Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name: Applied Physics
Subject Code: 4TE02APH1 Branch: B.Tech (All)

Semester: 2 Date: 27/04/2018 Time: 10:30 To 01:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) Which one of the material contains highest energy gap between valence band and conduction band?
A) Conductor B) Semiconductor C) Insulator D) None of the above

b) In an n-type semiconductor electrons are _____ and holes are _____.
A) Majority, Majority B) Minority, Minority C) Minority, Majority D) Majority, Minority

c) If the diode voltage is 1.2 V and the diode current is 1.75 A, what is the power dissipation?
A)2.1 W B) 0.83 W C) 0.68 W D) 3 W

d) Zener diodes are commonly used as _____regulators.

e) The ripple factor of a bridge rectifier is
A) 0.406 B) 0.812 C) 1.21 D) 1.11

f) The current amplification factor alpha dc is given by
A) I_C/I_E B) I_C/I_B C) I_E/I_B D) I_B/I_E

g) In a JFET, drain current is maximum when VGS is
A) zero B) negative C) positive D) equal to VP

h) A FET Consists of a
A) source B) drain C) gate D) all of the above

i) Which one of the semiconductor materials is used is used to manufacture the LED?
A) Si B) Ge C) Ga-As D) None of these

j) A bipolar junction transistor is a _____
A)Current controlled device B)Voltage controlled device C) Both current controlled & voltage controlled device D) None of the above

k) In an enhancement type MOSFET channel permanently exists.
A)True B) False

l) The reverse current in a diode is of the order of__
A)KA B) μA C) mA D) A

m) Fermi level refers to
A) Energy level of electron above the valance band B) Energy level of electron

above the conduction band c) Both the condition true depending upon the doping process D) All of these

n) A transistor has how many doped regions?
A) 1 B) 2 C) 3 D) 4

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	**(14)**
	(a)	Classify the materials based on energy theory. Draw energy band diagram for each material.	**07**
	(b)	Find the concentration of holes and electrons in a p-type silicon at 300 $^{\circ}$K assuming resistivity as 0.02 Ω-cm. Assume μ_P=475 m^2/V-s, n_i=1.45×10^{10} per cm^3.	**07**
Q-3		**Attempt all questions**	**(14)**
	(a)	Draw the circuit diagram and waveforms of half wave rectifier and explain its operation.	**07**
	(b)	A Diode crystal having internal resistance r_f = 25Ω is used for half wave rectification. if V= 60 sinωt,R_L = 725Ω find 1) I_{max},I_{dc} , I_{rms} 2) D.C.output voltage 3) Ac input power 4) Dc power output 5) efficiency	**07**
Q-4		**Attempt all questions**	**(14)**
	(a)	Explain Positive Clamper circuit with waveforms.	**07**
	(b)	Explain the operation of diode in forward and reverse bias condition.	**07**
Q-5		**Attempt all questions**	**(14)**
	(a)	Draw the construction of n-channel depletion type MOSFET and explain its operation.	**07**
	(b)	Explain the fixed bias circuit biasing techniques for FET.	**07**
Q-6		**Attempt all questions**	**(14)**
	(a)	Write a short note on Tunnel Diode & LED.	**07**
	(b)	Write a short note on Mass Action Law of Semiconductor.	**07**
Q-7		**Attempt all questions**	**(14)**
	(a)	Draw and explain input & output characteristics of transistor in CB configuration.	**07**
	(b)	Give brief introduction of optical Fiber and its applications.	**07**
Q-8		**Attempt all questions**	**(14)**
	(a)	Explain the construction and working of Nd: YAG LASER.	**07**
	(b)	Give various applications of LASER.	**07**