Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**
15BE2101

2nd Semester Back Examination 2018-19
BASICS OF ELECTRONICS
BRANCH : AEIE, AUTO, CHEM, CIVIL, CSE,
ECE, EEE, ELECTRICAL, ETC, FAT, IT, MECH, MINERAL, MINING
Max Marks : 100
Time : 3 Hours
Q.CODE : F715

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) What do you mean by frequency spectrum? Calculate the frequency and time period of the given sinusoidal signal. f(t)= 5 sin(300t).
b) State the characteristics of an ideal Op-Amp.
c) What do you mean by thermal runaway of a transistor?
d) What are the advantages of negative feedback amplifier?
e) What is ripple factor? Also mention its value for Full- Wave rectifier.
f) Realize Ex-OR gate with four NAND gates.
g) Convert $(10.01)_{10}$ to its equivalent binary number.
h) Why time-base is used in Cathode Ray Oscilloscope?
i) What is Q-point and load line in transistor output characteristics?
j) Differentiate between Zener diode and rectifying diode.

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) A crystal diode having an internal resistance $r_f = 20\Omega$ is used for a full wave rectification. If the applied voltage is $V = 50\sin 2t$ and the load resistance is $R_L = 800\Omega$, determine the following :
i. I_m, I_{dc}, I_{rms} of the output
ii. AC power input and power output
iii. Ripple factor
b) Explain how Op-Amp can be used as a summing amplifier with a neat diagram.
c) Draw the circuit diagram of a common base PNP transistor configuration with its input and output characteristics.
d) Why biasing circuits are required for a transistor? Discuss different biasing techniques.
e) What is a differential amplifier? Derive an output voltage expression for the differential amplifier with a neat sketch.
f) Which logical gates are considered as universal gates? Draw the circuit diagrams showing the universal properties of any one universal gate.
g) What is a clipper circuit? Discuss briefly on positive and negative clippers with appropriate sketch and some applications.
h) Draw a circuit to explain about R-C phase shift Oscillator.
i) State and explain the function of a sweep generator in an oscilloscope.
j) How the transistor can be used as an amplifier in CE configuration? Explain with proper diagrams.
k) Design a combinational logic circuit which adds three binary bits and implement using NAND gates.
l) What are the basic Boolean theorems? State and prove De Morgan's theorem of Boolean algebra.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3	Explain how you can use to measure voltage, current, frequency and time period of a sinusoidal wave in CRO. Also write the principle and working of a CRO with a proper block diagram.	**(16)**
Q4	Define the terms Input offset voltage, input bias current, CMRR, Slew Rate of an Op-Amp.	**(16)**
Q5	Define Multiplexing and Demultiplexing. Implement a full adder circuit using two 4:1 multiplexers.	**(16)**
Q6	Draw the circuit of an emitter follower. Derive the expression for input impedance, output impedance and the voltage gain.	**(16)**