Enrol. No. _____

END SEMESTER EXAMINATION: DECEMBER, 2014

PHYS101 **APPLIED PHYSICS - I**

[ETD]

Time: 3 Hrs Max Marks: 70

Note: Attempt questions from all sections as directed.

Section - A ***: Attempt any five questions. Each question carries 06 marks.*** **[30 Marks]**

1. State Gauss's Theorem of Divergence and Stoke's Theorem

Also find the value of grad S at the point (2,-1, -3) for $S(x, y, z)=x^2-x^2y+xy^2z^2$,

2. Derive all Maxwell's equations in differential form.

3. Describe and examine the formation of Newton's rings in reflected monochromatic light. Obtain expressions for the diameter of dark and bright rings in reflected light.

4. Describe the Fraunhofer diffraction due to a single slit and deduce the position of maxima and minima.

5. What are Einstein's coefficients A and B? Derive relation between them.

6. Describe the Michelson's-Morley experiment and explain the physical significance of negative result.

Section – B **: *Attempt any two questions. Each question carries 10 marks.*** **[20 Marks]**

7. (a) Define divergence and curl,give their physical significances? [6]

(b) Derive and explain Poynting theorem. [4]

8. (a) Describe the principle and construction of a Nicol prism. Explain how it can be used as a polarizer and analyser.

(b) Discuss the principle of optical fibre. Show the acceptance cone , core ,cladding with help of a diagram in the optical fibre.

9 (a) What do you understand by time dilation? Establish a relation for proper time interval. Explain why a moving clock appears slow relative to stationary observer.

(b)) How fast would a rocket have to go relative to an observer for its length to be contracted by 99% of its length at rest.

Section - C **: *Compulsory question*** **[20 Marks]**

10. (a) What is the Principle of a Laser? Discuss the construction and working of a Ruby laser. [7]

(b) Light of wavelength 6000Å falls normally on thin wedge shaped film of refractive index 1.4 formaing fringes that are 2.0 mm apart. Find the angle of the wedge. [5]

(c) Derive the expression for resolving power of a grating. [4]

(d) Show that a vector field $\vec{A} = x^2\hat{i} + y^2\hat{j} + z^2\hat{k}$ is irrotational. [4]