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**NEELKANTH INSTITUTE OF
TECHNOLOGY**

B.Tech ENE (Semester IV)

**FIRST SESSIONAL EXAMINATION
(IMPROVEMENT) 2014-2015**

**ANALOG AND DIGITAL ELECTRONICS (NEC-
409)**

Time: 1:00 Hours

Maximum Marks 30

NOTE: - i. be precise in your Answer

ii. All section are compulsory

SECTION A

**1. Attempt any Five Question :
2X5=10**

- (a) An LED is connected across a voltage source of +10V through a series resistance of 820 Ohm. Calculate the LED current. Assume the voltage drop across an LED of 15 V.
- (b) (i) Define 'Dark Current' in photodiode.
(ii) Write any two applications of tunnel diode.
- (c) Draw the **I-V** characteristics of tunnel diode.
- (d) Why is silicon not preferred as an LED material?

(e) Draw the small signal model of BJT. (Hybrid pi and T model).

(f) A resistor R is placed parallel to a Ge tunnel diode. The tunnel diode has

$$\left[\frac{di_d}{dv} \right]_{\max} = \frac{1}{10} \text{ mho}$$

Find the value of R so that the combination does not exhibit negative resistance region in Volt-ampere characteristics.

(g) For an amplifier 3-dB gain is 200 and higher cut-off frequency is 20KHz. Find the gain of the amplifier at the frequency 100 KHz.

SECTION B

**2. Attempt any Four Questions:
5X4=20**

- (a) Write a short note on transfer function & frequency response curve an amplifier and & find out the gain magnitude and phase of the LOW pass RC circuit and also plot them with respect to frequency.
- (b) Define the term 3dB bandwidth, Corner frequency. Explain the miller theorem with all required expression (use capacitor)
- (c) How the construction of the Schottky barrier diode is different from conventional semiconductor diode? Describe its mode of operation.
- (d) Explain the characteristics of a varactor diode and mention how it can be used in a resonant circuit. Also list some of the applications of the varactor diode.

- (e) Explain in detail "Oscillator Design" using negative resistance behavior of Tunnel diode.
- (f) A transistor used as a switch has its emitter current increased from 15 to 20

mA. This caused the reading of an ammeter in base lead to increase from 0.32 mA to 0.48 mA. Calculate β .