



HEF-003-1531001

Seat No. _____

M. Phil. (Physics) (Sem. I) (CBCS) Examination

December – 2017

**Research Methodology in Physics : Paper - I
(New Course)**

Faculty Code : 003

Subject Code : 1531001

Time : 3 Hours]

[Total Marks : 100

- Instructions :**
- (1) Attempt all questions.
 - (2) All questions carry equal marks.
 - (3) Assigned marks are mentioned on RHS.
 - (4) Mathematical symbols have usual meanings.

- 1 Answer in brief any TEN :
- (a) Give the names of techniques producing magnetic field. 2
 - (b) Draw the B-H loop and explain its main features. 2
 - (c) Who discovered superconductivity ? Which was the substance exhibited superconductivity in that particular experiment ? 2
 - (d) What are the applications of superconductivity ? 2
 - (e) Give details of applications of manganites. 2
 - (f) What is the full form of EDAX ? Where it is mainly used ? 2
 - (g) Write the main advantages of neutron diffraction. 2
 - (h) Define magneto-resistance. 2
 - (i) Explain in brief the destruction of superconductivity by magnetic field. 2
 - (j) How ionosphere plays important role in the radio wave propagation ? 2
 - (k) What is atmospheric aerosol ? How they occur ? 2
 - (l) Give difference of resistance and resistivity. 2

- 2** Answer any two :
- (a) Explain type - I and type - II superconductors with suitable examples. **10**
 - (b) Discuss superconductivity in terms of heat capacity and isotope effect. **10**
 - (c) Explain in detail the coherence length and penetration depth in superconductors. **10**
- 3** (a) Discuss in detail the structure of manganites with diagrams and explain its important features. **10**
- (b) Discuss in detail the Zener Double Exchange mechanism. **10**
- OR**
- 3** (a) With neat diagram explain the powder X-ray diffraction method. **10**
- (b) With suitable diagram explain the functioning of TGA set up. How the thermogram is interpreted ? **10**
- 4** Answer any two :
- (a) Explain vibrating sample magnetometer function with necessary diagrams. **10**
 - (b) Discuss in detail the four point probe method. **10**
 - (c) Explain the trans-ionospheric radio propagation technique. Why it is important ? **10**
- 5** Write notes on any two :
- (a) Air glow measurements **10**
 - (b) DLS method for particle size determination. **10**
 - (c) Jan-Teller effect **10**
 - (d) Ferro electricity and ferroelectric materials. **10**