Reg. No. : ....

Name : ....

III Semester B.Sc. Degree (CBCSS – Sup./Imp.) Examination, November 2021
(2015-'18 Admissions)
CORE COURSE IN PHYSICS
3B03PHY : Allied Physics

Time : 3 Hours   Max. Marks : 40

Instructions : 1) Section – **A** : Answer **all** questions (Very short answer type. **Each** question carries **1** mark).
     2) Section – **B** : Answer **any seven** questions (Short answer type. **Each** question carries **2** marks).
     3) Section – **C** : Answer **any four** questions (Short essay/problem type. **Each** question carries **3** marks).
     4) Section – **D** : Answer **any two** questions (Long essay type. **Each** question carries **5** marks).
     5) Write answers in **English** only.

SECTION – A

1. Define the term packing fraction.

2. What is meant by Poisson's ratio ?

3. The fundamental building block of a crystal structure is _____

4. The expression for capacitive reactance of an ac circuit is _____   (4×1=4)

SECTION – B

5. Obtain Braggs diffraction condition in direct lattice.

6. Define Miller indices. How are they obtained ?

7. Show that five-fold symmetry is not possible in a crystal.

8. Sketch (111) plane in a simple cubic unit cell.

9. Distinguish between angle of twist and angle of shear.

P.T.O.

10. Define critical velocity of a liquid flow. Obtain an expression for it.

11. Distinguish between a voltage source and current source.

12. What is meant by power factor of an ac circuit ?

13. Explain why small drops of mercury are spherical while large drops of mercury are flat.

14. Explain the working of a choke coil.   (7×2=14)

SECTION – C

15. How many lattice system and types exist in crystals ? Explain.

16. Derive an expression for excess pressure inside a soap bubble.

17. A spherical soap bubble of radius 1 cm is formed inside another of radius 2 cm. Find the radius of a single soap bubble whose internal pressure is the same as that of the smaller bubble.

18. A 400 mH coil of negligible resistance is connected to an AC circuit in which an effective current of 6 mA is flowing. Find out the voltage across the coil if the frequency is 1000 Hz.

19. Derive an expression for the resonant frequency of a series LCR circuit.

20. State and Explain Norton's Theorem.   (4×3=12)

SECTION – D

21. Derive Poiseuille's formula for the rate of flow of a liquid through a capillary.

22. Explain Laue method of X-Ray diffraction. Obtain Laue equations for X-ray diffraction by crystals.

23. What do you mean by bending moment ? Derive an expression for the depression of a uniform beam supported at its ends and loaded in the middle.

24. Explain growth and decay of current in a capacitor. What is meant by time constant ?   (2×5=10)