PG/IIS/PHS/204/25
(CBCS)

M.Sc. 2nd Semester Examination, 2025

PHYSICS

PAPER — PHS-204(CBCS)

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

GROUP — A

1. Answer any *four* questions : 2×4

    (*a*) State Newton's Laws of motion.

    (*b*) Write down the Thomson's atomic model.

(c) If our earth is assumed to be a solid sphere of iron of radius 6.37 *million metre* and density 7.86×10^3 kg. m^{-3}, then calculate the acceleration due to gravity at the earth's surface. Given, the value of universal gravitational constant $G = 6.58 \times 10^{-11}$ in S.I. unit.

(d) Explain how radio wave is generated.

(e) What are the advantages of optical fiber communication over copper wire communication ?

(f) Define Amplitude Modulation (AM) and Frequency Modulation (FM).

GROUP – B

2. Answer any *four* questions : 4×4

(a) (i) On the basis of Rutherford experiment, write down the features of the model of an atom.

(*ii*) Write the radioactive decay laws.

$2 + 2$

(*b*) Explain, giving reasons, how Einstein's interpretation of the photoelectric effect supported a wave or a particle model.

(*c*) (*i*) Describe the concept of 'inertia of an object'.

(*ii*) Write the differences between Classical mechanics and Quantum mechanics.

$1 + 3$

(*d*) How X-rays is produced in the laboratory ?

(*e*) What do you mean by resistivity of a material ? Prove that $\sigma = \frac{ne^2\tau}{m}$.

$1 + 3$

(*f*) Define crystalline and amorphous materials. Give one example of each.

$3 + 1$

GROUP – C

3. Answer any *two* questions : 8×2

(a) (i) What were Galileo's principle contributions to the advance of science ?

(ii) What are the main points of Dalton's atomic theory ?

(iii) How electrons were discovered ?

$2 + 3 + 3$

(b) (i) What do you mean by 'Primary rainbow' and 'Double rainbow' ?

(ii) State the laws of refraction of light. Give the relevant figure.

(iii) A balloon having a volume of 5.000 *l* is placed on a sensitive balance which registers a weight of 2.833 *g*. What is the "true weight" of the balloon if the density of the air is 1.294 $g.l^{-1}$?

$3 + 3 + 2$

[**Internal Assessment — 10 Marks**]