

8.1.2020 Revision Exam – 1 Marks:70  
 XII (A-E) Physics Time: 3 Hrs

I. Choose the correct answer: 15x1=15

- The internal resistance of a 2.1v cell gives a current of 0.2A through a resistance of  $10\Omega$  is \_\_\_\_\_.  
 a.  $0.2\Omega$     b.  $0.5\Omega$     c.  $0.8\Omega$     d.  $1.0\Omega$
- Current is a scalar but current density is a \_\_\_\_ quantity.  
 a. scalar    b. vector    c. none    d. all the above
- Carbon arc furnaces produce temperature up to \_\_\_\_.  
 a.  $2000^\circ\text{C}$     b.  $4000^\circ\text{C}$     c.  $3000^\circ\text{C}$     d.  $7000^\circ\text{C}$
- The SI unit for electric field is \_\_\_\_\_.  
 a.  $\text{NC}^3$     b.  $\text{N}^{-1}\text{C}^{-1}$     c.  $\text{N}^\circ\text{C}^{-1}$     d.  $\text{NC}^{-1}$
- The number of electrons in one coulomb of negative charge \_\_\_\_.  
 a.  $6.21 \times 10^{21}$     b.  $6.23 \times 10^{19}$     c.  $6.25 \times 10^{18}$     d.  $6.25 \times 10^{17}$
- Two points A and B are maintained at a potential of 7V and -4V respectively. The work done in moving 50 electrons from A to B is \_\_\_\_.  
 a.  $8.80 \times 10^{-7}\text{J}$     b.  $-8.80 \times 10^{-17}\text{J}$     c.  $4.40 \times 10^{-17}\text{J}$     d.  $5.80 \times 10^{-17}\text{J}$
- The principle used in bainbridge mass spectrograph is \_\_\_\_.  
 a. velocity selector    b. acceleration of charges  
 c. thumb rule    d. deaccelerating of electrons
- One henry is equal to \_\_\_\_ a.  $1\text{VsA}^1$     b.  $1\text{WbA}^{-1}$     c.  $1\text{WbA}^3$     d.  $1\text{WbA}^{-3}$
- If the instantaneous value of alternating voltage  $v=10\sin(3\pi \times 10^4 t)$  at OS is \_\_\_\_\_.  
 a.  $-9.9\text{v}$     b.  $7.09\text{v}$     c.  $0\text{v}$     d.  $0.8\text{v}$
- $\frac{20}{\pi^2}$  H inductor is connected to a capacitor of capacitance C. The value of C in order to impart maximum power at 50HZ is \_\_\_\_\_.  
 a.  $50\mu\text{F}$     b.  $0.5\mu\text{F}$     c.  $500\mu\text{F}$     d.  $5\mu\text{F}$

11. In a transformer the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in primary is 6A, then that in the secondary coil is \_\_\_\_.

- a. 2A    b. 18A    c. 12A    d. 1A

12. \_\_\_\_ used to produce dehydrated fruits in green houses to keep the plants warm.

- a. X-rays    b. Infrared radiation  
 c. Microwaves    d. Radio waves

13. Which of the following is not an electromagnetic waves?

- a.  $\alpha$ -rays    b.  $\beta$ -rays    c.  $\gamma$ -rays    d. visible light

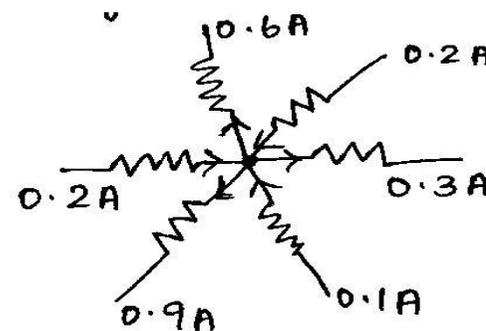
14. The dimension of  $\frac{1}{\mu_0 \epsilon_0}$  is \_\_\_\_\_. a.  $\text{LT}^{-1}$     b.  $\text{L}^2\text{T}^{-2}$     c.  $\text{L}^{-1}\text{T}$     d.  $\text{L}^{-2}\text{T}^2$

15. In the tangent galvanometer, the deflection is taken between \_\_\_\_.

- a.  $30^\circ-150^\circ$     b.  $30^\circ-180^\circ$     c.  $30^\circ-60^\circ$     d.  $30^\circ-70^\circ$

II. Answer the following, Q.no:8 is compulsory:[Any 6] 6x2=12

- Define action at points.
- Why it is safer to sit inside the bus than under a tree during lightning or thunder?
- From the given circuit find the value of I.



- State joule's law of heating.
- Define one ampere.

6. Difference between wattless and wattful current.
7. Write any 4 properties of electromagnetic waves.
8. Compute the speed of the electromagnetic wave in a medium if the amplitude of electric and magnetic fields are  $3 \times 10^4 \text{NC}^{-1}$  and  $2 \times 10^{-4} \text{T}$  respectively.

III. Answer the following: [Any 6] 6x3=18

- 1.a. Define electric flux.
  - b. Derive an expression for energy stored in a capacitor.
2. Explain the applications of Joules heating effect.
3. Obtain an expression for Torque acting on bar magnet in uniform magnetic field.
4. Using the relation  $\vec{B} = \mu_0 (\vec{H} + \vec{M})$ , show that  $X_m = \mu_r - 1$ .
5. Show that the total energy is conserved during LC oscillations.
6. Find out the phase relationship between voltage and current in a pure inductive circuit.
7. Explain the types of absorption spectra.
8. a. Why phosphor-bronze wire is used as a suspension wire.
  - b. Difference between coulomb's law and biot-savart law?

IV. Answer in detail: [Any 5] 5x5=25

1. Obtain an expression for electric field due to an infinitely long charged wire.
2. Derive an expression for average and RMS value of AC.
3. Write down Maxwell equations in integral form.
4. Explain the construction and working of transformer.
5. Find the magnetic induction due to a long straight conductor using Ampere's circuital law.

6. a. How the emf of two cells are compared using potentiometer?
- b. Find the heat energy produced in a resistance of  $10 \Omega$  when 5A current flows through it for 5 minutes.