

2019

MSc

2nd Semester Examination

ELECTRONICS

PAPER – ELC-206(Pr)

Full Marks: 50

Time: 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their

Own words as far as practicable.

Illustrate the answers wherever necessary.

(Turn Over)

ANSWER ANY **ONE** QUESTION SELECTING IT BY A LUCKY DRAW

1. Determine the carrier concentration and mobility of a semi conductor sample using Hall measurement.
2. Determine the storage delay time of a P – N junction diode (IN 4007) using CRO. Record your data from 300hz to 10khz. Plot normalized value of storage delay time (t_{sd}/T) with frequency.
3. Determine barrier height of a schottky diode using activation energy method. Extend your work to determine electronically active area of the device.
4. Determine the barrier height of a schottky barrier diode using current voltage Measurement method. Given $A^* = 120A/cm^2/k^2$.
5. Determine the band – gap of a semi conductor using temperature sensitive junction voltage measurement of a P – N junction diode.
6. Study the C – V characteristics of a P – N junction diode. Plot $\gamma_c - \gamma_v$. what information you can get from this plot.
7. Study the I – V characteristics of a P – N junction diode. Record your data calculate cut in voltage, dynamic resistance from your graph. Plot in I vs V and determine reverse saturation current and ideality factor from your plot.
8. Study the $I_d - V_d$ characteristics of a JEET for various gate voltages. Draw the $I_d - V_d$ curve and determine r_d , μ and g_m .
9. Study the $\sqrt{I_d} - V_g$ characteristics of a JFET for different temperature. In each case determine threshold voltage of the device from your graph. Plot $V_{th} - T$.

10. The drain current of a MESFET having arbitrary doping distribution is given by

$$I_D = \frac{2z\mu}{\epsilon_s L} \int_{y_1}^{y_2} \{\phi(a) - \phi(u)\} h \rho(h) dh$$

Where $\rho(y) = N_0 e^{-\alpha y}$ and $\phi(Y) = \int_0^Y \rho(Y) dy$

The values of z, μ, L, N_0 will be provided

Solve I_D for different V_d using MATLAB.