BSC. PART - II EXAMINATION - 2013

PHYSICS SUB/ GEN

1. Select the correct option from the following :

(a) Which one of the following is the best suited for making a strong magnet:
    (i) Steel   (ii) Soft iron   (iii) Aluminium   (iv) None of these

(b) The relation $\vec{D} = \epsilon_0 \vec{E} + \vec{P}$ holds good :
    (i) Only in vacuum   (ii) Only inside the dielectric
    (iii) Only outside the dielectric   (iv) Everywhere

(c) Electron volt is the unit of :
    (i) Charge   (ii) Potential difference   (iii) Current   (iv) Energy

(d) Ohm's law in vector form is:
    (i) $\vec{E} = \vec{J} \sigma$ (ii) $\vec{E} = \dfrac{\vec{J}}{\delta}$ (iii) $\vec{E} = \sigma \vec{E}$ (iv) $\vec{J} = \dfrac{\vec{E}}{\delta}$

(e) Work done in establishing a current i in a coil of self inductance L is:
    (i) Li   (ii) Li^2 (iii) $\dfrac{1}{2} Li$ (iv) $\dfrac{1}{2} Li^2$

(f) If 0 is the phase difference between emf and current in an A.C. circuit, then power factor is: (i) sin 0   (ii) cos 0   (iii) tan 0   (iv) cot 0

(g) The intensity in the interference pattern becomes zero when the path difference between the two waves is:
    (i) $n\lambda$ (ii) $(2n + 1)\dfrac{\lambda}{2}$ (iii) Both (i) and (ii)   (iv) None of these
    where n is an integer.

(h) The bending of light from the sharp edge of on obstacle is called:
    (i) Deviation of Light   (ii) Refraction of Light
    (iii) Reflection of Light   (iv) Diffraction of Light

(i) When two plane polarised light waves of unequal amplitude with phase difference $\dfrac{\pi}{2}$ combine. they produce: (i) Plane polarised wave
    (ii) Circularly polarised wave (iii) Elliptically polarised wave (iv) None of these

(j) $\vec{E}$ and $\vec{H}$ represent electric and magnetic field vectors of an electromagnetic wave. then the direction of propagation of the wave is that of:
    (i) $\vec{E}$ (ii) $\vec{H}$ (iii) $\vec{E} \times \vec{H}$ (iv) $\vec{H} \times \vec{E}$

GROUP-A

2. Define electrical images. Obtain an expression for the field produced by a point charge in the presence of a conductor at zero potential with an infinite plane face.

3. What is photoelectric effect ? What are the laws of photoelectric effect ? Establish Einstein's equation of photoelectric emission.

4. Describe with a neat diagram the construction, theory and working of a moving coil of ballistic galvanometer. State the conditions under which this galvanomenter is (a) ballistic and (b) dead beat.

5. An alternating emf is applied to an LCR circuit in series. Find the expression for instantaneous current in the circuit. Under what conditions will electrical resonance occur?

GROUP - B

6. State Fermat's principle of least time and apply it to prove laws of reflection and refraction of light at a plane surface.

7. Explain the theory of Newton's ring. Describe how the wave length of monochromatic light is measured with the help of these rings.

8. Give the theory of plane transmission grating. How can you measure the wave length of sodium light with this method ?

9. Establish Maxwell's equation of plane electromagnetic wave in free space.