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Name: .....

Reg.No: .....

**SECOND SEMESTER M.Sc. INTEGRATED DEGREE EXAMINATION, APRIL 2023**

(CBCSS)

(Regular/Supplementary/Improvement)

**CC20 PHY2I C02 - PROPERTIES OF MATTER, THERMODYNAMICS, WAVES AND  
OSCILLATIONS, ELECTRICITY AND MAGNETISM, COMPUTATIONAL PHYSICS**

(Physics)

(2020 Admission onwards)

Time : 2.5 Hours

Maximum : 80 Marks

Credit: 4

**Part A (Short answer questions)**

Answer *all* questions. Each question carries 2 marks.

1. Write down the expression for the twisting couple on a cylinder and explain the symbols.
2. Give any two everyday examples involving surface tension.
3. How does the viscosity of a gas depend on its pressure?
4. What is meant by thermodynamic equilibrium?
5. Define efficiency of heat engine.
6. State Carnot's theorem.
7. Give Clausius Clapeyron equation. Explain the terms.
8. Write down the expression for kinetic energy of particle executing SHM.
9. Sound wave is a mechanical wave. Explain.
10. State the principle of conservation of electric charge. Give examples.
11. State and Explain Gauss's law.
12. What is the principle of tangent galvanometer?
13. Write the syntax of built in function to convert the entered string into integer?
14. What is meant by a variable in python?
15. What is meant by pickling in python?

**(Ceiling: 25 Marks)**

**Part B** (Paragraph questions)

Answer *all* questions. Each question carries 5 marks.

16. A spherical ball contracts in volume by 0.1 %, when subjected to a normal uniform pressure of 100 atm. Calculate the bulk modulus of the material of the ball (1 atm = 100 N/m<sup>2</sup>).
17. Write a note on effect of electrostatic pressure on a bubble.
18. Calculate the change in entropy of 5Kg water at 100 degree celsius when changes into vapour.
19. For a damped oscillator, the mass m of the block is 200g. Force constant=10N/m and the damping constant is 40g/S. Calculate the period of oscillation if oscillatory.
20. Derive the relation between relative permeability and magnetic susceptibility.
21. What are the features of a high-level programming language?
22. What are the advantages and unique features of python language over other programming languages?
23. Differentiate between python list, tuple, set and dictionary.

**(Ceiling: 35 Marks)**

**Part C** (Essay questions)

Answer any *two* questions. Each question carries 10 marks.

24. What is meant by cantilever? Derive the expression of the cantilever loaded at free end, when the weight of the cantilever is negligible.
25. State first and second law of thermodynamics. Write its application in thermodynamic processes.
26. Derive the expression for the force between the plates of a parallel plate capacitor, energy stored in the capacitor and energy density in electric field inside the capacitor.
27. Explain different list operations in python with examples.

**(2 × 10 = 20 Marks)**

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