

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.
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Q-1 Attempt the following questions: (14)

- 1) A pentavalent impurity is added to the silicon atom to form _____ type of semiconductor.
A) Intrinsic semiconductor B) 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, Open B) Closed, Closed C) 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) Base B) Collector C) 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**



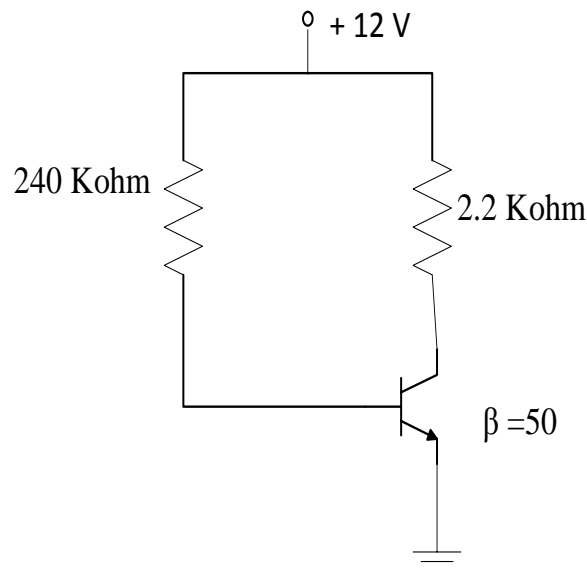
- i) Series Positive Clipper Circuit
- ii) Negative Clamper Circuit

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 8Ω, 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**

