Registration No:

Total Number of Pages: 02   <u>**B.TECH**</u>
                                                                   15BE2101

2nd Semester Back Examination 2016-17
BASICS OF ELECTRONICS
BRANCH(S): ALL
Time: 3 Hours
Max Marks: 100
Q.CODE: Z1041
**Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.**

<u>**Part – A (Answer all the questions)**</u>

Q1   Answer the following questions:*multiple type or dash fill up type*   **(2 x 10)**
  a) Cut-in voltage of a Si and Ge diode are _____ and _____ respectively.
  b) A signal given as $12 \sin(2\pi \times 10 \times 10^3)t$, the amplitude and frequency of the signal are _____ and _____ respectively.
  c) OPAMPs are called as **dc** amplifiers, **dc** stands for _____.
  d) A BJT works as an amplifier in _____ region of operation?
  e) Biasing of BJT done by connecting _____ supply to the circuit.
  f) A three input XOR gate will yield output logic-1 when _____
  g) Convert $(19A)_{16} = ($ $)_8$
  h) The 2s complement of $(-9)_{10}$ in binary is _____.
  i) The logic gates which are called as universal gates are _____.
  j) The carry input, $C_{in} = $ _____ of a full adder for 1-bit addition.

Q2   Answer the following questions: ***Short answer type***   **(2 x 10)**
  a) Define biasing and justify its necessity.
  b) Write equation of gain of an inverting amplifier using OPAMP and explain each term in the equation.
  c) Write the OR and AND identities.
  d) Write the truth table for a three-input XOR gate.
  e) What is CMMR of an OPAMP? Write the equation by explaining its significance.
  f) Establish and prove the relation between current gain of CB an CE BJT.
  g) What is the type and criteria of feedback for oscillations in amplifiers?
  h) What is a triggered sweep in CRO?
  i) What are deflection factor and deflection sensitivity of an CRO?
  j) Define Peak Inverse Voltage of a rectifier. What are PIV for full wave center tapped and bridge rectifiers?

Part – B (Answer any four questions)

Q3 a) Draw and explain the current-voltage characteristics of CE and CB BJT. **(10)**

b) Compare between CE and CB BJT amplifiers. **(5)**

Q4 a) Explain the working of different components of aCathode Ray Oscilloscope with a neat diagram. **(10)**

b) What are Lissajous patterns and how are they used for frequency and phase measurement? **(5)**

Q5 a) Explain what is biasing and its significance by comparing fixed bias and voltage divider bias of BJT. **(10)**

b) Write the current equation for CB BJT and CE BJT and establish the relation between the two,taking the effect of the current I_{CO}. **(5)**

Q6 a) Implement a full subtractor using 4:1 multiplexers. **(10)**

b) Explain what is a latch? How a SR latch is used to store bits. **(5)**

Q7 a) For a BJT based voltage divider circuit with components R1 = 100 KΩ, R2 = 50 KΩ, RC = 5 KΩ, RB = 3 KΩ, VCC = 15 V, C_E = Ci = Co = 10 μF and β= 100, draw the small signal amplifier circuit and find Q-points. **(10)**

b) Define sum of product expression of Boolean algebra. Explain how it is related to Product of sums? **(5)**

Q8 a) Draw and explain a Wien bridge oscillator. Also derive its expression for the frequency of oscillation. **(10)**

b) Explain a diode clipper circuit as positive and negative clipper. **(5)**

Q9 a) Explain the amplifiers with negative feedback, describing the different configurations of feedback circuits. **(10)**

b) Mention the advantage and disadvantages of using negative feedback. **(5)**