro-C
A2 109 micro-C
A3 290 micro-C
A4 320 micro-C
A5 157 micro-C
Q0
Q15Q0 An electric device, which heats water by immersing a
27 Q0 resistance wire in the water, generates 300 J of heat per
Q0 second when an electric potential difference of 12 V is
Q0 placed across its ends. What is the resistance of the
Q0 heater wire?
Q0
A1 0.48 Ohms
A2 0.81 Ohms
A3 0.58 Ohms
A4 0.94 Ohms
A5 2.1 Ohms
Q0
Q16Q0 Calculate the voltage E of the battery shown in Figure 1.
28 Q0
A1 20 V
A2 30 V
A3 40 V
A4 10 V
A5 50 V
Q0
Q17Q0 The light bulbs in the circuit of Figure 2 are identical.
28 Q0 When the switch S is closed, then:
Q0

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   A1 nothing changes to the intensity of the light bulbs.
   A2 both light bulbs turn off.
   A3 the intensity of light bulb A increases while the intensity
   A3 of light bulb B decreases.
   A4 the intensity of light bulb B increases while the intensity
   A4 of light bulb A decreases.
   A5 the intensities of both light bulbs increase.
   Q0
Q18Q0 The circuit in Figure 3 has been connected for a long time.
28 Q0 Find the potential difference Vb - Va.
   Q0
   A1 8  V
   A2 2  V
   A3 6  V
   A4 10 V
   A5 12 V
   Q0
Q19Q0 A 4.00 micro-F capacitor is charged to 24.0 V. Find the
28 Q0 charge on the capacitor 4.00 milli-seconds after it is
   Q0 connected across a 200-Ohm resistor.
   Q0
   A1 0.647 micro-C
   A2 0.324 micro-C
   A3 100   micro-C
   A4 15.5  micor-C
   A5 2.45  micro-C
   Q0
Q20Q0 An electron enters a region of magnetic field B = (0.40 i) T
29 Q0 with a velocity v = (3.0*10**4 i + 2.0*10**5 j) m/s.
   Q0 (i, j and k are the unit vectors in x, y and z directions,
   Q0 respectively).
   Q0 The magnetic force that the electron experiences is:
   Q0
   A1 ( 1.3*10**(-14)  k)   N
   A2 (-1.3*10**(-14)  k)   N
   A3 ( 1.9*10**(-15)  i)   N
   A4 (-1.9*10**(-15)  i)   N
   A5 zero
   Q0
Q21Q0 An electron moving perpendicular to a 50 micro-T magnetic
29 Q0 field, goes through a circular trajectory. What is the time
   Q0 required to complete one revolution?
   Q0
   A1 715  nano-seconds
   A2 420  nano-seconds
   A3 420  micro-seconds
   A4 840  micro-seconds
   A5 150  nano-seconds
   Q0
Q22Q0 Which one of the following statements is WRONG?
29 Q0
   A1 A magnetic force acting on a moving negatively charged
   A1 particle is always anti-parallel to its direction of motion.
   A2 It is impossible to isolate magnetic monopoles.
   A3 The SI units of the magnetic moment is A*(m**2).
   A4 The work done by the magnetic force on a charge moving
   A4 with a speed v in a static magnetic field B is always zero.
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   A5 The total magnetic force on any closed current loop in a
   A5 uniform magnetic field is zero.
   Q0
Q23Q0 A current of 17 mA is maintained in a circular loop of 2 m
29 Q0 circumference which is parallel to the y-z plane
   Q0 (see Figure 4). A magnetic field B = (- 0.8 k) T is applied.
   Q0  Calculate the torque exerted on the loop by the magnetic
   Q0 field. (i, j and k are the unit vectors in x, y and z
   Q0 directions, respectively).
   Q0
   A1 ( 4.33*10**(-3) j)  N*m
   A2 (-4.33*10**(-3) j)  N*m
   A3 ( 2.27*10**(-2) i)  N*m
   A4 (-2.27*10**(-2) i)  N*m
   A5 ( 3.54*10**(-3) k)  N*m
   Q0
Q24Q0 A segment of wire is formed into the shape shown in Figure 5
30 Q0 and carries a current I = 1.0 A. What is the magnitude of
   Q0 the resulting magnetic field at the point P if R = 10 cm?
   Q0
   A1 5.5 micro-T   into the page
   A2 5.5 micro-T   out of the page
   A3 1.8 micro-T   out of the page
   A4 1.8 micro-T   into the page
   A5 2.6 micro-T   out of the page
   Q0
Q25Q0 A 500 turns solenoid is 30 cm long, has a radius of 0.5 cm
30 Q0 and carries a current of 2.0 A. The magnitude of the
   Q0 magnetic field at the center of the solenoid is:
   Q0
   A1 4.2*10**(-3) T
   A2 9.9*10**(-8) T
   A3 1.3*10**(-3) T
   A4 5.6*10**(-8) T
   A5 8.2*10**(-3) T
   Q0
Q26Q0 Two long wires parallel to the x-axis carry currents I1 and
30 Q0 I2 as shown in Figure 6. If I1 = 5 A, what is the magnitude
   Q0 and direction of I2 if the net magnetic field at the origin
   Q0 is 0.35 micro-T and directed out the page.
   Q0
   A1 1 A   to the left
   A2 1 A   to the right
   A3 5 A   to the left
   A4 5 A   to the right
   A5 2 A   to the right
   Q0
Q27Q0 What must be the radius R of a long current-carrying wire
30 Q0 if the magnetic field at r1 = 2.0 cm (inside the wire) is
   Q0 equal to three times the magnetic field at r2 = 8.0 cm
   Q0 (outside the wire).
   Q0
   A1 2.3  cm
   A2 3.8  cm
   A3 5.2  cm
   A4 4.4  cm
   A5 7.3  cm
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   Q0
Q28Q0 A uniform magnetic field B = (2.0 i + 4.0 j + 5.0 k) T
30 Q0 intersects a circular surface of radius 2 cm lying in the
   Q0 yz plane. What is the magnetic flux through this surface?
   Q0
   A1 2.5*10**(-3)  T*m**2
   A2 5.0*10**(-3)  T*m**2
   A3 6.3*10**(-3)  T*m**2
   A4 8.4*10**(-3)  T*m**2
   A5 zero
   Q0
Q29Q0
31 Q0 A single turn plane loop of wire of cross sectional area
   Q0 40 cm**2 is perpendicular to a magnetic field that increases
   Q0 uniformly in magnitude from 0.5 T to 5.5 T in 2.0 seconds.
   Q0 What is the resistance of the wire if the induced current
   Q0 has a value of 1.0 mA.
   Q0
   A1 10  Ohms
   A2 20  Ohms
   A3 30  Ohms
   A4 40  Ohms
   A5 50  Ohms
   Q0
Q30Q0 Figure 7 shows a conducting bar moving with a constant
31 Q0 speed of 5.0 m/s to the right. Assume that R = 5.0 Ohms,
   Q0 L = 0.20 m, and that a uniform magnetic field of 3.5 T is
   Q0 directed into the page. Calculate the magnitude of the
   Q0 applied force pulling the bar.(Neglect the mass of the bar.)
   Q0
   A1 0.49  N
   A2 0.92  N
   A3 0.25  N
   A4 1.5   N
   A5 0.73  N
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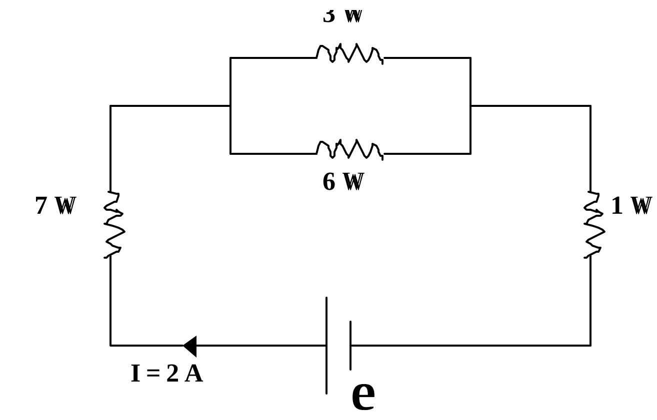

FIGURE 1

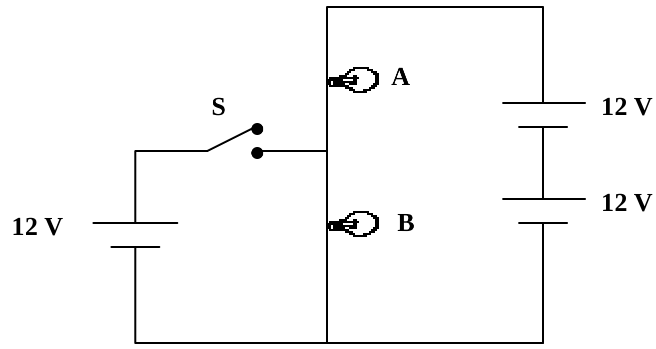

FIGURE 2

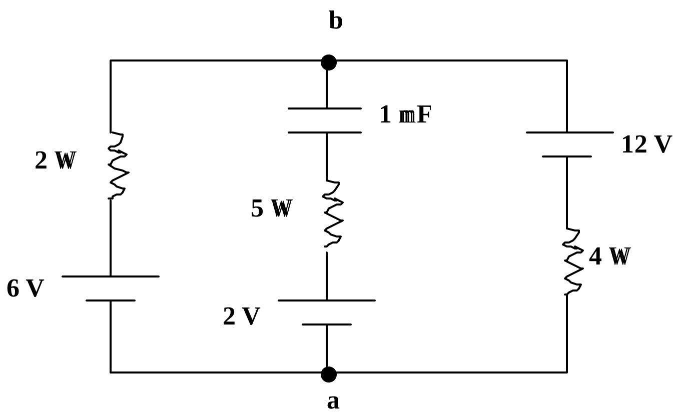

FIGURE 3

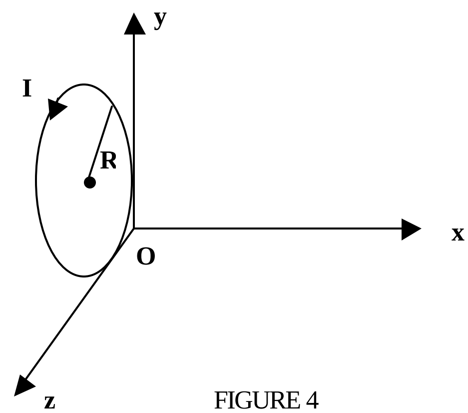

FIGURE 4

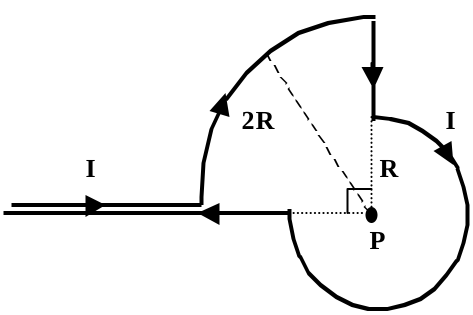

FIGURE 5

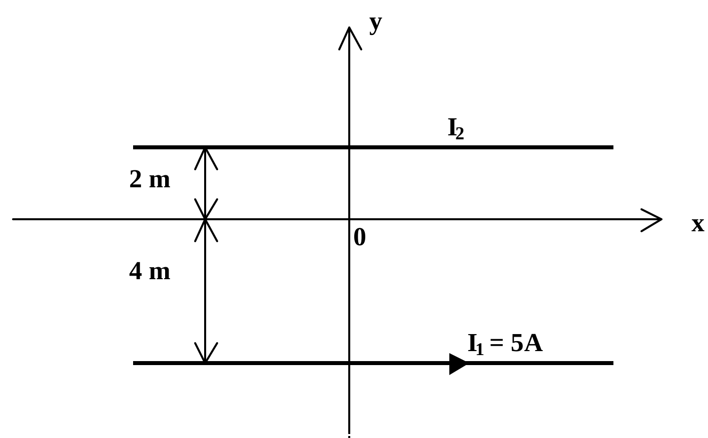

FIGURE 6

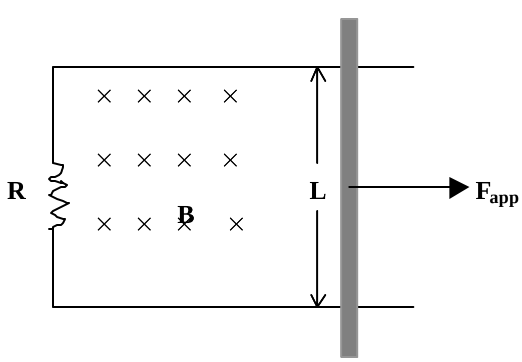

FIGURE 7

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