Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: **PHYSICS** — **Semester: I**
Program: **B.Sc., LL.B. (Hons.) IPR/FHEL/MFL** — **Time: 03 hrs.**
Course Code: CLNL 1033 — **Max. Marks: 100**

Instructions:

S. No.		**Marks**	**CO**
Q 1	Under normal conditions a diode conducts current when it is a. Avalanched b. Forward biased c. Reverse biased d. Saturated	**1**	**3**
Q 2	The resolving power of a microscope is highest amongst the following for a. Blue light b. Red light c. Violet light d. Green light	**1**	**1**
Q 3	The phenomenon of Interference in light proves a. Wave nature of light b. Longitudinal wave nature of light c. Transverse wave nature of light d. Quantum nature of light	**1**	**1**
Q 4	Two photons approach each other. Their relative velocity would be a. 0 b. c/2 c. 2c d. c	**1**	**4**
Q 5	A p – type semiconductor is a. Negatively charged b. Positively charged c. Electrically neutral d. None of the above	**1**	**3**
Q 6	Which process gives the laser its special properties as an optical source? a. Stimulated absorption b. Spontaneous emission c. Dispersion	**1**	**2**

	d. Stimulated emission		
Q 7	Two light beams with intensities I1 and I2 superimpose to produce interference pattern. The contrast between the fringes is the best when a. I1 = I2/2 b. I1 = I2/4 c. I1 = I2/3 d. I1 = I2	**1**	**1**
Q 8	A Nicol's prism is based on the action of a. Scattering of light b. Refraction of light c. Reflection of light d. Double refraction of light	**1**	**1**
Q 9	A sphere when moved along at very high speed will look like a a. Rectangle b. Circle c. Sphere d. Ellipsoid	**1**	**4**
Q 10	When white light is incident on a diffraction grating, the light that is deviated most from the central image a. Blue b. Red c. Violet d. Yellow	**1**	**1**
SECTION B			
Q 11	Give 3 differences between ordinary light and laser light.	**4**	**2**
Q 12	What is the effect on the fringe system obtained by a Young's double slit arrangement if the wavelength of the light used is reduced?	**4**	**1**
Q 13	Explain the concept of 'Mass Energy equivalence' in the Special Theory of Relativity.	**4**	**4**
Q 14	What is right circularly polarized light? [Hint: illustrating with diagram would help!]	**4**	**1**
Q 15	Differentiate between Intrinsic and Extrinsic semiconductors?	**4**	**3**
SECTION-C			
Q 16	Mean life of a meson is 2 x 10^{-8} s. Calculate the mean life of the meson in its frame, moving with a velocity of 0.8 c.	**5**	**4**
Q 17	A pulsed laser deposits about 4.95 x 10^{19} eV of energy per pulse in a small spot. If the wavelength of radiation is 7000 Å, then calculate the number of photons emitted in every such laser pulse.	**5**	**2**
Q 18	Calculate the minimum number of lines in a grating, which would just resolve lines of wavelengths, 5000 Å and 5010 Å in the first order. [Hint: For simplification of calculations use λ=5000Å]	**5**	**1**
Q 19	Newton's rings are observed in reflected light of wavelength λ=6000Å. The diameter of the 10^{th} dark ring is 0.5 cm. Find the radius of curvature of the lens used and the thickness of the corresponding air film.	**5**	**1**

SECTION-D			
Q 20	Describe the formation of potential barrier at a P-N junction. Describe in detail the forward and reverse biasing of a P-N junction and the conditions therein. Give some uses of these biasing.	**4+8+3**	**3**
Q 21	Discuss the phenomenon of double refraction in a calcite crystal. Describe the construction and working of a Nicol prism. Give some uses of polaroids.	**5+12+3**	**1**
Q 22	What are the fundamental postulates of Special Theory of Relativity. Mention the velocity addition relation and show that it is consistent with Einstein's second postulate.	**5+3+7**	**4**

SECOND SET