PHYSICS

BOOKS - MCGROW HILL EDUCATION PHYSICS (HINGLISH)

HEATING AND MAGNETIC EFFECTS OF CURRENT

Elementary Questions

1. It is a common notion that the earth's magne tism is due to the

A. presence of a huge permanent magnet in the interior of the earth

B. presence of electric currents circulating in the interior of the earth

C. influence of the sun's magnetic field

D. influence of a nuclear explosion

Answer: B

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2. The force between two parallel wires carrying currents has been used to define

A. ampere

B. coulomb

C. volt

D. watt

Answer: A

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3. A magnetic field cannot exert any force on a

A. moving magnet

B. moving charge

C. stationary magnet

D. stationary charge

Answer: D

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4. The force of rcpulsion between two parallel wires is f when each one of them carries a certain current I. If the current in each is doubled, the force between them would be

A. 4/f

B. 4f

C. 2f

D. f

Answer: B

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5. An electric iron draws a current of 4 A when connected to a 220 V mains. Its resistance must

A. 1000Ω

B. 44Ω

C. 55Ω

D. none of these

Answer: C

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6. The resistance of a conductor is reduced to half its initial value. In doing so the heating effects in the conductor will become

A. half

B. double

C. one-fourth

D. four times

Answer: A

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7. The coil of a heater is cut into two cqual halves and only one of them is used in the heater. The ratio of the heat produced by this half of the coil to that produced by the original coil is

A. $2:1$

B. $4:1$

C. $1:2$

D. $1:4$

Answer: A

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8. An electric current is always accompained by a magnetic field', was discovered by

A. Oersted

B. Maxwell

C. Faraday

D. Ohm

Answer: A

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9. Ampere rule is used to find the

A. direction of current

B. direction of magnetic field

C. direction of motion of the conductor

D. magnitude of current

Answer: B

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10. A magnetic field can exert force on a

A. stationary magnet only

B. moving charge only

C. moving magnet only

D. all the above

Answer: D

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11. A compass needle just above a wire in which electrons are moving towards cast, will point

A. east

B. west

C. north

D. south

Answer: D

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12. Choose the correct statement:

A. Lines of force are not imaginary lines

B. Lines of force cannot be mapped on paper

C. Lines of force do not intersect each other

D. Lines of force always intersect each other

Answer: C

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13. A motor converts

A. mechanical energy into electrical energy

B. mechanical energy into sound energy

C. clectrical energy into mechanical energy

D. electrical energy into sound energy

Answer: C

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14. A dynamo converts

A. mechanical energy into sound energy

B. mechanical energy into electrical energy

C. electrical energy into mechanical energy

D. electrical energy into sound energy

Answer: B

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15. By inserting a soft iron piece into a solenoid, the strength of the magnetic field

A. increases

B. decreases

C. first increases then decreases

D. remains unchanged

Answer: A

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16. By increasing the number of turns in the coil, the strength of the magnetic field.

A. decreases

B. increases

C. first decreases then increases

D. remains unchanged

Answer: B

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17. If current in the core decreases, the strength of the magnetic field

A. decreases

B. increases

C. sometimes decreases and sometimes increases

D. remains unchanged

Answer: A

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18. The unit of magnetic flux is

A. Weber

B. Gauss

C. Tesla

D. Weber/m2

Answer: A

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19. Fleming's right hand rule gives

A. the magnitude of the induced emf

B. the magnitude of the magnetic field

C. the direction of the induced emf

D. both magnitude and direction of the in duced emf

Answer: C

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20. The unit of induced emf is

A. ampere

B. volt

C. joule

D. electron volt

Answer: B

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21. The phenomenon of electromagnetic induction was discovered by

A. Lenz

B. Maxwell

C. Fleming

D. Faraday

Answer: D

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22. For making an electromagnet the best material to be used is

A. stainless steel

B. silver

C. soft iron

D. nickel

Answer: C

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23. The intensity of a magnetic field is defined as the force experienced by a

A. standard compass

B. unit positive charge

C. unit negative charge

D. unit north pole

Answer: D

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24. A copper ring is moved towards the north pole of a bar magnet. Then

A. the ring will not be affected

B. the ring will tend to get warm

C. an alternating current will flow in the ring

D. the ring will be positively charged

Answer: B

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25. A circular coil and a bar magnet recede from cach other with the same velocity. Then

A. there will be no induced emf in the coil

B. there will be an induced emf in the coil

C. an emf will be induced in the magnet

D. none of these

Answer: A

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26. The splitring in motion is called

A. armature

B. rotor

C. commutator

D. core

Answer: C

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27. In a bydel station, the motion produced in tur bines is due to the

A. burning of coal

B. burning of diesel

C. flow of water

D. production of steam

Answer: C

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28. The frequency of AC mains in India is

A. 100 Hz

B. 50 Hz

C. 1/100 Hz

D. 1/50 Hz

Answer: B

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29. At grid sub-stations the voltage is stepped up to reduce loss of

A. current

B. electrical energy

C. Power

D. resistance

Answer: C

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30. A switch is always connected to the

A. earth wire

B. neutral wire

C. live wire

D. none of these

Answer: C

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31. A fuse wire is always connected to the

A. earth wire

B. neutral wire

C. live wire

D. none of these

Answer: C

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32. Electricians use rubber gloves while working because

A. rubber is an insulator

B. rubber is a good conductor

C. it is easy to work while wearing gloves

D. none of these

Answer: A

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33. Faraday's laws of electrolysis are related to the

A. Faraday

B. Maxwell

C. Lenz

D. Bohr

Answer: A

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34. $\frac{4}{25}$ coulomb of charge contains electrons.

A. 10^{15}

B. 10^{18}

C. 10^{20}

D. none of these

Answer: B

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35. Laws of heating are given by

A. Joule

B. Ohm

C. Maxwell

D. Faraday

Answer: A

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36. An electric iron is based upon the principle of

A. heating effect of current

B. magnetic effect of current

C. chemical effect of current

D. none of these

Answer: A

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37. An electric bulb converts electrical energy into

A. sound energy

B. mechanical energy

C. nuclear energy

D. none of these

Answer: D

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38. Choose the wrong statement:

A. magnetic poles always exist in pairs

B. magnetic poles are always of equal strengths

C. like poles repel each other

D. unlike poles repel each other

Answer: D

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39. The force which a magnet exerts on iron and steel is called the

A. electric force

B. magnetic force

C. nuclear force

D. gravitational force

Answer: B

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40. Magnetite is a/an

A. natural magnet

B. electromagnet

C. U-shaped magnet

D. none of these

Answer: A

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41. Magnetic lines of force

A. are mere directions

B. have no physical reality

C. can be used to indicate the direction of the magnetic field at point

D. all the above are correct

Answer: D

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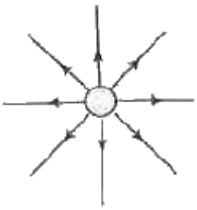
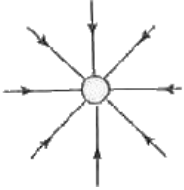
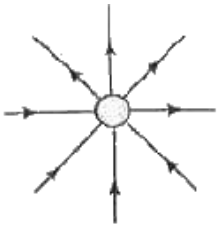
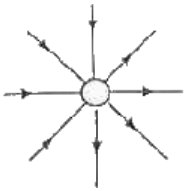
42. Which of the following figures represents the magnetic lines of force due to an isolated north pole?

A. 

B. 

C. 

D. 

Answer: A

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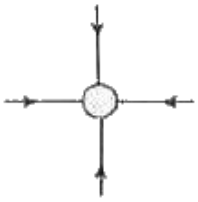
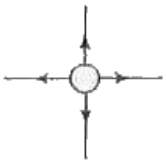
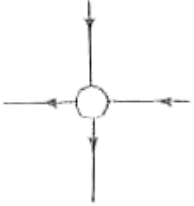
43. Which of the following figures represents the magnetic lines of force due to an isolated south pole ?

A. 

B. 

C. 

D. 

Answer: A

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44. Magnetic lines of force

A. form closed circuits

B. cannot intersect

C. are crowded together near the poles

D. all the above are correct

Answer: D

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45. The magnetic effect of electric current was discovered by

A. Maxwell

B. Oersted

C. Ampere

D. none of these

Answer: B

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46. A coil carrying current behaves as a/an

A. magnet

B. motor

C. dynamo

D. electric dipole

Answer: A

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47. An electric current predominantly produces _field around it.

A. magnetic

B. electric

C. gravitational

D. all the above

Answer: A

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48. Electromagnets are used in

A. electric bells only

B. telephones only

C. dynamos only

D. all the above

Answer: D

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49. A carbon microphone is best used in a

A. dynamo

B. telephone

C. transformer

D. none of these

Answer: B

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50. I gauss is equalt to

A. $10^4 T$

B. $10^{-4} T$

C. $10^3 T$

D. none of these

Answer: B

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51. 1 T equals

A. $1NA^{-1}m^{-1}$

B. $1NA^{-1}T$

C. $1NAm^2$

D. none of these

Answer: A

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52. If a bar magnet is cut lengthwise into 3 parts, the total number of poles will be

A. 2

B. 3

C. 4

D. 6

Answer: D

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53. A compass needle placed just above a wire in which electrons are moving towards west, will point

A. east

B. north

C. west

D. south

Answer: B

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54. The wire having a red plastic covering is a

A. live wire

B. neutral wire

C. earth wire

D. none of these

Answer: A

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55. The wire having a black plastic covering is a

A. live wire

B. neutral wire

C. earth wire

D. none of these

Answer: B

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56. The wire having a green plastic covering is

a

A. live wire

B. neutral wire

C. earth wire

D. none of these

Answer: C

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Higher Order Thinking Questions

1. none of these

A. 8J

B. 4J

C. 2

D. zero

Answer: A

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2. Two heating wires of equal length are first con nected in series and then in parallel to a constant voltage source. The rate of heat produced in the two cases is

A. $1:2$

B. $1:4$

C. $4:1$

D. $2:1$

Answer: B

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3. Of the bulbs in a house, one glows brighter than the other, which of the two has a large resistance.

A. The dim bulb

B. The bright bulb

C. Both have the same resistance

D. the brightness does not depend upon the resistance

Answer: A

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4. An electric fan and a heater are marked as 100 watt , 220 volt and 1000 watt , 220 volt respectively. The resistance of the heater is

A. lesser than that of fan

B. greater than that of fan

C. equal to that of fan

D. nothing can be decided

Answer: A

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5. If a 2 kW boiler is used everyday for 1 hour, then electrical energy consumed by boiler in thirty days is

A. 120 units

B. 100 units

C. 80 units

D. 60 units

Answer: D

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6. Appliances based on heating effect of current work on

A. only d.c.

B. only a.c.

C. both d.c. and a.c.

D. none of these

Answer: C

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7. Heat developed in an electric wire of resistance Rohm by current / ampere for a time t second is

A. $\left(\frac{I^2Rt}{4.2}\right)$ cal

B. $\left(\frac{I^2t}{4.2R}\right)$ cal

C. $\left(\frac{I^2R}{4.2t}\right)$ cal

D. $\left(\frac{Rt}{4.2I^2}\right)$ cal

Answer: A

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8. If R_1 and R_2 are respectively the filament resistances of a 200 watt bulb and 100 watt bulb designed to operate on the same voltage, then

A. $R_1 = 2R_2$

B. $R_1 = 4R_2$

C. $R_1 = \frac{R_2}{2}$

D. $R_1 = \frac{R_2}{4}$

Answer: C

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9. Two electric bulbs A and B are disigned for the same voltage. Their power ratings are P_A and P_B respectively with $P_A < P_B$. If they are joined in series across a V-volt supply

A. A will draw more power than B

B. B will dray more power than A

C. A and B will draw the same power

D. nothing can be decided

Answer: A

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10. Five equal risistors when connected in series dissipted 5 W power. If they are connected in parallel, the power dissipated will be

A. 125 W

B. 96 W

C. 68 W

D. 32 W

Answer: D

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11. Two heaters, eacch maked 1000 W, 250 V are connected in series with a 250 V supply. Assuming that their resistance remains

constant, their combined rate of heating will be

A. 250 W

B. 500 W

C. 1000 W

D. 2000 W

Answer: B

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12. Two bulbs, one of 50 watt and another of 25 watt are connected in series to the mains. The ratio of the currents through them is

A. $1:1$

B. $1:2$

C. $2:1$

D. $3:2$

Answer: A

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13. 1 joule equals

A. AVs^{-1}

B. $AV^{-1}s$

C. Avs

D. $A^{-1}Vs$

Answer: C

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14. You have the following appliances each of 500 W running 220 V ac.

(i) Electric iron

(ii) Electric lamp

(iii) Electric room heaater

The electric resistance is

A. maximum for room heater

B. maximum for electric iron

C. maximum for electric lamp

D. same in all the three cases

Answer: D

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15. An electric lamp is marked 60 W, 240 V. If it operats at 200, V the current through it will be

A. $0.18A$

B. $0.21A$

C. $0.30A$

D. $0.36A$

Answer: B

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16. Which of the following can be used to express energy ?The symbols used have their usual meanings for the units of physical quantities.

(i) Wh **(ii) VC**

(iii) AVs^2

(iv) $A^2\Omega s$

A. (i) and (iii)

B. (i) , (ii), (iv)

C. (ii), (iii), (iv)

D. (i),(ii),(iv)

Answer: B

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17. Two metallic wires of the same material and same length have different diameters. If we connect them in series across a battery, the

heat produced is H_1. If we connect them in parallel to the same battery the heat produced during the same time is H_2. From the above, we infer that

A. $H_1 > H_2$

B. $H_1 < H_2$

C. $H_1 = H_2$

D. nothing can be decided

Answer: B

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18. In the above question 73, when the wires are connected in parallel, the heat produced in thinner wire is H_1 and that in thicker wire is H_2. Which of the following is correct ?

A. $H_1 > H_2$

B. $H_1 < H_2$

C. $H_1 = H_2$

D. nothing can be decided

Answer: B

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19. Two equal resistances are connected in seires across a battery and consume a power P If these are connected in parallel, then power consumed will be

A. $4.0P$

B. 2.0

C. $\frac{P}{2}$

D. $\frac{P}{4}$

Answer: A

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20. Heat produced in a wire of resistance R due to current flowing at constant potential difference is proportional to

A. R

B. R^2

C. $\frac{1}{R}$

D. $\frac{1}{R^2}$

Answer: C

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21. The heat dissipated across a resistenace R and 10 V is 20 joules per second. The value of R is

A. 3Ω

B. 4Ω

C. 5Ω

D. 8Ω

Answer: C

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22. A moving charge produces

A. a magnetic field

B. an electric field

C. no field at all

D. both (a) and (b)

Answer: A

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23. The ratio of SI to cgs units of magnetic field is

A. 10^4

B. 10^2

C. 10^{-4}

D. 10^5

Answer: A

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24. Tesla is the SI unit of

A. electric field

B. magnetic field

C. pole strength

D. none of these

Answer: B

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25. Ampere-metre is used to represent

A. magnetic field

B. electric field

C. pole strength

D. none of these

Answer: C

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26. The source of magnetic field is

A. current carrying conductor

B. moving charged particle

C. permanent magnet

D. all of the above

Answer: D

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27. The effect of magnetic field on stationary charge Is

A. maximum

B. minimum but not zero

C. maximum but not infinity

D. zero

Answer: D

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28. When an electric charge is moving in free space

A. only magnetic field is produced

B. only electric field is produced

C. neither (a) nor (b)

D. both (a) and (b)

Answer: D

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29. When an electric current is passing through a conductor, there is no electric field produced because the conductor is

A. positively charged

B. negatively charged

C. electrically neutral

D. none of these

Answer: C

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30. If the lines of magnetic induction in a region are crowded together, the magnetic field strength in that region will be

A. weak

B. strong

C. infinite

D. zero

Answer: B

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31. In case of a uniform magnetic field, the lines of magnetic induction are

A. non-parallel

B. curved

C. equidistant and parallel

D. all of the above

Answer: C

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32. A current is passed through a straight wire. The magnetic field established around it has its lines of forces

A. circular

B. elliptical

C. parabolic

D. none of these

Answer: A

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33. When a charged particle moves in a magnetic field, does its kinetic energy always remain constant? Explain.

A. decreases

B. increases

C. remains constant

D. nothing can be decided

Answer: C

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34. A magnetic field

A. always exerts a force on a charged particle

B. never exerts a force on a charged particle

C. exerts a force, if the charged particle is moving along the magnetic field lines

D. exerts a force, if the charged particle is moving across the magnetic field lines

Answer: D

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