20PHU22

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 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 The number of lattice points in the rhombohedral unit cell is
(i) 8 (ii) 4
(iii) 2 (iv) 1

2 The magnetization of a superconductor is
(i) 0 (ii) -B
(iii) -1 (iv) -H

3 The unit of magnetic permeability are
(i) Am^{-1} (ii) Wbm^{-2}
(iii) Hm^{-1} (iv) $WbA^{-1}\ m^{-1}$

4 Nanotechnology possesses the potential to assist the food industries in manufacturing foods that are
(i) Safer (ii) Cheaper
(iii) Sustainable (iv) all the above

5 NDT techniques are used to find the
(i) yield strength of the material
(ii) hardness of the material
(iii) defects present in the material
(iv) elastic moduli of the material

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

6 a Write note on crystal directions and crystal planes.
OR
b Give note on Cubic and Tetragonal Bravais Lattice with crystal system, space lattice and their unit cell.

7 a Explain the resistivity range of conductors.
OR
b Bring out the temperature and frequency effects in dielectrics.

8 a Explain B-H curve for a typical ferromagnetic material.
OR
b Sketch and explain long chain polymer with their structure.

Cont...

9 a Explain the synthesis procedure of nanoparticle by hydro thermal method.

OR

b Illustrate the mechanism behind the functioning of Ball milling setup.

10 a Explain about the equipment used in Non-destructive testing.

OR

b Give an account of Nondestructive testing by opto acoustic image processing.

SECTION -C (30 Marks)

Answer **ALL** questions

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

11 a Discuss the classification of crystal imperfection on the basis of their geometry.

OR

b Describe space lattices and crystal structures with neat sketch.

12 a Discuss in detail about free electron theory.

OR

b Describe the superconducting phenomenon by means of Meissner effect.

13 a Discuss in detail about the Domain theory of Ferromagnetic materials.

OR

b Describe the classification of polymers in detail.

14 a Discuss the principle, construction and working of SEM Elaborately.

OR

b Discuss in detail about the principle, construction and working of particle size analyzer.

15 a Discuss the Non-destructive testing by radiography method.

OR

b Describe the construction and working of Piezoelectric ultrasonic generator.

Z-Z-Z END