Basc.1103 Engineering Physics (2+1) **Marks: 50**

Time: 2 hours

I **Answer all the questions** (10x1=10)

1 In Newton's ring experiment, predict what will happen, if a few drops of a transparent liquid is introduced between the lens and plate.
2 Name the properties of laser source associated with the use of lasers in 'laser induced fusion'.
3 Define Meissner's effect.

State True or False

4 Surface energy is the potential energy per unit area of the surface.
5 The susceptibility of a diamagnetic material is a positive value.

Fill in the blanks

6 The coefficient of viscosity of liquids............rapidly with the rise in temperature.
7 The temperature at which a normal conductor is converted into a super conductor is known as ....
8 An intrinsic semiconductor can be converted into an extrinsic semiconductor by a process called as......
9 Splitting of spectral lines in presence of magnetic field is known as----------------
10 The light signals are transmitted through optical fibres by...........................

II **Write Short notes on ANY FIVE of the following** (5x2=10)

1 Distinguish between Fresnel's and Fraunhoffer's class of diffraction.
2 Explain why a four level laser is preferred over a three level laser?
3 Account for non-uniform spacing of Newton's rings pattern.
4 It is easy to show diffraction with sound waves but it is difficult to show diffraction with light waves. Why?
5 Differentiate between n-type and p-type semiconductors.
6 What is Reynolds number? What is its significance?
7 Write a note on high T_C superconductors.

III **Answer ANY FIVE of the following** (5x4=20)

1 Briefly describe any four major properties of a laser.
2 Distinguish between intrinsic and extrinsic semiconductors.
3 In Newton's rings pattern, prove that the diameter of dark rings are proportional to square root of natural numbers.
4 Distinguish between Type I and Type II super conductors.
5 Write a note on nuclear magnetic resonance and it's use,
6 In Newton's rings setup the diameters of the 5th and 10th dark rings are 0.4 cm and 0.6 cm respectively. If the wavelength of light used is 5460 X 10^{-8} cm, calculate the radius of curvature of the lens used.
7 Define Holography and explain the recording of a hologram

IV **Write an essay on ANY ONE of the following** (1x10=10)

1 How will you explain surface tension of a liquid in terms of molecular forces? How do you determine the surface tension by capillary rise method?
2 Explain how light is propagated through an optical fiber. Derive expressions for the numerical aperture, acceptance angle and critical angle.

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