LECTURE BASED PROBLEM SHEET

TOPIC: SEMICONDUCTORS-I **FACULTY: MONI KAKATI**

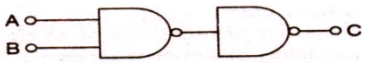
Q.1. In n-p-n transistor circuit, the collector current is 10 mA. If 90% of the electrons emitted reach the collector
(a) The emitter current will be 9 mA
(b) The emitter current will be 11 mA
(c) The emitter current will be 1 mA
(d) The emitter current will be 0.1 mA

Q.2. The current relationship between two current gains $\alpha$and β in a transistor is
(a) $\beta = \frac{\alpha}{1+\alpha}$ (b) $\beta = \frac{1+\alpha}{\alpha}$
(c) $\alpha = \frac{\beta}{1+\beta}$ (d) $\alpha = \frac{1+\beta}{\beta}$

Q.3. A transistor is connected in common emitter configuration. The collector supply is 8V and the voltage drop across a resistor of 800 Ω in the collector circuit is 0.5 V. If the current gain factor (α) is 0.96, then base current will be
(a) $24\mu A$ (b) $25\mu A$
(c) $26\mu A$ (d) $27\mu A$

Q.4. In a common base amplifier circuit, calculate the change in base current if that in the collector current is 2 mA and α=0.98
(a) 0.04mA (b) 1.96 mA
(c) 980mA (d) 2mA

Q.5. The arrangement shown in fig. performs the logic function of



(a) AND gate (b) NAND gate
(c) OR gate (d) XOR gate

Q.6. A truth table is given below. Which of the following has this type of truth table

A	B	X
0	0	1
1	0	0
0	1	0
1	1	0

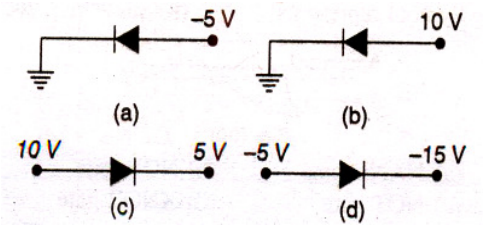
(a) XOR gate (b) NOR gate
(c) AND gate (d) OR gate

Q.7. The following truth-table belongs to which one of the four gates

A	B	X
1	1	0
1	0	0
0	1	0
0	0	1

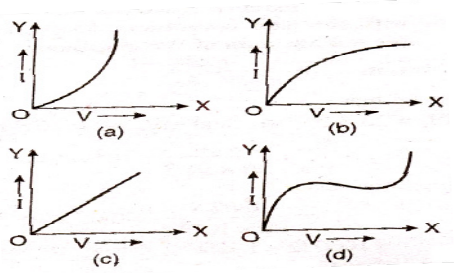
(a) OR (b) NAND
(c) XOR (d) NOR

Q.8. Which of the following semiconductor diodes is reversed biased?



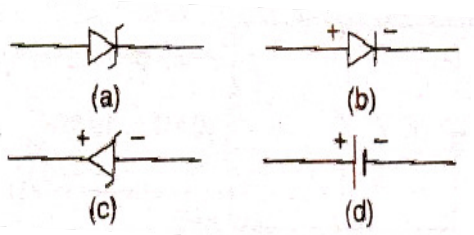
Q.9. In a p-n junction having depletion layer of thickness 10^{-6}m, the potential difference across is 0.1 V. The electric field is
(a) 10^{7} V/m (b) 10^{-6} V/m
(c) 10^{5} V/m (d) 10^{-5} V/m

Q.10. The current voltage characteristic of a p-n junction diode is represented by the graph

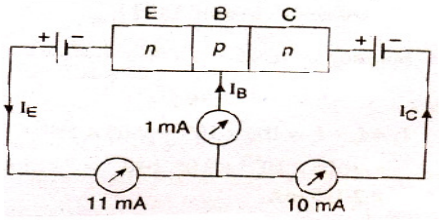


(a) I (b) II (c) III (d) IV

Q.11. The correct symbol for zener diode is



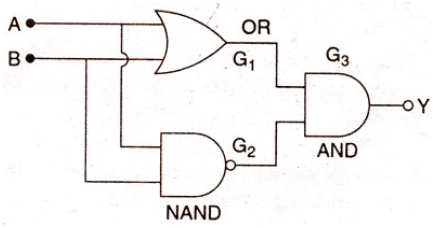
Q.12. In an n-p-n transistor circuit, the collector current is 10mA. If 90% of the electrons emitted reach the collector



(a) the emitter current will be 9 mA
(b) the emitter current will be 11 mA
(c) the base current will be 1 mA
(d) the base current will be -1 mA

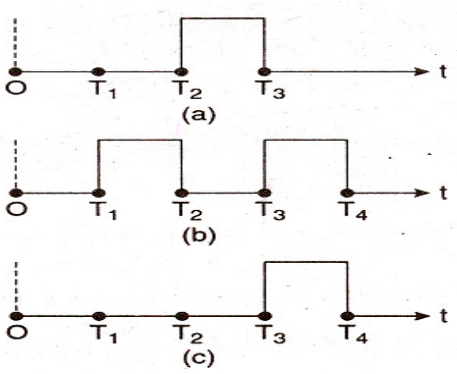
Q.13. What is the voltage gain in a common emitter amplifier, where imput resistance is 3Ω and load resistance 24 Ω? (Take β=06)
(a) 8.4 (b) 4.8
(c) 2.4 (d) 1.2

Q.14. The following configuration of gate is equivalent to



(a) NAND (b) XOR
(c) OR (d) None of these

Q.15. The fig shows the waveforms for two inputs A and B and that for the output Y of a logic circuit. The logic circuit is



(a) an AND gate (b) an OR gate
(c) a NAND gate (d) a NOT gate

ANSWERKEY

1.-(b)	2.-(c)	3.-(c)	4.-(a)	5.-(a)
6.-(b)	7.-(d)	8.-(a)	9.-(c)	10.-(a)
11.-(a)	12.-(b)	13.-(b)	14.-(b)	15.-(a)