PHYSICS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2009

Physics

1. In ruby laser, the stimulated emission is due to transition from

A. metastable state to any lower state

B. any higher state to lower state

C. metastable state to ground state

D. any higher state to ground state.

Answer: C

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2. A direct current I flow along the length of an infinitely long striaght thin walled pipe then the magnetic field is

A. uniform throughout the pipe but not

   zero

B. zero only along the axis of the pipe

C. zero at any point inside the pipe

D. maximum at the centre and minimum at

   the edges.

Answer: C

3. A convex lens made of glass has focal length 0.15 m in air. If the refractive index of glass is 3/2 and that of water is 4/3, the focal length of lens when immersed in water is

A. 0.45 m

B. 0.15 m

C. 0.30 m

D. 0.6 m

Answer: D

4. Two sources are called coherent if they produce waves

    A. having a constant phase different

    B. of equal wavelength

    C. of equal speed

    D. having same shape of wave front.

Answer: A

5. Three resistors $1\Omega, 2\Omega$ and 3Ω are connected to form a triangle. Across 3Ω a 3 V battery is connected. The current through 3Ω resistor is

A. 0.75 A

B. 1A

C. 2A

D. 1.5 A

Answer: B

6. In a common emitter amplifier the input signal is applied across

    A. anywhere

    B. emitter-collector

    C. collector base

    D. base emitter.

Answer: D

7. In a radioactive disintegration, the ratio of initial number oif atoms to the number of atoms present at an instant of tme equal to its mean life is

A. $1/e^2$

B. $1/e$

C. e

D. e^2

Answer: C

8. A ray of light is incident on a surface of glass slab at an angle $45°$. If the lateral shift produced per unit thickness is $\dfrac{1}{\sqrt{3}}$m, the angle of refraction produced is

A. $\tan^{-1}\left(\dfrac{\sqrt{3}}{2}\right)$

B. $\tan^{-1}\left(1 - \sqrt{\dfrac{2}{3}}\right)$

C. $\sin^{-1}\left(1 - \dfrac{\sqrt{2}}{3}\right)$

D. $\tan^{-1}\left(\sqrt{\dfrac{2}{\sqrt{3}-1}}\right)$

Answer: B

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9. Ferro magnetic materials used in transformer must have

A. low permeability and high hysterisis loss

B. high permeabililty of low hysterisis loss

C. high permeability and high hysterisis loss

D. low permeability and low hysterisis loss

Answer: B

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10. According to Newton's corpuscular theory, the speed of light is

A. same in all the media

B. lesser in rarer medium

C. lesser in denser medium

D. independent of the medium.

Answer: B

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11. State the condition for constructive interference in terms of path difference between the two waves.

A. $(2n + 1)\lambda$

B. $2n\pi$

C. $n\lambda$

D. $(2n + 1)\dfrac{\lambda}{2}$

Answer: C

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12. The accurate measuremetn of emf can be

obtained using

A. multimeter

B. voltmeter

C. voltameter

D. potentiometer.

Answer: D

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13. The kinetic energy of an electron gets tripled, then thede Broglie wavelength associated with it changes by a factor

A. $\dfrac{1}{3}$

B. $\sqrt{3}$

C. $\dfrac{1}{\sqrt{3}}$

D. 3

Answer: C

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14. Which of the following is not a thermodynamic co-ordinate?

A. Gas constant ®

B. Presure (P)

C. Volume (V)

D. Temperature(T)

Answer: A

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15. Two solid pieces, one of steel and the other

of aluminium when immersed completely in

water have equal weights. When the solid pieces are weighed in air

A. the weight of lauminium is half the weight of steel

B. steel piece will weigh more

C. they have the same weight

D. aluminium piece will weigh more.

Answer: D

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16. The amount of energy released when one microgram of mater is annihilated is

A. $0.25 \times 10^5 kWh$

B. $9 \times 10^6 kWh$

C. $3 \times 10^{10} kWh$

D. $0.5 \times 10^5 kWh$

Answer:

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17. The number of significant figures in the numbers 4.8000×10^4 and 48000.50 are respectively

    A. 5 and 6

    B. 5 and 7

    C. 2 and 7

    D. 2 and 6

Answer: B

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18. β decay means emission of electron from

   A. innnermost electron orbit

   B. a stable nucleus

   C. outermost electron orbit

   D. radioactive nucleus.

Answer: D

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19. An electric heater rated 220 V and 550 V is connected to AC mains. The current drawn by it is

A. 0.8 A

B. 2.5 A

C. 0.4 A

D. 1.25 A

Answer: B

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20. A body of mass m moving along a straight line covers half the distance with a speed of $2ms^{-1}$. The remaining half of the distance is covered in two equal time intervals with a speed of $3ms^{-1}$ and $5ms^{-1}$ respectively. The average speed of the particle for the entire journey is

A. $\dfrac{3}{8}ms^{-1}$

B. $\dfrac{8}{3}ms^{-1}$

C. $\dfrac{4}{3}ms^{-1}$

D. $\dfrac{16}{3} ms^{-1}$

Answer: B

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21. The moment of inertia of a circular ring of radius r and mass M about diameter is

A. $\dfrac{2}{5} Mr^2$

B. $\dfrac{Mr^2}{4}$

C. $\dfrac{Mr^2}{2}$

D. $\dfrac{Mr^2}{12}$

Answer: C

22. A body of mas 0.05 kg is observed to fall with an acceleration of $9.5ms^{-2}$. The opposing force of air on the body is .... ($g = 9.8ms^{-2}$)

A. 0.015 N

B. 0.15 N

C. 0.030 N

D. zero

Answer: A

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23. The colloidal solution in which both the dispersed phase and dipersion medium are liquids are called

A. emulsions

B. gels

C. foams

D. liquid crystals.

Answer: A

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24. In fog, photographs of the objects taken with infrared radiations are more clear than those obtained during visible light because

A. I-R radiation has lesser wavelength than

visible radiation

B. scattering of I-R light is more than

visible light

C. the intensity of I-R light from the object

is less

D. scattering of I-R light is less than visible

light.

Answer: D

25. Three concurrent co-planat forces 1N,2N and 3N acting along different directions on a body

A. can keep the body is equilibrium if 2N and 3N act at right angle

B. can keep the body is equilibrium if 1N and 2N act at right angle

C. cannot keep the body is equilibrium

D. can keep the body in equilibrium if 1N and 3 N act at an acute angle.

Answer: C

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26. Sound waves transfer

A. only energy not moment

B. energy

C. momentum

D. both energy and momentum.

Answer: D

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27. Two rectangular blocks A and B of masses 2 kg and 3 gk respectively are connected by a spring of spring constant $10.8 Nm^{-1}$ and are placed on a frictionless horizontal surface. The block A was given an initial velocity of $0.15 ms^{-1}$ in the direction shown in the figure.

The maximum compression of the spring during the motion is

0.15 ms ^{1}
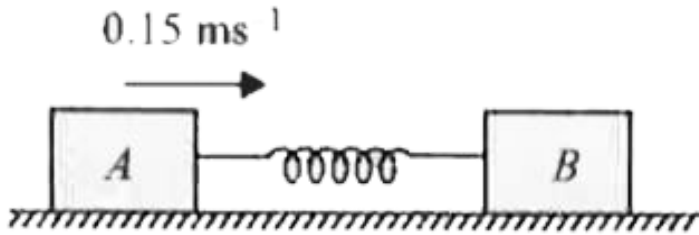
A. 0.01 m

B. 0.02 m

C. 0.05 m

D. 0.03 m

Answer: C

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28. G.P Thomson experimentally confirmed the existence of matter waves by the phenomena

    A. diffraction

    B. refraction

    C. polarisation

    D. scattering.

Answer: A

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29. The resistance of a wire at 300 K is found to be 0.3Ω. If the temperature co-efficent of resistance of wire is $1.5 \times 10^{-3} K^{-1}$, the temperature at which the resistance becomes 0.6Ω is

A. 720 K

B. 345 K

C. 993 K

D. 690 K

Answer: C

30. The work done by a force acting on a body is a shwon in the graph. The total work done in covering an initial distance of 20 m is
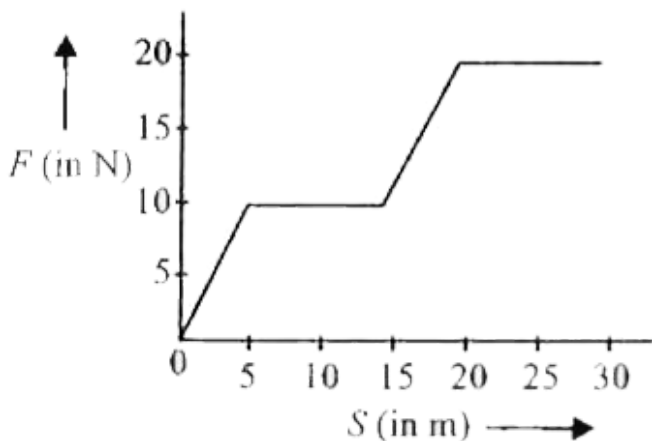
A. 225J

B. 200J

C. 400J

D. 175J

Answer: B

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31. Two luminous point sources seperated by a certain distance are at 10 km from an observer. If the aperture of his eyes is $2.5 \times 10^{-3}m$ and

the wavelength of light used is 500 nm, the distance of seperation between the point sources just seen to be resolved is

A. 12.2 m

B. 24.4 m

C. 2.44 m

D. 1.22 m

Answer: C

32. A door 1.6 m wide requires a force of 1 N to be applied at the free and to open or close it. The force that is required at a point 0.4 m distant from the hinges for opening or closing the door is

A. 1.2 N

B. 3.6 N

C. 2.4 N

D. 4 N

Answer: D

33. $0.1 m^3$ of water at $80°C$ is mixed with $0.3 m^3$ of water at $60°C$. The finial temparature of the mixture is

A. $65°C$

B. $70°C$

C. $60°C$

D. $75°C$

Answer: A

34. Which of the following series in the spectrum of the hydrogen atom lies in the visible region of the electromagnetic spectrum
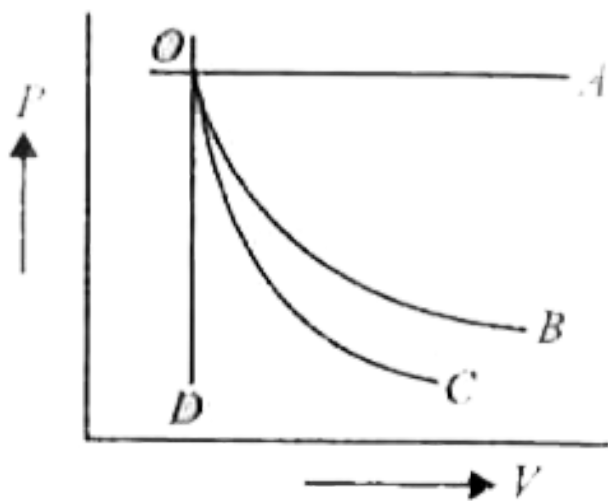
    A. Paschen

    B. Balmer

    C. Lyman

    D. Brackett.

Answer: B

35. A graph of pressure versus volume for an ideal gas for different process is as shown. In the graph curve OC represents

A. isochoric process

B. isothermal process

C. isobaric process

D. adiabatic process

Answer: D

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36. Which of the following statement is not

true ?

A. the wavelength changes when it travels from one medium to another.

B. The frequency changes when it travels from one medium to another.

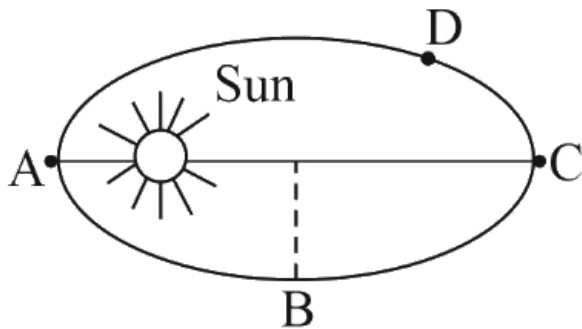C. The speed changes when it travels from one medium to another.

D. They travel is straight line in a given medium.

Answer: B

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37. A planet revolves around the sun in an elliptical . The linear speed of the planet will be maximum at
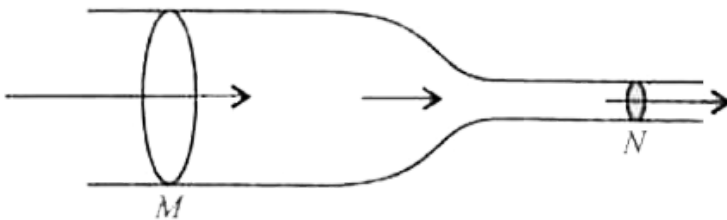

A. D

B. B

C. A

D. C

Answer: C

38. Horizontal tbe of non -uniform cross section has radii of 0.1 m and 0.5 m respectively at M and N. For a streamline flow of liquid the rate of liquid flow is

A. continuously changes with time

B. greater at M than at N

C. greater at N than at M

D. same at M and N

Answer: D

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39. A resistor and a capacitor are connected in

series with an a.c. source. If the potential drop

across the capacitor is 5 V and that across resistor is 12 V, the applied voltage is

A. 13 V

B. 17 V

C. 5 V

D. 12 V

Answer: A

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40. The amount of heat energy radiated by a metal at temperature T is E. When the temperature is increased to 3T, energy radiated is

    A. 81 E

    B. 9 E

    C. 3 E

    D. 27E

Answer: A

41. The angle of minimum deviation for an incident light ray on an equilateral prism is equal to its refracting angle. The refractive index of its material is

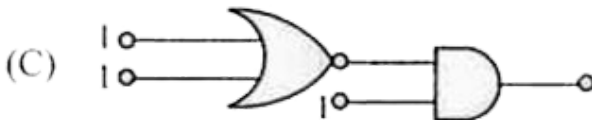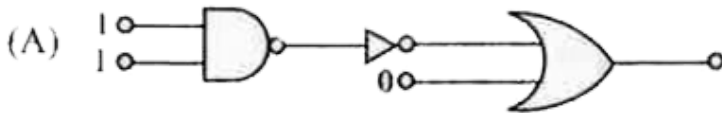A. $\dfrac{1}{\sqrt{2}}$

B. $\sqrt{3}$

C. $\dfrac{\sqrt{3}}{2}$

D. $\dfrac{3}{2}$

Answer: B

42. In the following combinations of logic gates, the outputs of A,B and C are respectively

(A)

(B)

(C)

A. 0,1,1

B. 0,1,0

C. 1,1,0

D. 1,0,1

Answer: C

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43. A stationary point source of sound emits sound uniformly in all directions in a non absorbing medium. Two points P and Q are at a distance of 4 m and 9 m respectively from

the source. The ratio of amplitudes of the waves at P and Q is

A. 4:9

B. 9:4

C. 1:2

D. 2:1

Answer: D

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44. A galvanometer of resistance 240Ω allows only 4% of the main current after connecting a shunt resistance. The value of the shunt resistance is

A. 10Ω

B. 20Ω

C. 8Ω

D. 5Ω

Answer: A

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45. Name any two phenomena which arise due to scattering of light in the earth's atmosphere.

    A. nuclear magnetic resonance

    B. lasers

    C. radioactivity

    D. nuclear fusion.

Answer: A

46. $y = 3 \sin \pi \left(\dfrac{t}{2} - \dfrac{x}{4} \right)$ represents an equation of a prgressive wave, where t is in second and x is in metre. The distance travelled by the wave in 5 seconds is

A. 8m

B. 10m

C. 5m

D. 32m

Answer: B

47. According to Huckel 's law, which is true?

A. 2 quarks and 3 antiquarks

B. 3 quarks and 2 antiquarks

C. 3 quarks and 3 antiquarks

D. 2 quarks and 2 antiquarks

Answer: C

48. An α particle of mass 6.4×10^{-27} kg and charge $3.2 \times 10^{-19}C$ is situated in a uniform electric field of $1.6 \times 10^5 Vm^{-1}$. The velocity of the particle at the ennd of $2 \times 10^{-2}m$ path when it starts from rest is

A. $2\sqrt{3} \times 10^5 ms^{-1}$

B. $8 \times 10^5 ms^{-1}$

C. $16 \times 10^5 ms^{-1}$

D. $4\sqrt{2} \times 10^5 ms^{-1}$

Answer: D

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49. A cylindrical tube open at both the ends hs a fundamental frequency of 390 hz and air. If 1/4 th of the tube is immersed vertically in water the fundamental frequency of air column is

A. 260 Hz

B. 130 Hz

C. 390 Hz

D. 520 Hz

Answer: A

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50. Temperature of the star is determined by

A. Planck's law
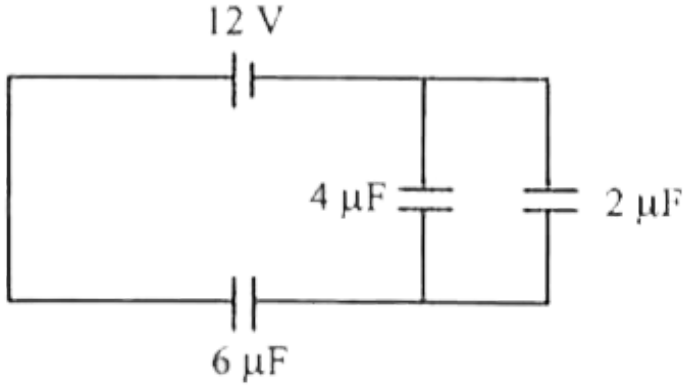
B. Wein's displacement law

C. Rayleigh -Jeans law

D. Kirchoff's law

Answer: B

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51. The charge deposited of $4\mu F$ capacitor in the cirucuit is

A. $6 \times 10^{-6} C$

B. $12 \times 10^{-6} C$

C. $24 \times 10^{-6} C$

D. $36 \times 10^{-6} C$

Answer: C

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52. A parallel beam of light is incident on a converging lens parallel to its principal axis. As one moves away from the les on the other side on its principal axis, the intensity of light

    A. first decreases and then increases

    B. contiunously increases

    C. continously decreases

    D. first increases and ten decreases.

Answer: D

53. Continuous spectrum is produced by

    A. incandescent electric lamp

    B. mercury vapour lamp

    C. sodium vapour lamp

    D. the sun

Answer: A

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54. A coil having N turns is would tightly in the form of a spiral with inner and outer radii a and b respectively. When a current I passes through the coil, the magnetic field at the centre is.

A. $\dfrac{\mu_0 n I}{(b-a)}\log_e\dfrac{a}{b}$

B. $\dfrac{\mu_0 n I}{2(b-a)}$

C. $\dfrac{2\mu_0 n I}{b}$

D. $\dfrac{\mu_0 n I}{2(b-a)}\log_d\dfrac{b}{a}$

Answer: D

55. A ray of light is incident on a plane mirror at an angle of $60°$. The angle of deviation produced by the mirror is

A. $120°$

B. $30°$

C. $60°$

D. $90°$

Answer: C

56. The electric potential at any point x,y,z in meters is given by $V = 3x^2$. The electric field at a point (2m,0,1m)is

A. $12Vm^{-1}$

B. $-6Vm^{-1}$

C. $6Vm^{-1}$

D. $-12Vm^{-1}$

Answer: D

57. Young's double slit experiment gives interference fringes of width 0.3 mm. A thin plate made of material of refractive index 1.5 is kept in the path of light from one of the sits, then the fringe width becomes
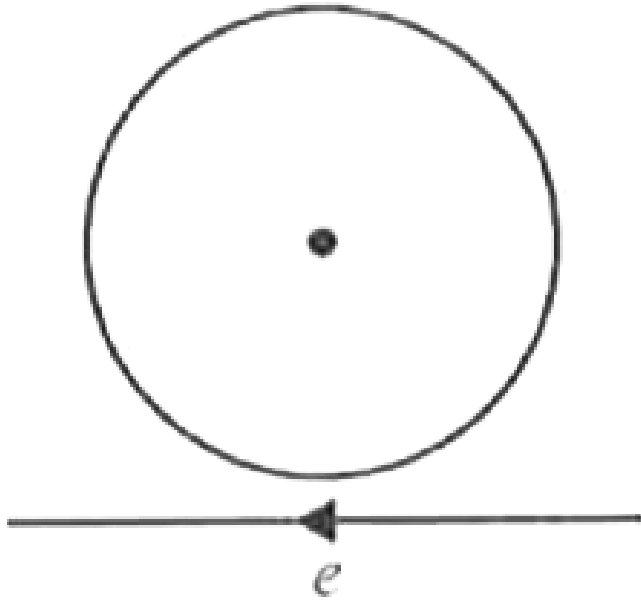
A. zero

B. 0.3 mm

C. 0.45 mm

D. 0.15 mm

Answer: B

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58. Near a circular loop of conducting wire as shown in the figure an electron moves along a straight line. The direction of the induced

curren if any in the loop is

A. variable

B. clockwise

C. anticlockwise

D. zero

Answer: A

59. Hydrogen atom from excited state comes to the ground state by emitting a photon of wavelength λ. If R is the Rydberg constant the principal quantum a number n of the excited state is

A. $\sqrt{\dfrac{\lambda R}{\lambda R - 1}}$

B. $\sqrt{\dfrac{\lambda}{\lambda R - 1}}$

C. $\sqrt{\dfrac{\lambda R^2}{\lambda R - 1}}$

D. $\sqrt{\dfrac{\lambda R}{\lambda - 1}}$

Answer: A

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60. The magnetic dipole moment of a current loop is independent of

A. magnetic field in which it is lying

B. number of turns

C. area of the loop

D. current in the loop.

Answer: A

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