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Paper Code	BEC-01

Roll No.	2	0	1	7	0	3	1	0	3	3		

Odd ~~Year 1st~~ B. Tech.
~~Semester 1st~~
Major Examination 2017-2018
FUNDAMENTALS OF ELECTRONICS ENGINEERING

Time: 3 Hours M.M.: 50

Note: - Attempt all the questions.

1. Attempt any four parts of the following. **(4x2.5) 10**

(a) Prove that reverse saturation current in semiconductor doubles for every rise of 10^0C in temperature.
For what voltage will the reverse current in a p-n junction Ge diode reach 90% of it's saturation value at room temperature?

(b) Draw the static characterstics of n-p-n transistor in CE configuration. Indicate different regions of operation what happens if transistor turns into saturation regions?

(c) What is the significance of load line and operating point? Why operating point shifts? Mention the points to be considered for selection of operating point.

(d) Explain the operation of p-channel JFET. Draw its Drain and transfer characteretics and indicate different regions. What is pinch off in JFET?

(e) Draw the structure of n-channel EMOSFET. Explain its working with characterstics. What is V_T?

(f) Draw the self Bias circuit of N-channel JFET. Calculate the value of Rs required to self bias and N channel JFET with I_{DSS}= 40mA, V_P= -10V, and V_{GSQ} = -5V.

2. Attempt any two parts of the following. **(2x5)=10**

(a) Prove that NAND and NOR gates are universal logic gates.

(b) Draw the circuit diagram of OP-AMP as summer and obtain the output expression.

(c) Explain the terms regarding an OP-AMP.
(i) Input off set current
(ii) Input Bias current
(iii) Slew rate
(iv) CMRR
(v) Virtual Ground

3. **Attempt any two parts of the following** **(2x5)=10**

(a) Minimize the following expressions using Boolean identities and Theorems.

$A\,B+\overline{AC}+A\overline{B}C(AB+C)$

$\overline{A}\,B+ABD+A\overline{B}\,C\,\overline{D}+BC$

(b) Simplify the following expression using K Map.

$f(A,B,C,D)=\Pi m(0,1,3,6,7,8,9,11,13,14,15)$

and draw the logic circuit for simplified expression

(c) The two input terminals of an op-AMP are connected to voltage signals of strength 745μV and 740μV respectively. The gain of the OP-AMP in differential mode is 5×10^5 and CMRR is 80dB. Calculate the output voltage and % error due to common mode.

4. **Attempt any two parts of the following** **(2x5)=10**

(a) Compare analog and digital instrument. What are the advantages of digital instruments.

(b) What is DVM? Draw the input circuit of DVM and output wave form of integrator used in DVM establish relation.

$$V_{in}=\frac{V}{R_t}{T}$$

where symbols have their usual meaning

(c) Explain the function of CRT with diagram. Write in details about. Glass envelop and screen of CRT.

5. **Attempt any two parts of the following** **(2x5)=10**

(a) Write the practical applications of CRO. Explain how phase and frequency can be measured with figures.

(b) Draw the block diagram of CRO. How Lissajous patterns are obtained on the screen of CRO. How unknown frequency can be determined by using Lissajous pattern?

(c) Draw the block diagram of DMM. Explain its working mention its applications.