



Printed Pages : 4

EEC309

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

PAPER ID : 0321

Roll No.

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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.

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[Contd...

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, $f_1 = 50 \text{ Hz}$, $f_2 = 200 \text{ kHz}$ 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
- $$A_v = 300, R_i = 1.5 \text{ k}\Omega, R_o = 50 \text{ k}\Omega \text{ and}$$
- $$\beta = \frac{1}{15}.$$
- (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.

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

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.