2017

PHYSICS

Paper : 206 E

EXPERIMENTAL TECNIQUES IN MATERIAL SCIENCE

Full Marks: 40

Time: 1.5 hours

The figures in the margin indicate full marks for the questions

1. **Answer All** 2×5=10

   (a) Explain the term back streaming and back migration in diffusion pump. 2

   (b) Explain the term thermal conductivity of the gas. Write the advantage of pirani gauge over thermocouple gauge. 2

   (c) Explain the general principle of ionization gauge 2

   (d) What do you mean by refrigeration? How does it differ from cooling? 2

   (e) Explain the phase change processes of refrigeration. 2

2 **Answer the following (any six)** 6x5=30

   (a) What do you mean by rough vacuum? Explain the working principle of rotary pump. 1+4

   (b) With neat diagram, explain the working principle of diffusion pump. Why cooling is required in diffusion pump? 4+1

(c) Explain the working mechanism of Mcleod vacuum gauge. Write the advantage and disadvantages of this pump. 3+2

(d) Explain the working principle of cold cathode ionization gauge. Write the advantage and disadvantages of the gauge. 4+1

(e) Explain the working mechanism of hot cathode ionization gauge. Write the advantage and disadvantages of the gauge. 4+1

(f) What is getter ion pump? Explain the working mechanism of cryopump. 1+4

(g) Write the importance of refrigeration. Explain the thermoelectric refrigeration in details. 1+4

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