1B2A22212 (Pages : 2) Reg. No:.........................

Name: ....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Second Semester Integrated M.Sc Geology Degree Examination, April 2022

PHY2IC01: Properties of Matter, Thermodynamics, Waves & Oscillations, Electricity & Magnetism, Computational Physics

(2020 Admission onwards)

Time: 2 ½ hours

Max. Marks: 80

PART A
Answer all questions

1. Define three elastic moduli.

2. Distinguish between intensive and extensive coordinates.

3. Explain what is meant by an harmonic oscillations.

4. State and explain Coulomb's law.

5. Write the syntax of a user defined function.

6. What are cohesive and adhesive forces? Give one example for each.

7. State First law of thermodynamics? Write the differential form of First law?

8. State Stokes Law.

9. Explain flexural rigidity of a beam.

10. Small drops of liquid are Spherical, Why?

11. What are the supported data types in Python?

12. What is Tan C position of deflection magnetometer?

13. Distinguish between paramagnets and ferromagnets.

14. Draw the PV diagrams of thermodynamic processes?

15. State the Principle of increase of entropy?

(15 x 2 = 30, ceiling 25 marks)

PART B
Answer all questions

16. With suitable example explain 'del' statement in Python.

17. Explain the principle and working of a Tangent galvanometer. Give one application.

18. A Carnot's engine whose lower temperature heat (sink) is at $27 \, 0^0C$ has its efficiency 40%. What is the temperate of the heat sources? By how much should the temperature of the source be raised if the efficiency if to be raised to 70 %?

19. Show that in longitudinal strain the work done per unit volume is equal to 1/2 (Stress x Strain).

20. Calculate the amount of energy needed to break a drop of water diameter 4×10^{-3} m into 10^9 droplets of equal sizes? Surface Tension of water is $72 \times 10^{-3} N/M$.

21. Derive Mayers equation using the first law of thermodynamics.

22. Define the terms;   a) Magnetizing field   b) Magnetic induction

    c) Magnetic Permeability   d) Intensity of magnetization   e) Magnetic Susceptibility.

23. Calculate the period of torsion pendulum consisting of a disc of mass 1.5 kg and radius 15 cm suspended by a wire of length 80 cm and radius 0.7mm.Rigidity modulus of the wire is 13.6×10^{10}.

(8 x 5 = 40, ceiling 35 marks)

PART C
Answer any two questions

24. Describe with the necessary theory the experimental determination of rigidity modulus of elasticity by torsion pendulum arrangement.

25. Describe the working of a Carnot's engine. Define efficiency of a heat engine. Derive an expression for efficiency of a Carnot engine.

26. State and Prove Gauss's Theorem. Apply it to find the electric field due to plane sheets of charge.

27. (a) Explain in detail, what are the rules for local and global variables in Python.

    (b) Write a python program for solving the equation $xe^x = 3$ correct to three decimals using bisection method

(2 x 10 = 20 Marks)

2B2A22213   (Pages : 2)   Reg. No:.....................

Name: ....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Second Semester Integrated M.Sc Geology Degree Examination, April 2022

GL02IB02–CRYSTALLOGRAPHY AND MINERALOGY

(2020 Admission onwards)

Time: 2 ½ hours   Max. Marks: 80

(Draw neat sketches, wherever necessary)

PART – A
All questions can be answered.
Each question carries Two mark.
Ceiling -25 Marks

1. Define unit cell.

2. Give different types of Habits.

3. What is composition plane?

4. Distinguish between twin plane and twin axis.

5. Explain morphological characters of crystals.

6. List out the various factors controlling the solid solution.

7. What do you mean by Transparent, Translucent and Opaque minerals?

8. Describe omission solid solution.

9. Explain fluorescence and phosphorescence properties of a mineral.

10. What are Ferromagnetism, Para-magnetism and Diamagnetism?

11. What do you mean by repeated twinning?

12. Distinguish mineral and mineraloid.

13. Draw and explain Contact Goniometer.

14. Define crystal zone.

15. Differentiate between Simple substitution and Coupled substitution.

PART – B
All questions can be answered.
Each question carries Five marks.
Ceiling -35 Marks

16. Write a note on plane of symmetry, axis of symmetry and centre of symmetry

17. Describe lustre, tenacity and fracture in detail

18. Classification of crystal forms

19. Explain what do you mean by 'interfacial angle', 'axial ratio', and 'hemihedral forms'

20. Symmetry and forms present in normal class of the Monoclinic system

21. Determination of specific gravity

22. Chemical properties of minerals

23. What is 'parameter' of a crystal face? Describe how is crystallographic notation done by 'Index system of miller'

PART - C
Answer any *two* questions.
Each question carries Ten marks.

24. Describe the symmetry elements and forms present in the *Galena type class* of the Cubic system.

25. Write about the characteristic features of the crystallographic axes of all the six major crystal systems and summarize the symmetry elements of the *Holohedral* classes of the six crystal systems.

26. Describe the symmetry elements and forms present in the *Normal class* of the Orthorhombic system.

27. What are silicates? Describe the types and classification of silicates.

2 x 10 = 20 Marks