

(Following paper code and roll No. to be filled in your answer book)

Paper ID: 3301

Roll No.

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(SEM. I) ODD SEMESTER THEORY EXAMINATION (2010-11)

Electronics Engineering

Time : 3 Hours

Total Marks : 100

Note : Attempt all questions. All questions carry equal marks. Assume any data, not given, suitably.

SECTION - A

Attempt all the parts of this question. All parts of the question carry equal marks. These questions contain 10 objectives/ fill in the blank type/ true-false type questions. 2x10=20

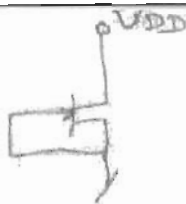
- i. The knee voltage of a p-n junction is ----- after doping.
 - ii. The Zener diode works as
 - (a) Current regulator
 - (b) Voltage regulator
 - (c) Power regulator
 - (d) Both (a) and (b)
 - iii. PIV of all the diodes of center-Tapped-transformer-full-wave-rectifier is ---.
 - iv. The biasing circuit which gives best stability to the Q point is
 - (a) Base resistor biasing
 - (b) Emitter resistor biasing
 - (c) Potential divider biasing
 - (d) Feed back resistor biasing
 - v. The parameters α and β of a bipolar junction transistor is related as -----.
 - vi. The gate of a depletion type MOSFET is made up of
 - (a) metal
 - (b) semiconductor
 - (c) both
 - (d) none
 - vii. The input impedance of a JFET is
 - (a) Very high
 - (b) Very low
 - (c) Moderately high
 - (d) Moderately low
 - viii. The De Morgan's Theorem states that -----.
 - ix. The CRO can measure
 - (a) phase
 - (b) voltage
 - (c) current
 - (d) none of the above
- The full-scale deflection of ohm scale in a multimeter reads
- (a) Infinity resistance
 - (b) Zero resistance
 - (c) Some finite resistance
 - (d) none of the above

**SECTION - B**

Note: Attempt any three parts of the following:

- (i) Define and explain the following terms in respect of p-n junction: Diffusion and transition capacitance, (v) PIV, (vi) ripple factor
- Explain the h-parameter model of a Bipolar Junction Transistor.
- Explain the working of p-channel JFET. Draw the I_D vs V_{DS} of the following circuit.

10x3=30



- d. Draw and explain the binary half-adder and half-subtractor circuits. How they are used to work as full adder and full subtractor circuits.
- e. With the help of block diagram explain the working of digital multimeter. What are the characteristics of Digital Voltmeter used in a typical digital multimeter?

SECTION - C

Attempt all the questions. All questions carry equal marks.

10x5=50

Attempt any two parts of the following

5x2=10

- a. Show that the maximum efficiency of Half wave rectifier is 40.6%.
- b. An ac voltage of peak value 20V is connected in series with a Si diode and load resistance of $1k\Omega$. If the forward resistance of diode is 15Ω , Find (i) peak current through diode (ii) peak output voltage.
- c. Describe the working of clamping circuit with neat diagrammes.

Attempt any one part of the following

10x1=10

- a. (i) In a CE transistor amplifier circuit, V_{CE} is increased from 2 to 12 V, the collector current changes from 3 to 4 mA, determine the output resistance.
(ii) In an n-p-n transistor $\alpha=0.98$, $I_E=10mA$, leakage current $I_{CBO}=1\mu A$. Determine I_C , I_B , β , I_{CBO} .
- b. Why biasing is needed in a BJT? Which of the biasing circuit is most preferred and why? Explain in detail.

Attempt any one part of the following

10x1=10

- a. Explain the characteristics of an ideal operational amplifier. Sketch unity gain amplifier and non-inverting amplifier and find the output voltages in terms of input voltage. Explain why the operational amplifier is called operational amplifier?
- b. Explain pinch off voltage, maximum saturation source current and transconductance of a FET. A FET has the transconductance of $3500 \times 10^{-6} mho$ and the load resistance is $10 k\Omega$ and is used in voltage amplifier circuit. Calculate the voltage amplification assuming that $r_d \gg R_L$.

Attempt any two parts of the following

5x2=10

- a. Whether the following expressions are true or false? State the theorems used.
(i) $AB + ABC + A'B + AB'C = B + AC$
(ii) $AB + AC + BC = AC + BC$
- c. Realize OR gate using NAND gates only and AND gate using NOR gates only. Explain your answer.
Explain the BCD numbers. How two BCD numbers are added?

Attempt any one part of the following

10x1=10

- a. Write the names of Non-integrating and Integrating type Digital Voltmeter. With the help of Block Diagram explain the working principle of any one of integrating type DVM. Also give the merit and demerit of technique used.
- b. Sketch a Cathode Ray tube used in a CRO and determine how many cycles of a 2-KHz sinusoidal are viewed if the sweep frequency is : 1 KHz, 2 KHz, 4 KHz.