DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA

First Test, 21 Sep'2021
Max. Marks: 15

ECPC-30 (Electronic Devices & Circuits)
Time: 50 minutes

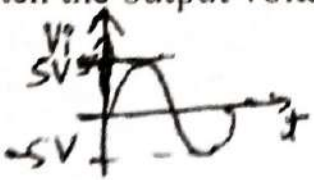
$1.5 \times 10^{10}\ cm^{-3}$

Q1. A Si abrupt pn junction has $N_d = 10^{15} cm^{-3}$ on the n side and $N_a = 4 \times 10^{18} cm^{-3}$ on the p side. At 300 K calculate (i) the built-in voltage (ii) the zero bias depletion region width (iii) the maximum electric field in the depletion region at zero bias. **4**

Q2. Explain the phenomenon of zener breakdown and avalanche multiplication. The transition capacitance of an abrupt pn junction is $20\,pf$ at 5V. Find the value of decrease in the capacitance for 1V increased in the bias. **3**

Q3. A crystal diode having internal resistance $R_f = 20\Omega$ is used for half-wave rectification. If the applied voltage $v = 50\,sin\,\omega t$ and load resistance $R_L = 800\Omega$, find (i) I_m, I_{dc}, I_{rms} (ii) a.c. power input and d.c. power output. **4**

Q4. Sketch the output voltage waveform for the circuit shown in figure1. **4**



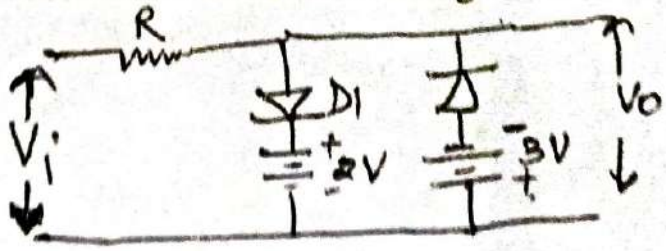


figure1