Printed pages: 2	**AS102**
(The paper code and roll No. to be filled in your answer book)	
Roll No.	

B TECH
(SEM I) CARRY OVER EXAMINATION 2016-17
ENGINEERING PHYSICS I

TIME: 2 Hours **Total Marks: 50**

Note: Attempt all questions. All questions carry equal marks. Assume standard data wherever needed.

Q1. Attempt any **two** parts of the following:

(a) What was the aim of Michelson-Morley experiment? Explain its negative results.
(b) What is time dilation? Describe experimental evidence to show time dilation is a real effect.
(c) Deduce Einstein's mass-energy relation, $E=mc^2$ and discuss it.

Q2. Attempt any **two** parts of the following:

(a) Explain the wave-particle duality. Derive the de-Broglie wavelength of a particle as a function of temperature.
(b) State and explain the Heisenberg's uncertainty principle. Using this principle show that electron can not reside in an atomic nucleus.
(c) Derive time independent Schrodinger wave equation and explain the physical significance of wave function.

Q3. Attempt any **two** parts of the following:

(a) Find the probabilities of finding a particle trapped in a box of length L in the region from 0.45L to 0.55L for the ground state and the first excited state.
(b) Discuss the constructive and destructive interference in thin film due to reflected light.
(c) Newton's ring arrangement is used with a source emitting two wavelength λ_1=6000A^o and λ_2= 4500A^o and it is found that the n^{th} dark ring due to λ_1 coincide with $(n+1)^{th}$ dark ring due to $\lambda 1$. If the radius of curvature of the curved surface is 90 cm, find the diameter of the n^{th} dark ring.

Q4. Attempt any **two** parts of the following:

(a) A lens of focal length 100 cm forms Fraunhofer pattern of a single slit of width 0.04 cm in its focal plane. The incident light contains two wavelengths λ_1 and λ_2. It is found that the fourth minimum corresponding to λ_1 and the fifth minimum corresponding to λ_2 occur at the same point 0.5 cm from the central maximum. Compute λ_1 and λ_2.
(b) What is grating? Explain dispersive power of grating.
(c) What is double refraction? Explain the working of a Nicol prism.

Q5. Attempt any **two** parts of the following:

(a) Explain spontaneous and stimulated emission of radiation. How stimulated emission takes place with exchange of energy between Helium and Neon atoms?
(b) Calculate the numerical aperture, acceptance angle and critical angle of the optical fiber if the refractive indices of the core and cladding are 1.50 and 1.45 respectively.
(c) What is principle of Holography? Explain construction and reconstruction of images in holography.