

# AAFAQ ACADEMY – KASUR

Physics Book II

Chapter (19) NEW

Objective + Subjective

## DAWN OF MODERN PHYSICS

Test Session 2014 – Name : \_\_\_\_\_ Roll No: (in words) \_\_\_\_\_

### OBJECTIVE

Time: 10 Minutes

Marks: 10

Note: Write your roll No. in space provided.

Over-writing, cutting, erasing, using of lead pencils will result into loss of marks.

Q.1: Encircle the correct answers.

- i. Which one of the following physical quantities change with relativistic speed?
- Length
  - Time
  - Mass
  - All of above
- ii. For a black body, the product of  $\lambda_m$  and T known as:
- Wien's constant
  - Planck's constant
  - Davison constant
  - Lumber's constant
- iii. The photoelectric effect predicts that light is made of:
- Photons
  - Neutrons
  - Protons
  - None of these
- iv. The unit of work function is:
- Electron
  - Ampere
  - Volt cell
  - Hz
- v. If the energy of photon is 10 eV and work function is 5 eV. Then the a value of stopping potential will be:
- 50 V
  - 2 V
  - 5 V
  - 15 V
- vi. Einstein photoelectric equation is:
- $hf = \phi + \frac{1}{2}mV_{\max}^2$
  - $\phi = hf + \frac{1}{2}mV_{\max}^2$
  - $hf + \phi = \frac{1}{2}mV_{\max}^2$
  - None of these
- vii. The Compton effect is associated with:
- X-rays
  - $\gamma$  -rays
  - Positive rays
  - $\beta$ -rays

viii. The numerical value of Compton wavelength is equal to:

- $3.43 \times 10^{-12} m$
- $1.43 \times 10^{-12} m$
- $2.43 \times 10^{-12} m$
- $0.43 \times 10^{-12} m$

ix. Unit of Stephen's constant is:

- $W m K^{-2}$
- $W m^{-2} K^{-4}$
- $W m K^{-4}$
- None

x. Compton shift is maximum for scattering angle of photon:

- $0^\circ$
- $90^\circ$
- $180^\circ$
- $45^\circ$

### SUBJECTIVE

Time: 30 min.

Marks: 20

Q.2: Write the short answers. (2×6)

- As a solid is heated and begins to glow, why does it first appear red?
- What happens to total radiation from a blackbody if its absolute temperature is doubled?
- Which photon, red, green, or blue carries the most (a) energy and (b) momentum?
- Which has the lower energy quanta? Radio waves or X-rays?
- Will bright light eject more electrons from a metal surface than dimmer light of the same colour?
- Will higher frequency light eject greater number of electrons than low frequency light?
- When light shines on a surface, is momentum transferred to the metal surface?
- Can pair production take place in vacuum? Explain?

Note: Long questions:

Q.3 (a) State and prove the Heisenberg uncertainty principle. (5)

(b) What is the mass of a 70 kg man in a space rocket traveling at 0.8 c from us as measured from Earth? (3)