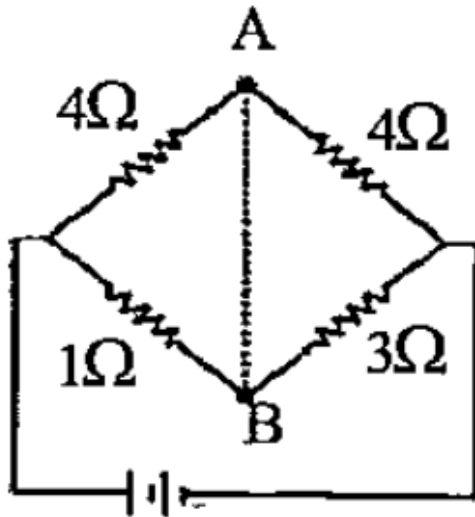# PHYSICS

BOOKS - SARAS PUBLICATION

MODEL QUESTION PAPER 2

Exercise

1. In the circuit shown,if a conducting wire is connected between points A and B , the

current in this wire will:

A. flow from A to B

B. flow in the direction which will be

decided by the value

C. be zero

D. flow from B top A

Answer:

2. The velocity v of a particle at time t is given by $v = at + \dfrac{b}{t + c}$ where a, b and c are constant. The dimensions of a, b and c respectively are

A. $\left[LT^{-2}\right]$,[L]and [T]

B. [L],[T] and $\left[LT^{2}\right]$

C. $\left[L^{2}T^{2}\right]$,[LT]and[l]

D. [L],[LT]and $[T^2]$

Answer:

3. Two batteries one of emf 18 V and internal resistance 2Ω. And the other of emf 12 V and internal resistance 1Ω , are connected as shown. The voltmeter V will velocity record a reading of:
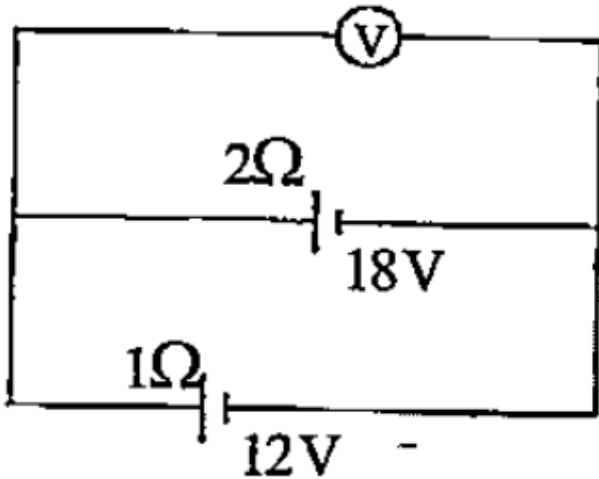
A. 15 V

B. 30 V

C. 14 V

D. 18 V

Answer:

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4. If $\vec{A} + \vec{B} + \vec{C} = 0$ then $\vec{A} \times \vec{B}$ is :

A. $\vec{B} \times \vec{C}$

B. $\vec{C} \times \vec{B}$

C. $\vec{A} \times \vec{C}$

D. none of these

Answer:

5. The ratio of charge to potential of a body is called as :

A. Resistance

B. Inductance

C. Conductance

D. Capacitance

Answer:

6. What is the dimensional formula for impluse

A. $\left[ML^2T^{-1}\right]$

B. $\left[MLT^{-1}\right]$

C. $\left[ML^2T^{-2}\right]$

D. $\left[MLT^{-2}\right]$

Answer:

7. A person holds on a weight of 10 kg. at a height of 5m. Above the ground for 5 minutes. Work done by him is

A. zero

B. 250J

C. 50J

D. 300J

Answer:

8. A disc is rotating with angular velocity $\left(\overrightarrow{\omega}\right)$ .A force $\overrightarrow{F}$ acts at a point whose position vector with respect to the axis of rotation is $\overrightarrow{r}$. The power associated with the torque due to the force is given by

A. $\left(\overrightarrow{r} \times \overrightarrow{F}\right). \overrightarrow{\omega}$

B. $\left(\overrightarrow{r} \times \overrightarrow{F}\right) \times \overrightarrow{\omega}$

C. $\overrightarrow{r} . \left(\overrightarrow{F} \times \overrightarrow{\omega}\right)$

D. $\vec{r} \times \left(\vec{F} \times \vec{\omega} \right)$

Answer:

9. The ratio of kinetic energy of two bodies of moment of inertia $9kgm^2$ and $1kgm^2$ are same. The ratio of their angular momentum is.....

A. $1:9$

B. $1:3$

C. $9:1$

D. $3:1$

Answer:

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10. The gravitational potential at a point due

to a point mass is V=

A. $\dfrac{GM}{r}$

B. $\dfrac{GM}{r^2}$

C. $-\dfrac{GM}{r^2}$

D. $-\dfrac{GM}{r}$

Answer:

11. The mass of the earth is 6×10^{24} kg and that of the Moon is 7.4×10^{22} kg. The constant of gravitation G is $6.67 \times 10^{-11} Nm^2 kg^{-2}$ The potential energy of the system is $- 7.79 \times 10^{28}$

J The mean distance between the Earth and Moon is.......... metre.

A. $3.37 \times 10^6 m$

B. $7.6 \times 10^4 m$

C. $1.9 \times 10^2 m$

D. 3.8×10^8

Answer:

12. Two liquidsAand B are at $32°C$ and $24°C$, when mixed in equal masses the temperature of the mixture is found to be $28°C$. Their specific heats are in the ratio of

A. $3:2$

B. $2:3$

C. $1:1$

D. $4:3$

Answer:

13. The young's modulus of steel is $2 \times 10^{11} N/m^2$ and its coefficient of linear expansion is 1.1×10^{-5} per day. The pressure to be applied to the ends of a steel cylinder to keep its length constant on raising its temperature by $100°$ C will be .

    A. $5.5 \times 10^4 N/m^2$

    B. $1.8 \times 10^6 N/m^2$

    C. $2.2 \times 10^8 N/m^2$

D. $2.0 \times 10^{11} N/m^2$

Answer:

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14. A carnot engine operates between $227°C$ and $127°C$. If it absorbs 60×10^4 calorie at higher temperature, how much work per cycle can the engine perform?

A. $5.02 \times 10^5 J$

B. $8 \times 10^5 J$

C. $6 \times 10^5 J$

D. none of these

Answer:

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15. The speed of sound in a gas is V. The rms speed of molecules of this gas is c. If $\gamma = \dfrac{C_p}{C_v}$ the ratio of V to c is .

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

B. 0.33_γ

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

D. $\sqrt{\dfrac{\gamma}{3}}$

Answer:

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16. A body oscillates with SHM according to the equation, $X = (5.0m)\cos[2\pi t + \pi/4]$ .At

t=1.5s, calculate the displacement

A. $-3.835m$

B. $-3.845m$

C. $-3.535m$

D. $-3.865m$

Answer:

17. Calculate the velocity of sound in air:

A. 300

B. 400

C. 500

D. 600

Answer:

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18. Intensity of an electric field E due to a dipole, depends on distance r as...

A. $E\alpha\dfrac{1}{r^4}$

B. $E\alpha\dfrac{1}{r^2}$

C. $E\alpha\dfrac{1}{r^3}$

D. $E\alpha\dfrac{1}{r}$

Answer:

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19. The potential at a certain point in an

electric field is 200 V. The work done in

carrying an electron upto that point will be

A. $-3.2 \times 10^{-17} J$
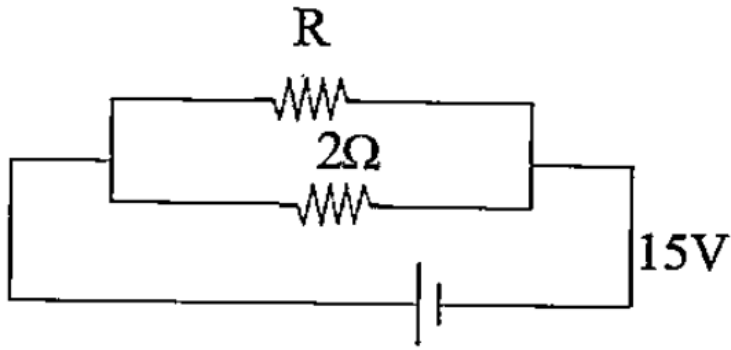
B. $6.2 \times 10^{-17} J$

C. 200 J

D. $-200 J$

Answer:

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20. If in the circuit, power dissipation is 150 W, then R is...

R

2Ω

15V

A. 2Ω

B. 6Ω

C. 5Ω

D. 4Ω

Answer:

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21. A coil of inductance 300 mH and resistance 2Ω is connected to a source of voltage 2V. The current reaches half of its steady state value is..

A. 0.1 S

B. 0.05 S

C. 0.3 S

D. 0.15 S

Answer:

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22. The direction of lines of force of magnetic field produced by passing direct current through a conductor is determined from....

    A. Lenz's

    B. Right handed screw's rule

    C. Fleming's left hand rule

    D. Fleming's right hand rule

Answer:

23. A long solenoid has 200 turns per cm. and carries a current of 2.5 amps. The magnetic field at its centre is $(\mu o = 4\pi \times 10^{-7} wber/amp - m)$...

A. $3.14 \times 10^{-2} weber/m^2$

B. $9.42 \times 10^{-2} weber/m^2$

C. $6.28 \times 10^{-2} weber/m^2$

D. $12.56 \times 10^{-2} weber/m^2$

Answer:

24. In an oscillating LC circuits the maximum charge on the capacitors is Q. The charge on the capacitor when the energy is stored equally between the electric and magnetic field is

A. $\dfrac{Q}{2}$

B. $\dfrac{Q}{\sqrt{3}}$

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

D. Q

Answer:

25. A metal conductor of length 1 m rotates vertically about one of its ends at angular velocity 5 rad. s^{-1} . If the horizontal component of earth's magnetic field is

0.2×10^4 T, then the emf developed between the ends of the conductor is

A. $5\mu v$

B. $50\mu v$

C. $5mv$

D. 50 mv

Answer:

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26. In a plane electromagnetic wave, the electric field oscillates sinusoidally at a frequency of $2.0 \times 10^{10} Hz$.What is the wave length of the wave?

    A. 1.0 cm

    B. 1.5 cm

    C. 2.0 cm

    D. 3.0 cm

Answer:

27. An electromagnetic wave going through vacuum is described by which of the following equation is true?

A. $E_0 K = B_0 \omega$

B. $E_0 \omega = B_0 K$

C. $E_0 B_0 = \omega K$

D. None of the above

Answer:

28. The focal length of a convex mirror is 20 cm, its radius of the curvature will be

A. zero

B. infinite

C. very less

D. negative

Answer:

29. A prism of refractive index n and angle A is placed in the minimum deviation position. If the angle of minimum deviation is A, then the value of A in terms of n is ....

A. $\sin^{-1}\left(\dfrac{n}{2}\right)$

B. $\sin^{-1}\sqrt{\dfrac{n-1}{2}}$

C. $2\cos^{-1}\left(\dfrac{n}{2}\right)$

D. $\cos^{-1}\left(\dfrac{n}{2}\right)$

Answer:

30. If the velocity of the particle is increased three times, then the percentage decrease in its de-Broglie wavelength will be...

A. 0.333

B. 0.666

C. 0.999

D. 1.332

Answer:

31. The de- Broglie wavelength of a particle of kinetic energy K is λ what would be the wavelength of the particle, if its kinetic energy were $\dfrac{K}{4}$?

    A. 2λ

    B. 3λ

    C. 4λ

    D. 5λ

Answer:

32. The AC current gain of a transistor is 120. What is change in the collector current in the transistor whose base current changes by $100\mu A$.

A. $12000\mu A$

B. $13000\mu A$

C. $1000\mu A$

D. 13 mA

Answer:

33. In p-n-p transistor circuit, the collector current is 10 mA. If 90 % of the holes reach the collector. Find emitter and base currents

A. 2 mA

B. 1 mA

C. 0 mA

D. 3 mA

Answer:

34. The following truth table is for

A	B	Y
1	1	1
1	0	1
0	1	1
0	0	1

A. NAND

B. AND

C. XOR

D. NOT

Answer:

35. What is the order of energy gap in a semi conductor?

A. 1 eV

B. 2 eV

C. 0 eV

D. None of these

Answer:

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36. An alternating current having peak value 14 A is used to heat a metal wire. To produce the same heating effect, a constant current i can be used where I is

A. 14A

B. above 20 A

C. $7A$

D. about 10 A

Answer:

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37. A wheel of mass 8 kg and radius of gyration 25 cm is rotating at 300 rpm what is its moment of inertia.

A. $1.57 Kg - m^2$

B. $0.63 Kg - m^2$

C. $4 Kg - m^2$

D. $4.15 Kg - m^2$

Answer:

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38. In the horizontal projection, the range of the projectile is

A. straight line

B. point

C. parabola

D. ellipse or circle

Answer:

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39. A bubble in glass slab (=1.5) when viewed from one side appears at 5 cm and 2 cm from other side, then thickness of slab is:

A. 3.75 cm

B. 3 cm

C. 10.5 cm

D. 2.5 cm

Answer:

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40. The total energy of an electron is 3.555 MeV, then its Kinetic energy is:

A. 3.545 MeV

B. 3.045 MeV

C. 3.5 MeV

D. None

Answer:

41. A prism of refractive index $\sqrt{2}$ has a refracting angle of $60°$. At what angle a ray

must incident on it so that when suffers a minimum deviation?

A. $45°$

B. $60°$

C. $90°$

D. $180°$

Answer:

42. The dimensional formula for Young's modulus is:

A. $\left[ML^{-1}T^{-2}\right]$

B. $\left[M^{\circ}LT^{-2}\right]$

C. $\left[MLT^{-2}\right]$

D. $\left[ML^2T^{-2}\right]$

Answer:

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43. A closed organ pipe and an open organ pipe are tuned to same fundamental frequency. What is the ratio of their length?

A. $1:2$

B. $2:1$

C. $3:4$

D. $4:3$

Answer:

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