22PHU623

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Sixth Semester)

Branch – **PHYSICS**

MATERIAL SCIENCE

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 Bravais lattice consists of _____ space lattices.
(i) Eleven (ii) Twelve
(iii) Thirteen (iv) Fourteen

2 What does the conductivity of metals depend upon?
(i) The nature of the material (ii) Number of free electrons
(iii) Resistance of the metal (iv) Number of electrons

3 The process of heat softening, moulding and cooling to rigidness can be repeated for which plastics?
(i) Thermoplastics (ii) Thermosetting plastics
(iii) Both (i) and (ii) (iv) Neither (i) nor (ii)

4 The secondary electrons radiated back in scanning microscope are collected by?
(i) Specimen (ii) Aanode
(iii) Vacuum chamber (iv) Cathode

5 In which of the following materials, ultrasonic testing cannot be used?
(i) Plastics (ii) Ceramics
(iii) Non-ferrous objects (iv) Ferrous object

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a Define unit cell and primitive cell.
OR
b What is space lattice and crystal structure.

7 a Briefly explain the conductor and resistor materials.
OR
b Discuss about Czochralski technique.

8 a Write a note on Ferrites.
OR
b Distinguish between dia and para magnetic materials.

9 a Classification of nanomaterials.
OR
b Explain the nanoscale phenomena.

10 a Briefly explain the photo elastic and thermal methods.
OR
b Explain the principle and working of electron microscope.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Analyze the imperfection in crystals.

OR

b Sketch the following planes in a cubic unit cell (001), (101) and (111).

12 a Explain superconducting materials.

OR

b Write a note on different types of polarizations.

13 a Narrate the hysteresis property of ferromagnetic material

OR

b Explain the classification of polymers.

14. a Outline the principle and working of SEM.

OR

b Explain, how to produce nanoparticles using the ball milling technique.

15 a Explain, how to produce ultrasonic waves using Piezoelectric oscillator.

OR

b Write a note on visual and optical and ultrasonic method in NDT.

Z-Z-Z END