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

Total Number of Pages: 02 **Course: IDD (B.Tech and M.Tech)**
Sub_Code: 23ES1002

2nd Semester Regular/Back Examination: 2024-25
SUBJECT: BASIC ELECTRONICS
BRANCH(S): AE, AEIE, AERO, AUTO, BIOMED, BIOTECH, CE, CHEM, CIVIL, CSE, CSEAI, CSEAIML, CSEDS, CSIT, CST, ECE, EEE, ELECTRICAL, ELECTRICAL & C.E, ELECTRONICS & C.E, ETC, MANUTECH, MECH, METTA, MME, PLASTIC
Time: 3 Hours
Max Marks: 100
Q.Code: S613
Answer Question No.1 (Part-I) 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 **Answer the following questions:** **(2 x 10)**

a) What is forbidden energy gap? What is it's magnitude for Ge and Si Semiconductor?
b) Determine the forward resistance of a silicon diode when the forward current is 4 mA at T = 300K
c) The reverse gate voltage of JFET when changes from 4.4 V to 4.2 V, the drain current changes from 2.2 mA to 2.4 mA. Find out the value of Transconductance of the JFET.
d) What is the relation between I_{CO} and I_{CEO} in a transistor?
e) Why the input impedance of a FET is more than that of a BJT?
f) What is virtual ground concept in OPAMP?
g) Calculate CMRR in decibel for the OPAMP circuit measurement of V_d = 1 mV, V_0 = 120 mV and V_C = 1 mV, V_0 = 20 µV
h) Convert $(35.45)_{10}$ = (____)$_2$ and $(AE.2B)_{16}$ = (____)$_8$
i) How does negative feedback influence input and output impedances in a voltage-series feedback amplifier?
j) If an AM signal has a carrier amplitude of 100 V and a modulating signal amplitude of 20 V, what is the modulation index?

Part-II

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

a) A Silicon diode has reverse saturation current of 2.5 µA at 300 K. Find forward voltage for a forward current of 10 mA.
b) Simplify the Boolean expression $F = ABC + A\bar{B}(\overline{\bar{A}\bar{C}})$ using Boolean laws and draw the logic diagram of the output expression using logic gates?
c) With neat sketch, explain the operation of a center tapped full wave rectifier.