Final T-041 (Answer is A1)

1 Q0 The tension in a 60 m telephone wire is 800 N. A pulse initiated
 17Q0 at one end of the wire is found to reach the other end in 1.5 s.
041Q0 What is the mass of the wire?
   Q0
   A1 30 kg.
   A2 60 kg.
   A3 15 kg.
   A4 40 kg.
   A5 50 kg.
   Q0
2 Q0 The intensity level of sound from 10 persons each of intensity
 18Q0 level 60 dB is
041Q0
   Q0
   A1 70 dB.
   A2 600 dB.
   A3 120 dB.
   A4 300 dB.
   A5 12 dB.
   Q0
3 Q0 Air is injected from a cylinder of compressed air into a
 19Q0 spherical balloon of initial volume V, causing its diameter
041Q0 to double. What is the work done at constant pressure P?
   Q0
   A1   7.0*P*V.
   A2   8.0*P*V.
   A3   1.0*P*V.
   A4   3.0*P*V.
   A5   4.0*P*V.
   Q0
4 Q0 The temperature difference of 45 Celsius degrees is equivalent to
 19Q0
041Q0
   A1   81 Fahrenheit degrees.
   A2   81 Kelvin.
   A3   25 Fahrenheit degrees.
   A4   25 Kelvin.
   A5   11 Fahrenheit degrees.
   Q0
5 Q0 The wall of a home is 0.2 m thick, 2.0 m high, 10 m wide and
 19Q0 has a thermal conductivity of 0.4 watt/m/K. If the inside
041Q0 temperature is 15 degrees Celsius and the outside temperature
   Q0 is -5.0 degrees Celsius, how much energy is lost in 12 hours?
   Q0
   A1   3.4*10**7 J.
   A2   4.5*10**6 J.
   A3   4.5*10**5 J.
   A4   4.5*10**6 J.
   A5   2.7*10**7 J.
   Q0
6 Q0 The average translational kinetic energy of the molecules of
20 Q0 an ideal gas in a closed, rigid container is increased by a
41 Q0 factor of 4. What happens to the pressure of the gas?
   Q0
   A1   it increases by a factor of 4.

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   A2   it increases by a factor of 8.
   A3   it decreases by a factor of 8.
   A4   it remains the same.
   A5   it decreases by a factor of 4.
   Q0
7  Q0 A sample of an ideal gas exerts a pressure of 60 Pa when its
20 Q0 temperature is 400 K and the number of molecules present per
041Q0 unit volume is n. A second sample of the same gas exerts a
   Q0 pressure of 30 Pa when its temperature is 300 K. How many
   Q0 molecules are present per unit volume of the second sample?
   Q0
   A1  2*n/3
   A2  3*n/2
   A3  n/3
   A4  n/2
   A5  5*n/3
   Q0
8  Q0 What is the coefficient of performance of an ideal
21 Q0 refrigerator if the temperatures of the two reservoirs are
041Q0 –10 degrees Celsius and 27 degrees Celsius.
   Q0
   A1  7.1
   A2  6.5
   A3  8.0
   A4  0.5
   A5  1.5
   Q0
9  Q0 Two small charges (q1 =1.0*10**(-8) C and q2 =-4.0*10**(-8) C)
   Q0 move from an initial separation of 0.02 m to a final separation
25 Q0 of 0.01 m. The change in their electrical potential energy is
041Q0
   A1  -1.8*10**(-4) J.
   A2   1.8*10**(-4) J.
   A3  -3.2*10**(-4) J.
   A4   3.2*10**(-4) J.
   A5  -2.7*10**(-4) J.
   Q0
10 Q0 An electrons are accelerated by a potential difference of
   Q0 2000 Volts. If this potential difference is increased to
25 Q0 8000 Volts, the speed of the electron will be increased by
041Q0 a factor of
   Q0
   A1  2
   A2  4
   A3  3
   A4  8
   A5  1.5
   Q0
11 Q0 Kirchoff’s two laws for electric circuits can be derived by
28 Q0 using certain conservation laws. On which conservation laws
41 Q0 do Kirchoff’s laws depend?
   Q0
   A1   charge  ; energy.
   A2   current ; charge.
   A3   mass    ; energy.
   A4   charge  ; mass.
   A5   current ; angular momentum.
   Q0
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12 Q0 The current in single-loop circuit is 5.0 A. When an additional
28 Q0 resistance of 2.0 Ohm is added in series, the current drops to
41 Q0 4.0 A. What was the resistance in the original circuit?
Q0
A1 8.0 Ohm.
A2 6.0 Ohm.
A3 4.0 Ohm.
A4 2.0 Ohm.
A5 1.0 Ohm.
Q0
13 Q0 Three wires are joined together at a junction. A 0.40-A current
28 Q0 flows toward the junction from one wire and a 0.3-A current
41 Q0 flows away from the junction in the second wire. The current in
Q0 the third wire is
Q0
A1 0.10-A, away from the junction.
A2 0.10-A, toward the junction.
A3 0.70-A, away from the junction.
A4 0.30-A, toward the junction.
A5 0.70-A, toward the junction.
Q0
14 Q0 An electrical source with internal resistance r = 2.0 Ohm is used
28 Q0 to operate a lamp of resistance R = 18 Ohm. What fraction of the
41 Q0 total power is delivered to the lamp?
Q0
A1 0.9.
A2 1.8.
A3 0.8.
A4 0.2.
A5 0.5.
Q0
15 Q0 In the circuit shown in figure 1, calculate potential
28 Q0 difference VB-VA. The points A, B and C are three junctions.
41 Q0 [Take the current I=2.0 A]
Q0
A1 8.0 V.
A2 12 V.
A3 9.0 V.
A4 7.0 V.
A5 11 V.
Q0
16 Q0 A capacitor of capacitance C is discharging through a resistor
28 Q0 of resistance R. In terms of RC, when will the energy stored in
41 Q0 the capacitor reduces to one fifth of its initial value?
Q0
A1 0.80 RC.
A2 0.35 RC.
A3 0.70 RC.
A4 1.20 RC.
A5 0.55 RC.
Q0
17 Q0 In figure 5, an electron moves toward the west at speed of
29 Q0 1.0*10**7 m/s in a downward (normal into the page) uniform
41 Q0 magnetic field of 3.0*10**(-4) T. The magnetic force on the
Q0 electron is
Q0
A1 4.8*10**(-16), north.
A2 4.8*10**(-16), south.

A3 4.8*10**(-16), west.
A4 1.6*10**(-16), north.
A5 1.6*10**(-16), south.
Q0
18 Q0 A circular area with a radius of 8.0 cm lies in the xy-plane.
29 Q0 What is the magnitude of the magnetic flux through this circle
41 Q0 due to a uniform magnetic field of 0.5 T at an angle of
Q0 30 degrees from the positive z-axis?.
Q0
A1 8.7*10**(-3) Wb.
A2 4.3*10**(-3) Wb.
A3 1.1*10**(-3) Wb.
A4 2.3*10**(-3) Wb.
A5 zero.
Q0
19 Q0 An electron is accelerated by a potential difference of 2.0 kV.
29 Q0 Then it passes normally through a region of magnetic field,
41 Q0 where it moves in a circular path with radius 0.2 m. What is
Q0 the magnitude of the magnetic field?
Q0
A1 7.5*10**(-4) T.
A2 2.1*10**(-4) T.
A3 6.0*10**(-4) T.
A4 3.2*10**(-4) T.
A5 0.4*10**(-4) T.
Q0
20 Q0 The plane of area 4.0 cm**2 rectangular loop of wire is parallel
29 Q0 to a 2.0 T magnetic field. The loop carries a current of 6.0 A.
41 Q0 Calculate the magnitude of the torque acts on the loop.
Q0
A1 4.8*10**(-3) N*m.
A2 1.0*10**(-3) N*m.
A3 3.6*10**(-3) N*m.
A4 2.4*10**(-3) N*m.
A5 zero.
Q0
21 Q0 A charged particle is placed in a region of space and it
29 Q0 experiences a force only when it is in motion. It can be
41 Q0 conclude that the region encloses
Q0
A1 A magnetic field only.
A2 An electric field only.
A3 Both a magnetic field and an electric field.
A4 Both a magnetic field and a gravitational field.
A5 Both a gravitational field and an electric field.
Q0
22 Q0 An electric field and a magnetic field normal to each other.
Q0 The electric field is 4.0 kV/m and the magnetic field strength
29 Q0 is 2.0 mT. They are act on a moving electron to produce no
41 Q0 force, calculate the electron speed.
Q0
A1 2.0*10**6 m/s.
A2 3.0*10**9 m/s.
A3 1.2*10**6 m/s.
A4 5.2*10**7 m/s.
A5 8.0*10**6 m/s.
Q0
23 Q0 Two long wires are parallel to the z-axis as shown in figure 2.

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30 Q0 Find the resultant magnetic field at the origin, given that the
41 Q0 wires carry equal current I and moves in the same direction.
   Q0 [Take I= 1.0 A and a=0.5 m]
   Q0
   A1   Zero.
   A2   8.0*10**(-4) Tesla, In the negative x-direction.
   A3   3.2*10**(-3) Tesla, In the positive z-direction.
   A4   3.2*10**(-4) Tesla, In the positive z-direction.
   A5   8.0*10**(-7) Tesla, In the positive x-direction.
   Q0
24 Q0 A solenoid has length L=2.0 m and diameter d=4.0 cm, and it
30 Q0 carries a current I=6.0 A. It consists of seven closed packed
41 Q0 layers, each with 90 turns along length L. What is B at its
   Q0 center?
   Q0
   A1   2.4*10**(-3) Tesla.
   A2   8.0*10**(-7) Tesla.
   A3   3.5*10**(-3) Tesla.
   A4   5.0*10**(-3) Tesla.
   A5   8.0*10**(-4) Tesla.
   Q0
25 Q0 Two infinite parallel wires are separated by 2.5 cm and carry
30 Q0 current 10 A and 12 A in the same direction. What is the force
41 Q0 per unit length on each wire?
   Q0
   A1   1.0*10**(-3) N/m, attraction.
   A2   1.0*10**(-3) N/m, repulsive.
   A3   0.5*10**(-3) N/m, attraction.
   A4   0.5*10**(-3) N/m, repulsive.
   A5   2.0*10**(-3) N/m, attraction.
   Q0
26 Q0 Part of a long, flexible, current-carrying wire is made into a
30 Q0 circular loop, while the rest of it lies in a straight line as
41 Q0 shown in figure 3. What is the magnetic field strength at point
   Q0 C, the center of the loop?
   Q0 [Take I= 1.0 A and a=0.5 m]
   Q0
   A1   1.7*10**(-6) T, out of the page.
   A2   1.7*10**(-6) T, into the page.
   A3   3.4*10**(-6) T, into the page.
   A4   3.4*10**(-6) T, out of the page.
   A5   zero.
   Q0
27 Q0 Figure 4 shows four circular loops concentric with a wire whose
30 Q0 current is directed out of the page. The current is uniform
41 Q0 across the cross section of the wire. Rank the loops according
   Q0 to the magnitude of the enclosed current, greatest first
   Q0 [loops a and b inside the wires, c and d are outside]
   Q0
   A1   d = c > b > a.
   A2   d > c > b > a.
   A3   a > c > b > d.
   A4   a > c > b > d.
   A5   a = b > c > d.
   Q0
28 Q0 A proton is moving along the axis of a solenoid carrying a
30 Q0 current. Which of the following statement is CORRECT about
41 Q0 the magnetic force acting on the proton?
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Q0
A1 No force acts.
A2 The force acts radially inwards.
A3 The force acts radially outwards.
A4 The force acts in the direction of motion.
A5 The force acts in the opposite direction of motion.
Q0
29 Q0 A circular wire loop, of an area 0.10 m**2, is initially
31 Q0 oriented so that its plane is perpendicular to a 0.40 T magnetic
41 Q0 field. When the loop is rotated so that its plane is parallel to
Q0 the field, a 25 V average potential difference is induced across
Q0 the loop. The time (in seconds) required to make this rotation
Q0 of the loop is
Q0
A1 1.6*10**(-3).
A2 4.5*10**(-3).
A3 1.2*10**(-3).
A4 3.3*10**(-3).
A5 1.0*10**(-3).
Q0
30 Q0 A 2.0 m long copper wire, with resistance 5.0 Ohm, is formed
31 Q0 into a square loop and placed perpendicular to a uniform
41 Q0 magnetic field that is increasing at the constant rate of
Q0 10.0 mT/s, at what rate is thermal energy generated in the loop?
Q0
A1 1.3*10**(-6) W.
A2 4.5*10**(-6) W.
A3 3.2*10**(-3) W.
A4 2.1*10**(-4) W.
A5 0.1*10**(-6) W.

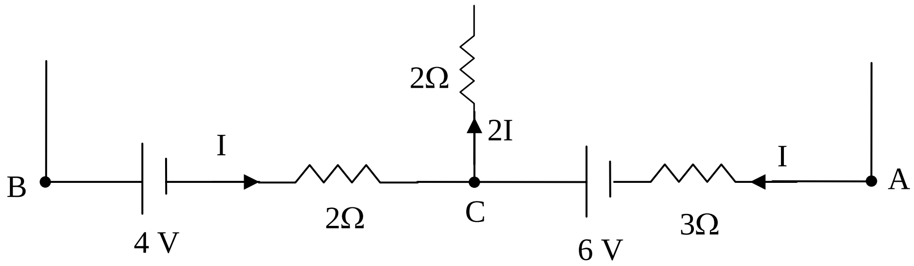

Figure (1)

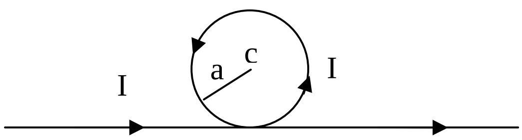

Figure (3)

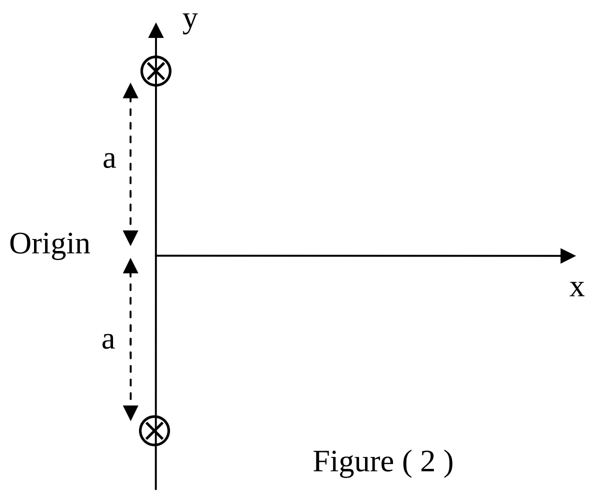

Figure (2)

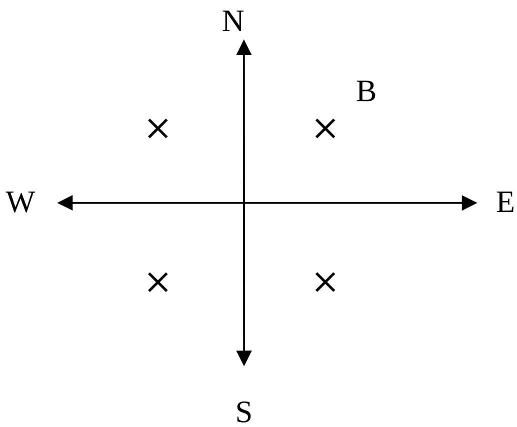

Figure (5)

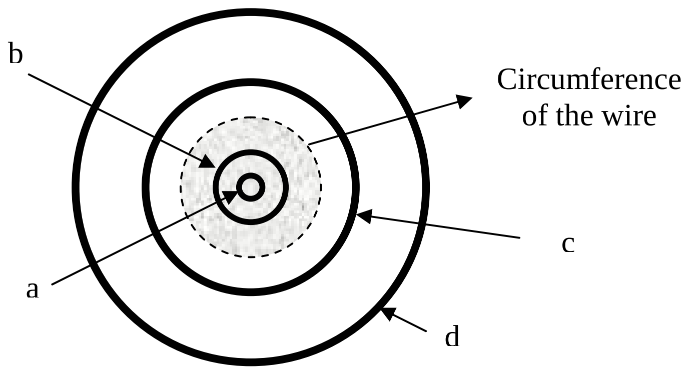

Figure (4)