

5. Attempt any two parts of the following question. 20

- A. Design an operational amplifier based first order low pass filter having cut off frequency of 10 kHz.
- B. Differentiate between astable and mono-stable multi-vibrator circuits with the help of relevant diagrams.
- C. Briefly describe working principle of a Voltage Controlled Oscillator.

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Printed Pages : 4

Paper ID & Roll No. to be filled in your Answer Book

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B.Tech. III Sem. (Odd Semester) Examination, 2013-14

Solid State Devices and Circuits

Time : Three Hours

10/10

[Max. Marks : 100]

Note: Attempt all questions. *Attempt*

1. Attempt any four parts of the following question. 20

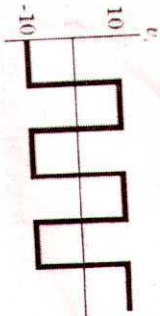
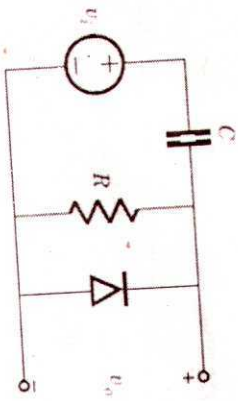
- A. Why direct band-gap semiconductor materials are used for fabrication of a light emitting diode.
- B. Explain construction, operation and characteristics of a Varactor Diode.
- C. The reverse saturation current of a pn junction diode and a Schottky diode are $I_{spn} = 10^{-12}$ A and $I_{ssch} = 10^{-8}$ A respectively. Determine the forward bias voltage required to produce 1 mA current in each diode.
- D. How reverse current is produced in a Schottky diode?
- E. What is the advantage of connecting an RC filter to the output of a diode rectifier circuit?

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(1)

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- F. For the circuit shown in figure the input voltage v_i is as shown in the same figure Assume the RC time constant large and cutin voltage of diode $V_T = 0$. The output voltage v_o is



2. Attempt any two parts of the following question. 20
- Differentiate between cascade and cascode amplifier circuits and which one is better for what shorts of applications?
 - Discuss briefly the choice of transistor configuration in a cascade amplifier and also explain effect of cascading on frequency response.
 - Explain working of a Darlington pair amplifier and with the help of relevant circuit diagram and mention its advantages.

3. Attempt any two parts of the following question. 20
- Give a brief introduction to the feedback and figure out major advantages and disadvantages of negative feedback in amplifier circuits.
 - Describe characteristics of voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier.
 - What is the Nyquist stability criterion for a feedback amplifier?

4. Attempt any two parts of the following question. 20
- Explain basic principle of oscillations and design a phase shift oscillator that oscillates at $f_o = 8 \text{ KHz}$.
 - With relevant and suitable diagram explain working of voltage regulator and determine output resistance and load regulation of voltage regulator. The output voltage of regulator is 5.0 V for a load current of 5.0 mA and 4.96 V for a load current of 1.5 A .
 - Explain construction and working principle of R-2R ladder network DAC and dual slope ADC.

(2)

(3)