INTERNAL ASSESSMENT TEST - 1

Dept: FY	Sem / Div:I /A,B,C & D	Sub:Engineering Physics	S Code:15PHY12
Date: 20/08/2015	Time:3.00pm – 4.30pm	Max Marks: 40	Elective: N
Note: (i)Answer any 2 full questions.			
(ii)Some constants: $e = 1.6 \times 10^{-19}$ C; $c = 3 \times 10^{8}$ m/s; $h = 6.626 \times 10^{-34}$ Js; $k = 1.38 \times 10^{-23}$ J/K			

QN		Questions	Bloom's Level	Marks
1	a	What is a perfect black body and explain characteristics of black body radiation spectrum with diagram?	L2	5
	b	Explain quantum theory of radiation and reduce Planck's law to Wien's law and Rayleigh-Jeans law.	L2	7
	c	State and explain Heisenberg's uncertainty principle and discuss its physical significance.	L2	4
	d	Explain Compton effect.	L2	4
2	a	Explain the limitations of Wien's law and Rayleigh- Jeans law of black body radiation.	L2	4
	b	Explain dual nature of light.	L2	3
	c	Explain the concept of phase velocity and group velocity and obtain the expression for group velocity.	L2	8
	d	X-ray photons of energy 0.12 MeV undergo Compton scattering through 180^0. Calculate energy and wavelength of the scattered photon.	L3	5
3	a	State de Broglie hypothesis and show that the de Broglie wavelength for an electron accelerated by a potential difference V volt is $\lambda = \frac{1.226}{\sqrt{V}} nm$	L2	7
	b	Derive the relation between group velocity and phase velocity and show that group velocity is equal to particle velocity.	L2	8
	c	Compute the de Broglie wavelength for a neutron moving with one tenth part of the velocity of light. Given: Mass of neutron is $1.674 \times 10^{-27} kg$	L3	3
	d	If the group velocity of a particle is $3 \times 10^{6} m/s$, find its phase velocity.	L3	2

Prepared by: Checked by: HOD 17/08/15