Reg. No. : ....

Name : ....

III Semester B.Sc. Degree (CBCSS- Reg./Sup./Imp.) Examination, November-2019
(2014 Admn. Onwards)
CORE COURSE IN PHYSICS
3B03PHY: ALLIED PHYSICS

Time : 3 Hours

Max. Marks :40

SECTION -A

Answer **All** questions (Very short answer type, Each question carries 1 Mark) (4×1=4)

1. What is space group?

2. In Diamond structure, the coordination number of each carbon is _____ and the nearest neighbour distance is equal to_____

3. The unit of modulus of rigidity is _____

4. According to Kirchoff's Voltage Law, the algebraic sum of all IR drops and e.m.f.s in any closed loop of a network is always_____

SECTION-B

Answer any **seven** questions (short answer type, Each question carries 2 Marks) (7×2=14)

5. Find the Miller indices for planes with each of the following sets of intercepts: (i) 3a, 3b, 2c; (ii) a, $\frac{b}{2}$,c

6. Why zeroth order diffraction is not considered as X ray diffraction.

7. Prove that a shear is equivalent to two linear strains of half the magnitude at right angles to each other.

8. State Superposition Theorem.

9. What is Poisson 's ratio? Explain its limiting value.

10. The young's modulus of a metal is $2 \times 10^{11} N/m^2$ and its breaking stress is $1.078 \times 10^9 N/m^2$. Calculate the maximum amount of energy per unit volume which can be stored in the metal when stretched.

11. What is reciprocity theorem?

12. What is surface energy and expression for surface tension?

13. Explain power factor?

14. Briefly explain Diamond structure.

SECTION- C

Answer any **Four** questions (short essay/ problem type. Each question carries 3 Marks). **(4×3=12)**

15. Describe Resistance, Inductance and Capacitance in series connection.

16. What is Norton's theorems and how to Norton's the given circuits.

17. Derive the expression for Excess Pressure Inside a Spherical liquid drop or an air bubble in a liquid.

18. Two circuits, the impedances of which are given by $Z_1 = 15+j12$ ohms and $Z_2 = 8-j5$ ohms are connected in parallel. If the potential difference across one of the impedance is $250+j0$ V, calculate total current and branch currents.

19. In a cubic unit cell, find the angle between normals to the planes (111) and (121).

20. Derive the expression for inter planar distance for the parallel (hkl) planes for an orthorhombic lattice.

SECTION- D

Answer any **Two** questions (Long essay type, Each question carries 5 Marks). **(2×5=10)**

21. Obtain Laue's equation for X ray diffraction by crystals. Show that these are consistent with Bragg's law.

22. Give the theory and method of determining the surface tension of water by capillary rise.

23. Explain viscosity in detail. Derive stoke's formula.

24. Describe ac through a resistance, inductance and capacitance in series.

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