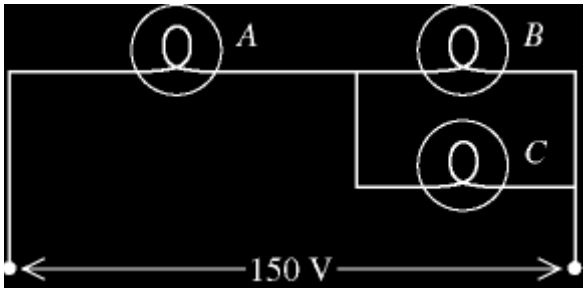
Exam

Name_____ Perm# _____

Email _____ Tel # _____

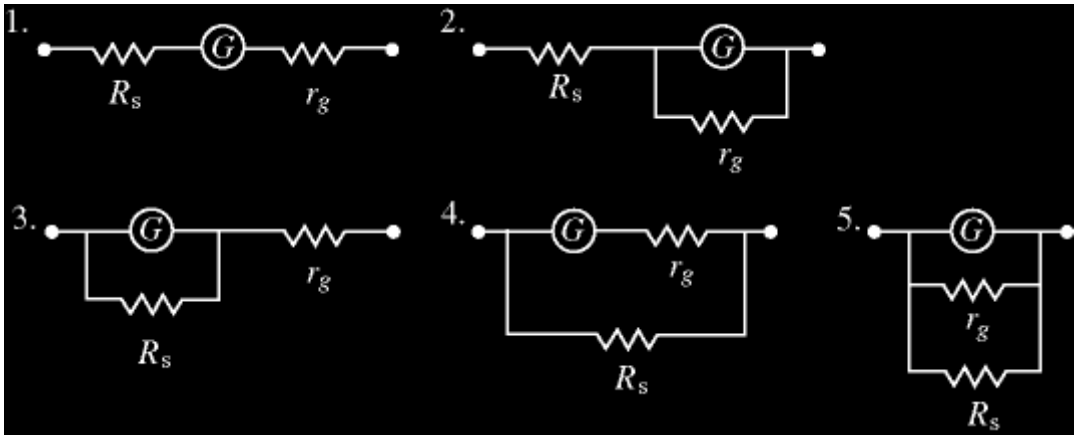
Remember to write all work in yoru Bluebook as well as put the answer on your Scantron
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Figure 26.1



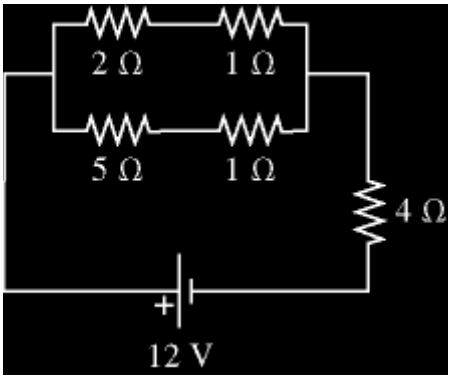
1) Three light bulbs, *A*, *B*, and *C*, have electrical ratings as follows: 1) _____
Bulb *A* – 85 W, 5.0 A
Bulb *B* – 80 V, 205 W
Bulb *C* – 120 V, 0.6 A
The three bulbs are connected in a circuit, which is across a 150–V line, as shown. Assume the filament resistances of the light bulbs are constant and independent of operating conditions. In Fig. 26.1, the equivalent resistance of the circuit is closest to:
A) 49 Ω B) 30 Ω C) 37 Ω D) 24 Ω E) 43 Ω

Figure 26.2
A galvanometer *G* deflects full scale when a potential difference of 0.500 V is applied. The internal resistance of the galvanometer r_g is 25 Ω. An ammeter is constructed by incorporating the galvanometer and an additional resistance R_S. The ammeter deflects full scale when a measurement of 2.0 A is made.



2) In Fig. 26.2, the most appropriate circuit diagram for the ammeter is: 2) _____
A) 1 B) 2 C) 3 D) 4 E) 5

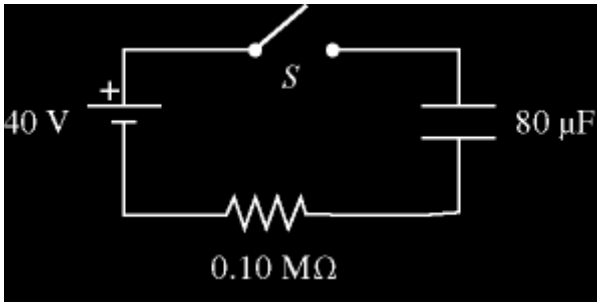
Figure 26.7



3) In Fig. 26.7, what is the power dissipated in the 2-Ω resistance in the circuit? 3) _____

A) 5.33 W B) 2.67 W C) 6.67 W D) 8.0 W E) 3.56 W

Figure 26.11d



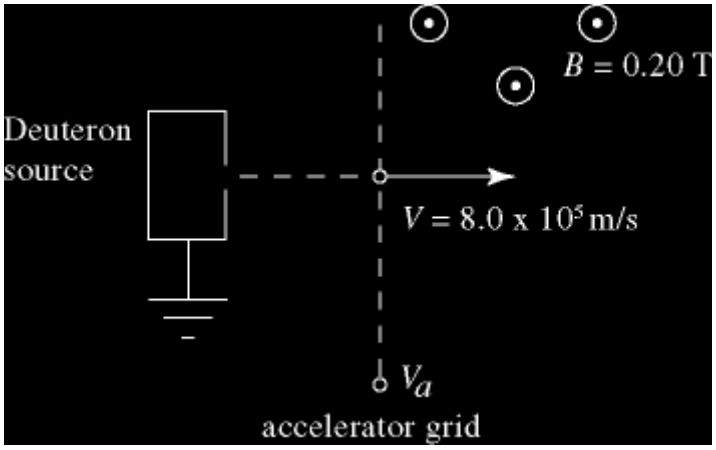
4) Initially, for the circuit shown, the switch *S* is open and the capacitor is uncharged.The switch *S* is closed at time $t = 0$. In Fig. 26.11d, when the time t is equal to 20.0 s, the potential difference across the resistor is closest to: 4) _____

A) 3.9 V B) 5.9 V C) 3.3 V D) 4.6 V E) 5.3 V

5) Alpha particles (charge = +2*e*, mass = 6.68×10^{-27} kg) are accelerated in a cyclotron to a final orbit radius of 0.60 m. The magnetic field in the cyclotron is 0.10 T. The period of circular motion of the alpha particles is closest to: 5) _____

A) 1.3 μs B) 2.0 μs C) 2.6 μs D) 3.9 μs E) 3.2 μs

Figure 27.3

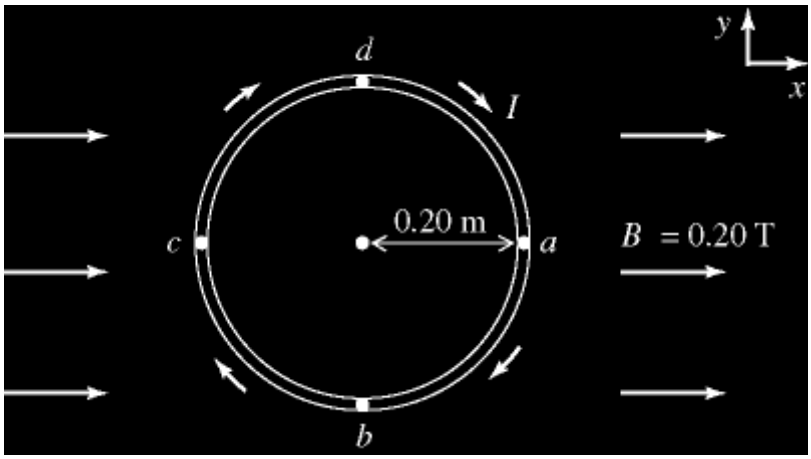


A mass spectrograph is operated with deuterons, which have a charge of $+e$ and a mass of 3.34×10^{-27} kg. Deuterons emerge from the source, which is grounded with negligible velocity. The velocity of the deuterons as they pass through the accelerator grid is 8.0×10^5 m/s. A uniform magnetic field of magnitude $B = 0.20$ T, directed out of the plane, is present at the right of the grid.

6) In Fig. 27.3, the electric potential of the accelerator grid V_a is closest to: 6) _____

A) +11 kV B) −9 kV C) +7 kV D) −7 kV E) +9 kV

Figure 27.8



A rigid circular loop has a radius of 0.20 m and is in the x–y plane. A clockwise current I is carried by the loop, as shown. The magnitude of the magnetic moment of the loop is 0.75 A • m^2. A uniform external magnetic field, $B = 0.20$ T in the positive x–direction, is present.

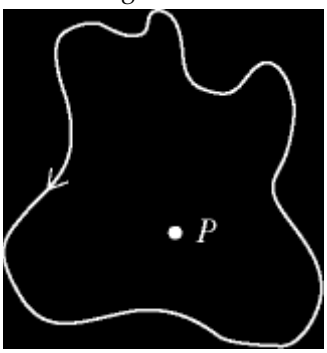
7) In Fig. 27.8, the magnitude of the magnetic torque exerted on the loop is closest to: 7) _____

A) 0.35 N • m B) 0.15 N • m C) 0.55 N • m D) 0.25 N • m E) 0.45 N • m

8) A point charge Q moves on the x–axis in the positive direction with a speed of 330 m/s. A field point is on the y–axis at $y = +80$ mm. The magnetic field produced at the field point, as the charge moves through the origin, is equal to –0.20 k μT. The moving charge is replaced by a current on the x–axis that produces a magnetic field at the field point that is equal to –0.20 k μT. The current and its sense along the x–axis are closest to: 8) _____

A) 80 mA, negative
B) 160 mA, negative
C) 120 mA, positive
D) 80 mA, positive
E) 160 mA, positive

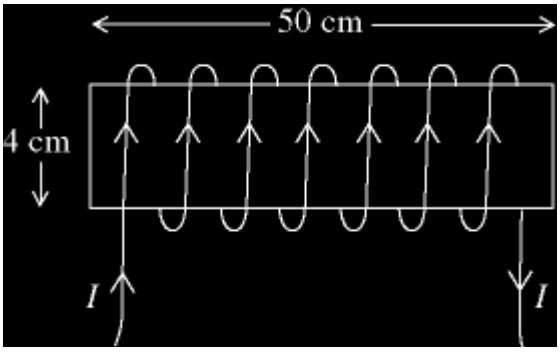
Figure 28.5



9) In Fig. 28.5, an irregular loop of wire carrying a current lies in the plane of the paper here. Suppose that now the loop is distorted into some other shape while remaining in the same plane. Point P is still within the loop. Which of the following is a true statement concerning this situation? 9) _____

A) It is possible that the magnetic field at point P is zero.
B) The magnetic field at point P will not change in magnitude when the loop is distorted.
C) The magnetic field at point P will always lie in the plane of the paper.
D) The magnetic field at P will not change in direction when the loop is distorted.
E) None of these are true.

Figure 28.7



10) A solenoid is wound with 350 turns on a form 4 cm in diameter and 50 cm long. The windings carry a current I in the sense that is shown. The current produces a magnetic field, of magnitude 2.5 mT, at the center of the solenoid. In Fig. 28.7, the current in the solenoid windings is closest to: 10) _____

A) 3.2 A B) 2.5 A C) 2.1 A D) 2.8 A E) 3.6 A