BSC. PART - II EXAMINATION - 2013

PHYSICS HONOUSRS PAPER IV

Answer five questions in all, selecting two questions each from Group A and Group B, in which Q. No. 1 is compulsory.

1. Choose the correct answer of the following :

(a) A ballistic galvanometer measures:

(i) Charge (ii) D.C. (iii) A.C. (iv) None of these

(b) Time constant of a circuit containing a capacitance C and resistance R is given by: (i) CR (ii) $\frac{1}{CR}$ (iii) $\frac{C}{R}$ (iv) R/C

(c) A circuit whose impedence is 60Ω has a reactance of 30Ω. Power factor is:

(i) 0.26 (ii) 0.5 (iii) 0.75 (iv) 1

(d) If E is E.M.F. developed in a thermocouple for wihei $\sigma = 0$ as one of the metal the Thomson co-efficient for the other metal is given by:

(i) $T^2\frac{dE}{dT}$ (ii) $T^2\frac{d^2E}{dT^2}$ (iii) $T.\frac{dE}{dT}$ (iv) $T.\frac{d^2E}{dT^2}$

(e) Velocity of plane electromagnetic wave in vacuum is given by:

(i) $C=\sqrt{\mu_0/\varepsilon_0}$ (ii) $C=\sqrt{\mu_0\varepsilon_0}$ (iii) $\frac{1}{\sqrt{\mu_0\varepsilon_0}}$ (iv) None of these

(f) An X-ray to be operates at 5000 KV. What is the energy of the most energetic X-rays photon produced?

(i) 5000 ev (ii) 5000 Mev (iii) 5000 Kev (iv) 500 Kev

(g) The equation of continuity in electromagnetism is given by:

(i) $\vec{\nabla}.\vec{j}+\frac{\delta\rho}{\delta t}=0$ (ii) $\rho+\frac{\delta\vec{j}}{\delta t}=0$ (iii) $\vec{j}=\sigma E$ (iv) $\vec{\nabla}\times\vec{j}+\frac{\delta\rho}{\delta t}=0$

(h) The existence of discrete energy level is shown by:

(i) Stern-Gerlack experiment (ii) Frank-Hertz experiment

(iii) Thomson experiment (iv) Bose experiment

(i) Pure rotation spectra of molecule lies in:

(i) Infra-red region (ii) Far-infrared region (iii) Visible region (iv) V-V. region

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(j) Lorentz Gauge transformation is given by:

(i) $\text{div}\,\phi = \frac{-\partial A}{dt}$ (ii) $\text{div}\,\phi = \frac{\partial A}{dt}$ (iii) $\text{Grad}\,\phi = \frac{-\partial A}{dt}$ (iv) None of these

GROUP-A

2. Give an account of photo-electricity and explain its importance in the theoretical physics. Describe the working of photo-voltaic cell.
3. What is Zeeman effect? Give its theoretical explanation and explain Lande-g-factor.
4. What is an AC Bridge? Describe, with necessary theory, the measurement of induc tance by Anderson bridge.
5. Define Seeback, Peltier and Thomson effect. Show that $\pi = T.\frac{dE}{dT}$ and

$\sigma_a - \sigma_b = T.\frac{d^2E}{dT^2}$ using thermodynamics.

GROUP-B

6. State and prove Poynting theorem for an electromagnetic field.
7. Derive e.m. wave equations for electric and magnetic fields in a conduction medium. Discuss the depth of penetration.
8. Disuess the motion of a charged particle in a crossed electric and magnetic field. What is velocity Selector?
9. Discuss the theory of rotation vibration spectra of diatomic molecule.

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