Printed Pages : 4 EEC309

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0321 Roll No.

B.Tech

(SEM III) ODD SEMESTER THEORY EXAMINATION 2009-10

ANALOG & DIGITAL ELECTRONICS

Time : 3 Hours] *[Total Marks : 100*

Note : *Attempt **all** questions. All questions carry equal marks.*

1 Attempt any four parts of the following :

(a) Draw the V-I characteristics of tunnel diode and indicate the useful region in the curve.

(b) Draw the output characteristics of transistor. How it is used as a switch ?

(c) Describe the characteristics and application of photo-diode.

(d) An LED is connected across a voltage source of + 10V through a series resistance of **820 Ω**. Calculate the LED current. Assume the voltage drop across an LED of 15 Volt.

(e) Explain the working of tunnel diode. Give its two applications.

(f) Why photodiode is used in reverse bias conditions ? Give any two applications of it.

2 Attempt any four parts of the following :

(a) An amplifier has a midband gain of 1500 and a bandwidth of 4.0 MHz, the midband gain reduces to 150 when a negative feedback is applied. Determine the value of feedback factor and Bandwidth.

(b) Draw the high frequency equivalent circuit for the typical RC coupled common emitter amplifier.

(c) Explain the effect of negative feedback on various characteristics of the amplifier.

(d) An RC coupled amplifier has a voltage gain of 1000, $f_1 = 50\ Hz$, $f_2 = 200\ kHz$ and a distortion of 5% without feedback. Find the amplifier voltage gain, f_1', f_2' and distortion when negative feedback is applied with feedback ratio of 0.01.

(e) Calculate the voltage gain, input and output resistances of a voltage series feedback amplifier having $A_v = 300, R_i = 1.5\ k\ \Omega, R_o = 50\ k\Omega$ and $\beta = 1/15$.

(f) Describe the properties of series-shunt and shunt-shunt feedback amplifier.

3 Attempt any **two** parts of the following :

(a) What is Barkhausen criterion for the Feedback oscillator ? Draw a neat diagram of a phase-shift oscillator using BJT. Derive an expression for its frequency of oscillation.

(b) Explain the working of Wein-bridge oscillator. Derive formula for the frequency of oscillation.

(c) A Colpitt's oscillator is designed with C_1 = 100 pf and C_2 = 7500 pf. The inductance is variable. Determine the range of inductance values, if the frequency of oscillation is to vary between 950 kHz and 2050 kHz ?

4 Attempt any **two** parts of the following :

(a) What do you mean by flip-flops ? Describe the edge triggered flip-flops. Convert SR flip-flops into JK flip-flops.

(b) Implement the boolean function using 8:1 multiplexer.

$$F(A, B, C, D) = \bar{A}B\bar{D} + ACD + \bar{B}CD + \bar{A}\bar{C}D$$

Describe the working of counter.

(c) Draw and explain the working of 4-bit up and down synchronous counter. Also describe the working of shift register.

5 Attempt any two parts of the following :

(a) Describe the working of 555 timer. How it works in A-stable operation ?

(b) Explain A/D converter using voltage to frequency converter. Describe any one method of A/D converter.

(c) Explain the organisation of RAM with the help of neat diagram. Also describe the switching regulators.
