

Mock Board Exam

STD: XII

SUBJECT: Physics

ASSESSMENT: Mock Test

Maximum marks : 35

21/3/2022 11:00 - 21/3/2022

Time Limit : 150 Minutes

22:30

All questions are compulsory.

This question paper is divided in 3 Sections A, B and C.

The intended marks for questions are given in brackets.

Answers to sub parts of the same question must be given in one place only.

A simple scientific calculator without a programmable memory may be used for calculations.

A student has to answer a question either by typing it out, in the space provided, or writing down each answer on paper, and uploading a picture of it using the upload option.

A student is advised to write the answers in a clear, legible handwriting using a blue/black ball point pen before uploading it.

Section A

7 Marks

7 Marks

- 1 Plane and convex mirrors produce virtual images of objects. Can they produce real images under some circumstances? Explain **1 M**
- 2 What is the value of angular momentum of an electron in the second orbit of Bohr's model of hydrogen atom? **1 M**
- 3 Write any three advantages of Newtonian Telescope. **1 M**
- 4 In fission process, nucleus X divides into two nuclei Y and Z , their binding energies being E_X , E_Y and E_Z respectively. Then **1 M**
 - (A) $E_Y + E_Z = E_X$
 - (B) $E_Y + E_Z > E_X$
 - (C) $E_Y + E_Z < E_X$
 - (D) $E_Y E_Z = E_X$
- 5 Magnifying power of a simple microscope is (when final image is formed at $D = 25\text{ cm}$ from eye) **1 M**
 - (A) $\frac{D}{f}$
 - (B) $1 + \frac{D}{f}$
 - (C) $1 + \frac{f}{D}$
 - (D) $1 - \frac{D}{f}$
- 6 For a person, the distance of the eye lens from the retina is 2 cm and maximum focal length of the eye lens is 1.96 cm . Find the far point of the person. **1 M**
 - (A) 88 cm
 - (B) 98 cm
 - (C) 78 cm
 - (D) 68 cm

- 7 In which of the following processes, the number of protons in the nucleus increase **1 M**
- (A) α - decay (B) β^- - decay (C) β^+ - decay
 (D) K - capture

Section B

10 Marks

10 Marks

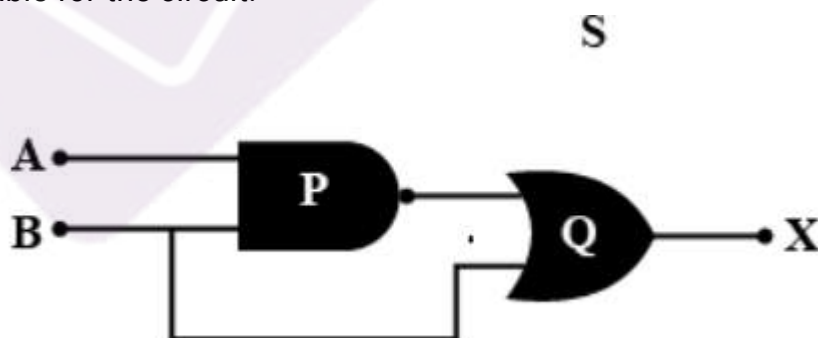
- 8 An electron with de-Broglie wavelength λ falls on the target in an X-rays tube. Find the cut-off wavelength λ_0 of the X-rays. **2 M**
- 9 a. Why are cadmium and boron rods used in a nuclear reactor? **2 M**
 b. Explain the function of moderators in a nuclear reactor.
- 10 In Bohr's model of hydrogen atom, the ratio of periods of revolution of an electron in $n = 1$ to $n = 2$ is **2 M**
- 11 Draw a ray diagram of a reflecting type telescope. State, its magnifying power. **2 M**
- 12 In Young's double slit experiment, the width of fringes obtained with a light of wavelength $6000 \text{ \AA}$ is 2 mm . What will be the fringe width if the entire apparatus is immersed in a liquid of refractive index $\frac{4}{3}$? **2 M**

Section C

18 Marks

18 Marks

- 13 i) Identify the logic gates marked P and Q . Also in the figure, write down the truth table for the circuit. **3 M**



- ii) What do you mean by universal gates?
- 14 (i) A thin mica sheet of thickness $2 \times 10^{-6} \text{ m}$ and refractive index $\mu = 1.5$ is introduced in the path of the first wave. The wavelength of the wave used is $5000 \text{ \AA}$. The central bright maximum will shift. **3 M**

(ii) A plate thickness t made of a material of refractive index μ is placed in front of one of the slits in a double slit experiment. What should be the maximum thickness t which will make the intensity at the centre of the fringe pattern zero?



- 15 (i) Explain the forbidden energy gap of an element. **3 M**
(ii) With label diagram show the different forbidden energy gaps for conductor, Semiconductor and Insulator.
- 16 Prove Snell's law for refraction using Huygens Principle. **3 M**
- 17 Derive the expression for magnifying power of a compound microscope with image at D . **3 M**
- 18 Calculate the longest and shortest wavelength in the Balmer series of Hydrogen atom. **3 M**