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

ECPC-30 (Electronic Devices & Circuits)

Second Test, 19 Nov'2022 **Time: 50 minutes**

Max. Marks: 15

Q1. What is an early effect and discuss in brief the advantages of the early effect. 3

Q2. Derive an expression of Pinch-OFF voltage. An n-channel JEFT has $I_{DSS} = 2mA$ and $V_P = -4V$. Find the transconductance g_m $in\ mA/V$ for an applied gate-to-source voltage $V_{GS} = -2V$. 4

Q3. The low frequency parameter for a given BJT at room temperature is $h_{ie} = 500\Omega$, $h_{fe} = 100$, $h_{re} = 10^{-4}$, $h_{oe} = 10^{-5}S$ and the Q point (10V; 10mA), $f_T = 50MHz$, $C_{b'c} = 3pF$. Find the value of all hybrid-π parameters. 4

Q4. A Si npn transistor as shown in Fig.1 with $\beta = 100$, $I_{CBO} = 25nA$ is in CE configuration. Indicate the region of operation of transistor and find different currents 4

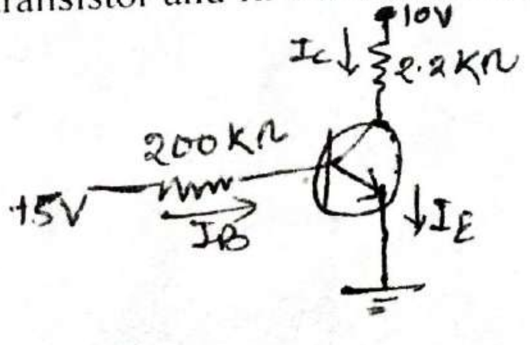

Fig1