

B.E - Bachelor of Engineering (CBCS Pattern) Second Semester
2BEAB02 - Applied Physics - II

P. Pages : 2

Time : Two Hours



GUG/W/18/11472

Max. Marks : 40

- Notes :
1. Due credit will be given to neatness and adequate dimensions.
 2. Assume suitable data wherever necessary.
 3. Illustrate your answers wherever necessary with the help of neat sketches.
 4. Use non programmable / scientific calculator is permitted.

List of Constants :

1. Planck's constant, $h = 6.63 \times 10^{-34}$ J.S.
2. Velocity of light, $c = 3 \times 10^8$ m/s
3. Boltzmann constant $k = 1.38 \times 10^{-23}$ J / K
4. Charge of electron, $e = 1.6 \times 10^{-19}$ C
5. Mass of electron, $m = 9.1 \times 10^{-31}$ kg

1. a) What is thin film? Obtain an expression for fringe width in the interference pattern of wedge-shaped thin film. 4
b) State any two applications of Newton's Ring. In this experiment why 1+4
i) The rings are not equally spaced.
ii) The central fringe is dark.
c) Light of wavelength 6000 \AA falls normally on a thin wedge-shaped film of Refractive Index 1.4, forming fringes that are 2 mm apart. Find the angle of wedge. 4

OR

2. a) What is meant by plane polarized, elliptically polarized and circularly polarized light. 5
b) Explain the term 4
i) Double refraction ii) Optic axis
iii) Positive crystal iv) Negative crystal
c) Find the thickness of a quarter wave plate for the wavelength of light of 589 nm and $\mu_0 = 1.55$, $\mu_e = 1.54$. 4
3. a) Explain how a charged particle describe a helical path in a uniform magnetic field. Obtain an expression for pitch, radius and time period of helix. 6
b) Explain the working of velocity selector. 4

- c) Electrons are accelerated through a potential difference of 200V and then projected at right angles into a magnetic field of 0.01 wb/m^2 . Calculate the velocity of electron on entering the field and determine the radius of the path. **4**

OR

4. a) Draw a block diagram of CRO. What is the function of Trigger Ckt. And Time base Ckt. **6**
- b) Explain the principles and working of Bainbridge mass spectrograph. **4**
- c) An electron passes undeviated through a velocity selector having Electric field intensity is 10^4 V/m and magnetic field is 0.02T. Determine the speed of electron. **4**
5. a) Explain the term **4**
- i) Stimulated emission ii) Pumping
- iii) Metastable state iv) Population Inversion
- b) Explain the principle and working of Ruby Laser with neat energy level diagram. **5**
- c) A typical helium – neon laser emits radiation of $\lambda = 6328 \text{ \AA}$. How many photons per second would be emitted by one milliwatt He-Ne laser. **4**

OR

6. a) Explain the term : **4**
- i) Acceptance Cone ii) Critical angle
- iii) Graded Index Fibre iv) Attenuation
- b) Derive the mathematical expression for Numerical Aperture and Acceptance angle for step index fibre. **5**
- c) Numerical aperture of a fibre is 0.5 and core R. I. is 1.48. Find cladding R.I. and Acceptance angle. **4**
