



U7514

Reg. No.:

Name:.....



University of Kerala
First Semester Degree Examination, November 2024
Four Year Under Graduate Programme
Discipline Specific Core Course
PHYSICS
UK1DSCPHY102- PROPERTIES OF SOLIDS
Academic Level: 100-199

Time: 1½ hours

Max.Marks: 42

Part A.

Answer All Questions, Objective Type. 1 Mark Each.
(Cognitive Level: Remember/Understand) 6 Marks. Time: 6Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
1.	What type of bonding is found in diamond?	Understand	1
2.	Which law states that the ratio of thermal conductivity to electrical conductivity of a metal is proportional to its temperature?	Remember	4
3.	What is the full form of MOSFET?	Remember	1
4.	Describe exchange interaction in ferromagnetic materials.	Understand	2
5.	Give two examples of superconducting materials and mention their transition temperatures.	Understand	3
6.	Define thermal diffusivity.	Understand	4

Part B.

Answer All Questions, Short Answer. 2 Marks Each.
(Cognitive Level: Understand/Apply) 8 Marks. Time: 24 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
7.	Explain Meissner effect in Superconductors.	Understand	3
8.	What are donor and acceptor energy levels in semiconductors?	Understand	1
9.	Find the relative permeability of a ferromagnetic material if a field strength of 200 Am^{-1} produces a magnetisation of 3100 Am^{-1} .	Apply	2
10.	One of the faces of a Cu cube of side 7.7cm is maintained at 100°C and the opposite face at 30°C . if the thermal conductivity of Cu is $385 \text{ Wm}^{-1}\text{K}^{-1}$. Calculate the rate of flow of heat through the cube.	Apply	4

Part C.

Answer all 4 questions, choosing among options within each question.

Long Answer. 7 Marks Each.

(Cognitive Level: Apply/Analyse/Evaluate/Create) 28 Marks. Time: 60 Minutes

Qn.No.	Question	Cognitive Level	Course Outcome (CO)
11.	A) Model a p-n junction by specifying the doping process and explain how the p-type and n-type regions influence the behaviour of the semiconductor in electronic devices. OR B) Demonstrate the working of LED and OLED with necessary theory.	Apply	1
12.	A) Illustrate how magnetic materials are classified as diamagnetic, paramagnetic and ferromagnetic. Mention any two uses of magnetic materials OR B) i) Demonstrate how magnetic materials are used for information storage. ii) Apply hysteresis curve to explain the behavior of a ferromagnet.	Apply	2
13.	A) Compare Type I and Type 2 Superconductors in detail. OR B) What are two key applications of superconductors in modern technology? Use BCS theory to explain Superconductivity	Apply	3
14.	A) Illustrate different thermoelectric effects in solids. Define thermoelectric power. OR B) Use appropriate theory to cylindrical flow of heat.	Apply	4