LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **ALLIED**

FOURTH SEMESTER – **APRIL 2023**

UPH 4401 – APPLIED PHYSICS

Date: 04-05-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	SECTION A - K1 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
1.	**Answer the following**	
a)	Write down any two examples of semiconductors.	
b)	Define LDR.	
c)	Convert $(24)_{10}$ into a binary number.	
d)	Draw the logic symbol of OR gate.	
e)	What are the characteristics of LASER?	
2.	**Fill in the blanks**	
a)	Intrinsic semiconductor is called _____.	
b)	The principle of a solar cell is _____.	
c)	In NAND gate, the output will be low when both the inputs are_____.	
d)	In IC 741, pin 2 is _____.	
e)	LASER works on the principle of _____.	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**True or False**	
a)	Steel is an insulator.	
b)	LED consume more electricity.	
c)	The NOT gate is also known as an inverter.	
d)	There are two outputs in an Op -Amp.	
e)	He-Ne is a four level laser.	
4.	**Match the following**	
a)	Compound semiconductor - invert the input	
b)	Threshold frequency - $\overline{X}+\overline{Y}$	
c)	Inverting Op-Amp - GaAs	
d)	$\overline{X.Y}$ - optical pumping	
e)	Ruby Laser - photoelectric effect	
	SECTION B - K3 (CO2)	
	Answer any TWO of the following	**(2 x 10 = 20)**
5.	a) What is biasing? (2) b) Explain the forward and reverse biasing of a P-N junction diode and draw the characteristic curve. (8)	
6.	With neat diagrams explain the construction and working principle of photo diode and photo transistor.	
7.	Convert a) $(1021)_{10}$ to binary (2)	

	b) $(934)_{10}$ to octal	(2)
	c) $(111001)_2$ to Hex	(2)
	d) $(111011)_2$ to decimal	(2)
	e) $(1101011.1011)_2$ to decimal	(2)
8.	With neat circuit diagrams, explain the working of inverting and non-inverting amplifier operations of Op-Amp.	
	SECTION C – K4 (CO3)	
	Answer any TWO of the following	**(2 x 10 = 20)**
9.	a) What is a semiconductor?	(2)
	b) Describe the classification of semiconductors.	(8)
10.	a) Simplify Y = $\overline{A}\,\overline{B} + \overline{A}$ B	(3)
	b) F(A,B,C) = ABC + $\overline{A}\,\overline{B}$C + $\overline{A}$ BC + AB$\overline{C}$ + $\overline{A}\,\overline{BA}\,\overline{C}$	(7)
11.	a) Write down the characteristics of LASER.	(4)
	b) Discuss spontaneous and stimulated emission of radiation.	(6)
12.	Discuss the working of an Op-Amp as an integrator and differentiator.	
	SECTION D – K5 (CO4)	
	Answer any ONE of the following	**(1 x 20 = 20)**
13.	Describe the construction and working principle of Nd:YAG laser with energy level diagram.	
14.	a) Explain the working of a Zener diode with neat diagram. (12) b) Describe how a Zener diode can be used for voltage regulation. (8)]	
	SECTION E – K6 (CO5)	
	Answer any ONE of the following	**(1 x 20 = 20)**
15.	a) With neat diagrams and truth tables, show that NAND is a universal gate.	(10)
	b) Convert the following hexadecimal numbers to decimal numbers i. $(E9)_H$ ii. $(FFFF)_H$ iii. $(604)_H$ iv. $(3FC.8)_H$	(10)
16.	Explain the operation of an Op-Amp as summing and difference amplifiers.	
