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## GIET UNIVERSITY, GUNUPUR – 765022

M. Sc. (Fourth Semester) Examinations, May' 2021

### PHPE 404 – CONDENSED MATTER AND MATERIALS PHYSICS – 2 (PHYSICS)

Time: 2 hrs

Maximum: 50 Marks

**The figures in the right hand margin indicate marks.**

#### **PART – A**

**(2 x 10 = 20)**

Q. 1 Answer **ALL** questions

- a. State the principle of fibre optic communication.
- b. What is F- centre? Give an example.
- c. What is meant by magnetic susceptibility?
- d. Define Neel temperature.
- e. What are spin waves?
- f. How is NMR used in medical field?
- g. What are nanoclusters?
- h. State Bragg's law of diffraction.
- i. What is a polymer?
- j. Define Giant magneto resistance.

#### **PART – B**

**(6 x 5 = 30)**

Answer **ANY FIVE** questions

Marks

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| 2. Define Einstein's coefficients and deduce an expression connecting them.  | (6) |
| 3. Describe the construction and working of He-Ne laser with energy level diagram. Give at least two industrial applications of He-Ne laser. | (6) |
| 4. What is the origin of diamagnetism in solids? Outline Langevin's theory of diamagnetism and obtain an expression for susceptibility.      | (6) |
| 5. Explain Antiferromagnetic order and discuss the susceptibility below the Neel temperature.  | (6) |
| 6. Discuss about diluted magnetic semiconductors.  | (6) |
| 7. Describe Mott's theory of spin dependent scattering of electrons.   | (6) |
| 8. Discuss briefly how Raman effect is employed in crystal studies   | (6) |
| 9. What is Mossbauer effect? Discuss the apparatus used for Mossbauer spectroscopy.  | (6) |

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