

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

Paper ID : 131410

Roll No. 

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**B.TECH.****Theory Examination (Semester-IV) 2015-16****ANALOG & DIGITAL ELECTRONICS***Time : 3 Hours**Max. Marks : 100***Section-A**

**Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)**

- (a) What are the different materials used for the manufacturing of LED?
- (b) What is the drawback in S-R flip-flop? How it can be eliminated?
- (c) What are the various applications of the Multiplexer?
- (d) What are the differences between Combinational and Sequential logic circuits?

- (e) What is a priority encoder?
- (f) What is the Brakhausen criterion for the feedback amplifiers?
- (g) What is the effect of negative feedback on characteristics of an amplifier?
- (h) Mention few properties of series-shunt and shunt series feedback amplifiers.
- (i) What is the principle of sinusoidal oscillator?

### Section-B

**Q2. Attempt any five questions from this section.**

**(10×5=50)**

- (a) What is a photodiode? Draw typical I-V characteristic curves at two illumination levels and explain how does it work as a photoresistor?
- (b) Draw the logic diagram of a two-to-four line decoder using NOR gates only.
- (c) An RC coupled amplifier has a voltage gain of 1000,  $f_1=50\text{Hz}$  and  $f_2=200\text{ KHz}$  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.

(2)

- (d) Design a combinational circuit whose input is a four-bit number and whose output is the 2's complement of the input number.
- (e) Explain the properties of a quartz crystal which are responsible for its use in an oscillator.
- (f) A Colpitt's oscillator is designed with  $C_1=100\text{ Pf}$  and  $C_2=7500\text{ Pf}$ . The inductance is variable. Determine the range of inductance values, if the frequency of oscillation is to vary between 750 kHz and 2050 kHz.
- (g) Find the characteristic equations of all flip-flops with the help of K-map.
- (h) Explain the working of the universal shift register.

### Section-C

**Note: Attempt any two questions from this section.**

**(15×2=30)**

**Q3. Discuss the current-voltage and capacitance-voltage characteristics and applications of the following:**

- a) Varactor diode
- b) Tunnel diode

(3)

- Q4. Draw the low frequency small signal model of a transistor in CB and CE configurations and explain significance of each model.
- Q5. (a) What is the problem associated with the JK flip flop? How it can be overcome? Explain with necessary diagrams.
- (b) An 8-bit successive approximation ADC has a resolution of 20mV. What will be its digital output for an analog input of 2.17V?