PHYSICS

BOOKS - AIIMS PREVIOUS YEAR PAPERS

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Physics

1. The amount of heat measured in calories needed to raise the temperature of 1 gram of substance by 1 degree centigrade is known as

A. heat of fusion

B. specific heat

C. coefficient of expansion

D. latent heat.

Answer: B

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2. What is the potential energy of a 10 kg steel ball which has been raised vertically 9 m above the floor ?

A. 441 joules

B. 98 joules

C. 90 joules

D. 882 joules

Answer: D

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3. The volume of a confined gas varies inversely with the absolute pressure provided that the

temperature remains unchanged. This statement is known as

A. Dalton's law

B. Bernoulli's law

C. Avagadro's law

D. Boyle's law.

Answer: D

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4. What is the work done In joules if a 100-kg ball is raised to 3 m above the floor in 1 second ?

    A. 1960 joules

    B. 980 joules

    C. 2940 joules

    D. 3240 joules

Answer: C

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5. You are standing 1000 m from the point where a steel block strikes the sidewalk. How long will It take the sound to reach your ears if the speed of sound in air at $0°$ C is about 333 m/sec. ?

   A. 3 seconds

   B. 2 seconds

   C. 1 second

   D. 5 seconds.

Answer: A

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6. Shadows consist of two portions, the umbra and the penumbra. Which statement below applies ONLY to the umbra?

A. It receives no light from any part of the source

B. It receives light from part of the source

C. it is a partial shadow

D. It is circular in shape

Answer: A

7. If a force of 30.6 kg acts on a 60 kg mass, calculate the resulting acceleration. (1 k.g of force = 9.8 newtons)

    A. $5m/\sec^2$

    B. $2m/\sec^2$

    C. $0.5m/\sec^2$

    D. $9.8m/\sec^2$

Answer: A

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8. If the uniform acceleration near the surface of the earth is about 9.8 $m/\sec^2$. for a free-fall, what Is the velocity at the end of 2 seconds of fall (neglect friction) ?

A. 14.6 m/sec

B. 17.0 m/sec

C. 19.6 m/sec

D. 9.8 m/sec.

Answer: C

9. If the mass of a moving projectile is tripled and its velocity is doubled, the kinetic energy will be multiplied by

A. 8

B. 6

C. 2

D. 12

Answer: D

10. Which ratio below best defines the efficiency of simple machines ?

A. $\dfrac{\text{useful work output}}{\text{work input}} \times 100\ \%$

B. $\dfrac{\text{work input}}{\text{work output}} \times 100\ \%$

C.

$\dfrac{\text{theoretical mechanical advantage}}{\text{actual mechanical advantage}} \times 100\ \%$

D. $\dfrac{\text{useful work input}}{\text{useful work output}} \times 100\ \%$

Answer: A

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11. If an object is moving with a constant acceleration, the net force acting on that body is

A. increasing

B. decreasing

C. constant

D. zero

Answer: C

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12. The direction of the force exerted on a surface by a liquid at rest is

A. normal to the surface

B. parallel to the surface

C. tangential to the surface

D. $30°$ to the surface

Answer: A

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13. In simplest terms, the energy of a wave is directly proportional to the square of Its

    A. height

    B. refraction

    C. reflection

    D. length.

Answer: A

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14. A good floor lamp has a wide heavy wide to Increase Its stability through

    A. banking

    B. lowering the center of gravity

    C. raising the center of gravity

    D. None of the above.

Answer: B

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15. A resultant force of 45 kg Is acting on a body whose acceleration Is 10 m/sec^2 . Calculate the mass of the body.

A. 450 kg

B. 44.1 kg

C. 4.5 kg

D. 1960 kg.

Answer: B

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16. Two forces of 45 kg-f and 40 kg-f act on a body

In opposite directions. What Is the resultant force

?

A. 45 kg-f

B. 40 kg-f

C. 5 kg-f

D. 90 kg-f.

Answer: C

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17. $F = Gm_1, m_2 / d_2$ is the equation representing Newton's law of universal gravitation. Which of the statements below is true?

A. G is called the gravitation constant

B. The law can be used to calculate the mass of an object on another planet if the mass and radius of that planet are known

C. Knowing the value of G, one can easily calculate the mass of the earth.

D. All of the above are true.

Answer: A

18. Which of the statements below is correct?

A. The angle of bank for a road is obtained

from a consideration of the centripetal

force required

B. There is no tendency for the vehicle to skid

if a road is banked for the speed at which

the vehicle is moving

C. The resultant force action on a vehicle will

be that which maintains it in a circular path

D. All of the above statements are correct.

Answer: D

19. How far will a body free-fall in 1 second If released from rest ?

A. 0.0 m

B. 4.9 m

C. 9.8 m

D. 19.6 m.

Answer: B

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20. Which statement below is true ?

A. Radiant energy is propagated as a wave motion

B. Positrons have the same mass as an electron

C. When a nucleus emits a beta particle, its mass number is unchanged

D. All of the above.

Answer: D

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21. Radium Ra^{236} has a half-life of 1590 years. How much of the original amount of Ra^{236} would

remain after 6360 year ?

A. $\dfrac{1}{8}$

B. $\dfrac{1}{4}$

C. $\dfrac{1}{16}$

D. $\dfrac{1}{2}$

Answer: C

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22. A ball is located in a semicircular trough. The

ball is moved slightly to one side and returns to

its original locatiun. The ball Is said to be in

A. neutral equilibrium

B. unstable equilibrium

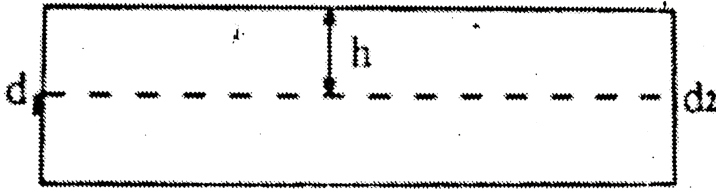C. stable equilibrium

D. all of the above.

Answer: C

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23. Using the figure below as a reference, identify

the true statement. The large tank is full of water

and is exposed to the atmosphere

d_1=diameter of opening

v_1=velocity at d_1

v_2=velocity at d_2

A. $v_1 / v_2 = 1$

B. $v_2 > v_1$

C. $v_1 > v_2$

D. none of the above

Answer: A

24. If a color disc composed of red, orange, yellow, green, blue, indigo, and violet pie-shaped sections is rapidly rotated, which color will your eye see ?

A. red

B. black

C. brown

D. white

Answer: D

25. The amount of a liquid's cohesive force per unit of length is called

    A. depression

    B. adhesion

    C. apparent weight

    D. surface tension

Answer: D

26. When light is reflected from a surface it can be either regular reflection or diffuse reflection. The essential difference between regularly and diffusely reflecting surfaces is that

A. regularly reflecting surfaces are smoother than diffusely reflecting surfaces

B. light can not be reflected from a diffusely reflecting surface

C. the regularly reflecting surface is coarser than the diffusely reflecting surface

D. all of the above are essential differences between regularly and diffusely reflecting surfaces.

Answer: A

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27. If the density of a given body Is 10 gm/ cm^3 , what Is Its specific gravity?

A. 0.01

B. 1.0gm

C. 1.0

D. 10.0

Answer: D

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28. When analyzed, most complicated machines are found to consist of a combination of various simple machines. Which machine below is NOT a simple machine?

A. lever

B. electric motor

C. inclined plane

D. pulley.

Answer: B

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29. Calculate the velocity of a test sled that Is propelled by a device that has 2500 joules of available energy to propel a sled of 50 kg mass

A. 10 m/sec

B. 25 m/sec

C. 50 m/sec

D. 1 m/sec.

Answer: C

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30. In uniformly accelerated motira the following questions hold :

V=Vo + at

$$X = Vot + 1/2at^2$$

When X = displacement , V=Velocity at time, Vo=

initial velocity, t=time , and a =acceleration. A ball is projected directly upward at a velocity of 15 m/sec.

What is the highest point this ball will reach?

A. 38.66 m

B. 11.48 m

C. 9.80 m

D. 1.53 m.

Answer: B

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31. In uniformly accelerated motira the following questions hold :

V=Vo + at

$$X = Vot + 1/2at^2$$

When X = displacement , V=Velocity at time, Vo= initial velocity, t=time , and a =acceleration. A ball is projected directly upward at a velocity of 15 m/sec.

What is the distance above the ground after 3 seconds ?

   A. 1.8 m

   B. 0.9 m

C. 0 m

D. 3.6 m.

Answer: B

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32. In uniformly accelerated motira the following questions hold :

V=Vo + at

$$X = Vot + 1/2at^2$$

When X = displacement , V=Velocity at time, Vo= initial velocity, t=time , and a =acceleration. A ball

is projected directly upward at a velocity of 15 m/sec.

What is Its velocity at that point ?

A. 14.4 m/sec. downward

B. 14.4 m/sec. upward

C. 29.4 m/sec. downward

D. 29.4 m/sec. upward

Answer: A

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33. What is the velocity of the light in the medium if Sin θ_i=0.707 , Sin θ_r=0.500 , and the velocity of light in a vacuum is 3.0×10^8 m/sec ?

A. 2.1×10^8 m/sec

B. 2.8×10^8 m/sec

C. 1.4×10^8 m/sec

D. 4.2×10^8 m/sec

Answer: A

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34. The ray of light as it enters will

    A. bend away from the normal

    B. be totally reflected

    C. bend toward the normal

    D. do none of the above.

Answer: C

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35. The index of refraction can be defined as the velocity of light In a vacuum divided by the

velocity In the medium $\left(N = \dfrac{C}{S}\right)$ If this is the case, another valid expression for Snell's law Is

A. $\dfrac{\sin \theta_i}{\sin \theta_r} = \dfrac{C_r}{S_r}$

B. $\dfrac{\sin \theta_i}{\sin \theta_r} = \dfrac{C_i}{C_r}$
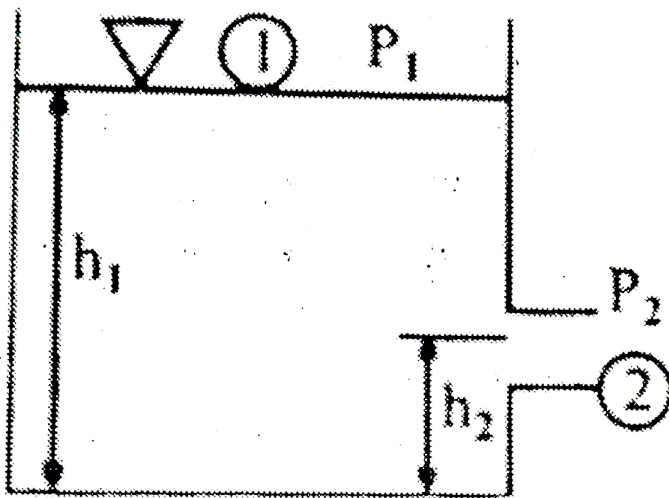
C. $\dfrac{S_i}{S_r} = \dfrac{N_r}{N_i}$

D. $\dfrac{\sin \theta_i}{\sin \theta_r} = \dfrac{S_i}{S_r}$

Answer: D

36. using the illustration when both surfaces 1 and 2 are exposed to the atmoshere, P_1 and P_2 are gauge pressure , and h_1 and h_2 are heights .

The Bernoulli equation for this situation is

$$h_1 + \frac{P_1}{W} + \frac{V_1^2}{2a} = h_2 + \frac{P_2}{W} + \frac{V_2^2}{2a}$$

If an Identical outlet were placed at exactly the same point on the left side of the container, the velocity would be
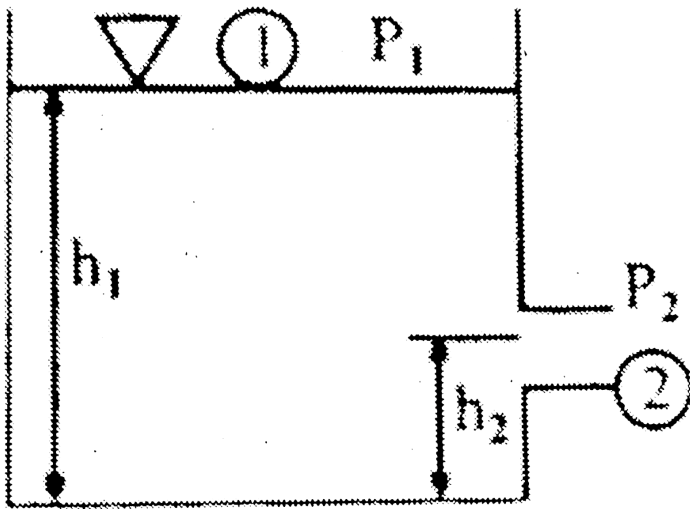
A. zero

B. computable

C. $2V_2$

D. none of the above

Answer: B

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37. using the illustration when both surfaces 1 and 2 are exposed to the atmoshere, P_1 and P_2 are gauge pressure , and h_1 and h_2 are heights .

The Bernoulli equation for this situation is

$$h_1 + \frac{P_1}{W} + \frac{V_1^2}{2a} = h_2 + \frac{P_2}{W} + \frac{V_2^2}{2a}$$

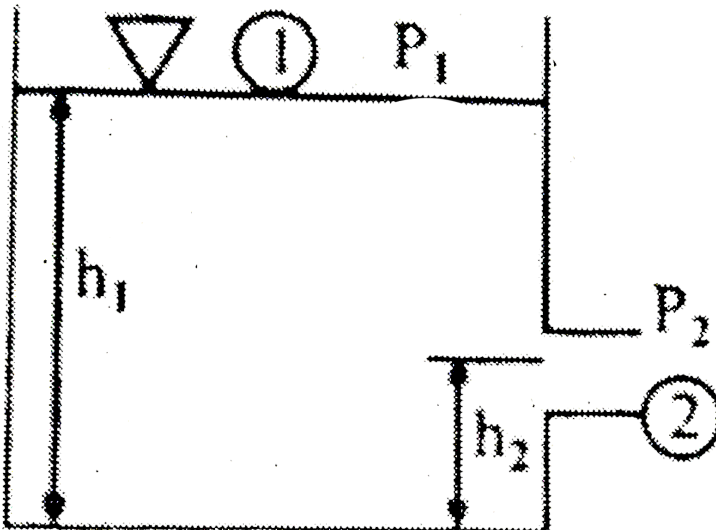The value of P_1 and P_2 are such that

A. $P_1 = P_2 = 0$

B. P_2 lt P_1

C. $P_1 > P_2$

D. $P_1 / P_2 = 0$

Answer: A

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38. using the illustration when both surfaces 1 and 2 are exposed to the atmoshere, P_1 and P_2 are gauge pressure , and h_1 and h_2 are heights .

The Bernoulli equation for this situation is

$$h_1 + \frac{P_1}{W} + \frac{V_1^2}{2a} = h_2 + \frac{P_2}{W} + \frac{V_2^2}{2a}$$

The velocity of the fluid leavening point (2) is constant and can be expressed as

A. $V_2 = (P_1/P_2)V_1$

B. $V_2 = (P_1/P_2)ah$

C. $V_2 = [(h_1 - h_2)(2a)]^{1/2}$

D. none of the above

Answer: C

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39. Choose the word or phrase that is most closely associated with the given word. You may use a choice more than once or not at all. Eliminate those choices that you think to be incorrect and mark the letter of your choice on the answer sheet

(1)Graham's law of diffusion

(2)Charles's law

(3)Ohm's law

(4) Gresham's law

$$F = \frac{MV^2}{R}$$

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40. Choose the word or phrase that is most closely associated with the given word. You may use a choice more than once or not at all. Eliminate those choices that you think to be incorrect and mark the letter of your choice on the answer sheet

(1)Graham's law of diffusion

(2)Charles's law

(3)Ohm's law

(4) Gresham's law

$$I = \frac{E}{R}$$

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41. Choose the word or phrase that is most closely associated with the given word. You may use a choice more than once or not at all. Eliminate those choices that you think to be incorrect and mark the letter of your choice on the answer sheet

(1)Graham's law of diffusion

(2)Charles's law

(3)Ohm's law

(4) Gresham's law

$$\frac{V}{V_1} = \frac{T}{T_1}$$

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42. Choose the word or phrase that is most closely associated with the given word. You may use a choice more than once or not at all. Eliminate those choices that you think to be incorrect and mark the letter of your choice on the answer sheet

(1)Graham's law of diffusion

(2)Charles's law

(3)Ohm's law

(4) Gresham's law

$R_1 / R_2 = \sqrt{M_2 / M_1}$

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43. An astronaut is accelerated in his spacecraft from rest to 800 mi./hr. In 60 sec. He was subjected to an acceleration of

    A. 4800 ft./sec./sec.

    B. 1200 mi. $/hr^2$

    C. 4800 mi./hr^2

    D. 48000mi./hr^2

Answer: D

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44. The proposal that no more than two electrons may occupy a particule atomic orbital was made by

A. Pauli

B. Pauling

C. Einstein

D. Curie

Answer: A

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45. An object is thrown upward with a vertical velocity of 128 ft./sec. It will return in

    A. 64 seconds

    B. 16 seconds

    C. 8 seconds

    D. 4 seconds

Answer: C

46. The particle accelerated at a constat rate from 23 mi./br. to 58 mi./hr. In 3.5 sec. Its acceleration was

A. 10 mi./hr. per sec.

B. 58 mi./hr. per sec.

C. 23 mi./hr. per sec.

D. less than 10 mi./hr. per sec.

Answer: A

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47. Since speed changed at a uniform rate and the average velocity is equal to the average of the Initial and final speeds. how far has the particle traveled while It was accelerating ?

A. 51 ft

B. 600ft

C. 210ft

D. less than 20 mi.

Answer: C

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48. A particle travels 336 mi in 6 hn, its 1 average velocity is

A. 33.6 mi./hr

B. 66 mi./hr

C. 56 mi/hr.

D. 40 mi/km/hr.

Answer: C

49. The volume of the piece of glass Is

A. $166 cm^3$

B. $60 cm^3$

C. $1.6 cm^3$

D. $1666 cm^3$

Answer: D

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50. If the buoyant force of the water Is equal to the weight of the water displaced, then the piece of glass suspended in water weighs

A. 16 N

B. 100 N

C. 83 N

D. 50 N.

Answer: C

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51. If the piece of glass were suspended in air, It would weight (the buoyancy of air is neglected)

A. 100 Newtons

B. 50 Newtons

C. 10 Newtons

D. 600 Newtons

Answer: A

52. Assertlon (A). When an electric motor is started the Initial current In It Is considerably more than the final current

Reasoning : The current falls due to the fall In the back emf

A. Assertion is true, Reason is false

B. Assertion is false, Reason is true

C. Both Assertion and Reason are true and Reason is the correct explanation of Assertion·

D. Both Assertion and Reason are true but Reason is not the correct explanation of Assertion

Answer: C

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53. Assertion(A). A pool of water looks shallower than it actually is

Reasoning (R). Light bends towarch the normal while travelling from water to air

A. Both Assertion and Reason Correct and Reason explains Assertion

B. Assertion is right, Reason is wrong

C. Both Assertion and Reason correct but Reason does not explains Assertion

D. Assertion and Reason are both wrong.

Answer: B

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54. Weight of a person can be zero when

1. he is falling freely

2. he is orbiting in a satellite

3. he is in aeroplane flying at a high altitude.

4. he is having ride in a gas filled balloon.

    A. 1, 2, 3 and 4 are correct

    B. 1 and 2 are correct

    C. 1 and 4 are correct

    D. 1, 2 and 4 are correct.

Answer: B

55. Assertion(A) : The earth revolves around the sun an elliptical orbit

Reasoning(R) : The sun alwaye attracts the earth with the same force

   A. both Assertion and Reason are both are both wrong

   B. Assertion is right, Reason is wrong

   C. both Assertion and Reason are correct and Reason explains Assertion

D. both Assertion and Reason are correct, but

Reason does not explain Assertion

Answer: C

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56. Assertion:The couple acting on a body is not

equal to the rotational KE of the body

Reason: Couple and KE have different dimensions

A. both Assertion and Reason are both are

both wrong

B. Assertion is right, Reason is wrong

C. both Assertion and Reason are correct and

Reason explains Assertion

D. both Assertion and Reason are correct, but

Reason does not explain Assertion

Answer: A

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57. Assertion: A tiny drops of liquid resist

deforming forces better than bigger drops

Reason:Excess pressure inside a drop is directly proportional to the Surface tension.

A. both Assertion and Reason are both are both wrong

B. Assertion is right, Reason is wrong

C. both Assertion and Reason are correct and Reason explains Assertion

D. both Assertion and Reason are correct, but Reason does not explain Assertion

Answer: B

58. Assertion: A thin aluminium disc, spinning freely about a centre pivot, is quickly brought to rest when . placed between the poles of a strong U-shaped magnet

Reason:A current induced in a disc rotating in a magnetic field produces a force which tends to oppose the disc's motion.

A. both Assertion and Reason are both are both wrong

B. Assertion is right, Reason is wrong

C. both Assertion and Reason are correct and

Reason explains Assertion

D. both Assertion and Reason are correct, but

Reason does not explain Assertion

Answer: A

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59. Assertion: In Rutherford's experiment, a-

particles from a sodium source were allowed to

fall on a 104 mm thick gold foil. Most of the

particles passed straight through the foil.

Reason : The entire positive charge and nearly whole of the mass of an atom is concentrated in the nucleus.

A. both Assertion and Reason are both are both wrong

B. Assertion is right, Reason is wrong

C. both Assertion and Reason are correct and Reason explains Assertion

D. both Assertion and Reason are correct, but Reason does not explain Assertion

Answer: A

60. Assertion: At ordinary temperatures. the Vibrational degrees of freedom do not contribute to the specific heat of gases

Reason:The average charge corresponding to a degree of vibration is not kT and hence the molecular vibrations are not excited.

   A. both Assertion and Reason are both are

      both wrong

B. Assertion is right, Reason is wrong

C. both Assertion and Reason are correct and

Reason explains Assertion

D. both Assertion and Reason are correct, but

Reason does not explain Assertion

Answer: C

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