Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name: Applied Physics

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

Semester: 2 Date: 06/05/2017 Time: 02:00 To 05:00 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)

1) A pentavalent impurity is added to the silicon atom to form_____type of semiconductor.

A) Intrinsic semiconductorB) P-type semiconductor

C) N-type semiconductor D) None of the above

2) Holes are the minority charge carriers in which type of material?

A) N type B) P type C) Intrinsic D) None of the above

3) The equation of current density for semiconductor is $J = \sigma E$ .What does the σ stands for?

A) Resistivity B) Electric field intensity

C) Conductivity D) Current Density

4) The cut in voltage for a LED is of the order of _____

A) 1 V B) 1.5 V C) 0.7 V D) 0 V

5) The ideal diode acts as a _____ switch when forward biased and act as a_____ switch when reverse biased.

A) Open, OpenB) Closed, ClosedC) Open, Closed D) Closed, Open

6) 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) 1.2 W

7) What is the efficiency of a full wave rectifier ?

A) 40 % B) 50 % C) 75 % D) 81 %

8) Ripple factor of a half wave rectifier is _____

A) 100 % B) 50 % C) 121 % D) 0 %

9) In an enhancement type MOSFET, channel permanently exists.

A) True B) False

10) In a transistor lightly doped part is_____

A) BaseB) CollectorC) Emitter D) None of the above

11) In a P-N-P transistor, base is made of N type material.

A) True B) False

12) If the base emitter junction and base collector junction of BJT both are forward biased, BJT operates in _____region.

A) Active B) Cut-off C) Saturation region D) None of the above

13) List the characteristics of laser.

14) Give any two difference between stimulated emission and spontaneous emission.

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

Q-2 **Attempt all questions** **(14)**

(a) Explain the formation of P- type semiconductors. **07**

(b) Classify the conductors, insulators and semiconductors with the help of energy band theory. **07**

Q-3 **Attempt all questions** **(14)**

(a) Draw the V-I characteristics of diode and explain how diode works in forward bias condition. **07**

(b) Draw the symbol and V-I characteristics of zener diode and discuss various regions of the characteristics. **07**

Q-4 **Attempt all questions** **(14)**

(a) Draw the circuit diagram and waveforms of full wave bridge rectifier and explain its operation. **07**

(b) Draw the circuit diagram, input and output voltage waveforms for below circuits. **07**

i) Series Positive Clipper Circuit

ii) Negative Clamper Circuit

Q-5 **Attempt all questions** **(14)**

(a) Draw the circuit of common base configuration for BJT. Draw its output characteristics and explain regions of output characteristics. **07**

(b) A full wave rectifier circuit is fed from a transformer having a centre-tapped secondary winding. The *rms* voltage from a either end of secondary to centre tap is *30 V*. If the diode forward resistance is *20* Ω and that of the half secondary is *8*Ω, for a load of *1 k* Ω. Calculate, **07**

i) Maximum value of load current

ii) Average value of load current

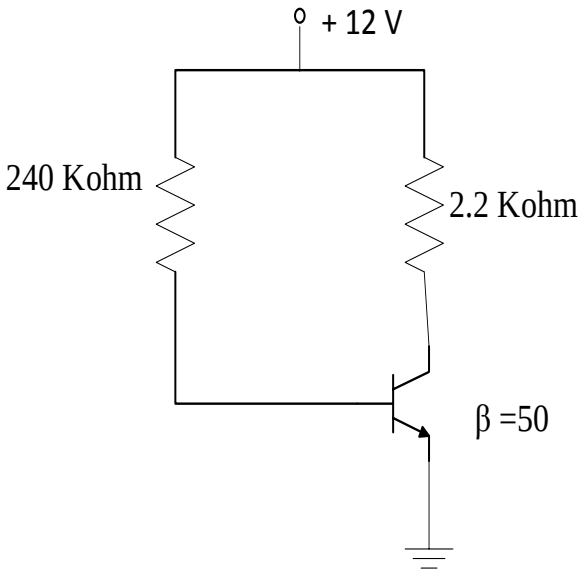
iii) RMS value of load current

Q-6 **Attempt all questions** **(14)**

(a) Explain the transistor action with the help of an NPN transistor and show that $I_E = I_B + I_C$.Where I_B = Base Current, I_E =Emitter Current, I_C = Collector Current **07**

(b) Determine the following parameters for the below network. **07**

i) Base Current I_B ii)Collector current I_C iii) Collector Emitter Voltage V_{CE}



Q-7		**Attempt all questions**	**(14)**
	(a)	Draw the construction of N-channel JFET and explain its operation. Draw its V-I characteristics and transfer characteristics.	**07**
	(b)	Explain the fixed bias circuit for N channel JFET.	**07**
Q-8		**Attempt all questions**	**(14)**
	(a)	Classify the types of LASER and explain any one of them.	**07**
	(b)	Explain the different types of material based optical fibers.	**07**