

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH
BRANCH: ECE

SEMESTER : III
SESSION : MO/19

SUBJECT: EC201 ELECTRONIC DEVICES

TIME: 3 HOURS

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Describe Hall effect. Explain the applications of the Hall effect. [5]
- Q.1(b) A sample of Si is doped with 10^{16} phosphorus atoms/cm³. Estimate the Hall voltage in a sample with $W = 500 \mu\text{m}$, $A = 2.5 \times 10^{-3} \text{ cm}^2$, $I = 1 \text{ mA}$, and $B_z = 10^{-4} \text{ Wb/cm}^2$. [5]
- Q.2(a) Sketch I-V characteristics of an illuminated solar cell. Show the maximum power rectangle by shading in the diagram. [5]
- Q.2(b) Sketch the Hynes-Shockley experiment setup with a sample geometry and show the position of hole pulse and shape of the pulse for several times during its drift down the bar. [5]
- Q.3(a) Explain the principle of operation of varactor diode. Write applications varactor diode. [5]
- Q.3(b) Diagram structure of a PIN diode. Explain its working principle. Point out its applications. [5]
- Q.4(a) Appraise the Kirk effect and explain it with suitable diagram. [5]
- Q.4(b) Summarize hole and electron transport in a p-n-p transistor with proper biasing. [5]
- Q.5(a) Schematize output characteristics of long-channel enhancement mode NMOSFET and PMOSFET for at least three different values of V_G . [5]
- Q.5(b) Construct equivalent circuit of a MOSFET, showing the passive capacitive and resistive components. [5]

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