



K15U 0215

Reg. No. :

Name :

III Semester B.Sc. Degree (CCSS – 2014 Admn. – Regular) Examination,
November 2015
Core Course in Physics
3B03PHY : ALLIED PHYSICS

Time : 3 Hours

Maxi. Marks : 40

SECTION – A

Answer **all** questions very short answer type. **Each** question carries **1** mark.

- 1) The number of lattice points in a primitive cell are _____
- 2) The potential energy per unit volume of a strained wire is _____
- 3) What is the unit of coefficient of viscosity ?
- 4) At half power points of a resonance curve, the current is _____ times the maximum current. (4×1=4)

SECTION – B

Answer **any seven** questions short answer type. **Each** question carries **2** marks.

- 5) What are Miller indices ? How are they determined ?
- 6) Show that the packing factor for fcc lattice is $\frac{\pi\sqrt{2}}{6}$.
- 7) What is Poisson's ratio ? Show that the theoretical limiting values of Poisson's ratio are -1 and 0.5.
- 8) What is terminal velocity ? How terminal velocity is attained ?
- 9) Prove that surface tension is numerically equal to surface energy.

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- 10) Differentiate between streamline flow and turbulent flow.
- 11) State Kirchoff's laws with diagram.
- 12) Explain ideal constant - voltage source.
- 13) Explain resonance in parallel LCR circuit.
- 14) Explain power factor. (7×2=14)

SECTION – C

Answer **any four** questions short essay/problem type. **Each** question carries **3** marks.

- 15) Calculate the packing fraction and density of sodium chloride from the following data : Radius of Na = 0.098nm; Radius of Cl = 0.181nm; Atomic mass of Na = 22.99amu; Atomic mass of chlorine = 35.45amu.
- 16) An X-ray beam of wavelength 0.071nm is diffracted by a cubic KCl crystal of density $1.99 \times 10^3 \text{kgm}^{-3}$. Calculate the interplanar spacing for (200) planes and the glancing angle for the second order reflection from these planes. The molecular weight of KCl is 74.6amu and the Avogadro's number is $6.023 \times 10^{26} \text{kg}^{-1} \text{mol}^{-1}$.
- 17) Derive an expression for excess pressure inside a liquid drop.
- 18) A gold wire 0.32mm in diameter, elongates by 1mm when stretched by a force of 330gm. wt and twists through 1 radian, when equal and opposite torques of $145 \times 10^{-7} \text{Nm}$ are applied at its ends. Find the value of Poisson's ratio for gold.
- 19) A resistance of 20Ω , an inductance of 0.2H and a capacitance of $100\mu\text{F}$ are connected in series across 220V, 50Hz mains. Determine the following
(a) impedance (b) current (c) voltage across R,L and C (d) power in watts
(e) power factor.
- 20) An alternating emf of 200V, 50Hz is applied to a capacitor in series with a 20V,5W lamp. Find the capacitance. (4×3=12)