



PHYSICS

BOOKS - UNITED BOOK HOUSE

MODEL PAPER SET-04

Exercise

1. The electric potential at any point in 3 dimensional co-ordinate (x,y, z) space is $V = 4x^2$ volt. The electric field at $(1m, 0m, 2m)$ point in V/m will be

A. $-8\hat{i}$

B. $8\hat{i}$

C. $-16\hat{i}$

D. $16\hat{i}$

Answer:



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2. If the charge on a capacitor is increased by 2 coulomb, the energy stored in it increases by 21%. The original charge on the capacitor is

A. 10 C

B. 20C

C. 30 C

D. 40 C

Answer:



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3. A thin wire of resistance 4Ω is bent to form a circle. The resistance across any diameter is

A. 4Ω

B. 1Ω

C. $\frac{1}{4}\Omega$

D. $\frac{1}{16}\Omega$

Answer:



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4. A galvanometer of resistance 8Ω . is shunted with 2Ω resistance. If total current is 1 A, then what will be the shunt current?

- A. 1.2 A
- B. 0.8 A
- C. 0.5 A
- D. 0.3 A

Answer:



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5. A bar magnet of magnetic moment M is suspended in a uniform magnetic field (B). The work done to rotate 180° from its equilibrium position will be —

A. MB

B. $2MB$

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

D. $4MB$

Answer:



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6. If Q is the dimension of charge then which quantity of the following is dimensionally equivalent to $[ML^2Q^{-2}]$

A. *Henry*

B. *Henry. meter*⁻¹

C. *Wb*

D. *Tesla*

Answer:



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7. The number of turns of a coil in an a.c. generator is 2000 . Area of the coil is $0.1m^2$ and angular speed is

200rad/sec . What will be the peak value of the induced e.m.f. when the magnetic field is 0.2T ?

- A. 1000 V
- B. 2000 V
- C. 4000 V
- D. 8000 V

Answer:

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8. An electromagnetic wave is propagating along X-axis. The magnitude of its electric vector $\vec{E} = 6v/m$ at $x = 1$

m and $t = 10$ sec. The magnitude of its magnetic vector is

—

A. 2×10^{-8}

B. 3×10^{-7}

C. 6×10^8

D. 5×10^{-7}

Answer:



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9. The angle of minimum deviation is the same as the angle of a glass prism of refractive index $\mu = \sqrt{3}$. What is the angle of the prism?

A. 30^2

B. 45°

C. 60°

D. 90°

Answer:



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10. Two periodic waves of intensities I_1 and I_2 are travelling through a region in a same direction at the same time. What is the summation of maximum and minimum intensities?

A. $I_1 + I_2$

B. $(\sqrt{I_1} + \sqrt{I_2})$

C. $(\sqrt{I_1} - \sqrt{I_2})$

D. $2(I_1 + I_2)$

Answer:



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11. If the electron in a hydrogen atom jumps from an orbit with level $n_1 = 2$ to an orbit with level $n_2 = 1$ the emitted radiation has a wavelength given by

A. $\lambda = \frac{5}{3R}$

B. $\lambda = \frac{4}{3R}$

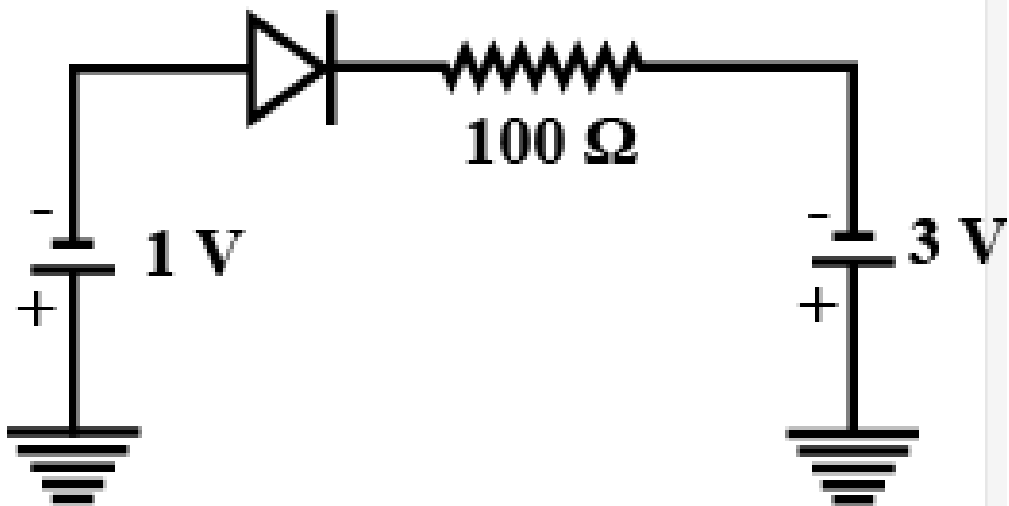
C. $\lambda = \frac{R}{4}$

D. $\lambda = \frac{3R}{4}$

Answer:

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12. Find the current through an ideal p-n junction diode as shown in figure is :



A. zero

B. 10 mA

C. 20 mA

D. 50 mA

Answer:



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13. In A.M. the maximum and minimum amplitude are 25 V and 5V respectively. The modulation index will be

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

B. $\frac{1}{5}$

C. $12/5$

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

Answer:



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14. The horizontal and vertical component of earth's magnetic field at a place are same. What is the angle of dip at that location?



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15. Which quantity' corresponds to J/T ? Define that quantity?

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16. When the current in a coil changes form +2A to-2A in 0.5 sec then the induced e.m.f. is 8V, Find self inductance of the coil.

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17. The real object distance and real image distance from a concave mirror are p and q respectively. Draw a graph between $\frac{1}{p}$ and $\frac{1}{q}$.



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18. Convert this into binary number $(17.625)_{10}$.



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19. If 1Ω shunt be connected across a galvanometer of 99Ω resistance, what fraction of the main current does the flow through the galvanometer?



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20. The potential difference between two ends of an electric bulb is reduced 2%. What should be the change

of dissipated power?



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21. Name the physical quantity whose S.I. unit is J/C. Is it a scalar or a vector quantity?



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22. Two protons P and Q moving with the same speed enter magnetic fields B_1 and B_2 respectively at right angles to the field directions. If B_2 is greater than B_1 , for which of the protons P and Q, the circular path in the magnetic field will be a smaller radius?



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23. What is microwave? Why is this wave used in RADAR?

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24. Derive the expression of 1st Bohr orbit applying Bohr's theory.

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25. The half life of radium is 1600 years. In how many years will $8 \times 10^{-3} \text{ kg}$ of radium become $1 \times 10^{-3} \text{ kg}$?

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26. What is modulation? Write down its utility.

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27. What is quantization of charge? Establish the expression of electric potential at a point for a point charge.

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28. The electric field in a region is radially outward with a magnitude $E=Ar$ where E = electric field, A is a constant = $100V/m^2$ and r denotes the distance from the origin in

meters. Find the charge contained in a sphere of radius 0.20 m centred as the origin.

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29. The equivalent capacitance are C_s and C_p when two capacitors are connected in series and parallel respectively. Find each of the capacitance of the two capacitors.

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30. The cyclotron frequency of a cyclotron is 10 MHz. What will be the effective magnetic field to accelerate proton?



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31. The focal length of a-convex lens is f . Show that if the object distance is $\left(f + \frac{f}{N}\right)$ then the images will form N times magnified in both cases.



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32. Calculate energy of an electromagnetic wave of wave length 0.0242\AA in eV unit.



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33. What is the origin of characteristics X-ray? When an electron of a hydrogen atom jumps from $n = 3$ to $n = 2$ orbit, then what should be the wavelength of the emitted photon? Does it correspond to visible range? Rydberg constant $R = 1.1 \times 10^7 \text{ m}^{-1}$.



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34. There are no electrons in the nucleus but how does it emit β particles? What is nuclear fusion?



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35. What is OR gate? Give its truth table.



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36. Sum in binary. $(10110)_2 + (10111)_2$.



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37. Define α_{dc} and β_{dc} of a transistor. Write the relation between these.



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38. Prove $V_{r.m.s} = \frac{V_0}{\sqrt{2}}$ in an a.c. circuit. Where V_0 = the peak value of voltage.





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39. Derive the relation among apparent depth, real depth and refractive index of a medium.



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