



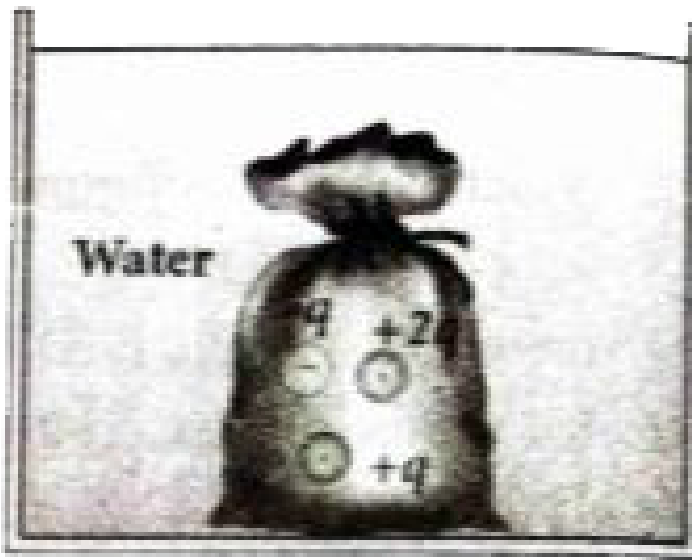
PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER - 17 (UNSOLVED)

Part I

1. The total electric flux for the following closed surface which is kept inside water



A. $\frac{80q}{\epsilon_0}$

B. $\frac{q}{40\epsilon_0}$

C. $\frac{q}{80\epsilon_0}$

D. $\frac{q}{160\epsilon_0}$

Answer: B



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2. A toaster operating at 240 V has a resistance of 120Ω . The power is

A. 400 W

B. 2W

C. 480 W

D. 240 W

Answer: C



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3. Which of the following has negative temperature coefficient of resistance ?

A. Copper

B. Aluminium

C. Germanium

D. Iron

Answer: C



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4. A wire of length l carries a current I along the Y direction and magnetic field is given by

$$\vec{B} = \frac{\beta}{\sqrt{3}} (\hat{i} + \hat{j} + \hat{k})T. \text{ The magnitude of}$$

Lorentz force acting on the wire is

A. $\sqrt{\frac{2}{\sqrt{3}}}\beta Il$

B. $\sqrt{\frac{1}{\sqrt{3}}}\beta Il$

C. $\sqrt{2}\beta Il$

D. $\sqrt{\frac{1}{2}}\beta Il$

Answer: A



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5. A moving charge is subjected to an external magnetic field. The change in the kinetic energy of the particle

A. increases with the increase in the field strength

B. decreases with the increase in the field strength

C. is always zero

D. depends upon whether the field is uniform or non-uniform.

Answer: C



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6. If the magnetic monopole exists , then which of the Maxwell's equation to be modified ?

$$\text{A. } \oint \vec{B} \cdot d\vec{A} = \frac{Q_{\text{enclosed}}}{\epsilon_0}$$

$$\text{B. } \oint \vec{B} \cdot d\vec{A} = 0$$

C.

$$\oint \vec{E} \cdot d\vec{A} = \mu_0 I_{\text{enclosed}} + \mu_0 \epsilon_0 \frac{d}{dt} \int \vec{E} \cdot d\vec{A}$$

$$\text{D. } \oint \vec{E} \cdot d\vec{l} = - \frac{d}{dt} \Phi_B$$

Answer: B



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7. In an electromagnetic wave the phase difference between electric field \vec{E} and magnetic field \vec{B} is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. π

D. zero

Answer: D



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8. A rod of length 10 cm lies along the principal axis of a concave mirror of focal length 10 cm in such a way that its end closer

to the pole is 20 cm away from the mirror. The length of the image is,

A. 2.5 cm

B. 5 cm

C. 10 cm

D. 15 cm

Answer: B



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9. Which mirror is to be used to obtain a parallel beam of light from a small lamp?

- A. Plane mirror
- B. Convex mirror
- C. Concave mirror
- D. None of the above

Answer: C



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10. A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and $\frac{\lambda}{2}$. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function at the surface of material is

A. $\frac{hc}{\lambda}$

B. $\frac{2hc}{\lambda}$

C. $\frac{hc}{3\lambda}$

D. $\frac{hc}{2\lambda}$

Answer: D



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11. Atomic number of H-like atom with ionization potential 122.4 V for $n = 1$ is

A. 1

B. 2

C. 3

D. 4

Answer: C



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12. Which of the following transitions in hydrogen atoms emits photon of highest frequency?

A. $n=1$ to $n=2$

B. $n=2$ to $n=6$

C. $n=6$ to $n=2$

D. $n=2$ to $n=1$

Answer: D



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13. The electrical is present in

A. AND

B. OR

C. NOR

D. NAND

Answer: A



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14. The ozone layer is present in

A. troposphere

B. stratosphere

C. ionosphere

D. mesosphere

Answer: B



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15. "Ski wax" is an application of nano product in the field of

A. Medicine

B. Textile

C. Sports

D. Automotive industry

Answer: C



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1. State Gauss's Law ?



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2. State Kirchhoff's current rule.



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3. What is meant by hysteresis?





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4. A circular antenna of area $3m^2$ is installed at a place in Madurai. The plane of the area of antenna is inclined at 47° with the direction of Earth's Magnetic field. If the magnitude of Earth's field at that place is $40773.9nT$ find the magnetic flux linked with the antenna .



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5. What is meant by Fraunhofer lines?



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6. What is Rayleigh's scattering?



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7. A radiation of wavelength 300 nm is incident on a silver surface. Will photoelectrons be observed ?



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8. What are the constituent particles of neutron and proton?

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9. The given circuit has two ideal diodes connected as shown in figure below. Calculate the current flowing through the resistance R_1



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1. Consider a point charge $+q$ placed at the origin and another point charge $-2p$ placed at a distance of 9 m from the charge $+q$. Determine the point between the two charges at which electric potential is zero.



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2. Distinguish between drift velocity and mobility.



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3. Compare dia, para and ferromagnetism.



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4. An inductor blocks AC but it allows DC . Why ? and How ?



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5. Light travelling through transparent oil enters into glass of refractive index 1.5. If the refractive index of glass with respect to the oil is 1.25, what is the refractive index of the oil?



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6. What is a photo cell? Mention the different types of photocells.



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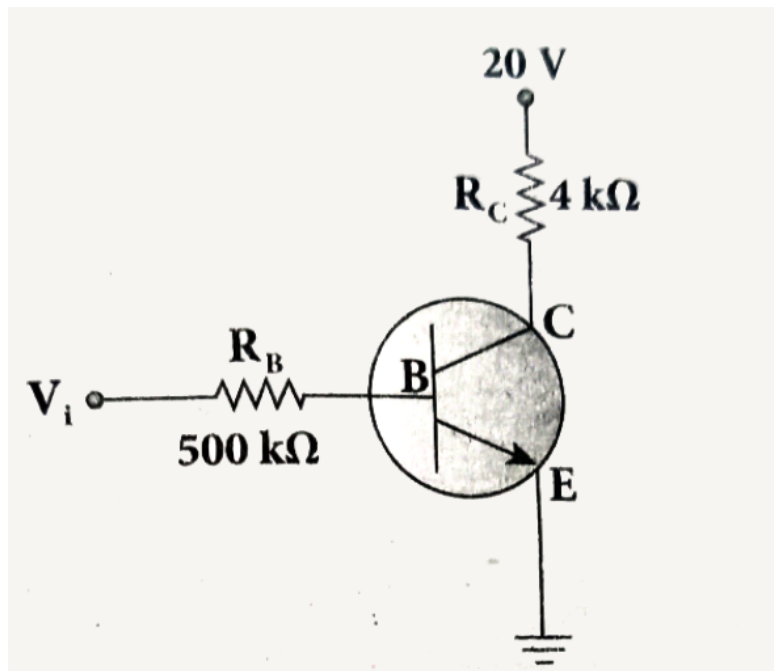
7. Write down the draw backs of Bohr atom model.



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8. In the circuit shown in the figure , the input voltage V_i is 20 V, $V_B E=0V$ and $V_C E=0V$. What

are the value of I_B , I_C , β ?



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9. Distinguish between wireline and wireless communication? Specify the range of

electromagnetic waves in which it is used.



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Part Iv

1. Explain in detail Coulomb 's law and its various aspects.



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2. Obtain the condition for bridge balance in Wheatstone's bridge.



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3. Discuss the working of cyclotron in detail.



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4. An inductor of inductance L carries an electric current i . How much energy is stored

while establishing the current in it ?



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5. Write down the properties of electromagnetic waves.



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6. Derive the equation for effective focal length for lenses in contact.



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7. What do you mean by electron emission ?

Explain briefly various methods of electron emission.



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8. Explain the J.J. Thomson experiment to determine the specific charge of electron.



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9. Draw the circuit diagram of a half wave rectifier and explain its working.



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10. Elaborate on the basic elements of communication system with the necessary block diagram.



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