

# FE Sem 2 Applied Physics II (R-2012)

- **Total 6 Questions of 15 marks each**
- Q-1 Compulsory. Will contain 7 bits of 3 marks each.
- Solve any **Three** from (Q-2 to Q-6)

	Question	Marks	Unit No
Q-1	a	3	1.1
	b	3	1.3
	c	3	2.1
	d	3	2.2
	e	3	3.3
	f	3	4.1
	g	3	5.1
Q-2	a	8	1.1
	b	7	2.1
Q-3	a	8	2.2
	b	7	1.1
Q-4	a	5	1.3
	b	5	3.2
	c	5	5.1
Q-5	a	5	1.3
	b	5	3.3
	c	5	6.1
Q-6	a	5	3.1
	b	5	4.1
	c	5	6.1

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## Content Wise Blueprint

Module No.	Unit No.	Unit Title(contents)	Unit Wise Marks	Module wise total Marks
01	1.1	Interference in thin film - Introduction. Interference due to reflected and transmitted light by thin transparent parallel film. Origin of colour in thin film. Wedge shaped thin film. Newton's rings.	10	33
	1.2	Applications of interference – Determination of thickness of very thin wire or foil. Determination of refractive index of liquid. Wavelength of incident light. Radius of Curvature of lens. Testing of surface flatness. Non-reflecting films. Highly reflecting film.	10	
	1.3	Diffraction of Light - Introduction: Fraunhofer diffraction at single slit. Fraunhofer diffraction at double slit. Diffraction due to N- slits (Diffraction Grating). Missing orders. Highest possible orders. Determination of wavelength of light with a plane transmission grating: resolving power of a grating. Dispersive power of a grating. <b>02</b>	13	
02	2.1	<b>Fibre optics:</b> Introduction. Total internal reflection. Basic construction. Optical fibre as light guide and types of optical fibre; Numerical Aperture and maximum angle of acceptance. Numerical Aperture for graded index fiber: V-number. Maximum number of possible orders: Losses in optical fiber: Merits of optical fiber: Applications.	10	20
	2.2	<b>Lasers:</b> Quantum processes as absorption, spontaneous emission and stimulated emission, Meta-stable states, population inversion, pumping, resonance cavity. Einstein's equations, Helium Neon laser, Nd: YAG laser, Semiconductor laser, Applications of laser-Holography (construction and reconstruction of Holograms) and other applications.	10	
3	3.1	Introduction, Wave particle duality, De Broglie Wave length, Experimental verification of de Broglie theory,	05	18

		Properties of matter Waves, Wave packet, group velocity and phase velocity, Wave function, Physical interpretation of wave function		
	<b>3.2</b>	Heisenberg's uncertainty principle. Electron diffraction experiment and Gamma ray Microscope experiment. Applications of Uncertainty principle.	<b>05</b>	
	<b>3.3</b>	Schrodinger's time dependent wave equation. Time independent wave equation Motion of free particle. Particle trapped in one dimensional infinite potential well.	<b>08</b>	
4	<b>4.1</b>	Electrostatic focusing. Magneto static focusing. Cathode ray tube (CRT). Cathode ray Oscilloscope (CRO). Application of CRO.	<b>08</b>	<b>08</b>
5	<b>5.1</b>	Introduction, Meissner Effect. Type I and Type-II superconductors. BCS Theory (concept of Cooper pair). Josephson effect. Applications of Superconductors – SQUID, MAGLEV.	<b>07</b>	<b>07</b>
6	<b>6.1</b>	Introduction to Nano-science and Nanotechnology. Two main approaches in nanotechnology - Bottom up technique and top down technique. Tools used in nanotechnology such as Scanning electron microscope. Scanning Tunneling Microscope. Atomic Force Microscope. Nano materials: Methods to produce nanomaterial. Applications of Nanomaterial. Different forms of carbon Nanoparticles. Carbon nanotubes. Properties and Applications.	<b>10</b>	<b>10</b>
		<b>Grand Total</b>		<b>96</b>

\*Variation up to  $\pm 2$  marks is possible in the total marks for the module

#Grand total includes all optional Q. Nos. from 2 to 6 and internal options of Q. No. 1

## Distribution of Marks :

Module No.	Unit No.	weightage	Q-1 (comp) 3 X 7	Q-2 (opt) 8+7	Q-3 (opt) 8+7	Q-4 (opt) 5+5+5	Q-5 (opt) 5+5+5	Q-6 (opt) 5+5+5	Weightage For Module
<b>1</b>	1.1	10	3		7				33
	1.2	10		8					
	1.3	13	3			5	5		
<b>2</b>	2.1	10	3	7					20
	2.2	10	3		8				
<b>3</b>	3.1	5						5	18
	3.2	5				5			
	3.3	8	3					5	
<b>4</b>	4.1	8	3					5	8
<b>5</b>	5.1	7	3			5			7
<b>6</b>	6.1	10					5	5	10
<b>TOTAL</b>		<b>96(60)</b>	<b>21(15)</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>96</b>

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