

[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 8405

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Roll No.....

Unique Paper Code : 222305

Name of the Paper : PHHP – Physics Lab III (Lab Theory)

Name of the Course : B.Sc. (Hons.) Physics, Part II

Semester : III

Duration : 1 Hour

Maximum Marks : 20

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **twenty** questions.
3. Each questions carries **one** mark.

1. How to check whether steady state has been achieved in any thermal experiment ?
2. Define mechanical equivalent of heat ?
3. Can we replace a DC source by an AC source (or vice-versa) in Callender and Barne's experiment ? Give reasons in support of your answer.
4. How do we ensure that the heat loss is same in Callender and Barne's experiment in two sets of observations ?
5. In Callender and Barne's apparatus, why water should be passed through the tube before passing the current ?
6. Answer with reference to errors whether it is better to use a  $1/10^{\text{th}}$  degree or a  $1/5^{\text{th}}$  degree thermometer in Searle's method for the measurement of thermal conductivity.
7. What would happen if a rod of smaller cross section is used in the Searle's method ?

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8. Can Lee and Charlton's method be used for the determination of thermal conductivity of a good conductor ?
9. How is Newton's law of cooling verified by plotting a graph ?
10. In Lee and Charlton's method why are the two thermometers kept close to the bad conductor ?
11. What is the thermal conductivity of a perfect insulator ?
12. Define thermal diffusivity.
13. What is the main objective of the Angstrom's method of determination of thermal conductivity ?
14. How does the resistance of a metal vary with temperature ?
15. How is the Resistance Temperature Device (RTD) different from a mercury thermometer ?
16. What is the maximum difference in the resistance of the two outer gaps in a Carey Foster's Bridge ?
17. What is the principle of a potentiometer ?
18. What is Seebeck effect ?
19. What determines the direction of current in a thermocouple ?
20. What is the order of the total thermo-emf generated for copper-constantan for 100 degrees Celsius difference of temperature between the two junctions ?
21. How do we ensure that all the wires of the potentiometer are effectively used in the determination of thermo-emf ?
22. Give two important applications of a thermocouple.
23. What is 'inversion temperature' of a thermocouple ?
24. How can the gain of an operational-amplifier (IC 741) be increased ?
25. Define 'standard error' for a set of n observations.