Mahindra University

Mahindra University École Centrale School of Engineering
Hyderabad

Program: B.Tech. Branch: AI/CSE/CM/CE/ME/MT/NT/CB/BT Year: I Semester: I

End term Examination (Fractal)

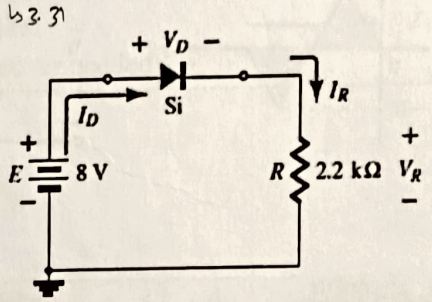
Subject: EE1105 (Electronics)

Date: ***28.12.2022*** Time: ***09.00 AM to 11.00 AM***

Time Duration: ***2:00 Hours*** Max. Marks: **60**

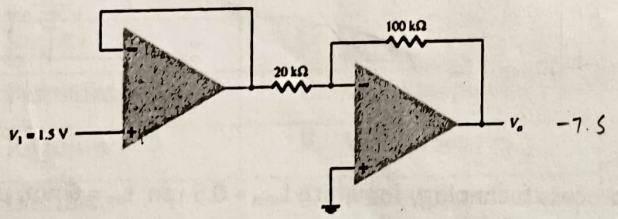
Note: There are 5 questions, all of which are compulsory.

Q1 In the circuit below, find V_R, I_D. Given, $V_D = 0.7V$. 10



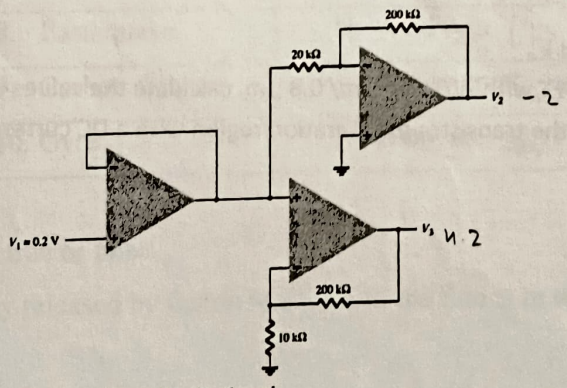
Q2 Calculate the output voltage for the circuits below.

(a)



5

(b)



5

Q3 Express the following numbers in decimal: 10 (2 x 5)

(a) $(10110.0101)_2$

(b) $(16.5)_{16}$

(c) $(26.24)_8$

(d) $(DADA.B)_{16}$

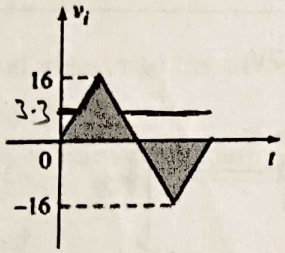
(e) $(1010.1101)_2$

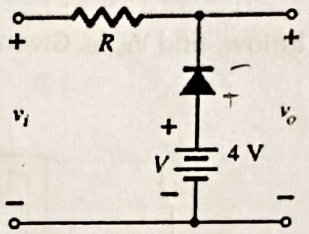
Q 4 Simplify the Boolean expression using a 4-variable k-map. 10

$$F(A,B,C,D) = \sum(0,1,2,5,8,9,10)$$

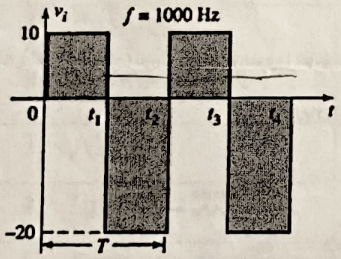
Q 5 Draw the output waveform for the following diode circuits (Si diodes with $V_k = 0.7V$)

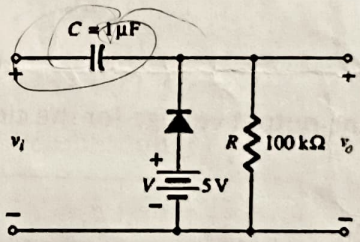
(a) 5





(b) 5





Q 6 Consider a process technology for which $L_{min} = 0.5\ \mu m$, $t_{ox} = 6$ nm, $\mu_n = 350\ cm_2/V \cdot s$, and $V_t = 0.7$ V. 10 (3+7)

(a) Find C_{ox} and k'_n

(b) For a MOSFET with W/L = 8 μm/ 0.8 μm, calculate the values of V_{ov}, V_{GS}, V_{DSmin}, needed to operate the transistor in saturation region with a DC current - $I_D = 100\ \mu A$.