PHYSICS

BOOKS - UNITED BOOK HOUSE

MODEL PAPER SET-05

Exercise

1. A cube of length L is placed in a uniform electric field E. If two surfaces of the cube are perpendicular to E, then the total electric flux through the cube is—

A. $\frac{3}{4}EL^2$

B. $\frac{EL^2}{2}$

C. 0

D. EL^2

Answer:

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2. The space between parallel plates of a parallel plate capacitor C is filled with a oil of dielectric constant k = 2. If the oil is removed, then what will be the capacitance of the capacitor—

A. $\sqrt{2}C$

B. 2 C

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

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

Answer:

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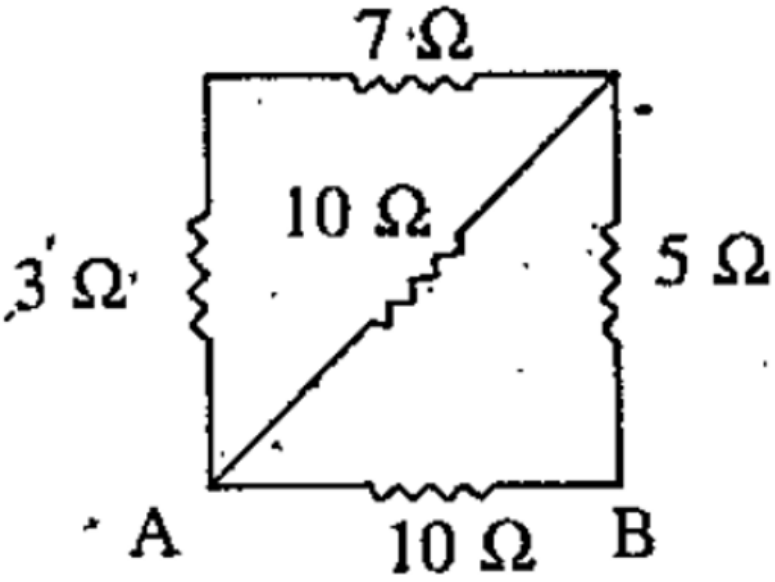
3. The equivalent resistance between A and B is in the figure given—



A. 5Ω

B. 10Ω

C. 20Ω

D. 30Ω

Answer:

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4. The r.m.s. value of current i = $(4 + 10 \sin 100\pi t)$ A is—

A. 7.07 A

B. 8.12 A

C. 11.07 A

D. 7.60 A

Answer:

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5. The energy of infrared ray is greater than—

A. visible light

B. u.v ray

C. microwave

D. $\gamma - ray$

Answer:

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6. A object is moving towards a fixed concave mirror of focal length f = 1 m.along the principal axis of the mirror With a velocity $5m/s$ when its distance is just 9m. The average velocity of image will be

A. $\frac{1}{5} m / s$

B. $\frac{1}{10} m / s$

C. $\frac{5}{9} m / s$

D. $\frac{4}{10} m / s$

Answer:

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7. The radius of curvature of convex surface of a piano convex is.15 cm and refractive index of the lens is 1.6. The power of the lens is—

A. $+1D$

B. 2D

C. $+3D$

D. $+4D$

Answer:

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8. The maximum kinetic energy of photo electron emitting' from a metallic surface of work function 1.8 eV is 0.5 eV. The corresponding stopping potential is—

A. 1.8 V

B. 1.3 V

C. 0.5 V

D. 2.3 V

Answer:

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9. What parts of a radioactive element is disintegrated in its average life period?

A. e

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

C. $\frac{e-1}{e}$

D. $\frac{e}{e-1}$

Answer:

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10. The value of a of a common base amplifier is 0.98. If the change of emitter current is 5 mA, then the change of collector current will be—

A. 2.9mA

B. 4.9 mA

C. 0.12 mA

D. 0.98 mA

Answer:

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11. Mobile phone acts in the frequency limit of

A. 1-100 MHZ

B. 100-200MHz

C. 1000-2000MHZ

D. 800-950MHZ

Answer:

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12. What is current sensitivity of a galvanometer?

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13. A coil has a number of turns n and area A. It is placed at an angle 60° with the direction of magnetic field . If B is change in magnetic field with time then what will be induced e.m.f in the coil?

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14. What is,the percentage of r.m.s. value of an a.c. current with respect to its peak value?

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15. Convert $(110111)_2$ into decimal number.

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16. Substract following in 1 s complement method 1101-1010=?

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17. Show that to get maximum power in an electrical circuit the external resistance should be equal to the internal resistance.

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18. There are n number of cells each of resistance R. When they are connected in parallel, the equivalent resistance is Y and when they are connected in series , the equivalent resistance is X. Find the relation between X,Y and R.

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19. The internal resistance of a battery of e.m.f. 100 Vis 4Ω. A voltmeter of resistance 250Ω is used to measure the e.m.f. of the battery. What should be the minimum value of the voltmeter resistance so that the error in finding the e.m.f. of the battery may not be more than 1 percent?

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20. A plane electromagnetic wave of frequency 25 Hz is moving along. x direction in free space.At a certain location ina moment the electric field $\vec{E} = 6.3\hat{j}V/m$. What will be the value of $\vec{B}$ in that location.

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21. What is electric dipole? Find electric field intensity at a point on the? perpendicular bisector of an electric dipole.

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22. Three point charges q, 2q and- 4q are in air at three points so-that the distance between any two charges is 10 cm. Calculate total potential energy of the system if q = 3×10^2esu.

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23. Establish the formula of equivalent capacitor for three capacitors in series combination.

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24. State Biot Savart's law.

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25. A ray of lilght is incident at a small angle θ on a rectangular glass slab of thickness t. IF the refractive index of glass is μ show that the perpendicular distance between the emergent ray from the slab and the incident ray is $\theta t(\mu - 1)/\mu$

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26. Write down the expression of angle of deviation by thin prism. A ray of light undergoes deviation of 30° when incident on an equilateral prism of refractive index

$\sqrt{2}$. Find the angle made by the ray inside the prism with the base of the prism.

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27. X-rays of wavelength λ fall on photosensitive-surface emitting electrons. Assuming that the work function of the surface can be neglected, prove that the de-Bfoglie wave-length of eleectrons emitted will be $\sqrt{\left(\frac{h\lambda}{2mc}\right)}$ .What is threshold frequency?

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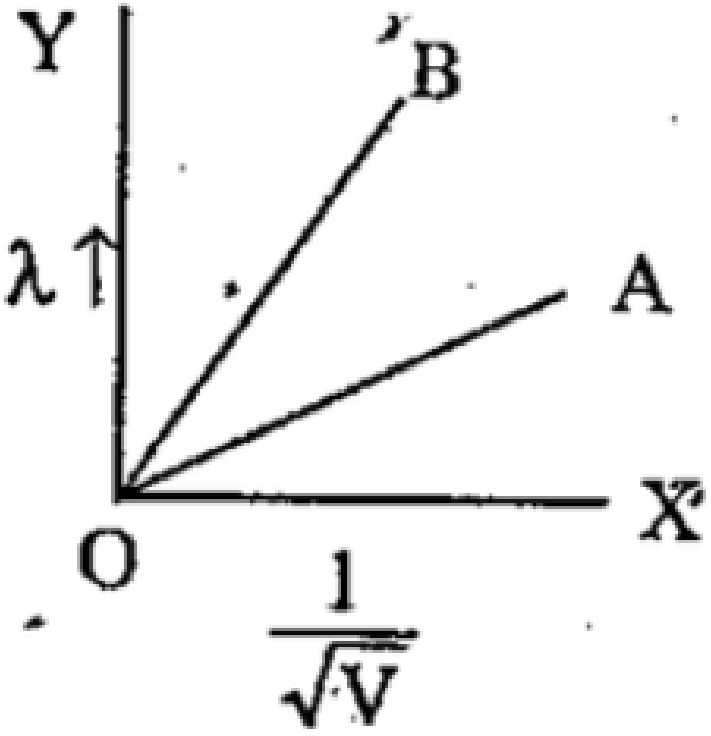
28. The two lines A and B shown in the graph plot the de Broglie wavelength (λ) as a function of $\frac{1}{\sqrt{V}}$ (V is the accelerating potential) for two particles having the same charge which of the two represents the particle for heavier mass? Write down Eienstein's equation in photoelectrie effect.



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29. What kind of diode is used as a voltage regulator? .draw the v-i characteristic curve for this diode.

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30. How is the p-n junction, used as a half wave rectifier and draw the input and output wave form for this rectification.

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31. Write Kirchhoff's 2nd law.

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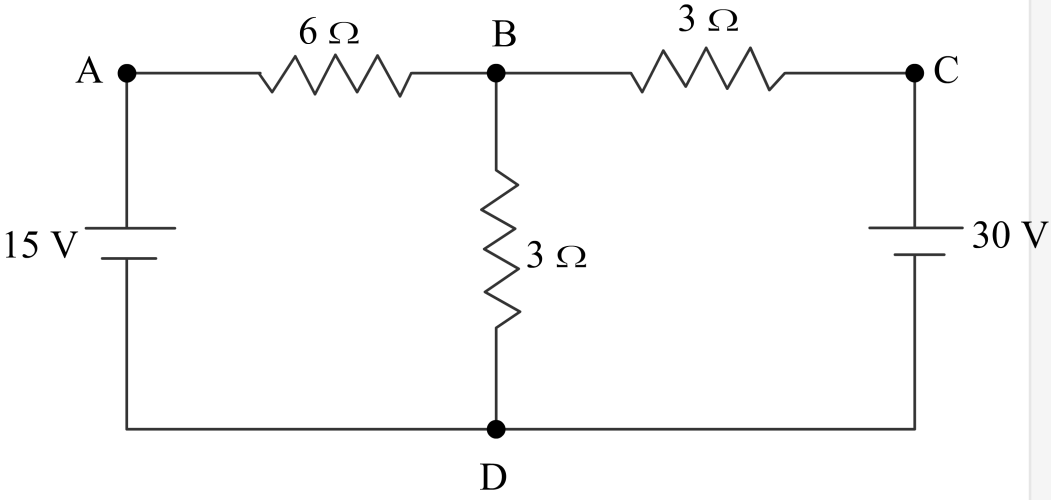
32. For the network of conductors forming an electrical circuit as shown in the figure, Find the current in each loop.



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33. What is the nature of temperature coefficient of resistance of a semiconductor?

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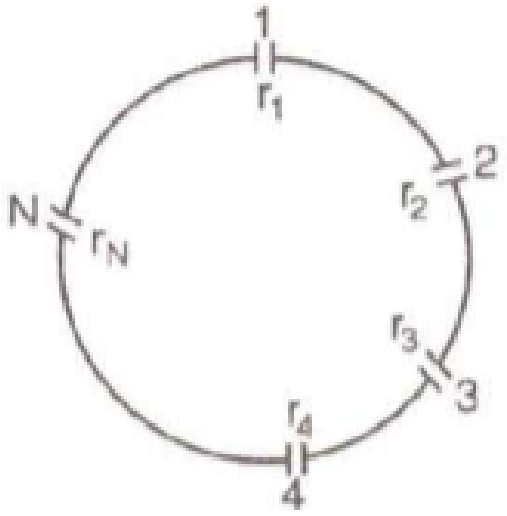
34. Group of N cells whose e.m.f. varies directly with the internal resistance, as per the equation $E_N = 1.5r_N$ are connected as shown in fig .Find the current I in the

circuit.



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35. Show that if n identical conductors are joined in series, the combined resistance is n^2 times as great as when they are joined in parallel.

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36. It is said that the induced current has no direction of its own. DO you agree to this statement? Why?

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37. A closed circular coils of average radius 10×10^{-2} m is placed normal in a uniform magnetic field of intensity 100×10^{-4} T. Determine the amount of charge flowing through the coil if it is turned through 180° about one of its diameters, giveii that the resistance of the coil is 2Ω.

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38. Show that in the C R circuit, the phase angle is $\tan^{-1}\left(\frac{1}{\omega CR}\right)$

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39. In an L-C-R circuit with all components connected in series,the e.m.f. and the current flowing in the circuit are given by the following equation : $e_d = 200\sin(314.\, t + \pi/6)$ Volt,I = 5 sin 314 t A. obtain:The peak values of current and e.m.f.

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40. In an L-C-R circuit with all components connected in series,the e.m.f. and the current flowing in the circuit are given by the following equation : $e_d = 200\sin(314.\ t + \pi/6)$ Volt,I = 5 sin 314 t A. obtain: The frequency of the a.c. source.

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41. In an L-C-R circuit with all components connected in series,the e.m.f. and the current flowing in the circuit are given by the following equation : $e_d = 200\sin(314.\ t + \pi/6)$ Volt,I = 5 sin 314 t A. obtain: The phase difference between current and e.m.f.

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42. In Young's double slit experiment the distance between two slits is 0.3×10^{-3} m, the distance betwe'en slits and screen is 1.2 m. Distance of second bright fringe from the centre of the central bright fringe is 4.5×10^{-3} m. Obtain wavelength of the ligth .

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43. In Young's double slit experiment the distance between two slits is 0.3×10^{-3} m, the distance betwe'en slits and screen is 1.2 m. Distance of second bright fringe from the centre of the central bright fringe is 4.5×10^{-3} m. Obtain fringe width.

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