ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

SOLUTION TO WORK SHEET: 50

Subject : PHYSICS

Date : 01.02. 2021

CLASS : XII

Chapter-Semiconductors and Electronics

Topic: Transistor, CE configuration of a transistor, characteristics of a transistor, amplifier.

Multiple choice questions : **1 X 15 = 15**

1. Least doped region in a transistor is
(a) either emitter or collector (b) base (c) emitter (d) collector

Ans. (b) base

2. A transistor can be used as
(a) full wave rectifier (b) half wave rectifier (c) filter (d) amplifier

Ans. (d) amplifier

3. A transistor is used in common emitter configuration. Given its $\alpha = 0.9$, calculate the change in collector current when the base current changes by 2μA
(a) lμA (b) 0.9 μA (c) 30 μA (d)18 μA

Ans. (d)18 μA

4. In a common emitter amplifier $(I_c/I_e) = 0.98$, then current gain is
(a) 49 (b) 4.9 (c) 98 (d) 9.8

Ans. (a) 49

5. In a common base transistor circuit $I_C = 0.97$ mA, $1_b = 30$ μA then current gain α =
(a) 0.97 (b) 0.097 (c) 95 (d) 500

Ans. (a) 0.97

6. In a *n-p-n* transistor amplifier, the collector current is 9 mA. If 90% of the electrons from the emitter reach the collector, then
(a) $\alpha = 0.9$; $\beta = 9.0$ (b) base current = 10 mA
(c) emitter current = 1 mA (d) $\alpha = 9$; $\beta = 0.9$

Ans. (a) $\alpha = 0.9$; $\beta = 9.0$

7. In an *n-p-n* transistor the collector current is 24 mA. If 80% electrons reach collector, its base current in mA is
(a) 36 (b) 26 (c) 16 (d) 6

Ans. (d) 6

8. Consider an *n-p-n* transistor amplifier in common emitter configuration. The current gain of the transistor is 100. If the collector current changes by 1 mA, what will be the change in emitter current ?
(a) 1.1 mA (b) 1.01 mA (c) 0.01 mA (d) 10 mA

Ans. (b) 1.01 mA

9. In an *n-p-n* transistor, the collector current is 10 mA. If 90% of the electron emitted reach the collector, then the emitter current will be
(a) 9 mA (b) 11.1 mA (c) 0.1 mA (d) 0-01 mA

Ans. (b) 11.1 mA

10. Consider an *n-p-n* transistor with its base-emitter junction forward biased and collector-base junction reverse biased. Which of the following statement is true?

(a) electrons cross over from emitter to collector (b) holes move from base to collector
(c) holes move from emitter to base
(d) electrons from emitter move out of base without going to the collector

Ans. (a) electrons cross over from emitter to collector

11. The breakdown in a reverse biased *p-n* junction is more likely to occur due to the
(a) large velocity of the minority charge carriers if the doping concentration is small
(b) large velocity of the minority carriers if the doping concentration is large
(c) strong electric field in a depletion region if the doping concentration is small
(d) weak electric field in the depletion region if the doping concentration is large

Ans.(a) large velocity of the minority charge carriers if the doping concentration is small

12. In an *n-p-n* transistor circuit, the collector current10 mA. If 95% of the electrons emitted reach the collector which of the following statement is true ?
(a) the emitter current will be 8 mA
(b) the emitter current will be 10.53 mA
(c) the base current will be 10.53 mA
(d) the base current will be 2 mA

Ans. (b) the emitter current will be 10.53 mA

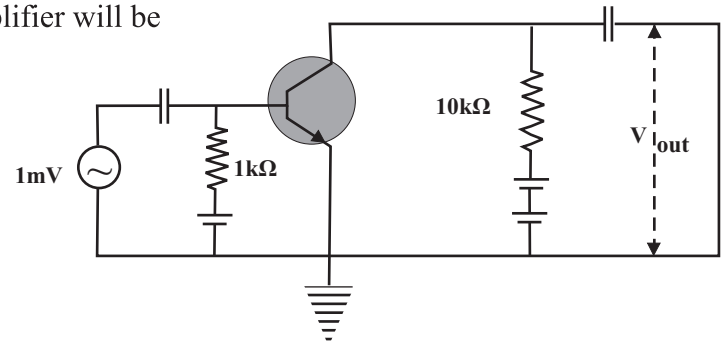
13. The part of a transistor which is most heavily doped to produce large number of majority carriers is
(a) emitter (b) base (c) collector (d) can be any of the above three

Ans. (a) emitter

14. In the following common emitter configuration an 'n-p-n' transistor with current gain $\beta = 100$ is used. The output voltage of amplifier will be

(a) 10 mA (b) 0.1 V
(c) 1.0 V (d) 10 V

Ans. (c) 1.0 V



15. In a CE transistor amplifier, the audio signal voltage across the collector resistance of 2 kΩ is 2 V if the base resistance is 1 KΩ and the current amplification of the transistor is 100, the input signal voltage is
(a) 1 mV (b)10 mV (c) 0.1 V (d) 1.0 V

Ans. (b)10 mV