



**CBSE SAMPLE QUESTION PAPER**  
**CLASS-XII**  
**PHYSICS [TERM-II]**

Time : 2 Hrs.

Maximum Marks : 35

**General Instructions :**

- (i) There are 12 questions in all. All questions are compulsory.
- (ii) This question paper has three sections: Section A, Section B and Section C.
- (iii) Section A contains three questions of two marks each, Section B contains eight questions of three marks each, Section C contains one case study-based question of five marks.
- (iv) There is no overall choice. However, an internal choice has been provided in one question of two marks and two questions of three marks. You have to attempt only one of the choices in such questions.
- (v) You may use log tables if necessary but use of calculator is not allowed.

**Section A**

1. (a) Which lens is used as magnifying glass and why ?  
(b) In Astronomical telescope, which lens is of smaller focal length ?
2. (a) Which radiation is of minimum energy among ultraviolet, X-rays and  $\gamma$  radiations ?  
(b) If rotating electron have orbit radius R while rotating in second orbit then calculate its orbit radius when it is in third orbit.
3. Give the four properties of electromagnetic wave.

**OR**

Calculate the momentum of a photon having frequency  $5 \times 10^{13}$  Hz. Given that  $h = 6.6 \times 10^{-34}$  Js and  $c = 3 \times 10^8$  ms<sup>-1</sup>.

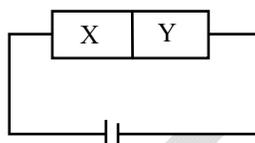
**Section B**

4. (a) If a glass slab of thickness 6 cm and refractive index  $\mu = 1.5$  placed over an object, then calculate apparent shift of object  
(b) Curved surface radius of a planoconvex lens is equal to focal length in terms of magnitude then calculate refractive index of lens material
5. Radiations of frequency  $10^{15}$ Hz are incident on two photo sensitive surfaces P and Q. Following observations are made:
  - (i) Surface P : Photoemission occurs but the photoelectrons have zero kinetic energy and
  - (ii) Surface Q: Photoemission occurs and photoelectrons have some kinetic energy. Which of these has a higher work function ? If the incident frequency is slightly reduced. What will happen to photo electron emission in two cases.

6. If distance between two slits in young's double slit experiment is  $0.5 \text{ mm}$  and distance of screen from plane of slits is  $1 \text{ m}$ . Then calculate distance between second maxima and fifth minima for wavelength  $4000 \text{ \AA}$ .
7. Three photo diodes  $D_1$ ,  $D_2$  and  $D_3$  are made of semiconductors having band gaps of  $2.5 \text{ eV}$ ,  $2 \text{ eV}$  and  $3 \text{ eV}$ , respectively. Which one will be able to detect light of wavelength  $6000 \text{ \AA}$  ?
8. If a radioactive substance can decay by two methods with half lives  $T_1$  and  $T_2$ . If the substance decays by both the methods then what will be the half life of substance ?
9. If light of wavelength  $5000 \text{ \AA}$  incidents over a slit of width  $0.5 \text{ mm}$  and fringe pattern is obtained over a screen at  $2 \text{ m}$  from slit. Then calculate width of central maxima.
10. Why matter waves are neither electro magnetic waves nor mechanical waves.

OR

Two semiconductor material  $X$  and  $Y$  shown in the given figure are made by doping germanium crystal with indium and arsenic respectively. The two are joined end to end and connected to a battery as shown.



- (i) will the junction be forward or reverse biased ?
- (ii) sketch a V-I graph for this arrangement.

11. A giant refracting telescope at an observatory has an objective lens of focal length  $15 \text{ m}$ . If an eyepiece lens of focal length  $1.0 \text{ cm}$  is used, find the angular magnification of the telescope. If this telescope is used to view the moon, what is the diameter of the image of the moon formed by the objective lens? The diameter of the moon is  $3.42 \times 10^6 \text{ m}$  and the radius of the lunar orbit is  $3.8 \times 10^8 \text{ m}$ .

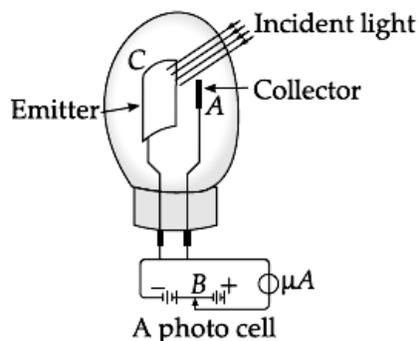
OR

Explain the term wave front. Describe Huygen's construction for propagation of wavefront in a medium.

## Section C

### 12. CASE STUDY : PHOTOCELL

A photocell is a technological application of the photoelectric effect. It is a device whose electrical properties are affected by light. It is also sometimes called an electric eye. A photocell consists of a semi-cylindrical photo-sensitive metal plate  $C$  (emitter) and a wire loop  $A$  (collector) supported in an evacuated glass or quartz bulb. It is connected to the external circuit having a high-tension battery  $B$  and micro ammeter ( $\mu\text{A}$ ) as shown in the Figure.



Sometimes, instead of the plate C, a thin layer of photosensitive material is pasted on the inside of the bulb. A part of the bulb is left clean for the light to enter it. When light of suitable wavelength falls on the emitter C, photoelectrons are emitted. These photoelectrons are drawn to the collector A. Photocurrent of the order of a few microampere can be normally obtained from a photo cell. A photocell converts a change in intensity of illumination into a change in photocurrent. This current can be used to operate control systems and in light measuring devices.

**Based on the above facts, answer the following questions:**

- (a) Photocell is an application of
- (i) thermoelectric effect.
  - (ii) photoelectric effect.
  - (iii) photoresistive effect.
  - (iv) None of the above
- (b) Photosensitive material should be connected to
- (i) –ve terminal of the battery.
  - (ii) +ve terminal of the battery.
  - (iii) any one of (i) or (ii).
  - (iv) connected to ground.
- (c) Which of the following statement is true?
- (i) The photocell is totally painted black.
  - (ii) A part of the photocell is left clean.
  - (iii) The photocell is completely transparent.
  - (iv) A part of the photocell is made black.
- (d) The photocurrent generated is in the order of
- (i) ampere
  - (ii) milliampere
  - (iii) microampere
  - (iv) None of the above
- (e) A photocell converts a change in \_\_\_\_ of incident light into a change in \_\_\_\_ .
- (i) intensity, photovoltage
  - (ii) wavelength, photovoltage
  - (iii) frequency, photocurrent
  - (iv) intensity, photocurrent