K17U 1979

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree (CBCSS – Reg./Sup./Imp.) Examination, November 2017
(2014 Admn. Onwards)
Core Course in Physics
3B03PHY : ALLIED PHYSICS

Time : 3 Hours Max. Marks : 40

***Instruction** : Answer the questions in **English** only.*

SECTION – A

Very short answer type. **Each** carries **1** marks. Answer **all 4** questions.

1. In a FCC cubic lattice the number of nearest neighbours for a given lattice point is _____ ?
2. Longitudinal strain is not possible in the case of gases true or false ?
3. The power factor at resonance in LCR parallel circuit _____ ?
4. Who discovered X-rays ? **(4×1=4)**

SECTION – B

Very short answer type. **Each** carries **2** marks. Answer **7** question out of 10.

5. What are miller indices ? How are they determined ?
6. Define surface energy. How is it related to surface tension ?
7. Calculate the number of carbon atoms per unit all of diamonds.
8. What is packing efficiency ? What are its values for sc, bcc, fcc and hcp ?
9. What are the theoretical limits to the value of Poisson ratio ? For a material $\alpha = 0.7$ comment ?
10. It is easier to spray water when soap is added to it than when it is pure why ?
11. State and explain Kirchhoff's laws.
12. Is it possible to determine the viscosity of water by stock's method ?

P.T.O.

13. What is meant by ideal constant current source ?

14. Explain the term Skin effect. **(7×2=14)**

SECTION – C

Short essay/problem type. **Each** carries **3** mark. Answer **4** questions out of 6.

15. What is the optimum order of x-ray wave length used to observe the diffraction effects ? What happens if the wavelength deviated too much from this value, explain.

16. Determine the relationship between the lattice parameter a and the atomic radius r for monoatomic SC, BCC and FCC structures.

17. A liquid drop of radius 10^{-8} m breaks into 64 tiny drops find the resulting change in energy ? Assumes that the surface tension of liquid is 75×10^{-3} N/m.

18. How to Thevenize a given circuit ? Explain.

19. Derive an expression for the moment of the couple required to twist one end of a cylinder when the other end is fixed ?

20. Derive an expression for decay of charge while discharging a capacitor. **(4×3=12)**

SECTION – D

Long essay type. **Each** carries **5** marks. Answer **2** questions out of 4.

21. Describe the powder method for x-ray diffraction. Discuss the formation of diffraction pattern on the photographic film.

22. What is a cantilever ? Obtain an expression for the depression at the free end of a thin light be clamped horizontally at one end and loaded at the other end.

23. Describe with theory, stock's method of determining the viscosity of a highly viscous fluid.

24. Derive an expression for growth of charge in an LCR circuit and explain the different conditions for oscillation. **(2×5=10)**