

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Sixth Semester)

Branch – PHYSICS

MATERIALS SCIENCE

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

1. Which of the following is characteristic of non-crystalline structures?
(i) Long range of periodicity (ii) Well defined structure and geometry
(iii) Low density (iv) Sharp diffraction pattern
2. What is the process of producing electric dipoles inside the dielectric by an external electric field?
(i) Polarisation (ii) Dipole moment
(iii) Susceptibility (iv) Magnetisation
3. The magnetic properties of a material are due to the existence of _____
(i) Electrons in atoms (ii) Electric dipole moment
(iii) Magnetic dipole moment (iv) None of the mentioned
4. A material with one dimension in Nano range and the other two dimensions are large is called _____
(i) Micro-material (ii) Quantum wire
(iii) Quantum well (iv) Quantum dot
5. Which of the following is used in electron microscope?
(i) Electron beams (ii) Magnetic fields
(iii) Light waves (iv) Electron beams and magnetic fields

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

6. a) Explain space lattices and crystal structure.
(OR)
b) Write a note on crystal directions and planes.
7. a) Distinguish between intrinsic and extrinsic semiconductors.
(OR)
b) Explain about the electric breakdown.

Cont

8. a) Write a note on domain theory of ferromagnetic material.
(OR)
b) Explain the structure of long chain polymers.
9. a) Write a note on classification of nanomaterials.
(OR)
b) Explain about the particle size analyser.
10. a) Write about the principle and working of electron microscope.
(OR)
b) Write a note on photo elastic and ultrasonic method in NDT.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11. a) Discuss in detail about the imperfections and dislocations in crystals.
(OR)
b) Write a note on crystal directions and planes.
12. a) Describe in detail about the free electron theory of conductor.
(OR)
b) Explain about the temperature and frequency effects of polarisation.
13. a) Explain about the classical theory of paramagnetic material.
(OR)
b) Write a note on ferrites.
14. a) With neat diagram, explain the principle, construction and working of TEM.
(OR)
b) Explain about the liquid phase synthesis.
15. a) Explain, how to produce ultrasonic waves using magnetostriction ultrasonic generator with neat sketch.
(OR)
b) Write a note on X-ray radio graphic method.

Z-Z-Z

END