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reviewer4@nptel.iitm.ac.in ▼

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# Unit 7 - Bipolar Junction Transistor

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## Course outline

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**Bipolar Junction  
Transistor**

Introduction to  
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Basics of BJT

Working of BJT

Working of BJT  
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Delays in BJT

## Week 6 Assignment

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-03-13, 23:59 IST.**

1) When a silicon diode is forward biased, what is  $V_{BE}$  for a C-E configuration? **1 point**

- Voltage-divider Bias
- 0.4 V
- 0.7 V
- Emitter voltage

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

0.7 V

2) When transistors are used in digital circuits they usually operate in the: **1 point**

- Active Region
- Breakdown Region
- Saturation and Cutoff Region
- Linear Region

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

Saturation and Cutoff Region

3) You are given two n-p-n BJTs: one made of GaAs (sample X), and the other made of GaN (sample Y). Consider room temperature situation. Both devices are separately operated under forward-active mode. Let the gain of the samples be  $\beta_X$  and  $\beta_Y$  respectively. **0.5 points**

Consider the following statements, and give your answer as either True or False.

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Opto-electronic devices: Light Emitting Diodes (LED)

Applications of transistors and basics of microelectronic fabrication

 False True**No, the answer is incorrect.****Score: 0****Accepted Answers:***False*

4) Consider details given in Q 3 and answer the question given below:

**0.5 points**b)  $\beta_Y$  does not change when the quasi-neutral base region of sample Y is illuminated with light of wavelength  $\lambda = 520$  nm with sufficient optical power. True False**No, the answer is incorrect.****Score: 0****Accepted Answers:***True*

5) Consider details given in Q 3 and answer the question given below:

**0.5 points**c)  $\beta_X$  increases when the quasi-neutral emitter region of sample X is illuminated with light of wavelength  $\lambda = 520$  nm with sufficient optical power. False True**No, the answer is incorrect.****Score: 0****Accepted Answers:***False*

6) Consider details given in Q 3 and answer the question given below:

**0.5 points**d)  $\beta_Y$  increases when the quasi-neutral base region of sample Y is illuminated with light of wavelength  $\lambda = 300$  nm with sufficient optical power. False True**No, the answer is incorrect.****Score: 0****Accepted Answers:***False*7) For an ideal p-n-p transistor, the current components are given by  $I_{E_p} = 4$  mA,  $I_{E_n} = 0.05$  mA,  $I_{C_p} = 3$  mA. Determine (a) the emitter efficiency  $\gamma$ , (b) the base transport factor  $\alpha_T$ ?**2 points** 0.15 & 0.17 0.21 & 0.15 0.98 & 0.75 1 & 0**No, the answer is incorrect.****Score: 0****Accepted Answers:***0.98 & 0.75*

8) For an ideal BJT in forward active region of operation in Common-emitter configuration, the **1 point** collector current is dependent on which of these electrical quantities.

- Collector Voltage
- Base Current
- Collector-Base Voltage
- Both a & b

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Base Current*

9) Among the following two BJT's A and B, which gives better current transfer ratio and which **1 point** gives higher gain?

BJT A: Emitter injection efficiency is 0.99 and base transport factor is 0.96

BJT B: Emitter injection efficiency is 1 and base transport factor is 0.98

- BJT A gives better current transfer ratio but BJT B gives better gain
- BJT B gives better current transfer ratio but BJT A gives better gain
- BJT B gives better current transfer ratio and gain
- BJT A gives better current transfer ratio and gain

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*BJT B gives better current transfer ratio and gain*

10) Consider the base-collector junction of a BJT operating in forward-active mode. Assuming **1 point** base doping does not affect the E-B junction operation and neglecting other effects of base doping, increasing the base doping \_\_\_\_\_ the gain.

- Increases
- Decreases
- Remains the same
- First increases as doping is increased, reaches a maximum and then decreases

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Decreases*

11) Consider two BJT's A and B with identical designs, but with A having higher emitter doping **1 point** than B. Neglecting the effects of bandgap narrowing, temperature etc., gain of A is \_\_\_\_\_ gain of B.

- greater than
- lesser than
- equal to
- None of the above

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*greater than*

