

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2064)

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B. Tech 4th Semester Examination

Electronic Device Modelling (N.S.)

EC-223

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question from each of the Sections A, B, C & D. Section E is compulsory.

SECTION - A

1. (a) Taking the example of CE amplifier, explain the criterion for selection of a suitable operating point and factors affecting its stability. Hence define stability factor. (10)
(b) In a fixed biasing circuit, determine I_B , I_C and V_{CE} if transistor is of silicon, $V_{CC} = 10V$, $R_B = 2.5 M\Omega$, $R_C = 15 k\Omega$ and $\beta = 90$. (10)
2. (a) Explain the working of a JFET. Define the parameters of a JFET and develop its equivalent circuit. (10)
(b) Describe the constructional details of UJT. Sketch its V.I. characteristics and explain its operation. Describe the function of a relaxation oscillator using UJT with waveform. (10)

SECTION - B

3. (a) Draw the circuit diagram of an stable multivibrator. Justify that it is a two stage RC coupled amplifier using feedback. How does it give a square wave? (10)

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- (b) Differentiate between the monostable and bistable multivibrator. (10)
4. (a) What is LED? Give its principle of working, construction, circuit symbol, merits, demerits and applications. (10)
- (b) What is LCDs? In what respect LCDs are advantageous over LEDs? Give their drawbacks in comparison to LEDs and applications. (10)

SECTION - C

5. (a) Design a combinational circuit that gives a binary output equal to the square of a binary coded decimal numbers 0 through 9. (10)
- (b) Give a ROM circuit to realize this function. (10)
6. (a) Explain how a J-K flip flop can be converted into a D-flip-flop. (10)
- (b) Design an exclusive-OR circuit using NAND and NOR gates. (10)

SECTION - D

7. (a) What is a ripple counter? Draw the logic diagram of a MOD-10 Count-up ripple counter using count reset. (10)
- (b) Explain the working of serial in serial out shift register with logic diagram and waveforms. (10)
8. (a) Consider the NAND implementation of the function $F = (AB)' + AD$ shown in Fig. 1. Assuming that all gates have the same time delays draw a logic microtiming diagram for the case where A changes while B=D=1. (10)

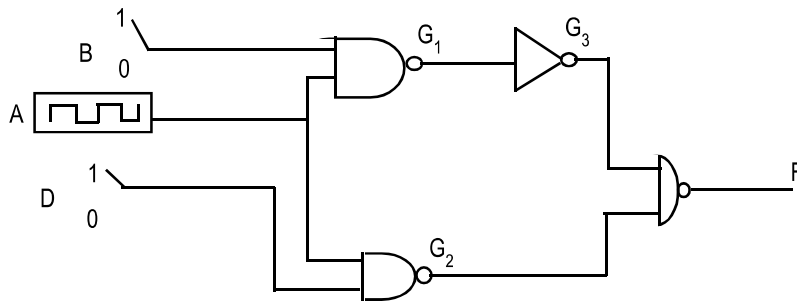


Fig. 1

- (b) For the circuit in above problem, draw the K-map, add a hazard covering to eliminate the glitch, and discuss its impact on the hardware. (10)

SECTION - E

9. (a) Write down the law of mass action.
- (b) Draw the equivalent circuit of diode.
- (c) How is a P-N junction diode tested?
- (d) How α and β are related from each other?
- (e) Why LCDs are not operated from ac supply of frequency lower than 25 Hz and higher than 50 Hz?
- (f) What is a multivibrator?
- (g) How do square wave generators differ from pulse generators?
- (h) What is Boolean Algebra?
- (i) What is Karnaugh map?
- (j) What is a state table? (2×10=20)